CITY OF BLACK DIAMOND

May 1, 2025 Special Meeting Agenda

Council Chambers, 25510 Lawson St.
Black Diamond, WA 98010

THIS IS OFFERED AS A HYBRID MEETING AND MAY BE ATTENDED IN PERSON AT THE ABOVE NOTED ADDRESS OR BY JOINING VIRTUAL/TELEPHONICALLY. CALL IN AND JOINING INFORMATION FOLLOWS:

Zoom link to join meeting: https://zoom.us/j/4454477047?pwd=eGxRY3ZEeU14SVM2cGRBcUxCSjdmZz09
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Meeting ID: 445 447 7047 Password: Council

Telephone dial in options: +1 253 215 8782 US (Tacoma) +1 206 337 9723 US (Seattle) Meeting ID: 445 447 7047

6:00 P.M. CALL TO ORDER, FLAG SALUTE, ROLL CALL

WORK SESSION:

1) Review and Discussion on Water System Plan

ADJOURNMENT:

City of Black Diamond

WATER SYSTEM

SUMMER 2024

Mayor
Carol Benson

City Council
Tamie Deady
Sara Nielsen
Darcey Peterson
Leih Mulvihill
Jesse Young
Nathan Jones
Debbie Page

Public Works Director
Scott Hanis

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PREPARED BY RH2 ENGINEERING

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CERTIFICATE OF ENGINEER

"I hereby certify that this Water System Plan for the City of Black Diamond was prepared under the supervision and direction of the undersigned, whose seals as licensed professional engineers of the State of Washington are affixed below."

_____

Geoffrey G. Dillard, P.E.

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EXECUTIVE SUMMARY

Green River Pipe Bridge

The City of Black Diamond's (City) 2024 Water System Plan (WSP) provides a long-term planning document for the City's water system. It evaluates the system over a 20-year planning horizon and develops a list of recommended project improvements. This WSP has been prepared in accordance with Washington State Department of Health (DOH) requirements as outlined in Washington Administrative Code (WAC) Chapter 246-290.

The City's water system is currently served by the Black Diamond Spring Field, located approximately 2 miles southeast of the City. Water from the Black Diamond Spring Field is pumped to a 4.3 million gallon (MG) Reservoir by a pump station located on the north side of the Green River. An additional source of water for the City is two wholesale interties with the City of Tacoma from Tacoma Water's Second Supply Pipe Line (SSPL). It is anticipated that wholesale water will be the City's major source in the long-term future.

The City has two reservoirs that serve the City's water service area (WSA). The City's distribution system currently operates with three pressure zones – the upper pressure zone at a pressure head of approximately 965 feet, the middle pressure zone at a pressure head of approximately 850 feet, and the lower pressure zone at a pressure head of approximately 750 feet. Portions of the system operate with high pressures, so there are individual pressure reducing valves (PRVs) on a number of service connections throughout the WSA. The transmission and distribution system for the City consists of approximately 181,163 linear feet of pipe ranging from less than 2 inches to 20 inches in diameter.

The City currently serves approximately 1,937 connections, over 90 percent of which are single-family residences. Although growth in the WSA has been very slow, several large master planned communities are in the process of building out. Therefore, the City is preparing to serve substantial growth. The City's water system is expected to expand from serving 2,562 Equivalent Residential Units (ERUs) in 2022 to serving over 8,800 ERUs in 2044.

A complete hydraulic analysis of the system has been conducted and numerous projects are recommended to improve the system. Projects selected for the WSP are:

1. Growth-related projects associated with extensions to the existing system to serve proposed new master planned developments;
2. System improvements to address existing system deficiencies, such as inabilities to meet minimum fire flow requirements;
3. Projects to replace small waterlines that are 4 inches and smaller; and
4. Projects to replace waterlines constructed of asbestos cement (AC) or other substandard materials.

A funding program has been developed using three funding sources:

1. Projects to be funded outright by development as extensions to the system or a frontage fee;
2. Projects to be funded by connection charges to the existing system to address growth-related deficiencies; and
3. projects to be funded by customer rates to address existing system deficiencies.

In the past 20 years, the City has made tremendous improvements to the water system, including a new storage reservoir, new treatment systems, new chlorine disinfection systems, two interties with the City of Tacoma providing greater reliability, replacement of half the old AC water mains, upgrades to the telemetry and controls system, purchasing new equipment, meeting new DOH requirements, improving fire flow, and meeting the demands of new growth.

The City has established a development agreement known as the Water Supply and Facilities Funding Agreement, or WSFFA, with the two major landowners in the City (now represented by Oak Pointe and Palmer Coking Coal) to fund the major needed water improvements and to secure the needed water supply for the future growth in the City. This agreement sheltered the current citizens from the impacts of growth but also provided for the water needs of the growing City. Many of the proposed projects discussed in this plan are entirely funded by the WSFFA, while others are funded by rate payers.

It is anticipated that revenue from commodity sales will increase significantly with growth from the new developments, and that revenue will continue to increase with growth and outpace operation and maintenance expenses. In 2024, the City retired a major debt obligation that put the water utility in the position to more easily fund additional maintenance projects that have been put on hold, like the painting of the 965 Pressure Zone Reservoir. If the trends described above continue, then no significant rate increases are projected over the next 6 years.

The City is committed to providing its customers with a safe and reliable source of drinking water. The City is updating this plan to meet 10-year approval requirements. The City is anticipating substantial growth in population over the 20-year planning period and this plan provides a means for ensuring that the City water system can accommodate current and future customers.

1 | INTRODUCTION

Old Green River Bridge

LOCATION

The City of Black Diamond (City) is located approximately 30 miles southeast of Seattle, Washington. The City was established in 1880 and developed as a coal mining town over the next 50 years. The City was incorporated in 1959. The City is located along Highway 169 (also known as Maple Valley-Black Diamond Road), just west of the Cascade Mountains. Figure 1.1, Vicinity Map (Washington State) illustrates the location of the City in the State of Washington. Figure 1.2, Vicinity Map (King County) illustrates the location of the City within King County.

WATER SYSTEM OWNERSHIP

The City owns and operates a public water system. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in Table 1.1, Water System Ownership Information.

Table 1.1
Water System Ownership Information

Information Type	Description
System Type	Community – Group A
System Name	Black Diamond Water Department
County	King
DOH System ID Number	07220 7
Owner Number	513
Address	PO Box 599 Black Diamond, WA 98010
Contact	Jesse Stavano
Contact Phone Number	(360) 851-4522

OVERVIEW OF EXISTING SYSTEM

A summary of water system data for the City's system and the number of customers served in 2022 is shown in Table 1.2, Water System Summary.

Table 1.2
Water System Summary

Description	Data (2022)
Total City Population [1]	4,525 people
Population Served by City	3,025 people
Population Served by Covington Water District	1,500 people
Total Connections	1,937 accounts
Total Customers	2,562 ERU
Demand per Customer	178 gpd/ERU

[1] Population estimate are consistent with the Office of Financial Management.

A summary of the important characteristics of the City's existing water system facilities in 2022 is shown in Table 1.3, Water System Description.

Table 1.3
Water System Description

Description	Facilities
Number of Pressure Zones	3
Black Diamond Spring Field Annual Withdrawal	551 acre ft/year
Wholesale Intertie Production Capacity	807.4 MG/year
Number of Pressure Reducing Valves	4
Total Length of Water Main	181,163 linear feet

The location of the City is shown in Figure 1.1, Vicinity Map (Washington State) and Figure 1.2, Vicinity Map (King County).

Figure 1.1
Vicinity Map (Washington State)

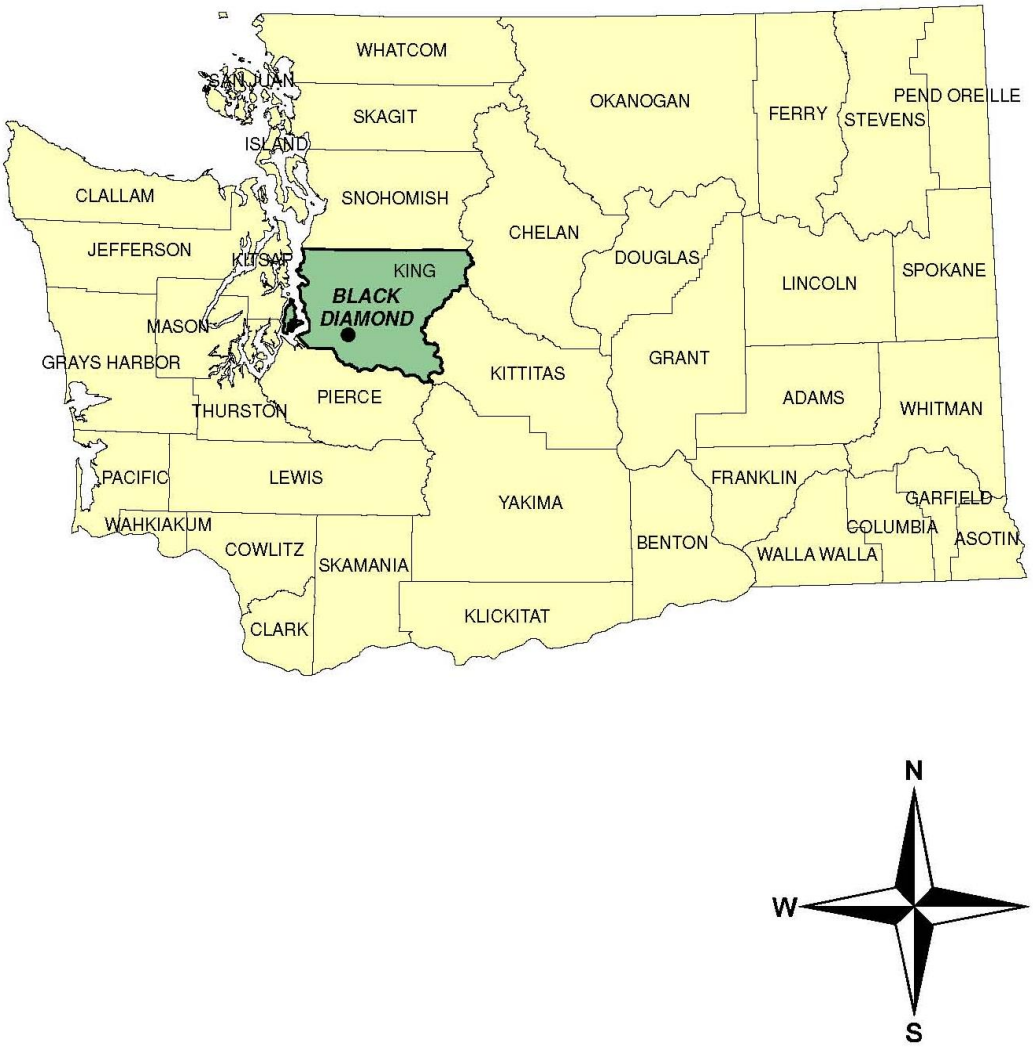
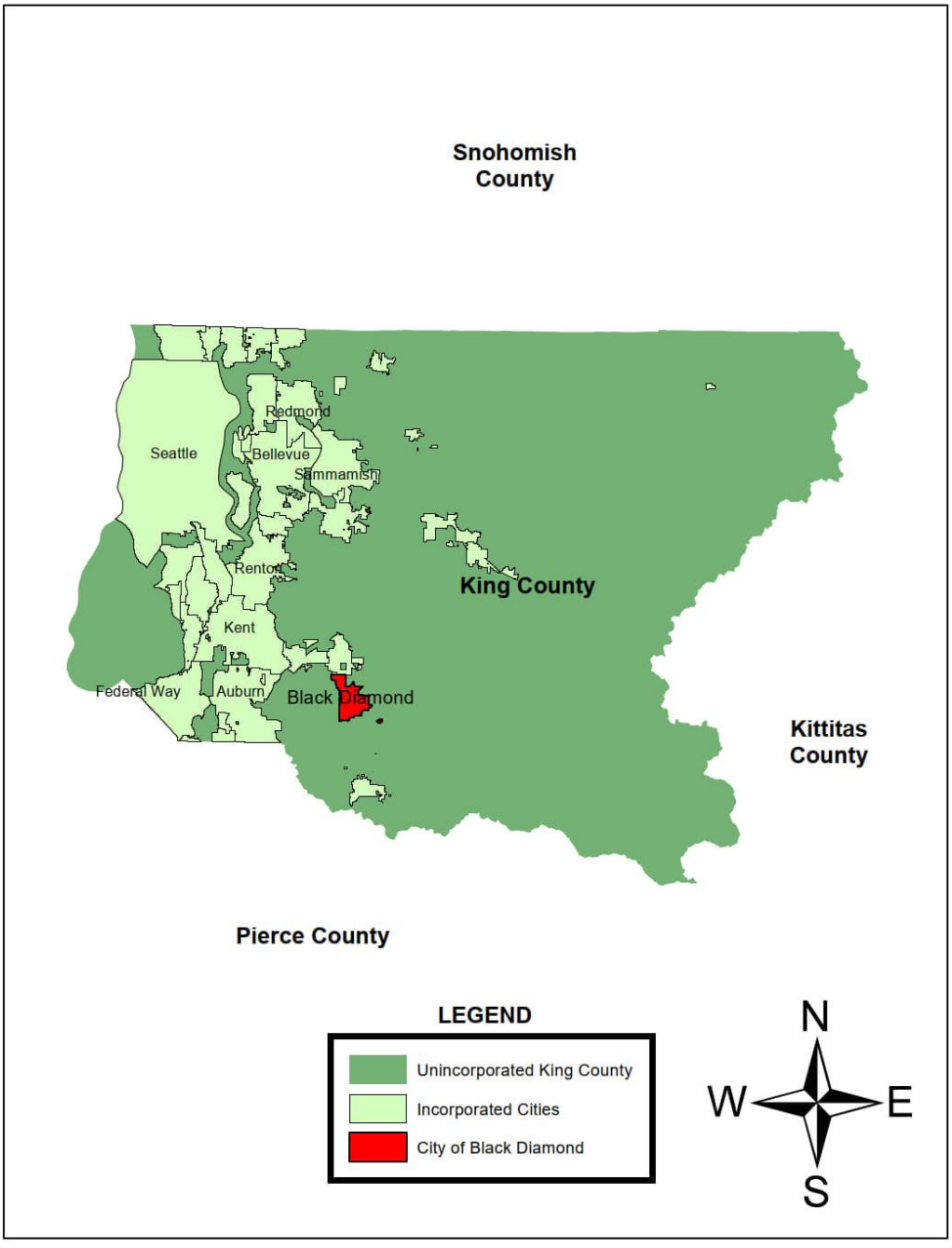


Figure 1.2
Vicinity Map (King County)



AUTHORIZATION AND PURPOSE

In April 2023, the City authorized RH2 Engineering, Inc., to prepare a Water System Plan (WSP) update as required by state law under Washington Administrative Code (WAC) 246-290-100. It is the City's intent to update its WSP and submit it to DOH every 10 years as required. The previous plan was approved and adopted in 2008, with an extension granted until 2020. The purpose of this updated WSP is as follows.

- To evaluate the existing water demand data and project future water demands.
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria.
- To identify water system improvements to resolve existing system deficiencies and accommodate future needs of the system for at least 20 years into the future.
- To prepare a schedule of improvements that meets the goals of the City's financial program.
- To evaluate past water quality and identify water quality improvements, as necessary.
- To document the City's operations and maintenance program.
- To prepare conservation, emergency response, cross-connection control, wellhead and watershed protection, and water quality monitoring plans.
- To comply with all other 2020 WSP requirements of DOH.

ORGANIZATION OF PLAN

A brief summary of the content of the chapters in the WSP is as follows.

- The Executive Summary provides a brief summary of the key elements of this WSP.
- Chapter 1 introduces the reader to the City's water system, the objectives of the WSP, and the WSP organization.
- Chapter 2 presents the water service area, describes the existing water system, and identifies the adjacent water purveyors.
- Chapter 3 presents related plans, land use, and population characteristics.
- Chapter 4 identifies existing water demands and projected future demands.
- Chapter 5 presents the City's operational policies and design criteria.
- Chapter 6 discusses the City's water sources and water quality.
- Chapter 7 discusses the water system analyses and existing system deficiencies.
- Chapter 8 discusses the City's operations and maintenance program.
- Chapter 9 presents the proposed water system improvements, their estimated costs, and implementation schedule.

- Chapter 10 summarizes the financial status of the water utility.
- The Appendices contain additional information and plans that supplement the main chapters of the WSP.

ACRONYMS AND ABBREVIATIONS

AC	asbestos cement
ADD	Average Day Demand
afy	acre feet per year
AWWA	American Water Works Association
BDUGAA	Black Diamond Urban Growth Area Agreement
BPS	Booster Pump Station
CIP	Capital Improvement Program
City	City of Black Diamond
cfs	cubic feet per second
County	King County
CT	Contact Time
CWSSA	Critical Water Supply Service Area
CWD	Covington Water District
DOH	Washington State Department of Health
DI	ductile iron
DSL	Distribution System Leakage
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpd	gallons per day
gph	gallons per hour
gpm	gallons per minute
HGL	Hydraulic Grade Line
hp	Horsepower
MCL	Maximum Contaminant Level

MDD	Maximum Day Demand
MG	million gallons
mg/L	milligrams per liter
MGD	Million Gallons per Day
MPD	master planned development
PHD	Peak Hour Demand
PRV	Pressure Reducing Valve
psi	pounds per square inch
RCW	Revised Code of Washington
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SKCCWSP	South King County Coordinated Water System Plan
SKCWUCC	South King County Water Utilities Coordinating Committee
SSPL	Second Supply Pipe Line (City of Tacoma)
Tacoma	City of Tacoma
TDH	Total Dynamic Head
UGA	Urban Growth Area
WAC	Washington Administrative Code
WSFFA	Water Supply and Facilities Funding Agreement
WSA	Water Service Area
WSP	Water System Plan

DEFINITION OF TERMS

Annual Demand: The total water system demand for one calendar year.

Average Day Demand (ADD): The total amount of water delivered to the system in a year divided by the number of days in the year. ADD is typically expressed as gallons per day per equivalent residential unit (gpd/ERU).

Consumption: The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

Contaminant: A substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

Critical Water Supply Service Area (CWSSA): A geographical area that is characterized by a proliferation of small, inadequate water systems, or by water supply problems that threaten

the present or future water quality or reliability of service in a manner that efficient and orderly development may best be achieved through coordinated planning by the water utilities in the area.

Cross-Connection: Any physical connection, actual or potential, between a water system and any source of non-potable substance that presents the potential for contaminating the public water system.

Dead Storage: The volume of stored water not available to all consumers at the minimum design pressure.

Demand: The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial, and public uses, and to provide enough water to supply firefighting, system losses, and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period.

Demand Forecast: An estimate of future water system water supply needs assuming historically normal weather conditions and calculated using numerous parameters, including population, historic water use, local land use plans, water rates and their impacts on consumption, employment, projected water use efficiency savings from implementation of a water use efficiency program, and other appropriate factors.

Disinfection: The use of chlorine or other agent or process for killing or inactivating microbiological organisms, including pathogenic and indicator organisms.

Distribution System Leakage (DSL): The amount of water supply lost to leakage.

Equalizing Storage: The volume of storage needed to supplement supply to consumers when the peak hourly demand exceeds the total source pumping capacity.

Equivalent Residential Units (ERUs): One ERU represents the amount of water used by one single-family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

Fire Flow: The rate of flow of water required during firefighting, which is usually expressed in terms of gpm.

Fire Suppression Storage: The volume of stored water available during fire suppression activities to satisfy minimum pressure requirements.

Head: A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

Head Loss: Reduction in pressure resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

Hydraulic Analysis: The study of a water system's distribution main and storage network to determine present or future adequacy for provision of service to consumers within the

established design parameters for the system under peak flow conditions, including fire flow. The analysis is used to establish any need for improvements to existing systems or to substantiate adequacy of design for distribution system components such as piping, elevated storage, booster stations, or similar facilities used to pump and convey water to consumers.

Hydraulic Elevation: The height of a free water surface above a defined datum; the height above the ground to which water in a pressurized pipeline would rise in a vertical open-end pipe.

Maximum Contaminant Level (MCL): The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

Maximum Day Demand (MDD): The maximum amount of water delivered to the system during a 24-hour time period of a given year.

Operational Storage: The volume of distribution storage associated with source or booster pump normal cycling times under normal operating conditions. Operational storage is additive to the equalizing and standby storage components, and to fire flow storage if this storage component exists for any given tank.

Peak Hour Demand (PHD): The maximum amount of water delivered to the system, excluding fire flow, during a one-hour time period of a given year. A system's peak hour demand usually occurs during the same day as the maximum day demand.

Potable: Water suitable for human consumption.

Pressure Zone: A portion of the water system that operates from sources at a common hydraulic elevation. For example, 748 Zone refers to a pressure zone that has water tanks with an overflow elevation of 748 feet.

Purveyor: An agency, subdivision of the State, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

Reclaimed Water: Effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur; it is no longer considered wastewater.

Standby Storage: The volume of stored water available for use during a loss of source capacity, power, or similar short-term emergency.

Supply: Water that is delivered to a water system by one or more supply facilities that may consist of supply stations, booster pump stations, springs, and wells.

Storage: Water that is "stored" in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage.

Water Right: A permit, claim, or other authorization, on record with or accepted by the Washington State Department of Ecology, authorizing the beneficial use of water in accordance with all applicable State laws.

2 | WATER SYSTEM DESCRIPTION

North Bank Pump Station

WATER SYSTEM MANAGEMENT

The City of Black Diamond's (City) water system is operated and maintained by the City, a municipal corporation that is governed by a Mayor-Council form of government. The water system is operated and maintained by the City's Public Works Department. The Washington State Department of Health (DOH) water system identification number is 072207. A copy of the Water Facilities Inventory (WFI) Form is included in Appendix A – Water Facilities Inventory (WFI) Form.

DOH has oversight on the review and approval of the City's system and Water System Plan (WSP). Correspondence with DOH and copy of the WSP Checklist are included in Appendix B – DOH Checklists and Correspondence.

SYSTEM BACKGROUND

HISTORY OF WATER SYSTEM DEVELOPMENT AND GROWTH

The City's original water supply system was built prior to 1915 by the Pacific Coast Coal Company. The Pacific Coast Coal Company owned and operated the system until 1943. From 1943 to 1968, the system was owned and operated by King County Water District No. 66. In 1968, ownership was transferred to the City.

The City was established in the late 1800s as a coal mining town. The City has maintained a rural atmosphere and has a 2022 estimated population of 6,994. The City encompasses just over 4,250 acres, or 6.6 square miles, which includes the Lake Sawyer area that was annexed in 1998. The Lake Sawyer area is currently served by the Covington Water District (CWD) and is not included in the City's existing Water Service Area (WSA). Therefore, the City's water system only provides service to approximately 67 percent of the City's total population, with CWD serving approximately 1,500 people.

Growth and System Planning Efforts

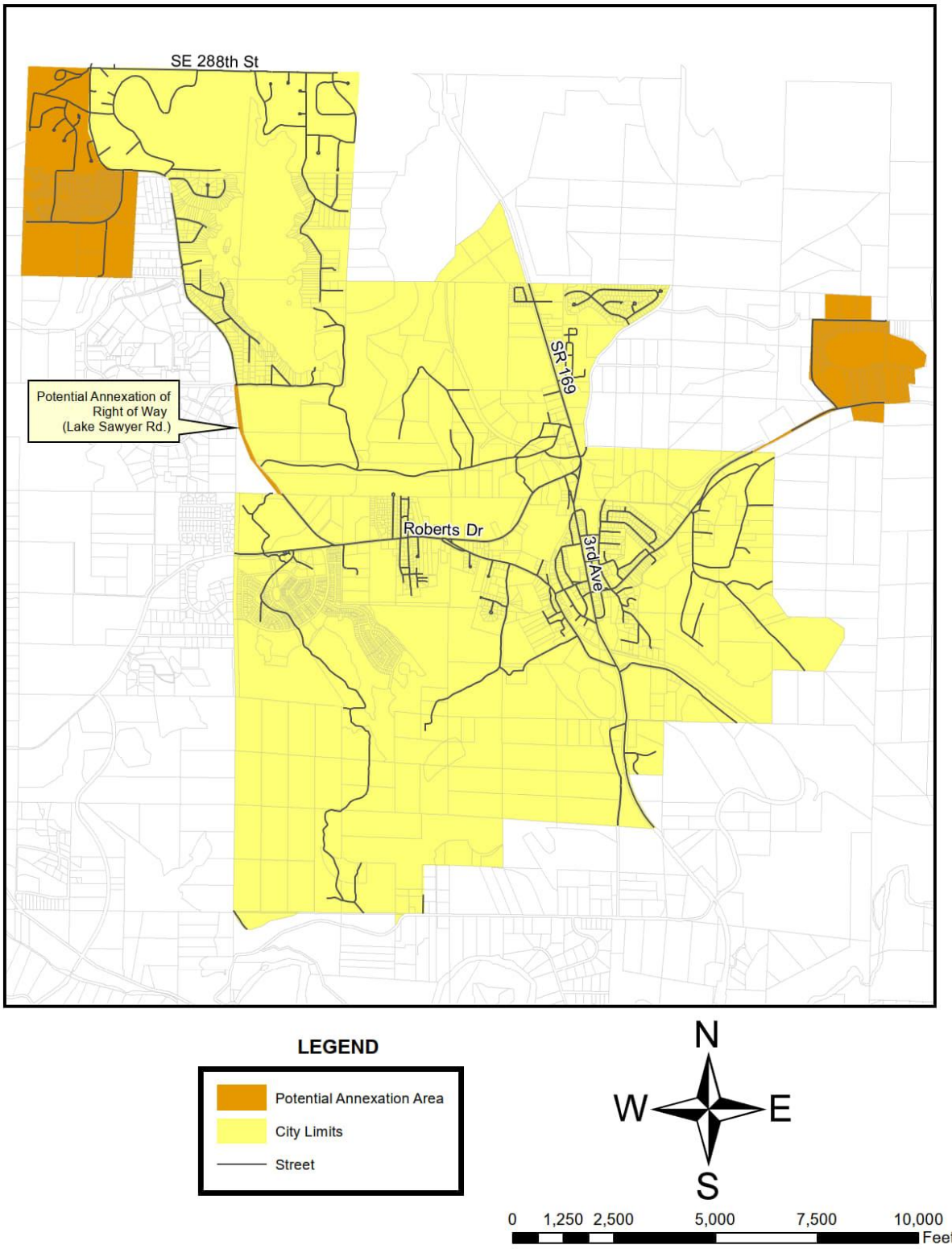
In 1996, the City entered into the Black Diamond Urban Growth Area Agreement (BDUGAA), which established much larger future City boundaries and put the City in charge of planning for the utilities to serve the area. Previously, the City did not have the water system source capacity to serve the larger new service area, was deficient in storage, delivery, and redundancy, and had health risk issues that needed to be addressed. Plum Creek Timber Company, Palmer Coking Coal Company, and Black Diamond Associates were the three major landowners of the vacant undeveloped land in the City. The City did not have the funding to meet the needs of future growth or the water system improvements needed to meet DOH requirements, and the large land owners could not develop their land without the water system capacity. The City and the landowners entered into the Water Supply and Facilities Funding Agreement (WSFFA). The WSFFA identified the water system improvement projects to be funded by the landowners and the water to be purchased from the City of Tacoma to serve the vacant land in exchange for credit on capital facility charges. The landowners have purchased the water needed, constructed an intertie, replumbed the City's water system into 3 pressure zones, replaced one third of the spring supply line with a larger main, installed transmission mains to serve the west portion of the City, and upgraded the disinfection system. The obligations under this agreement are to complete the new supply line from the pump station to the City, upgrade the pump station to deliver the full water right from the springs, upgrade the spring collection system to meet DOH requirements, replace and upsize the pipes from the springs to the pump station, and conduct a final rate study to determine capital facility charge credit.

All the urban area identified in the BDUGAA (Appendix C – Black Diamond Urban Growth Area Agreement) has been annexed, except for the area around Lake 12 east of the City, as identified in Figure 2.1, Potential Annexation Areas.

There were two major annexations in 2009; the south annexation area by Ordinance No. 09-032; and the east annexation area by Ordinance No. 09-031.

The other area that could potentially still be annexed and served by the City's water utility is the area around Lake 12, east of the City. This area is somewhat remote and detached from the City, and to date, there has not been much interest in annexing this area, and no requests for annexation have been submitted. Consequently, the City has not developed plans to serve the area.

Figure 2.1
Potential Annexation Areas



The City is currently working with two large-scale developments within the City limits. One is Lawson Hills at Black Diamond. Lawson Hills at Black Diamond is a master planned community that is expected to include approximately 1,200 new residences, as well as retail development. It is located on 325 acres, east of Highway 169 and south of Lawson Street.

The second is Ten Trails, previously known as The Villages at Black Diamond. This master planned community is approved for 4,800 new residences, as well as retail space, office space, and other amenities. It is located primarily on 950 acres west of Highway 169 and south of Black Diamond-Auburn Road.

With the prospect of the City's population more than quadrupling in the near future, the City is facing unique challenges in ensuring that its water system will be prepared to accommodate such intense growth. Although the developers are responsible for implementing and funding the improvements necessary to serve them, the City will need to be prepared to meet the operational and maintenance demands as the water system grows. In the last two years the City has added two full-time employees to the Public Works Department.

ADJACENT PURVEYORS

The largest water system adjacent to the City's WSA is CWD. Figure 2.2, Adjacent Water Systems shows the location of water purveyors adjacent to the City's WSA. Adjacent purveyors have been afforded the opportunity to comment on this WSP. Comments received from adjacent purveyors have been included in Appendix D – Agency Review Comments.

Covington Water District

CWD is the purveyor for the areas to the north and west of the City. It has a service area of approximately 53 square miles and provides water to the Cities of Covington, Maple Valley, and portions of Black Diamond, as well as unincorporated areas of King County (County). CWD is the City's largest adjacent purveyor. As previously mentioned, CWD is the current purveyor for the Lake Sawyer Area within the City limits. CWD and the City were in dispute over 94 acres in West Black Diamond, caused by conflicts between the *South King County Coordinated Water System Plan* map and other planning documents, including the BDUGAA, the City's approved WSP, and annexation ordinances. The service area dispute was resolved by an agreement between CWD and the Land Owner/Developer of the dispute area. CWD has relinquished claims to the dispute area.

Additional Systems

Additionally, there are several private wells and small public water systems served by wells located within the City as shown in Table 2.1, Additional Water Systems. The City desires to discontinue the use of such systems. The City's *Comprehensive Plan* outlined the City's policy to require any new developments to hook up to the municipal water system and will consider consolidation of private systems on a case by case basis. Additionally, the Comprehensive Plan outlines the City's policy to prohibit new private water systems within the City. See Chapter 5 for additional policies regarding private water systems.

Figure 2.2
Adjacent Water Systems

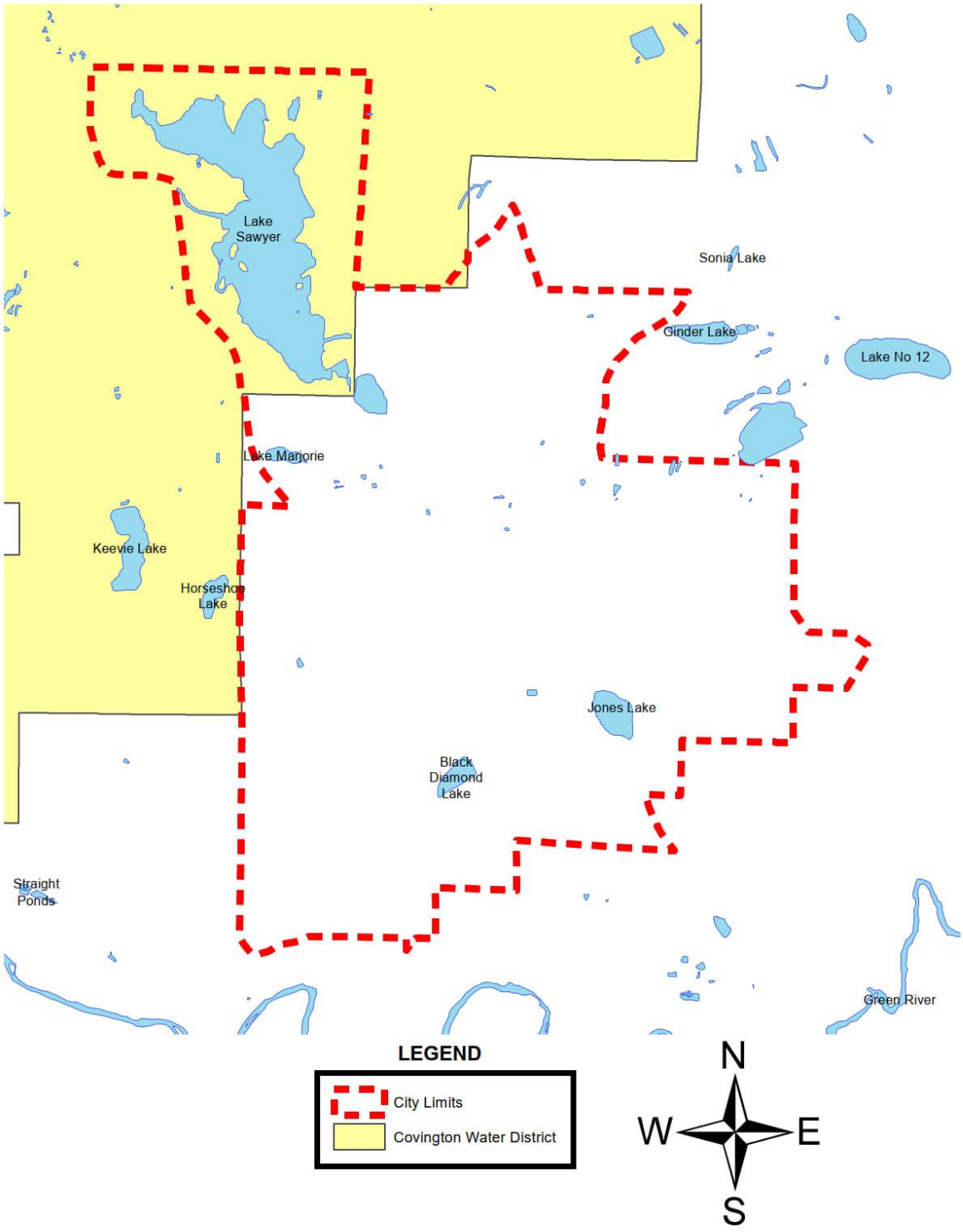


Table 2.1
Additional Water Systems

Water System Name	Water System ID	System Type	Number of Connections	Within City Limits	Type of Source
COVINGTON WATER DISTRICT	416508	A	19,680	Yes	Multiple
KENT WATER DEPARTMENT	381501	A	34,530	No	Well Field
SAWYERWOOD ESTATES WATER	76460N	A	22	No	Well
SAWYERWOOD WATER SYSTEM	76462P	A	11	No	Well
BEADLE-FRESHWATER	52331Y	B	3	No	Well
BLUM, E.	14321	B	4	No	Groundwater
BOONDOCKS TAVERN	07710L	B	2	No	Well
CALLERO, A.	10553H	B	4	No	Well
CAR	05259H	B	2	No	Well
COKE-LONEY	62136A	B	2	No	Well
DIAMOND ACRES	42240J	B	4	No	Well
DIAMOND RIDGE	23897	B	5	No	Well
GOLDSBERRY, P.	264442	B	2	Yes	Well
HENRY COMMUNITY WATER SYSTEM	06182L	B	2	No	Well
HOFMANN	26601Q	B	2	Yes	Well
JOHNSON, J.	44176D	B	2	Yes	Well
KNIGHT, T.	16453R	B	4	No	Well
MCLEAN	572906	B	2	No	Well
MORENO SUPPLY	561607	B	3	No	Well
MORRIS BROS.	56185A	B	5	Yes	Well
OOSTERINK WATER SYSTEM	284992	B	2	No	Well
PACIFIC COAST COAL COMPANY	05453N	B	1	No	Well
SAWYER GLEN	764550	B	8	No	Well
SHOPP G	42651U	B	3	No	Well
SMITH, CLAUDE	806001	B	3	No	Well
STUTH CO.	399525	B	3	No	Well
TOLLBER, R. M.	284277	B	6	No	Well
W & S #1	02451	B	5	No	Groundwater
WALTENBURG	07683U	B	2	No	Well
WILLIAMS, C.	01057Y	B	4	Yes	Well

INVENTORY OF EXISTING FACILITIES

This section provides a detailed description of the existing water system and the current operation of the facilities. The analysis of the existing water system is presented in Chapter 7 – Water System Analysis.

SYSTEM OVERVIEW

The City's water system is primarily served by the Black Diamond Spring Field, located approximately 2 miles southeast of the City above the south bank of the Green River. Water from the Black Diamond Spring Field is pumped to the 4.3 MG Reservoir by a pump station located on the north side of the Green River. An additional source of water for the City is a wholesale intertie with the City of Tacoma Second Supply Pipe Line (SSPL).

The City has two reservoirs that serve its water system. The City's distribution system currently operates with three pressure zones: the upper pressure zone at a pressure head of approximately 965 feet; the middle pressure zone at a pressure head of approximately 850 feet; and the lower pressure zone at a pressure head of approximately 750 feet. Portions of the City's system operate with high pressures, individual pressure reducing valves (PRVs) are required on all high pressure service connections throughout the WSA. Figure 2.3, Existing Water System illustrates the existing configuration of the City's water system.

SOURCES OF SUPPLY

Black Diamond Spring Field

Currently, the City's primary source of water is from a series of natural springs located approximately 2 miles southeast of the City on a large City-owned parcel. The springs water can be used for both domestic supply and power generation. Typical flow capacities for the different spring field collection areas are listed in Table 2.2, Spring Capacity.

Table 2.2
Spring Capacity

Spring Collection Area	Typical Capacity	
	(cfs)	(gpm)
Nos. 1 and 3	4.30	1,930
No. 2	1.90	853
No. 4 (Upper Area Only)	1.34	601
Total	7.54	3,384

Note: Only Springs Nos. 1 and 3 are connected to the City's system.

Black Diamond Springs Collection Box No. 1

Water Rights

The City currently holds two surface water certificates on file with the Washington State Department of Ecology (Ecology). The source of water for both certificates is the Black Diamond Springs.

Surface Water Certificate No. 3580 was issued on May 19, 1950, with a priority date of August 22, 1949. Since this water right is for power production purposes, it has not been included in the City's calculations for its potable municipal water supply water rights for planning purposes.

Surface Water Certificate No. S1-00506C was issued on March 29, 1974, with a priority date of April 15, 1968. This water right meets the definition as being for municipal water supply purposes, provided under Revised Code of Washington (RCW) 90.03.15. These water rights are summarized in Table 2.3, Water Rights.

Table 2.3
Water Rights

Certificate Number [1]	Priority Date	Source Type	Instantaneous Withdrawal (Qi)	Annual Withdrawal (Qa)
			(cfs)	(afy)
3580	August 22, 1949	Surface Water	2.93	0
S1-00506C	April 15, 1958	Surface Water	8.0	551

(1) As recorded by the Department of Ecology.

Interties

Water system interties are physical connections between two adjacent water systems. Interties are normally separated by a closed isolation valve or control valve. Emergency supply interties provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main and is unable to provide a sufficient quantity of water to its customers. Normal supply interties provide water from one system to another during non-emergency situations and are typically supplying water at all times.

City of Tacoma Intertie

The City negotiated a wholesale water agreement with the City of Tacoma (Tacoma) in 2003 wherein the two agencies agreed that Tacoma would supply wholesale water to the City. The supply quantities are outlined in Table 2.4, Tacoma Wholesale Intertie Water Supply.

Table 2.4
Tacoma Wholesale Intertie Water Supply

Agreement	Date of Agreement	Wholesale Supply Capacity (gpd)
Wholesale Water Agreement	August 1, 2003	1,712,000 for average day use 3,852,000 for maximum day use 3,659,400 for 4-day maximum use
Amendment No. 1	February 1, 2007	500,000 for average day use 1,125,000 for maximum day use 1,068,750 for 4-day maximum use
Amendment No. 2	September 3, 2020	Second Intertie (Lake Sawyer Road SE)

The intertie connection to Tacoma's SSPL was constructed in 2005 at the City's 4.3 MG Reservoir site. Amendment No. 1 to the agreement was approved in 2007 and included the purchase of additional water. Amendment No. 2 to the agreement was finalized in 2020 and is for a second intertie off Tacoma's SSPL at Lake Sawyer Road SE. Copies of the 2003 Wholesale Water Agreement, Amendment No. 1 and Amendment No. 2 have been included in Appendix E – Tacoma Wholesale Agreement.

PUMPING FACILITIES

The City currently operates and maintains two active pump stations. One is located on the northerly side of the Green River and the second is located at the 4.3 MG Reservoir site. Pump curves for the City's pumping facilities are located in Appendix F – Pump Curves.

North Bank Pump Station

The North Bank Pump Station was constructed in 1997 and replaced an older pump station that was located on the same property. The North Bank Pump Station has an installed pump capacity of approximately 600 gallons per minute (gpm). The two pumps were designed to operate at 600 gpm each. The City replaced the pump station as part of the North Bank Booster

Pump Station Project which was bid in September of 2020 and built in 2021. A 12-inch-high density polyethylene (HDPE) and a 12-inch-diameter ductile iron (DI) water main runs from the North Bank Booster Pump Station (BPS) to the 4.3 MG Reservoir.

North Bank BPS (Outside)

North Bank BPS (Inside)

4.3 MG Reservoir Pump Station

The pump station located at the 4.3 MG Reservoir site was constructed in 2006. This pump station operates two electric pumps with a standby generator system. The two pumps are operating at a capacity of 650 gpm each. An 8-inch-diameter water main runs from the 4.3 MG Reservoir Pump Station to the City's 0.5 MG Reservoir.

4.3 MG Reservoir Pump Station and Treatment Building

STORAGE

The City currently is served by two reservoirs. An overview of the City's reservoirs is provided in Table 2.5, City of Black Diamond Reservoirs.

Table 2.5
City of Black Diamond Reservoirs

Reservoir Name	Volume (MG)	Overflow Elevation (feet)	Material	Year Built
0.5 MG Reservoir	0.5	965	Steel	1986
4.3 MG Reservoir	4.3	850	Steel	2006

0.5 MG Reservoir

The 0.5 MG Reservoir is located on a City parcel that is approximately 1,200 feet easterly up a gravel road from the intersection of Botts Drive SE and SE Mountain View Drive. This reservoir was constructed in 1986 and has a capacity of 500,000 gallons. The 0.5 MG Reservoir is at an approximate elevation of 930 feet,[1] with an overflow elevation of approximately 965 feet.

[1] Prior reports, studies, and designs have shown the 0.5 MG Reservoir to be located at an approximate elevation of 915 feet with an overflow elevation of 950 feet. Physical topographic surveying completed for the City in 2004 resulted in the revised elevations.

0.5 MG Reservoir

4.3 MG Reservoir

The 4.3 MG Reservoir is located just north of the intersection of Lawson Street and SE Botts Drive on a City parcel. This reservoir was constructed in 2006 and has a capacity of 4.3 MG. The reservoir has an approximate elevation of 770 feet, with an overflow elevation of approximately 850 feet.

4.3 MG Reservoir

PRESSURE ZONES

The City's water system consists of three pressure zones. An existing system hydraulic profile is shown on Figure 2.4, Existing Hydraulic Profile. This figure shows the vertical relationship of the pressure zones and demonstrates how the water moves throughout the system. Additionally, Figure 2.5, Existing Pressure Zones shows the various pressure zones located within the City. These pressure zones have been defined through the use of PRVs and closed valves in the system. It should be noted that the 1175 Pressure Zone is a future pressure zone and is not part of the existing water system.

PRESSURE REDUCING VALVES

PRVs are installed between pressure zones to allow water from a higher level pressure zone to flow into the lower level pressure zone at reduced pressures. The PRVs hydraulically vary the flow rates to maintain a constant and preset pressure in the downstream or lower level pressure zone. This results in a safe range of pressures in the lower zone. The City has several PRVs installed throughout the system to help moderate pressures in the distribution system. Additionally, individual PRVs are installed on all service meters within the system to further control pressures.

Table 2.6, Pressure Reducing Valves summarizes the location and upstream and downstream pressure zones of the City's existing PRVs.

Table 2.6
Pressure Reducing Valves

PRV No.	Location	Elevation (feet)	Downstream Pressure Setting	Upper Pressure Zone	Lower Pressure Zone
			(psi)	(HGL)	(HGL)
1	Lawson Street	669	40.0	850	750
2	Railroad Avenue	634	53.0	850	750
3	Roberts Drive	612	65.0	850	750
4	Newcastle Drive	727	53.0	965	850
5	Temporary 4-inch	778	31.0	965	850

TRANSMISSION AND DISTRIBUTION

Pipes

The existing transmission and distribution system is shown in Figure 2.3, Existing Water System. The water system consists of approximately 181,163 linear feet of pipe, including approximately 10,500 linear feet of transmission mains. The existing transmission and distribution system consist of pipes ranging in size from 1.5 inches to 20 inches in diameter. The pipes are manufactured from various materials, including AC, DI, cast iron (CI), HDPE, and polyvinyl chloride (PVC). Table 2.7, Pipe Inventory shows a summary of the various pipe sizes and materials.

Table 2.7
Pipe Inventory

Diameter	Length (feet)	Percent of Total
4-inch or smaller	8,144	4%
6-inch	11,792	7%
8-inch	89,198	49%
12-inch	64,364	36%
16-inch	3,954	2%
20-inch	3,711	2%
Total	**181,163**	**100%**
Material	**Length (feet)**	**Percent of Total**
PVC	5,790	3%
HDPE	4,399	2%
Asbestos Cement	27,095	15%
Ductile Iron	143,771	79%
Cast Iron	108	0%
Total	**181,163**	**100%**

The size and material of the existing water mains are an important element when evaluating the City's water system. Figure 2.6, Existing Pipe Sizes shows the various pipe sizes of the City's water system. Figure 2.7, Existing Pipe Materials shows the various pipe materials of the City's water system.

Meters

One hundred percent of the City's connections are metered. There are currently 1,973 metered service connections within the City's WSA. Approximately 92 percent, or 1,783, of the connections are for single-family residences. The remaining meters are for public buildings and facilities, multi-family residences, irrigation, and commercial businesses.

TELEMETRY AND CONTROL SYSTEM

A telemetry and supervisory control system collects information and can efficiently control a water system by automatically optimizing facility operations. The telemetry and control system is capable of providing alarm notifications in the event of equipment failure, reservoir overflow, or other emergency situations. The City's telemetry and control system was first put into operation in 2006 and has been updated several times. The operation of the telemetry system is controlled onsite at the 4.3 MG Reservoir treatment building. The North Bank Pump Station is controlled via a radio read from the 4.3 MG Reservoir to the 0.5 MG Reservoir, then via coax cable from the reservoir to the North Bank Pump Station. Portions of the telemetry system computer and software were upgraded in 2018.

Control Panel

TREATMENT FACILITIES

The City's water system is currently disinfected via a hypochloride chlorination system that was installed in 2016 at the North Bank Pump Station. Corrosion treatment is provided at the pump station located at the 4.3 MG Reservoir site.

WATER SERVICE AREA

The boundaries of the City's WSA, retail service area, and potential service area are depicted in Figure 2.8, Water Service Area.

Retail Service Area

The Municipal Water Supply – Efficiency Requirements Act, Chapter 5, Laws of 2003 (Municipal Water Law) amended the Washington State Board of Health Code (Chapter 43.20 RCW) to require that municipal water suppliers provide water service to all new retail customers within a retail service area under certain conditions. A retail service area is the area within which water is or will be sold directly to the ultimate consumers.

According to the Municipal Water Law, a municipal water supplier has a duty to serve new water service within the identified retail service area if the utility:

- Can provide water service in a timely and reasonable manner;
- Has sufficient water rights, or uses water from a source that has a water right;
- Has sufficient capacity to serve the water in a safe and reliable manner as determined by DOH; and
- Is consistent with the requirements of any comprehensive plans or development regulations adopted under Chapter 36.70A RCW or any other applicable adopted comprehensive plans, land use plans, or development regulations.

PHYSICAL ENVIRONMENT

Planning for the future water system requires a basic understanding of the physical environment of the WSA. A working knowledge is useful in identifying any constraints that may affect the development of the water system. Physical characteristics that influence planning and design include topography, geology, soils, surface water, groundwater, and climate. Descriptions of these characteristics, as well as a summary of environmentally sensitive areas in the City, are as follows.

Topography

The City is situated on an upland plateau bounded on the south and southeast by the Green River and on the northeast by the Cascade Range. Depressions and hummocks characterize the rolling glacial terrain.

The plateau is dotted with lakes and cut by numerous streams that drain to the Green River. The plateau is deeply incised by the Green River gorge located approximately two miles south of the City. The descent to the river is steep, with a maximum slope of approximately 55 percent.

Elevations within the existing City limits vary between approximately 500 feet at Morganville to 1,000 feet at the eastern perimeter. Most of the existing buildings within the City are located at lower elevations, between approximately 500 and 700 feet.

Elevations within the study area range from approximately 300 feet in the southwestern corner of the study area near the banks of the Green River, to over 1,200 feet in the eastern part of the study area outside the City limits. Elevations of at least 1,000 feet also are found in the northeast corner of the study area, northeast of Lake No. 12.

Geology and Soils

The surficial geology and landforms in the Black Diamond area, located on the Covington Drift Plain, are the result of the most recent regional glaciation, the Vashon Stade of the Fraser glaciation. The Vashon ice sheet completely melted from the Black Diamond area approximately 10,000 years ago. During the maximum extent of the Vashon Stade, the planning area was covered with up to 2,000 feet of ice.

Since the last glaciation, urbanization, rural development, logging, gravel mining activities, erosion, and sedimentation have modified the land surface. Weathering and erosion of native soils has resulted in the development of topsoil and colluvium at the ground surface. The topsoil in undeveloped areas consists of a few inches of silt and sand with decayed roots and leaves. The weathered soils underlying the topsoil consists of silty sand and gravel with roots, generally extending 2 to 6 feet. Topographic depressions and low gradient stream channels have accumulated soft organic silt and peat. In general, the areas underlain by organic silt and peat are within wetland areas.

Vashon recessional outwash mantels the west portion of the City. The soil consists of sand and gravel with variable amounts of silt and cobbles deposited by the rivers emanating from the melting front of the Vashon ice sheet. This soil is considered a valuable gravel resource in this area depending on its thickness and silt content.

Vashon till is at the ground surface in some areas of the east portion of the City. Till consists of unstratified silt, sand, gravel, and cobbles that are in a very dense condition because of being overridden by the glacial ice. Till is usually 20 to 40 feet thick and probably underlies the recessional outwash, but till may be absent where eroded during deglaciation meltwater runoff episodes.

Pre-Vashon glacial and interglacial sediments underlie the Vashon till in the west portion of the City area where bedrock is deep. The pre-Vashon glacial and interglacial sediments consist of interbedded and/or stratified silt, gravel, and till. These soils are not exposed at the ground surface in the City, but are exposed in the upper walls of the Green River gorge, south of the City, and are penetrated by water wells in the west portion of the area.

Bedrock of the Puget Group underlies the City and surrounding area. The bedrock is locally exposed at the surface in the east portion of the area and in the walls of the Green River gorge. The bedrock consists of sedimentary sandstone, mudstone, shale, and coal. Based on elevations of surface exposures and the interpretation of well water logs by Icicle Creek Engineering, Inc., bedrock underlies the property at a depth of 200 feet or more in the west portion of the City.

Additional geological information is contained in Appendix G – Soils Information.

Surface Water

The City's WSA lies within the Duwamish/Green River drainage basin. A number of lakes, wetlands, and creeks lie within the service area.

Black Diamond Lake and Jones Lake are located in the southern part of the City limits. Ginder Lake and Lake No. 12 are located east of the City limits within the potential service area. Two

smaller lakes, Oak Lake and Horseshoe Lake, are located within the western part of the City limits. Lake Sawyer is one of the largest lakes in terms of size and volume in the Green River Basin and is located in the recently annexed portion of the City but outside the potential service area. It discharges to Covington Creek, which in turn discharges to Big Soos Creek. The Big Soos Creek flows into the Green River near the City of Auburn. Lake levels of Lake Sawyer are controlled by a privately owned and operated concrete dam at the entrance of Covington Creek.

Rock Creek is the principal drainage basin in the City and flows north to Lake Sawyer. Ginder Creek, Lawson Creek, and three smaller creeks drain into Rock Creek. Existing development in the City is located in the central portion of the drainage basin. All development within the Rock Creek basin (including that outside of the City limits) is preferred by King County and the City to be served by public sewer. Land use control within the basin also is viewed by the City as critical in order to promote open space and protect the drainage basin from future degradation.

The Green River originates in the western Cascade Range approximately 30 linear miles east of the City. Flows in the river result largely from rainfall runoff and snowmelt. Flows are regulated approximately 20 miles upstream of the City by a flood control structure operated by the US Army Corps of Engineers known as the Howard Hanson Dam.

Groundwater

Groundwater occurs in three aquifer systems beneath the service area. These aquifer systems include: a seasonal shallow, or perched, unconfined aquifer in the weathered soil and recessional outwash overlying till of bedrock; an intermediate depth, regional unconfined and confined aquifer system within the pre-Vashon glacial and interglacial sediments; and a confined regional aquifer system within the bedrock.

The shallow aquifer system is the primary water resource penetrated by most of the domestic wells in the WSA. At least seven water wells penetrate the intermediate depth aquifer in the area. The intermediate depth aquifer has potential for development as a water resource based on limited available information. The deep bedrock aquifer is controlled by fractures in the bedrock. Several domestic wells penetrate the bedrock aquifer in the east portion of the area, but are typically very low in yield.

A potential groundwater resource was recently identified in the southwest portion of the area on the Black Diamond Associates property. Preliminary studies of this groundwater resource by others indicate its potential to supplement the City's public water supply system, subject to securing water rights, which is very unlikely.

Groundwater Quality

The shallow aquifer is particularly vulnerable to contamination from the surface and may dry out seasonally in some areas. The intermediate depth aquifer is recharged over a very large area and is generally protected from contamination from the surface. The bedrock aquifer often contains water with elevated levels of minerals, such as iron and sulfur, that may affect water quality.

Groundwater Flow Patterns

Groundwater flow patterns have both horizontal and vertical components. In the Black Diamond area, the primary vertical component of flow is downward percolation from the shallow aquifer, through the underlying till or fractures in the bedrock, and into the intermediate or deep bedrock aquifer. Horizontal groundwater flow in the shallow aquifer discharges to the surface water features of Rock Creek, Ravensdale Creek, and Crisp Creek.

Groundwater Recharge

Groundwater recharge to the shallow aquifer is primarily from precipitation or infiltration of surface water runoff from adjacent areas. As precipitation falls on the ground surface, a portion infiltrates the soil. Precipitation that does not infiltrate remains on the surface, filling small depressions or moving downslope as surface runoff. Some shallow infiltrated water is used by plants and returns to the atmosphere by evapotranspiration. When the soil moisture content is high, such as occurs after a long period of rainfall, some water within the soil migrates downward. Downward percolation of water is impeded by relatively impermeable till or bedrock that underlies most of the area. Where water is concentrated within topographic low areas such as wetland or streams, there is generally more recharge than in topographic high areas, where the surficial aquifer is dry much of the time.

The intermediate depth and deep bedrock aquifer systems are recharged by infiltrating water over an area much larger than the City.

Information regarding groundwater wells in the area was collected from the Brown and Caldwell hydrogeology report of the Black Diamond Springs (1989) and well log information collected by Robinson and Noble, Inc., (1990) regarding well development in the southeastern corner of the City limits.

Climate

The Pacific Ocean and Puget Sound moderate temperature extremes in the region, while the Cascade Mountains influence the area's precipitation. Precipitation in the area occurs primarily due to cooling of moisture-laden air masses as they flow and rise over the Cascade Mountains.

Annual precipitation ranges from 45 to 70 inches, averaging approximately 55 inches. More than 80 percent of the precipitation occurs October through May, and 50 percent from November through February. Total evaporation averages approximately 25 inches per year, with approximately 75 percent occurring during the months of May through August. Precipitation and evaporation were measured at the Landsburg weather station located approximately 5 miles north northeast of the City.

Available temperature data is also from the Landsburg weather station. Low temperatures in December and January average 30 degrees to 33 degrees Fahrenheit and the highs range from 41 degrees to 46 degrees Fahrenheit. In July and August, the average low temperature is approximately 50 degrees Fahrenheit and the high is 75 degrees Fahrenheit. The lowest recorded temperature from 1976 to 1993 was 0 degrees Fahrenheit in February 1989, and the highest recorded temperature was 102 degrees Fahrenheit in August 1981 and May 1983.

Prevailing wind direction is from the south to the southwest during the rainy season and from the west or northwest in summer. Average wind velocity is less than 10 miles per hour.

Mining Activity

Abandoned coal mines underlie at least 50,000 acres in western and central Washington. Many of the abandoned, underground mines present in the Black Diamond area have been documented by the State. Applicants for building permits in abandoned coal mine areas are required to demonstrate the safety of the proposed project. Mitigation of a mine may be required, and a horizontal buffer of 500 feet from the vertical projection of the mine is required, regardless of depth, unless otherwise recommended by a geotechnical report by a professional engineer with expertise in geotechnical engineering. High hazard areas are typically those areas underlain by mine workings shallower than 200 feet or fifteen times the knees of the coal seam for gently dipping seams. Moderate hazard areas are areas where more workings are deeper than 200 feet or deeper than fifteen times the knees of the seam or workings for gently dipping seams. The study by professional engineers should detail the presence of surface openings, potential sinkholes, depth of working, and a detailed examination of historic mine maps and records.

Environmentally Sensitive Areas

The Black Diamond Municipal Code, Chapter 19.12 establishes regulations for development in environmentally sensitive areas. These regulations were developed to prevent action undertaken by any person or entity resulting in a substantial environmental alteration. Specific information on the location and extent of sensitive areas within the City can be obtained from the City, while sensitive areas information for other areas is available from King County. Any development should be coordinated with the City's Wellhead Protection Map.

Environmentally sensitive areas include wetlands, fish and wildlife habitat conservation areas, and geologically hazardous areas. Geologically hazardous areas include areas that are not suitable to development due to their susceptibility to erosion, sliding, earthquake, or other geological events. A geotechnical report prepared by a licensed professional engineer is required prior to any development in these areas.

Fish and wildlife conservation areas within the City include Rock Creek and Ginder Creek corridors, open water ponds, lakes and riparian forests. Geologically hazardous areas include steep slopes (greater than 25 percent) and past coal mine working areas. Development around wetland areas requires buffer zones to reduce or mitigate any adverse impact. Permitted activities within the buffer zones include passive recreation, parks, pedestrian and bicycle trails, and road and utility facilities when necessary.

LAND USE AND ZONING

Land use and zoning play an important role in determining growth patterns, and therefore, future water requirements. Future land use, variations in use, and changing population densities, as determined by applicable zoning ordinances, can significantly impact the City's

ability to provide adequate water service. Land use and zoning are discussed in more detail in Chapter 3 – Land Use and Population.

FUTURE SERVICE AREA

The City's future service area has been modified from the previous future water service area as identified in the *South King County Coordinated Water System Plan* (SKCCWSP). The SKCCWSP established future water service areas for the utilities that are included in the plan. A service area agreement was prepared by the South King County Water Utilities Coordinating Committee (SKCWUCC) and agreed to by the participating utilities. A copy of the Interlocal Agreement for Establishing Water Utility Service Area Boundaries as Identified by the South King County Coordinated Water System Plan has been included in Appendix H – SKCCWSP Service Area Agreement.

SERVICE AREA AGREEMENTS

All water purveyors located within a Critical Water Supply Service Area are required to have a water service area agreement that identifies the external boundaries of their water service area. The City has a service area agreement that was developed as part of the SKCCWSP. A copy of this agreement has been included in Appendix H – SKCCWSP Service Area Agreement. If SKCCWSP updates its plan, the City would like to participate in that process.

3 | LAND USE AND POPULATION

MDRT Planning Documents

Conceptual Ten Trails

RELATED PLANNING DOCUMENTS

The following related planning documents were examined in the preparation of the City of Black Diamond's (City) Water System Plan (WSP) to ensure consistency with the land use policies of all involved agencies. Comments received from these agencies have been included in Appendix D – Agency Review Comments. Comments and correspondence with Washington State Department of Health (DOH), including review checklists, are included in Appendix B – DOH Checklists and Correspondence.

CITY OF BLACK DIAMOND PLANNING DOCUMENTS

City of Black Diamond 2009 Water System Plan

This document, approved by DOH in 2009, presented system improvements and projects necessary to update and enhance the existing water system facilities.

The City's *Comprehensive Plan* document includes chapters regarding the City's urban growth area (UGA), population and employment characteristics, and land use. The City's *Comprehensive Plan* was adopted in 1996, and amended in 2001, 2009, and 2018.

REGIONAL PLANS AND DOCUMENTS

King County Comprehensive Plan

The *King County Comprehensive Plan* was adopted in 2004 and amended in 2006 and 2016. This document identifies the City as a Rural City. This document also includes the City within the UGA of King County for purposes of planning, land use, and facility needs. The City's WSP has been developed consistent with the *King County Comprehensive Plan*.

King County Code

The King County Code contains details in Chapter 13.24 regarding Water and Sewer Comprehensive Plans. A listing of the applicable code sections has been provided by King County and is included in Appendix D – Agency Review Comments. The City's WSP has been developed in conformance with these codes.

Regional Water Supply Planning – Climate Change Technical Memoranda

The Regional Water Supply Planning Group includes a technical committee to study the regional effects of climate change. They produced a series of technical memoranda outlining anticipated regional effects. Based on a review of the memoranda, it is not anticipated that there will be any significant impacts due to climate change during the planning period covered in this WSP. However, the City is committed to investigating potential impacts of future climate changes on its water system and proactively preparing for these impacts.

Water Resource Inventory Area (WRIA) 9 Plans

King County has produced several documents regarding watershed and salmon recovery issues such as the *Final WRIA 9 Near-Term Action Agenda for Salmon Habitat Recovery Planning* and *WRIA 9 Strategic Assessment Report – Scientific Foundation for Salmonid Habitat Conservation*. These plans address interim and long-term conservation plans for salmon habitat in the Green/Duwamish watershed. The City's WSP does not propose any improvements that are known to be in conflict with these planning documents.

South King County Groundwater Management Plan

The South King County Groundwater Management area encompasses nearly 260 square miles mostly within the Green/Duwamish Watershed. The City is located within the plan area, near the eastern boundary. The majority of the water in the South King County Groundwater Management Area is used for private, municipal, industrial, and agricultural purposes, and is provided by groundwater sources. The City recognizes the importance of protecting groundwater sources. The City's WSP does not propose any improvements that are known to be in conflict with groundwater management planning documents.

Cascade Water Alliance 2004 Transmission and Supply Plan

The Cascade Water Alliance was formed through an interlocal agreement by eight public water systems in King County (County) and serves as a regional water supplier to the City of Bellevue, City of Tukwila, City of Kirkland, City of Issaquah, City of Redmond, Covington Water District (CWD), Sammamish Plateau Water and Sewer District, and the Skyway Water and Sewer

District. In January 2004, the Cascade Water Alliance began delivering regional water supplies to its members.

The Transmission and Supply Plan meets the requirement of DOH for public water systems to prepare a water system plan every ten years. The *Cascade Water Alliance Transmission and Supply Plan* addresses water supply and transmission needs. Local distribution of the water supply is covered in the separate water system plans prepared by the members of the Cascade Water Alliance.

The Cascade Water Alliance plan was reviewed because one of the members of the Cascade Water Alliance, CWD, is an adjacent purveyor to the City and serves the Lake Sawyer area within the City's corporate limits. This WSP has been developed in consistency with the *Cascade Water Alliance Transmission and Supply Plan*.

Covington Water District Water System Plan Update

Covington Water District is an adjacent purveyor to the City. CWD's *Water System Plan Update* was prepared in 2016. The CWD's *Water System Plan Update* was revised in 2017 and is no longer in a service area conflict with the City's WSP. The City's WSP has been developed consistent with CWD's *Water System Plan Update*.

City of Tacoma Water Plan Update

The City negotiated a long-term supply of water with the City of Tacoma (Tacoma). Tacoma's *Water Plan Update* was approved by DOH in 2018. The City's WSP has been developed consistent with Tacoma's *Water Plan Update*.

LAND USE AND ZONING

Land use and zoning play an important role in determining growth patterns, and therefore, future water requirements. Future land use, variations in use, and changing population densities, as determined by applicable zoning ordinances, can significantly impact the City's ability to provide adequate water service.

Figure 3.1, City Land Use Designation is the proposed land use for the City as included in the City's *Comprehensive Plan*. This figure shows designated land use within incorporated Black Diamond and the portions of unincorporated King County that are within the City's Water Service Area (WSA). Current land uses are primarily residential uses, with some light industrial and commercial areas. The land use shown may not accurately represent the layout of the developed parcels as the land use designations were not modified from the City's available data.

Figure 3.2, County Land Use Designation includes the designated land uses for the area of unincorporated King County within the City's WSA. Figure 3.2, County Land Use Designation includes the zoning designations as defined by the County.

PROJECTED POPULATION AND LAND USE

Population projections for the 20-year planning horizon were estimated for the City's WSA based on a moderate annual growth rate of 0.78 percent based on the County's Office of Financial Management OFM growth projections. An average household size of 2.73 persons per

household was utilized in the population projections.

The City is expected to experience substantial growth in the near future due to the large-scale developments that are underway. Projected land uses are based on the City's Land Use map as shown in the City's *Comprehensive Plan* and has been included previously in this WSP as Figure 3.1, City Land Use Designation.

Assumptions included in this WSP for these large-scale developments are based on data from the development companies and are subject to change based on the actual rate at which development occurs. The Lawson Hills Development is assumed to consist of 1,200 residential units and be built at a rate of 200 units per year. The Ten Trails Development is assumed to consist of 4,800 residential units and be built at a rate of 400 units per year. Construction began in 2016 with new connections began in 2018.

Population, employment and equivalent residential unit (ERU) projections are included in Table 3.1, Growth Projections. Population and ERU projections utilized do not include the population of approximately 1,500 persons within the Lake Sawyer area, as this area is currently being served by CWD, or the master planned developments. Employment projections for 2020, 2025, 2030, 2035 and 2040 were available through PSRC (Puget Sound Regional Council), and the remaining years not available were interpolated using the PSRC projections Population and ERU projections, including the master planned developments (MPDs), are included in Table 3.1, Growth Projections.

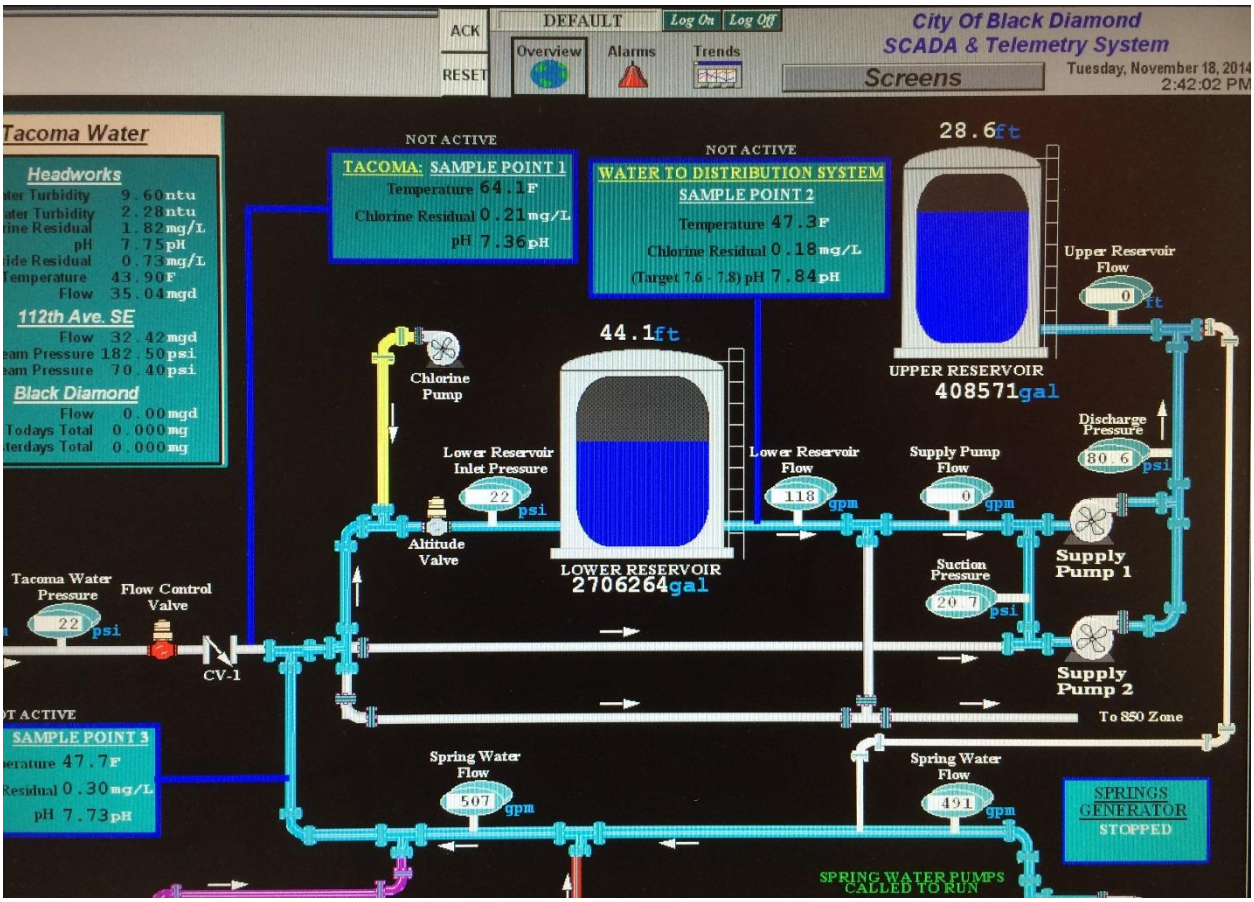
Table 3.1
Growth Projections

Year	Population	Employment [1]	ERUs
2019	4,522	591	1,657
2020	5,011	776	1,836
2021	6,040	833	2,212
2022	6,994	890	2,562
2023	13,191	948	4,832
2024	15,430	1,005	5,652
2025	17,969	1,062	6,582
2026	20,371	1,122	7,462
2027	22,340	1,183	8,183
2028	23,257	1,243	8,519
2029	23,314	1,304	8,540
2030	23,372	1,364	8,561
2031	23,429	1,437	8,582
2032	23,486	1,510	8,603
2033	23,546	1,584	8,625
2034	23,606	1,657	8,647
2035	23,666	1,730	8,669
2036	23,726	1,813	8,691
2037	23,786	1,896	8,713
2038	23,847	1,978	8,735
2039	23,909	2,061	8,758
2040	23,972	2,144	8,781
2041	24,035	2,227	8,804
2042	24,098	2,308	8,827
2043	24,161	2,390	8,850
2044	24,226	2,469	8,874
2045	24,292	2,548	8,898
2046	24,357	2,625	8,922
2047	24,423	2,699	8,946
2048	24,488	2,771	8,970

(1) Employment projections derived from PSRC growth projections for the City.

Beyond the development occurring within the MPDs there are undeveloped areas within the City and UGA that are candidates for potential future development. To guide future planning and design efforts an approximate number of ERUs was estimated based on the projected development density within the MPDs. These buildable areas are shown in Figure 3.3, Potential Buildout Locations and Surrounding Sensitive Areas.

4 | WATER DEMANDS



SCADA and Telemetry System

INTRODUCTION

A detailed analysis of system demands is crucial to a water purveyor's planning efforts. A demand analysis first identifies current supplies and demands to determine if the existing system can effectively provide an adequate quantity of water to its customers under the most crucial conditions, in accordance with federal and state laws. A future demand analysis identifies projected supplies and demands to determine how much water will be needed to satisfy future water system growth while continuing to meet federal and state laws.

Water system demands determine the size of storage reservoirs, supply facilities, water mains, and treatment facilities. Several different types of demands were analyzed and are addressed in this chapter, including average day demand (ADD), maximum day demand (MDD), peak hour demand (PHD), fire flow demand, future demands, and a conservation demand reduction forecast.

The magnitude of water demands is typically based on three main factors: 1) population; 2) weather; and 3) water use classification. Population and weather have the two largest

impacts on water system demands. Population growth tends to increase the annual demand, whereas high temperatures tend to increase the demand over a short period of time. Population does not solely determine demand, because different populations use varying amounts of water. Use varies based on the number of users in each type of customer class, land use density, and irrigation practices. Water use efficiency efforts also will impact demands and can be used to accommodate a portion of system growth without increasing a system's supply capacity.

CERTIFICATE OF WATER AVAILABILITY

In accordance with the requirements of the Growth Management Act (GMA), the City of Black Diamond (City) must identify that water is available prior to issuing a building permit. A Certificate of Water Availability is issued if there is sufficient water supply to meet the domestic water service and fire flow requirements of the proposed customer. The requirement for providing evidence of an adequate water supply was codified in 1990 under Revised Code of Washington (RCW) 19.27.097 in the Building Code section. To assist governments with implementing these requirements, the Washington State Department of Health (DOH) has developed a handbook titled *Guidelines for Determining Water Availability for New Buildings*.

WATER USE CLASSIFICATIONS

The City has divided its water customers into four different classes for billing purposes: 1) Single-Family; 2) Multi-Family; 3) Commercial; and 4) Irrigation and Hydrant Meters. For planning purposes in this Water System Plan (WSP), the water customers have been combined into six different groups: 1) single-family residential; 2) multi-family residential; 3) commercial; 4) government and public (which includes City and County government uses, schools, and churches); 5) irrigation and hydrant meters,; and 6) non-metered water and distribution system leakage (DSL).

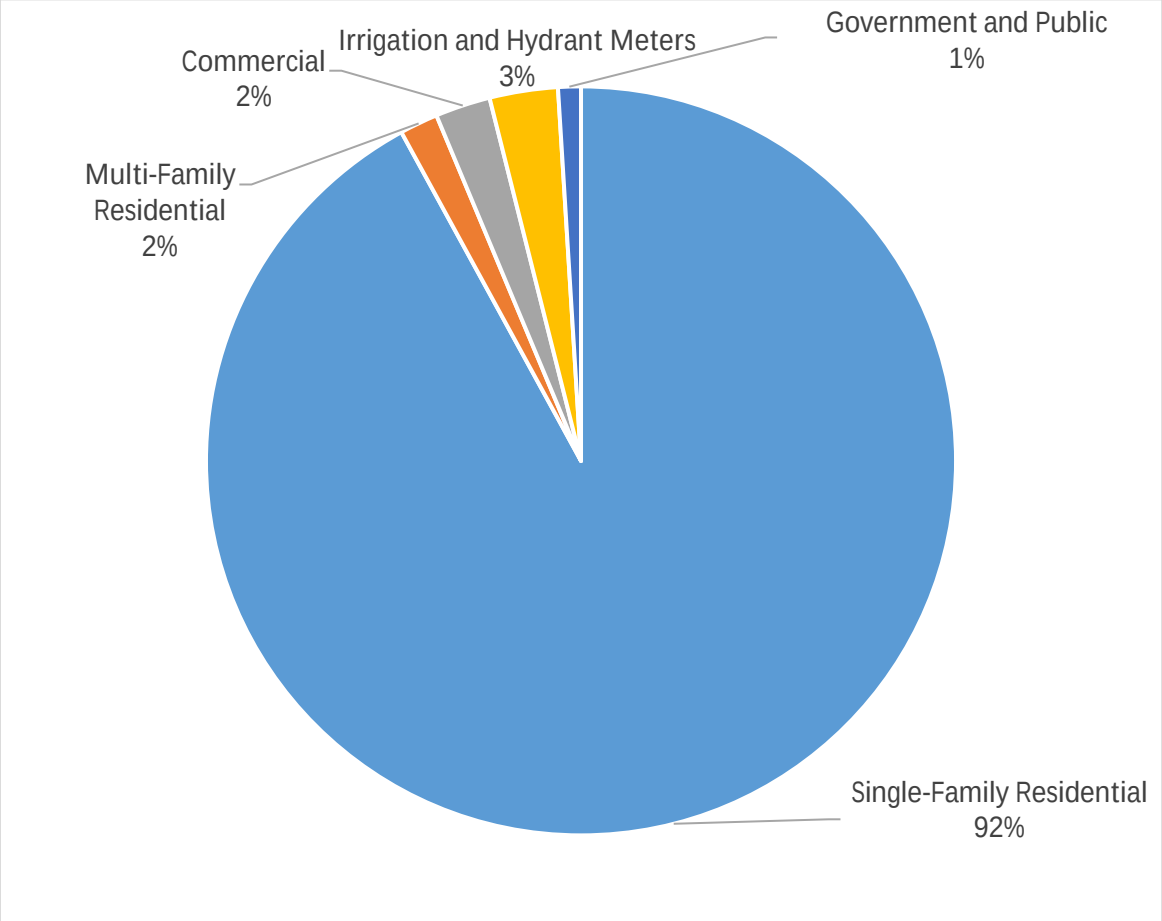
As shown in Table 4.1, 2022 Service Connections by Customer Class the City currently has 1,937 active service connections.

Table 4.1
2022 Service Connections by Customer Class

Customer Class	Accounts	
	(Meters)	(Percent)
Single-Family Residential	1,783	92%
Multi-Family Residential	32	2%
Commerical	46	2%
Irrigation and Hydrant Meters	57	3%
Government and Public	19	1%
Total (2022)	1,937	100%

Approximately 92 percent of these connections are for single-family residences as shown in Chart 4.1, 2022 Service Connections by Customer Class.

Chart 4.1
2022 Service Connections by Customer Class



EXISTING WATER CONSUMPTION

Water consumption is the amount of water used by all customers of the system, as measured by the customer's meters. Historical billed consumption for the City is shown in Table 4.2, Historical Consumption.

Table 4.2
Historical Consumption

Year	Billed Consumption	
	(CF/Year)	(MG/Year)
2014	8,825,280	66.0
2015	8,987,178	67.2
2016	9,100,279	68.1
2017	9,971,281	74.6
2018	11,548,410	86.4
2019	11,277,936	84.4
2020	14,208,839	106.3
2021	17,740,830	132.7
2022	18,391,153	137.6

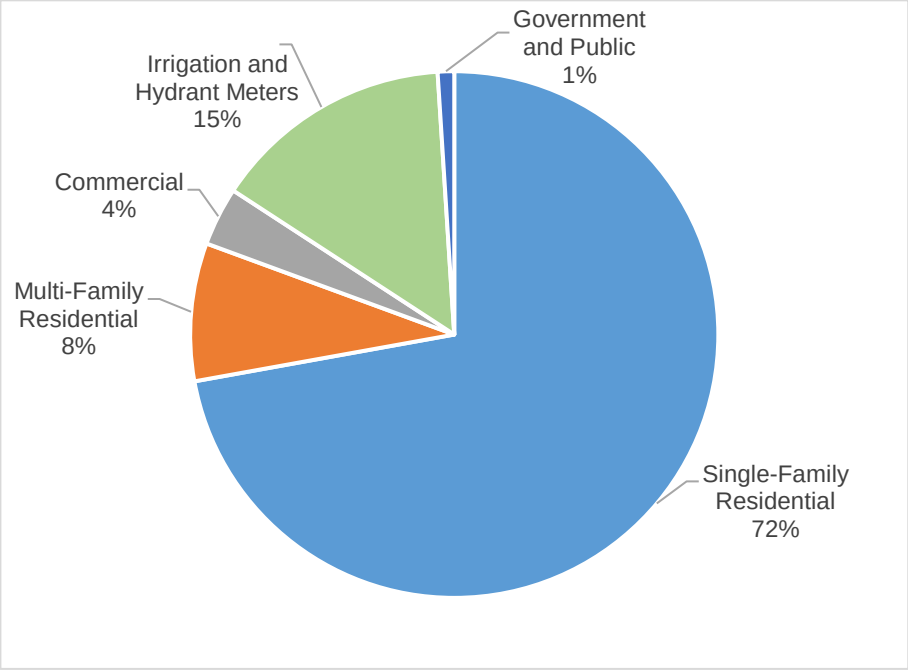
Meter data for the City is collected monthly. Recent consumption records based on customer billing records are included in Table 4.3, 2022 Consumption by Customer Class.

Table 4.3
2022 Consumption by Customer Class

Customer Class	Billed Consumption	
	(MG/Year)	(Percent)
Single-Family Residential	99.3	72%
Multi-Family Residential	11.6	8%
Commercial	4.9	4%
Irrigation and Hydrant Meters	20.3	15%
Government and Public	1.4	1%
Total (2022)	137.6	100%

Chart 4.2, 2022 Consumption by Customer Class indicates that roughly 72 percent of the consumption has been by the single-family residential customer class. Including multi-family customers, approximately 80 percent of the City's consumption could be classified as residential use.

Chart 4.2
2022 Consumption by Customer Class



EXISTING WATER DEMANDS

Equivalent Residential Units

The water used by each customer class can be expressed in terms of equivalent residential units (ERUs) for demand forecasting and planning purposes. One ERU is equivalent to the amount of water used by one single-family residence. An ERU is calculated by dividing the total volume of water utilized in the single-family customer class by the total number of single-family residential connections. The volume of water used by other customer classes can then be divided by this number to determine the equivalent residential units utilized by the other customer classes.

The ERU is meant to capture how much water a single-family household uses in a year. In planning for how many customers a water system has enough capacity to serve, it is helpful to know how many additional homes, or large new commercial businesses, are being proposed. Converting all customers, both residential and non-residential, to a common demand factor helps planners understand the relative usage of various types of accounts. For example, understanding how much water a food processing plant might use, compared to how many households could be served by that same amount of water, is useful information.

Calculating a representative ERU number for the City is complicated by the relatively large growth rate that City has experienced in the last several years. Therefore, instead of simply taking the total annual consumption in the single-family customer class and dividing it by the number of single-family accounts (as is typical for most systems), a different approach was taken for this WSP. Based on a review of the City's billing records, it was clear that many of the metered accounts were for home builders or houses that were not yet occupied. In fact, for 2022, approximately 6 percent of all metered accounts at the end of the year showed no water usage or less than 12 cubic feet (cf) of water usage, for the whole year. In order to calculate the ERU number for the City, only typical customers were used in the analysis. Based on billing records, only single-family accounts that used more than 12 cf per year were used to calculate the ERU number for each year.

The results of this analysis are shown in Table 4.4, Historical Consumption per Typical Single-Family Customer and per Capita. It is important to note that the consumption and the number of accounts shown in this table differ from previous tables in this WSP since the numbers in this table only represent the consumption of a typical, or fully occupied, household.

Table 4.4
Historical Consumption per Typical Single-Family Account and per Capita

Year	Consumption	Typical Customer[1]	Demand Per Customer	Demand Per Capita[2]
	(CF/Year)	(Accounts)	(gpd/ERU)	(gpd/Capita)
2014	6,563,259	768	175	64
2015	6,795,436	773	180	66
2016	5,935,743	778	156	57
2017	6,323,782	768	169	62
2018	6,271,011	768	167	61
2019	6,849,961	852	165	60
2020	7,968,934	876	186	68
2021	10,564,755	1,147	189	69
2022	11,359,463	1,305	178	65
6-Year Average			176	64

(1) A typical customer represents a single-family home that is occupied year-round.

(2) Assumes 2.73 people per household.

Table 4.4, Historical Consumption per Typical Single-Family Customer and per Capita shows that over the last 6 years, single-family residential customers used an average of approximately 176 gallons per day (gpd) per connection. The highest demand factor of 189 gpd/ERU was in 2021, which is typical for most water systems in the region. Table 4.4, Historical Consumption per Single-Family Customer and per Capita, also shows that the amount of water used per person, or per capita, is approximately 64 gpd/Capita. This number assumes that approximately 2.73 people live in a single-family home as documented in the City's *Comprehensive Plan*.

Historical consumption and the number of customers by classification were used to calculate a demand factor per customer. These demand factors are used to convert the number of service meters within a customer class to ERUs, and are included in Table 4.5, Demand Factors by Customer Class and Total ERUs. The numbers in Table 4.5 are based on the ERU factor of 178 gpd/ERU, which represents the demand factor for (2022) as shown in Table 4.4, Historical Consumption per Single-Family Customer and per Capita.

Table 4.5
Demand Factors by Customer Class and Total ERUs

Customer Class	Total Customers Served (ERU)	Metered Connections or Units	Factor	Basis
Single-Family Residential	1,525	1,783 meters	0.9	Equal to the total customers connected to the system regardless if the homes are occupied yet or not.
Multi-Family Residential	179	256 units	0.7	Total number of multi-family units times a 70% ERU/MF factor.
Commercial	76	46 connections	1.7	Total number of commercial connections times the conversion factor based on annual consumption divided by 178 gpd/ERU.
Irrigation	312	57 connections	5.5	Total number of irrigation connections times the conversion factor based on annual consumption divided by 178 gpd/ERU.
Government/Other	21	19 connections	1.1	Total number of Government & Public connections times the conversion factor based on annual consumption divided by 178 gpd/ERU.
Non-Metered and DSL	449	29.3 MG/Year	178 gpd/ERU	Total annual consumption divided by 178 gpd/ERU.
Total	2,562	--		

Largest Water Users

The 20 largest water users of the system, and their total amount of metered consumption for 2022 are shown in Table 4.6, 2022 Largest Water Users. The total water consumption of these 20 water accounts represented approximately 15.7 percent of the system's total metered consumption in 2022.

Table 4.6
2022 Largest Water Users

Rank	Account	Customer Class	Total Annual Consumption (gallons/year)	Percent of City-Wide Consumption
1	Third Ave 31108	Multi-Family Residential	6,362,884	4.6%
2	NW Corner of Village Parkway SE & SE Fir St. Intersection Meter CC	Irrigation and Hydrant Meters	1,472,790	1.1%
3	Roberts Dr 23601, #34	Irrigation and Hydrant Meters	1,450,739	1.1%
4	Hydrant Meter #5	Irrigation and Hydrant Meters	1,327,625	1.0%
5	SW Corner of Village Parkway & SE Cherry St. Intersection Meter Z	Irrigation and Hydrant Meters	970,777	0.7%
6	Willow Ave SE Meter I	Irrigation and Hydrant Meters	945,696	0.7%
7	Between Village Parkway & Hemlock on S. side of Fir St. Meter W	Irrigation and Hydrant Meters	925,732	0.7%
8	Willow Ave SE Meter H	Irrigation and Hydrant Meters	823,638	0.6%
9	Willow Ave SE Meter F	Irrigation and Hydrant Meters	686,903	0.5%
10	NE Corner of Villages Parkway SE & SE Fir St. Intersection Meter BB	Irrigation and Hydrant Meters	652,600	0.5%
11	Ten Trails Landscape Meter U	Irrigation and Hydrant Meters	643,841	0.5%
12	Willow Ave SE Meter E	Irrigation and Hydrant Meters	636,735	0.5%
13	Willow Ave SE Meter D	Irrigation and Hydrant Meters	634,671	0.5%
14	Third Ave 30628	Commerical	624,722	0.5%
15	Meter X Oval Park & Village Green	Irrigation and Hydrant Meters	616,532	0.4%
16	Old Lawson Rd 26101	Single-Family Residential	595,842	0.4%
17	Willow Ave SE Meter G	Irrigation and Hydrant Meters	584,218	0.4%
18	Roberts Dr 25123	Multi-Family Residential	561,598	0.4%
19	Irr SE Stevens St 33230	Irrigation and Hydrant Meters	548,426	0.4%
20	Railroad Ave 32805	Commerical	528,223	0.4%
Total			21,594,192	15.7%
City-Wide Billed Consumption			137,565,824	100.0%

Water Supply

Water supply, or production, is the total amount of water supplied to the system, as measured by the meters at each supply source. Water supply is different than water consumption in that water supply is essentially the recorded amount of water put into the system and water consumption is the recorded amount of water taken out of the system. The measured amount of water supply of any system is typically larger than the measured amount of water consumption due to non-metered water use and water loss (e.g., distribution system leakage).

The City's water system has two sources of supply – the Black Diamond Spring Field and the City of Tacoma Interties. Supply meters are monitored and read three times a week by City personnel. Historical production records have been included in Table 4.7, Historical Production.

Table 4.7
Historical Production

Year	Annual Production (gallons/year)	Annual Production (MG/Year)	Annual Production (CF/Year)	Annual Production (afy)
2010	81,943,000	81.94	10,954,947	251.5
2011	73,451,000	73.45	9,819,652	225.4
2012	74,991,000	74.99	10,025,535	230.2
2013	75,894,997	75.89	10,146,390	232.9
2014	76,752,000	76.75	10,260,963	235.6
2015	71,888,000	71.89	9,610,695	220.6
2016	75,533,800	75.53	10,098,102	231.8
2017	84,600,205	84.60	11,310,188	259.6
2018	97,909,000	97.91	13,089,439	300.5
2019	99,623,000	99.62	13,318,583	305.8
2020	124,904,192	124.90	16,698,421	383.3
2021	152,426,342	152.43	20,377,853	467.8
2022	166,817,061	166.82	22,301,746	512.0

Distribution System Leakage

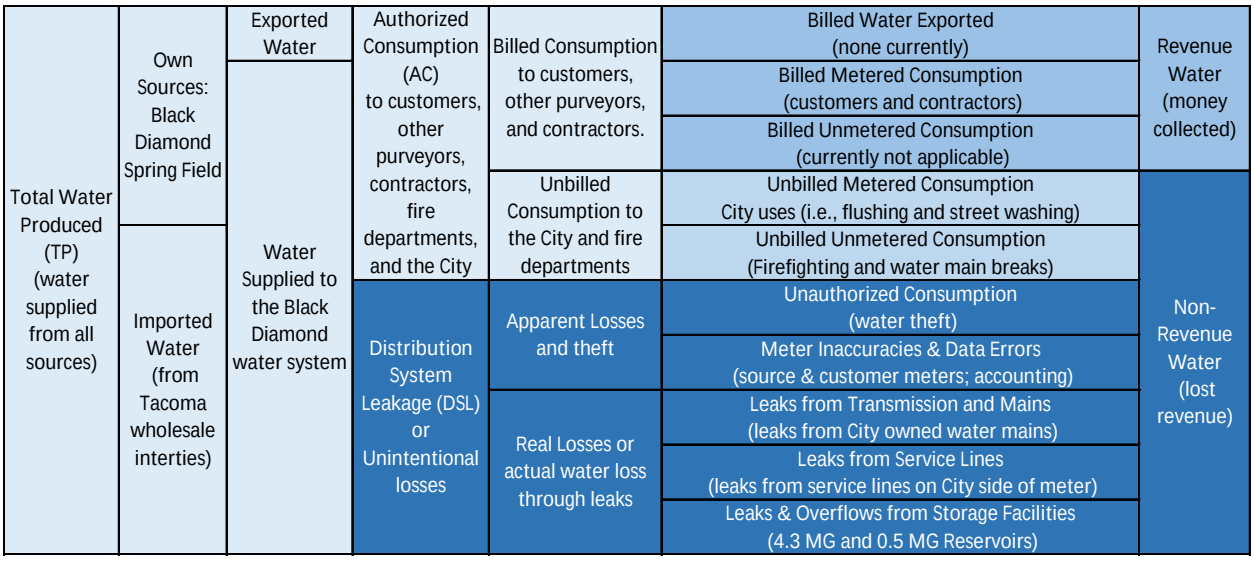
An important factor in analyzing water system demands is knowing how much water is consumed knowingly by City customers (e.g., metered residential and non-residential accounts, operation and maintenance (O&M) uses, firefighting, water main flushing, etc.) and how much is consumed or lost unintentionally (e.g., theft, meter inaccuracies, and leaks). Water use efficiency programs developed under Washington Administrative Code (WAC) 246-290-810 require purveyors to track and report to DOH how much water is lost to system leakage. Total production (TP) can be divided into two categories: Authorized Consumption (AC) and Distribution System Leakage (DSL). WAC 246-290-820 defines DSL as the difference between total water produced and authorized consumption (DSL = TP – AC). Prior to water use efficiency programs, water was classified as accounted-for and unaccounted-for water. These terms are no longer used. AC includes metered consumption by all City customers, as tracked by the City's Finance Department, including metered consumption by the City's O&M staff for City uses and unmetered and known but estimated uses, such as firefighting and water main breaks. In a typical water system, there are several sources of water loss, or DSL, including water system leaks, inaccurate meters, and illegal water system connections or water use.

The Water Use Efficiency Rule, which became effective January 2007, sets a standard for DSL of less than 10 percent averaged over the last 3-year period. WAC 246-290-820(1)(b)(i) requires purveyors to implement a stricter water use efficiency program until their DSL 3-year average is less than 10 percent. To meet this standard, the City will continue to implement the measures discussed in the Water Use Efficiency Program. These measures include water main replacements, leak detection programs, system-wide service meter replacements, source meter calibration, and increased monitoring of water used for construction and firefighting.

Chart 4.3, Revenue and Non-Revenue Water Distribution shows the different classifications of all water produced. This chart divides all water into revenue generating water and non-revenue

generating water and shows the different components that make up DSL water. The chart also describes how the various categories, or classifications, are specific to the City's system.

Chart 4.3
Revenue and Non-Revenue Water Distribution



Since 2014, the amount of DSL has ranged between a high of 17.5 percent (2022) and a low of 3.6 percent (2015), as shown in Table 4.8, Authorized Consumption and Distribution System Leakage. The average amount of DSL over the last 3 years is 12.9 percent, which is higher than the preferred range of 5 to 10 percent; therefore, it is higher than the compliance standard of less than 10 percent.

Table 4.8
Authorized Consumption and Distribution System Leakage

Year	Annual Production (AP) [2]	Annual Billed Consumption	Non-Billed Authorized Consumption [1]	Total Authorized Consumption (AC) [2]	Distribution System Leakage (DSL)		DSL 3-Year Average
	(MG/Year)	(MG/Year)	(MG/Year)	(MG/Year)	(MG/Year)	%	%
2014	76.75	66.01	4.77	70.78	5.97	7.8%	14.1%
2015	71.89	67.22	2.06	69.29	2.60	3.6%	9.4%
2016	75.53	68.07	0.01	68.09	7.45	9.9%	7.1%
2017	84.60	74.59	0.00	74.59	10.02	11.8%	8.4%
2018	97.91	86.38	0.00	86.38	11.53	11.8%	11.2%
2019	99.62	84.36	0.30	84.66	14.97	15.0%	12.9%
2020	124.90	106.28	0.00	106.28	18.62	14.9%	13.9%
2021	152.43	132.70	0.00	132.70	19.72	12.9%	14.3%
2022	166.82	137.57	0.00	137.56	29.25	17.5%	15.1%
3-Year Average							12.9%

(1) Non-Billed Authorized Consumption equals zero for years when the City didn't track it. Any Non-Billed Authorized Consumption for those years is counted as DSL.

(2) The numbers reported in the WUE may differ slightly due to discrepancies in the City's historical meter data.

Historical Customers Served

Determining the total number of customers served in any given year is based on both consumption and production data. Calculating the number of billed customers served is based on annual consumption per customer class and the amount of water used for non-billed purposes (i.e., municipal uses such as water main flushing) and lost to DSL. This analysis is represented in Table 4.9, Total ERUs. The City has grown by 55 percent since 2019, or by 905 ERUs. Most of this growth is because of the large irrigation usage for the master planned developments and from increases in DSL.

Table 4.9
Total ERUs

Customer Classification	Number of ERUs								
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family	768	773	788	790	797	926	1,131	1,391	1,525
Multi-Family	34	32	233	252	256	138	129	162	179
Commercial	205	193	65	50	62	68	48	67	76
Irrigation	1	1	85	104	283	251	238	290	312
Government/Other	24	23	21	14	16	19	16	16	21
Non-Billed Authorized	75	31	0	0	0	5	0	0	0
System Leakage (DSL)	93	40	131	163	189	249	274	286	449
TOTAL Customers (ERU)	1,201	1,093	1,324	1,374	1,603	1,657	1,836	2,212	2,562
ERU Demand Factor (gpd/ERU)	175	180	156	169	167	165	186	189	178
Total Production (MG/Year)	76.75	71.89	75.53	84.60	97.91	99.62	124.90	152.43	166.82

Note: The increase in Multi-Family in 2016 was because a mobile home park was moved into this classification from commercial. Decrease in Multi-Family consumption in 2019 was because a very large leak was fixed after the meter in the mobile home park.
The number of ERUs in this table differ slightly from those in Table 4.5 due to the difference in the 180 gpd/ERU demand factor used in that table and the actual demand factors used in this table.

DEMAND ANALYSIS

Demand Elements

Average Day Demand

ADD is the total amount of water delivered to the system in a year divided by the number of days in the year. ADD is determined from the system's historical water use data and can be used to project future demands. ADD data are typically used to determine standby storage requirements for water systems. Standby storage is the volume of a reservoir used to provide water supply under emergency conditions when supply facilities are out of service. Water production records from the City's wells, springs, and wholesale sources were reviewed to determine the system's ADD.

Maximum Day Demand

MDD is the maximum amount of water used throughout the system during a 24-hour time period of a given year. MDD is typically determined from the combined flow of water into the system from all supply sources and water reservoirs on the peak day. MDD typically occurs on a hot summer day when lawn watering is occurring throughout much of the system. In accordance with WAC 246-290-230 – Distribution Systems, the distribution system shall provide fire flow at a minimum pressure of 20 pounds per square inch (psi) during MDD conditions. Supply facilities (i.e., wells, springs, pump stations, and interties) are typically designed to supply water at a rate that is equal to or greater than the system's MDD.

Peak Hour Demand

PHD is the maximum amount of water used throughout the system, excluding fire flow, during a 1-hour time period of a given year. PHD, like MDD, is typically determined from the combined flow of water into the system from all supply sources and water reservoirs. In accordance with WAC 246-290-230 – Distribution Systems, new public water systems or additions to existing systems shall be designed to provide domestic water at a minimum pressure of 30 psi during PHD conditions. Equalizing storage requirements are typically based on PHD data.

Maximum Month Demand

Maximum month demand is the maximum amount of water used over a 1-month period. It is expressed in terms of gallons per day, which is an average of the total demand in gallons over one month divided by the number of days in the month. This demand can be used to see how different summers compare from year to year and how peak MDD is compared to average summer usage.

4-Day Maximum Demand

4-Day Maximum Demand (4DMD) is the maximum amount of water used over a consecutive 4-day period. It is expressed in terms of gallons per day, which is an average of the total demand in gallons over the 4-day period divided by 4 days. This demand can be used to see how a MDD compares to a longer peak period. Also, it is used by Tacoma to track big peaks in a system and calculate wholesale water system development charges.

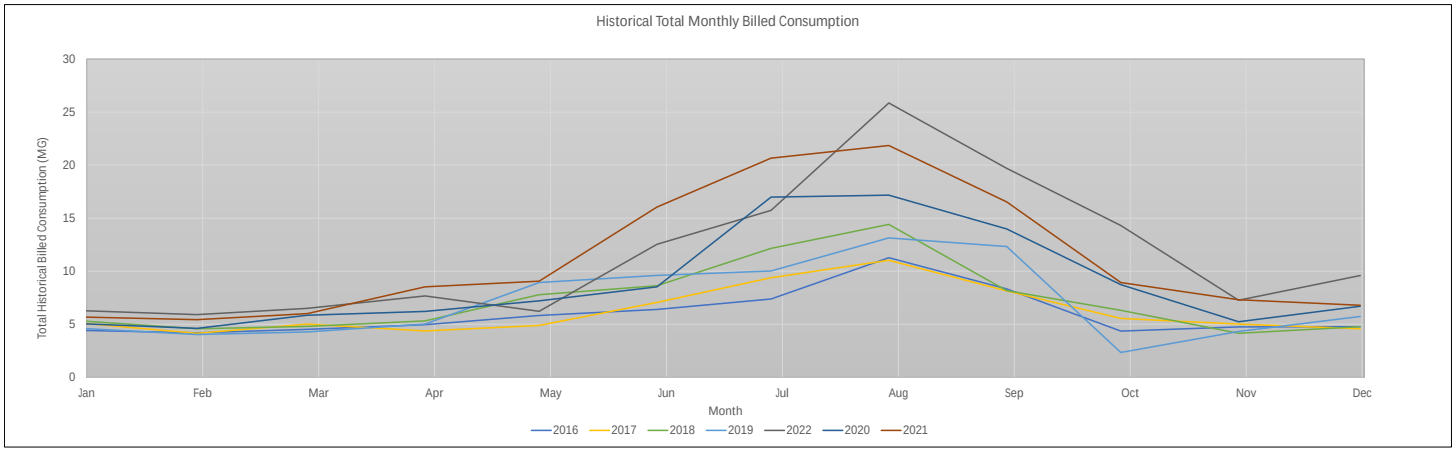
Demand Factor per Customer

An average demand per customer, or ERU, of 180 gpd per ERU is utilized in calculating projected water needs for all future growth in this WSP. This value is derived from the demand per customer factor calculated from the recent customer demand data.

Seasonal Demand by Customer Class

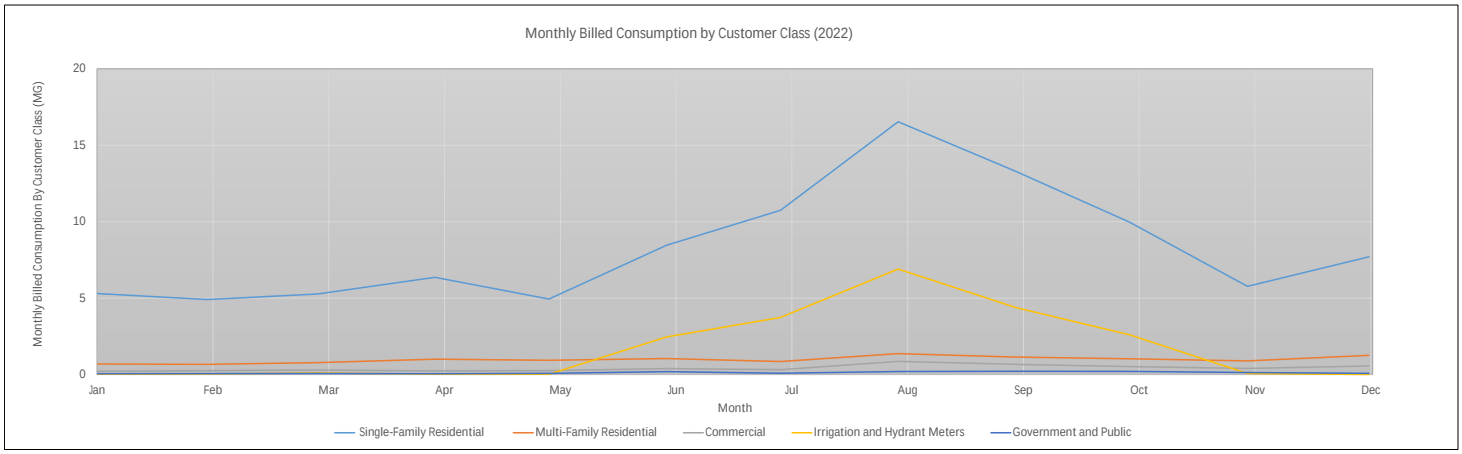
Demand fluctuations as a result of seasonal variations are commonly observed water consumption patterns. The monthly and yearly total consumption by each customer class was provided by the City staff. Chart 4.4, Historical Total Monthly Billed Consumption illustrates the City's seasonal variation of water consumption.

Chart 4.4
Historical Total Monthly Billed Consumption



The data provided suggests that the variation in historical water consumption is relatively consistent from year to year. As shown in Chart 4.4, the highest peak in water consumption occurred in 2022 and represents a typical increase in residential and irrigation water consumption during Summer months. Chart 4.5, Monthly Billed Consumption by Customer Class depicts the seasonal variation of water consumption for each customer class.

Chart 4.5
Monthly Billed Consumption by Customer Class (2022)



Fire Flow Demand

Fire flow demand is the amount of water required during firefighting as defined by applicable codes. Fire flow requirements are established for individual buildings and expressed in terms of flow rate (gpm) and flow duration (hours). Fighting fires imposes the greatest demand on the water system because a high rate of water must be supplied over a short period of time, requiring each component of the system to be properly sized and configured to operate at its optimal condition. Adequate storage and supply are useless if the transmission or distribution system cannot deliver water at the required rate and pressure necessary to extinguish a fire.

These minimum, or general, fire flow requirements were established for the different land use categories to provide a target level of service for planning and sizing future water facilities in areas that are not fully developed. The general fire flow requirement for each land use category is shown in Table 4.10, General Fire Flow Requirements. The water system analyses presented in Chapter 7 – Water System Analysis are based on an evaluation of the water system providing sufficient fire flow in accordance with these general fire flow requirements and the fire flow requirements of existing buildings. At a minimum, the City's general requirements are used, except for areas where the other land use agency's requirements are more stringent. The general requirements do not necessarily equate to actual existing or future fire flow needs for a specific site. The values shown in Table 4.11, General Fire Flow Requirements are the minimums set by code.

Table 4.10
General Fire Flow Requirements

Land Use Category	Fire Flow Requirement (gpm)	Flow Duration (minutes)
Urban Reserve; Residential (Low Density)	1,000	120
Residential (Medium Density); Mixed Use; Neighborhood Commercial, Town Center; Community Commercial; MPD Overlay	2,500	120
Business Park; Light Industrial	3,000	120
Industrial; School	3,500	120

Peaking Factors

Telemetry data or daily production does not exist for the City, so typical peaking factors were utilized from other sources. A peaking factor of 2.5 was applied to the ADD to calculate MDD. PHD were calculated based on formulas presented in DOH's *Water System Design Manual* (Equation 3-1).

The values shown in Table 4.11, Demand Factors and Peaking Factors are the peaking factors for the City's water system based on the ADD, MDD, and PHD data presented earlier in this chapter. The MDD/ADD demand ratio of 2.5 is within the typical range of 1.2 to 2.5 for most systems. The estimated PHD/MDD ratio of 1.75 is within the typical range of 1.3 to 2.0 for most systems. These peaking factors will be used later in this chapter, in conjunction with projected ADD, to forecast future MDDs and PHDs of the system.

Table 4.11
Demand Factors and Peaking Factors

Demand Type	Demand Factors	
	(gpm/ERU)	(gpd/ERU)
Average Day Demand (ADD)	0.124	178
Maximum Day Demand (MDD)	0.310	446
Peak Hour Demand (PHD)	0.542	NA
Peaking Factors		
Maximum Day Demand/Average Day Demand (MDD/ADD)		2.50
Peak Hour Demand/Maximum Day Demand (PHD/MDD)[1]		1.75
Peak Hour Demand/Average Day Demand (PHD/ADD)		4.38

(1) Based on DOH Equation 3-1; value varies but shown for 2022 in this table.

DEMAND PROJECTIONS

Demand projections for the next 20 years are presented in the next two tables. The projections shown are based on the 180 gpd/ERU, a sensitivity analysis was performed to verify that the existing customer demand accurately represented future customers associated with the MPD. Due to the relatively large growth presented by the master planned developments (MPDs), resulting in an almost quadrupling of the number of customers served by the City, projected demands are shown for both City in-fill only and total City growth, including the MPDs. Based on projected development schedule of the MPDs, it is assumed that both MPDs will be built-out within the next 10-year period.

Table 4.12, Projected Water Demands summarizes the projected water demands for future years and includes growth in the City's Water Service Area with the MPDs.

Table 4.12
Projected Water Demands

Year	Customers (ERUs)	ADD (gpd)	MDD (gpd)	PHD[1] (gallons/hour)	PHD/MDD
2019	1,657	298,182	745,456	54,996	1.77
2020	1,836	330,409	826,022	60,367	1.75
2021	2,212	398,231	995,577	71,671	1.73
2022	2,562	461,173	1,152,933	82,161	1.71
2023	4,832	869,760	2,174,400	150,259	1.66
2024	5,652	1,017,360	2,543,400	174,859	1.65
2025	6,582	1,184,760	2,961,900	202,759	1.64
2026	7,462	1,343,160	3,357,900	229,159	1.64
2027	8,183	1,472,940	3,682,350	250,789	1.63
2028	8,519	1,533,420	3,833,550	260,869	1.63
2029	8,540	1,537,200	3,843,000	261,499	1.63
2030	8,561	1,540,980	3,852,450	262,129	1.63
2031	8,582	1,544,760	3,861,900	262,759	1.63
2032	8,603	1,548,540	3,871,350	263,389	1.63
2033	8,625	1,552,500	3,881,250	264,049	1.63
2034	8,647	1,556,460	3,891,150	264,709	1.63
2035	8,669	1,560,420	3,901,050	265,369	1.63
2036	8,691	1,564,380	3,910,950	266,029	1.63
2037	8,713	1,568,340	3,920,850	266,689	1.63
2038	8,735	1,572,300	3,930,750	267,349	1.63
2039	8,758	1,576,440	3,941,100	268,039	1.63
2040	8,781	1,580,580	3,951,450	268,729	1.63
2041	8,804	1,584,720	3,961,800	269,419	1.63
2042	8,827	1,588,860	3,972,150	270,109	1.63
2043	8,850	1,593,000	3,982,500	270,799	1.63
2044	8,874	1,597,320	3,993,300	271,519	1.63

(1) PHD is calculated using DOH's Water Sytem Design Manual Equation 3-1 which varies with system size.

5 | POLICIES AND DESIGN CRITERIA

Large Diameter Water Main Installation

Regulatory Compliance

SERVICE AREA POLICIES

The service area policies for the City of Black Diamond's (City) water system have been developed to guide the development and financing of the infrastructure required to provide water service throughout its water service area (WSA). Table 5.1, Service Area Policies summarizes the City's policies.

Table 5.1
Service Area Policies

Policy Name	***Reference***
Wholesaling Water Policy	
It is the City's policy to not allow wholesaling of water from the City's water system.	***Water System Plan***
Wheeling Water Policy	
It is the City's policy to not allow wheeling of water through the City's water system. The City defines wheeling as passing non-Black Diamond water through the City's water system to non-Black Diamond customers.	***Water System Plan***
Annexation Policy	
It is the City's policy to ensure that development does not occur before it can be adequately served by public facilities, utilities, and services. Therefore, new development outside the City limits will be controlled by annexing designated expansion areas according to an identified timetable.	***Water System Plan***
Direct Connection and Satellite/Remote Systems Policy	
New development in the City limits and within the City's water service area shall be required to hook up to the municipal water system for water service. (Policy CF-5)	***Comprehensive Plan***
Prohibit new private water systems within the City. Existing development with private systems must connect to municipal water. (Policy CF-12)	***Comprehensive Plan***
Satellite management of other water systems is limited at this time due to current levels of staffing but could be accomplished depending on the timing and size of the proposed development. The City proposes to consider requests for service on a case-by-case basis, reserving the right for either system extension or satellite management.	***Water System Plan***
Design and Performance Standards Policy	
The City Water Ordinance (Black Diamond Municipal Code, Chapter 13.04) specifies regulations concerning service connections, metering, and billing.	***City of Black Diamond Municipal Code***
The City Water Ordinance is found in the Black Diamond Municipal Code, Chapter 13.04. The City Water Ordinance specifies regulations concerning service connections, metering, and billing. In addition, the City has developed draft Development Guidelines and Public Works Standards. These standards provide requirements for developers performing work within public rights-of-way or publicly owned easements.	***Water System Plan***
Upgrade existing deficiencies in water service (including fire flow). *(Policy CF-3)*	***Comprehensive Plan***

Table 5.1
Service Area Policies (continued)

Policy Name	*Reference*
Surcharge For Outside Customers Policy	
The minimum monthly water rates for all users outside the City limits shall be charged one hundred percent (or twice) the rate charged to users inside the City limits. In addition, in the event of a shortage of water, all water users within the City limits shall have a first priority over users outside the City limits.	***City Municipal Code 13.04.280***
Requests for service to areas outside the City limits and established potential annexation areas will be considered on a case-by-case basis. In general, it is the goal of the City to annex those areas to which public services are to be extended. However, this may not always be practical or possible, and in some instances an annexation, or other interlocal agreement may be required to serve these properties as development requires.	***Water System Plan***
It is recommended that the City establish a formal policy regarding extensions to the water system. This policy should cover a special rate structure for customers served by extensions to the system. The rates should be structured to cover operation and maintenance costs, as well as long-term replacement costs for extensions to the system. It is recommended that the rate structure be tiered based on the geographic location in relation to the core system.	
Formation of Local Improvement Districts Outside Legal Boundaries Policy	
It is the City's policy to only allow formation of Local Improvement Districts outside of its legal boundaries to relieve health hazard conditions.	***Water System Plan***
Design new development to allow for efficient and economical provision of water services, and require new development to pay its fair share of the cost of providing service. *(Policy CF-4)*	***Comprehensive Plan***
Late-Comers Agreements Policy	
The City does not currently have a formally adopted late-comer agreement policy. It is recommended that the City develop a policy that provides definitive guidance to developers.	
Oversizing Policy	
Ensure that the water service necessary to support development will be adequate to serve the development at the time the development is available for occupancy and use. *(Policy CF-2)*	***Comprehensive Plan***
Maintain an updated WSP that is coordinated with the Land Use Plan so that new development is located where sufficient system capacity exists or can be logically extended. (Policy CF-6)	
Cross-Connection Control Program Policy	
No service connection shall be allowed from the City mains to any premises supplied by water from any other source, unless special permission is given by the water superintendent, which special permission may be terminated at any time if in the judgment of the water superintendent the public interest so requires.	***City Municipal Code 13.04.090***
No cross-connection shall be made or maintained between any City service connection and pipe supplying water from any other source unless the water supplied from the other source, by tests of the State Board of Health, is shown to conform to the United States Bacteriological Standard for drinking water. The tests must be made by a professional tester and submitted to the City at least once a month.	
Extension Policy	
Where property is located within the City's WSA and within the City limits, and where there is no existing water main laid, or where the capacity of existing water mains is not sufficient to meet the demands of new construction, the installation and cost of a water main extension to service such property previously unserviced shall be the responsibility of the applicant.	***City Municipal Code 13.04.040***

Table 5.1
Service Area Policies (continued)

Policy Name	*Reference*
Additional System Policies	
Establish a reserve fund and pursue outside funding services to finance needed improvements to the water system. *(Policy CF-1)*	***Comprehensive Plan***
Ensure coordination between the City and adjacent water purveyors and municipal owned systems. (Policy CF-7)	
Encourage conservation efforts to address the need for adequate supply of water resources, and to protect natural resources. Efforts should include, but are not limited to, public education, water reuse and reclamation, use of native and/or drought resistant landscaping, low flow shower heads, conservation credits, and energy in new and existing buildings. *(Policy CF-9)*	
Reduce DSL and other unaccounted-for water loss. *(Policy CF-10)*	
Service area exchanges with neighboring purveyors may be required from time to time to best serve individual properties. Such exchanges will be considered on a case by case basis and interlocal service area exchange agreements will be required.	***Water System Plan***

SYSTEM DESIGN STANDARDS

Design standards were developed by the City to ensure the utility's ability to meet a minimum level of service for existing and future customers. The *City of Black Diamond Development Guidelines and Public Works Standards – Water System Standards* outlines the minimum system requirements. A copy of these standards has been included in Appendix I – Black Diamond Public Works Standards.

The standards included in the *City of Black Diamond Development Guidelines and Public Works Standards* are intended to represent the minimum standards for the design and construction of water system facilities. More stringent standards may be required by the City due to specific project conditions. All improvements to the existing water system shall be in compliance with the Washington State Department of Health (DOH) requirements as outlined in the *Washington State Department of Health Water System Design Manual*, dated December 2019. Additionally, the *South King County Coordinated Water System Plan* (SKCCWSP) established uniform minimum design standards to ensure compatibility between systems. A copy of these standards has been included in Appendix J – SKCCWSP Design Standards. The SKCCWSP Design Standards were established in 1989, and only apply to the City's customers who are within the City's water service area, but outside the City's (or other cities) corporate limits. A summary of many of the design standards is provided in Table 5.2, Minimum Design Standards.

Table 5.2
Minimum Design Standards

	MINIMUM DESIGN STANDARDS	
	Design Standard	Reference
ADD and MDD	ADD should be determined from previous actual water use. MDD is estimated at approximately 2 times the ADD if metered data is not available. MDD = 2 x ADD, where MDD = Maximum Day Demand ADD = Average Day Demand	*DOH Design Manual*
PHD	Distribution pipelines must be able to sufficiently deliver water to meet peak hour demands at 30 psi at every existing and proposed service connection. PHD = (MDD/1440)[(C)(N) + F] + 18 for residential demands, where PHD = Peak Hourly Demand (gpm) C = Coefficient associated with ranges of ERUs N = Number of service connections F = Factor associated with ranges of ERUs MDD = Maximum Day Demand (gpd/ERU) If more than one pressure zone exists, each PHD value needs to be calculated separately for each zone and analyzed appropriately.	*DOH Design Manual*
Storage Requirements	For a given reservoir design, each of the five storage components must be considered. 1. Operational Storage 2. Equalizing Storage 3. Standby Storage 4. Fire Suppression Storage 5. Dead Storage	*DOH Design Manual*
Fire Flow Rate and Duration	Fire flow rate and duration requirements shall be determined by the local fire control authority.	*DOH Design Manual*

Table 5.2
Minimum Design Standards (continued)

	MINIMUM DESIGN STANDARDS	
	Design Standard	**Reference**
Minimum System Pressure	The system must be capable of delivering PHD at the required pressure of 30 psi at every existing and proposed service connection. If fire flow is to be provided, the distribution pipelines must also be capable of delivering the MDD rate, in addition to the fire flow, at the required pressure of 20 psi throughout the distribution system.	***DOH Design Manual***
	The City will require that its customers install pressure reducing valves in the water service pipe when the street main static pressure exceeds 80 psi.	***City Public Works Standards***
Minimum Pipe Sizing	Minimum water main size is 8 inches. Larger size pipe will be required if projected to be needed in the City's WSP or as deemed necessary based on the project demands. Verification of capacity by the developer's engineer may be required by the City.	***City Public Works Standards***
	Oversizing of water mains may be required to be installed per the City's WSP.	
	Pipes connecting hydrants to mains shall be at least 6 inches in diameter and not longer than 50 feet.	
Valve and Hydrant Spacing	All valves larger than 12 inches shall be butterfly valves. All valves 12 inches and smaller shall be resilient seat gate valves.	***City Public Works Standards***
	Sufficient valving should be placed to keep a minimum number of customers out of service when water is turned off for maintenance, repair, replacement, or additions. As a general rule, valves on distribution mains of 12 inches and smaller should be located such that the water main length of not more than 1,000 feet can be isolated by valve closure.	***DOH Design Manual***
	Fire hydrants are generally required approximately every 500 feet in residential areas, and every 300 feet in commercial areas. However, fire hydrants shall be furnished and installed at all locations as specifically mandated by the local fire marshal and/or per City Building Code.	***City Public Works Standards***
	Fire hydrants on dead-end streets and roads shall be located within approximately 300 feet from the frontage center of the farthest lot.	***City Public Works Standards***

Table 5.2
Minimum Design Standards (continued)

Continued from Previous Page		
	MINIMUM DESIGN STANDARDS	
	Design Standard	Reference
Back-up Power Requirements	All source and booster pumping facilities required for primary supply in an emergency shall be equipped with auxiliary power.	*Water System Plan*
Additional Policies	Water mains shall be extended to the far property line(s) of the property being served.	*City Public Works Standards*
	Off-site extensions may be required to hydraulically loop existing and new systems.	*City Public Works Standards*
	Dead-end lines are not permitted except where the Developer can demonstrate to the City's satisfaction that it would be impractical to extend the line at a future date. Water mains on platted cul-de-sacs shall extend to the plat line beyond the cul-de-sac to neighboring property for a convenient future connection, and extended off site to create a hydraulic loop. Fire hydrants will be installed at or on the termination point.	*City Public Works Standards*
	All new construction shall comply with the accepted procedure and practice in Cross Connection Control Manual as published by the Pacific Northwest Section of the American Water Works Association, 1996, Sixth Edition, and current amendments thereto. A copy of such is available for review at the City office.	*City Public Works Standards*
	One water sampling station shall be provided for developments in size of five to ten lots. The water sampling shall be furnished and installed at a location determined by the City. One additional sampling station shall be provided for each additional 50 lots or portion thereof.	*City Public Works Standards*
	Pressure in the distribution system should not exceed 100 psi, unless the design engineer can justify the need for the excessive pressure (reduce pumping costs, fire flow reliability, etc.), and verify that the pipe material is appropriate for this use.	*DOH Design Manual*

Table 5.2
Minimum Design Standards (continued)

	MINIMUM DESIGN STANDARDS	
	Design Standard	**Reference**
Water Quality Parameters	Water quality must be proved to conform with the criteria specified in Chapter 246-290 WAC, the SKCCWSP, the DOH and/or any additional requirements contained in King County Board of Health Rules and Regulations No. 9, South King County Department of Public Health (SKCDPH).	***Water System Plan***

PROJECT REVIEW PROCEDURES

The process by which the City will review all project documents related to the City water system has been clearly outlined in the City's water standards. Specific emphasis has been placed on distribution projects that will not need to be reviewed and approved by the Washington State Department of Health (DOH). A copy of the draft standards has been included in Appendix I – Black Diamond Public Works Standards.

POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

Policies and requirements for outside parties, such as developers, including right-of-way and pipe looping requirements, have been addressed by the water standards, as well as the City's developer extension agreements and checklists that have been included in Appendix K – Developer Extension Checklist and Agreement. Various sections of these standards cover the requirements of a development project that will include City water system components.

The City's water standards cover the general design requirements for additions to the City's water system. Developer extension agreements cover the administrative and contractual requirements of outside parties constructing water projects to be included in the City's water system. These documents generally address the necessary applications, provisions for special circumstances, design standards, developer charges, and performance bonding for outside parties.

The City currently provides Water Investigation Certificates to developers inquiring about water availability. This practice is pursuant to the Growth Management Act (GMA) level of service standards for potable water. In 1990, the Washington State Legislature passed the GMA, which has been codified primarily in the Revised Code of Washington (RCW) Chapter 36.70A. The legislative intent of the GMA is to coordinate and plan growth so as to balance environmental, economic development, health, safety, and quality concerns in the use of the lands within the state.

The specific provision of the GMA regarding water availability has been codified in RCW 19.27.097(1), of the State Building Code Act. It provides as follows:

> Each applicant for a building permit of a building necessitating potable water shall provide evidence of an adequate water supply for the intended use of the building. Evidence may be in the form of a water

> right permit from the department of ecology, a letter from an approved water purveyor stating the ability to provide water, or another form sufficient to verify the existence of an adequate water supply. In addition to other authorities, the county or city may impose conditions on building permits requiring connection to an existing public water system where the existing system is willing and able to provide safe and reliable potable water to the applicant with reasonable economy and efficiency. An application for a water right shall not be sufficient proof of an adequate water supply.

It is recommended that the City revise and expand its current efforts to provide information to the public regarding its potable water availability. The Water Investigation Certificate format is recommended to include language regarding the guarantee of that availability as it is reliant on the ability of the applicant to obtain a building permit. This letter also should include reference to an expiration date of 1 year from the date of issuance.

It also is recommended that the City implement a documentation program for the availability of its water supply. This program should include up to date tracking of water system capacity and current water usage throughout the system. This data can then be weighed against those requests for future water service to project system capacity in support of development. This also can be used to assist in assessment of future capital facilities needs for the City's water system.

DESIGN STANDARDS

Design standards and sizing criteria for City water improvements are outlined in the water standards in Appendix I – Black Diamond Public Works Standards. All proposed water mains shall be sized by a professional engineer qualified to do so and licensed in the State of Washington. Minimum pipe size will be as specified in the water standards and this Water System Plan (WSP). Specific requirements regarding pipe sizing and performance are included in Chapter 2 – Water System Description and Chapter 7 – Water System Analysis.

CONSTRUCTION STANDARDS

Construction materials and methods for the City's water system have been addressed in detail in the City's water standards. The water standards include specific references to individual standards of pipe class, manufacturers, and construction specifications. A copy of this draft document has been included in Appendix J – SKCCWSP Design Standards.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

The City is committed to ensuring that City water projects are constructed in accordance with the City's water standards. Specific design, approval, inspection, testing, acceptance, and contractor warranty requirements are included in the water standards. All these elements of the standards and procedures undertaken by the City work to ensure that water system facilities are installed to the standards set forth by the City, DOH, and Washington State Law.

Construction inspection procedures, including pressure testing, disinfection, and water quality sampling procedures are outlined in the City's water standards. Specific instruction and direction are provided to the contractor and City Inspector on the standards of testing required for construction certification by the City.

Procedures for final certification by the City also require the preparation and submittal of construction record drawings. For distribution main replacement projects that do not require DOH review, the City must retain a construction completion report for their records. However, if DOH review is required, the project must be documented through the submittal of a Construction Completion Report following Washington Administrative Code (WAC) 246-290-120(5).

6 | WATER SOURCE AND QUALITY

Black Diamond Springs

INTRODUCTION

The two basic objectives of a water system are to provide a sufficient quantity of water to meet customer usage demands and to provide high quality water. Chapter 7 – Water System Analysis discusses the City of Black Diamond's (City) ability to supply a sufficient quantity of water and identifies future source requirements. This chapter discusses the City's existing water sources, water rights, water quality regulations, and water quality monitoring results.

EXISTING WATER SOURCES AND TREATMENT

Water Sources

The City's municipal water supply is provided by a spring field and interties with the City of Tacoma. The City will follow the *Water Shortage Response Plan* for the City of Tacoma in the event that water shortage measures must be taken.

The Black Diamond Springs are located approximately 2 miles southeast of the City on a large City-owned parcel. Four major collection areas are associated with the Black Diamond Spring Field. Potable water supply is currently provided by the Black Diamond Spring Field Collection Area No. 1 (also known as the South Springs) and the Black Diamond Spring Field Collection Area No. 3 (also known as the North Springs). Black Diamond Spring Field Collection Area No. 2 (also known as the Middle Springs) is currently offline due to groundwater under the influence of surface water concerns. Black Diamond Spring Field Collection Area No. 4 (also known as the Palmer Spring Area) is not currently online.

Combined flow from the Black Diamond Springs varies from 3,150 to 18,400 gallons per minute (gpm) depending on the time of year, with the highest flows occurring in spring, and the lowest flows occurring in fall.

The minimum combined flow of the North and South Springs, as measured at the junction box during the fall of 2013, was approximately 1,930 gpm (4.3 cubic feet per second). This rate is the firm supply that can always be captured from the source for potable supply if the infrastructure from the junction box to the City was upgraded.

Water Treatment

The springs sources are currently disinfected with sodium hypochlorite generated onsite with a 12 pound per day system at the North Bank Pump Station. A solution of 0.8 percent sodium hypochlorite is added to the water to provide an initial dose of 1.0 milligrams per liter (mg/L).

Caustic soda is injected into the water supply in the form of 25-percent sodium hydroxide at the pump station located at the 4.3 million gallon (MG) Reservoir site to provide corrosion control for lead and copper rule compliance.

WATER RIGHTS AND INTERTIES

Overview

A water right is a legal authorization to use a specified amount of public water for specific beneficial purposes. The water right amount is expressed in terms of instantaneous withdrawal rate and annual withdrawal volume. Washington State law requires users of public water to receive approval from the Washington State Department of Ecology (Ecology) prior to actual use of the water. This approval is granted in the form of a water right permit, which is developed into a certificate. However, a water right is not required for certain purposes (typically individual residences) that use 5,000 gallons per day (gpd) or less of groundwater from a well.

The process of obtaining a water right involves submitting a water right application that is reviewed by Ecology. If the request is approved, a water right is issued to allow for water use to commence. A water right permit provides permission to construct the necessary wells or diversions, pumps, and pipes to start using water. The water right permit remains in effect until the permit holder determines that its project is complete, and they have used as much water as they will under the water right. At that time, the permit holder files a proof of appropriation

form, which attests to the rate and volume of water used under the water right. A water right certificate is issued by Ecology following a proof of examination and determination that the amount of water put to beneficial use is consistent with the amount and conditions indicated on the water right permit.

A water right permit can only be issued by Ecology if the proposed use meets the following requirements:

- Water will be put to beneficial use.
- There will be no impairment to existing or senior rights.
- Water is physically and legally available for appropriation.
- Issuance of the requested water right will not be detrimental to the public interest.

During preparation of the report of examination, Ecology considers existing basin management plans, stream closures, minimum instream flows, hydraulic continuity (surface water interconnected to groundwater), utilization of existing water sources, water conservation, and availability of alternative water supplies, among other things. The water right decision process is increasingly becoming more complex and time consuming, due to the many competing interests for water, environmental issues, and regulatory requirements.

Existing Water Rights and Interties

The City currently holds two surface water certificates on file with Ecology. The source of water for both certificates is Black Diamond Springs. The springs are in Water Resource Inventory Area (WRIA) 9 – Duwamish-Green. Each water right is discussed in more detail in the sections that follow. Copies of the water right documents discussed can be found in Appendix L – Water Right Documents. The City currently has no pending new water right applications and no pending water right change applications.

S1-00506C

Surface Water Certificate S1-00506C was issued on March 29, 1974, with a priority date of April 15, 1968. This water right certificate was granted to the Town of Black Diamond for the maximum use of 8.0 cubic feet per second (cfs) and 551 acre-feet per year (afy) for year-round municipal supply. The place of use on the water right certificate is defined as the "Area served by the Town of Black Diamond." This water right meets the definition as being for municipal water supply purposes, provided under Revised Code of Washington (RCW) 90.03.15.

There have been multiple water right actions taken since the certificate was issued, but they have all led to the certificate being the controlling water right document. The actions taken by the City and Ecology since issuance of the original certificate are described below.

On January 17, 1990, the City applied to Ecology to change the point of diversion from being identified as a surface water right, to a ground water right (water right tracking number CS1-00506C). Since no physical change to the point of diversion was occurring, Ecology denied this request in a report of examination for change dated April 29, 1992. In that denial, Ecology also recommended that the instantaneous rate authorized under the certificate be reduced

from 8 cfs to approximately 1.23 cfs to reflect the actual rate of water being diverted from Black Diamond Springs at that time.

On August 13, 1990, the City applied to Ecology to change its place of use to include areas served by neighboring water purveyors (water right tracking number CS1-00506C@1). Ecology partially approved this request and allowed for the City to serve water within the area served by Covington Water District in a report of examination for change dated June 30, 1993. In that approval, Ecology also recommended that the certificate should be reduced from 8 cfs to approximately 1.23 cfs to reflect the actual rate of water being diverted from Black Diamond Springs, at that time.

On March 9, 2012, Ecology issued Administrative Order No. 12WRNR-DE9035 related to both reports of examination for change (CG1-00506C and CG1-00506C@1). This order recognized that the 2003 Municipal Water Law had made the approved change application moot. This order also recognized that Ecology should not reduce the City's water right, since it is continuing to grow into the inchoate portions. This order had the impact of reinstating the original March 19, 1974, certificate as the controlling water right document.

Table 6.1, Potable Municipal Water Rights summarizes the potable municipal water right held by the City.

Table 6.1
Potable Municipal Water Rights

Water Right	Priority Date	Source	Instantaneous Rate (Qi) (cfs)	Annual Volume (Qa) (afy)
S1-00506C	April 15, 1958	Black Diamond Springs	8.0	551.0

Surface Water Certificate 3580

Surface Water Certificate 3580 was issued on May 19, 1950, with a priority date of August 22, 1949. This water right certificate was granted originally to King County Water District No. 66 for the maximum use of 2.93 cfs for year-round power production. No maximum annual volume was specified.

Since this water right is for power production purposes, it has not been included in the City's calculations for its potable municipal water supply water rights for planning purposes, as shown in Table 6.1, Potable Municipal Water Rights.

City of Tacoma Intertie

Water system interties are physical connections between two adjacent water systems. Interties are normally separated by a closed isolation valve or control valve. Emergency supply interties provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main and is unable to provide a sufficient quantity of water to its customers.

Normal supply interties provide water from one system to another during non-emergency situations and are always typically supplying water.

The City negotiated a wholesale water agreement with the City of Tacoma (Tacoma) in 2003 wherein the two agencies agreed that Tacoma would supply wholesale water to the City. The supply quantities are outlined in Table 6.2, Tacoma Wholesale Intertie Maximum Water Supply. Under the terms of the agreement, the City is responsible for System Development Charges (SDCs) associated with the connection to Tacoma's system to be repaid over a ten-year period.

The City has two intertie connections to Tacoma's Secondary Supply Pipe Line (SSPL) one intertie was constructed in 2005 and the other in 2020. Amendment No. 1 to the agreement was approved in 2007 and included the purchase of additional water. Amendment No. 2 to the agreement was approved in 2020. Copies of the 2003 Wholesale Water Agreement and Amendment No. 1 have been included in Appendix E – Tacoma Wholesale Agreement.

Table 6.2
Tacoma Wholesale Intertie Maximum Water Supply

Agreement	Date of Agreement	Wholesale Supply Capacity (gpd)
Wholesale Water Agreement	August 1, 2003	1,712,000 for average day use 3,852,000 for maximum day use 3,659,400 for 4-day maximum use
Amendment No. 1	February 1, 2007	500,000 for average day use 1,125,000 for maximum day use 1,068,750 for 4-day maximum use
Amendment No. 2	2020	Second Intertie (Lake Sawyer Road SE)

Water Right and Intertie Summary

In anticipation of the large amount of growth that the City will experience with the construction of the master planned developments (MPDs), the City and the Partners secured enough water supply and water rights to meet demands well past the 20-year planning horizon. Table 6.3, Water Right and Intertie Summary documents the City's water rights capacity. An analysis of reliable supply capacity is presented in Chapter 7 – Water System Analysis.

Table 6.3
Water Right and Intertie Summary

Source	Peak Supply (Qi)		Annual Volume (Qa)	
	(gpm)	(gpd)	(afy)	(MG/Year)
Black Diamond Springs	3,590	5,170,176	551	179.5
Tacoma Wholesale Intertie	3,456	4,977,000	2,478	807.4
Total	7,046	10,147,176	3,029	986.9

DRINKING WATER REGULATIONS

Overview

The quality of drinking water in the United States is regulated by the Environmental Protection Agency (EPA). Under provisions of the Safe Drinking Water Act (SDWA), the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, DOH is the agency responsible for implementing and enforcing the drinking water regulations. For the State of Washington to maintain primacy (delegated authority to implement requirements) under the SDWA, the state must adopt drinking water regulations that are at least as stringent as the federal regulations. In meeting these requirements, the State, in cooperation with the EPA, has published drinking water regulations that are contained in Washington Administrative Code (WAC) Chapter 246-290.

Existing Regulations

The Federal SDWA was enacted in 1974, as a result of public concern about water quality. The SDWA sets standards for the quality of drinking water and requires water treatment if these standards are not met. The SDWA also sets water testing schedules and methods that water systems must follow. In 1986, the SDWA was amended as a result of additional public concern and frequent contamination of groundwater from industrial solvents and pesticides. The 1986 Amendments required water systems to monitor and treat for a continuously increasing number of water contaminants identified in the new federal regulations. The EPA regulated approximately 20 contaminants between 1974 and 1986. The 1986 Amendments identified 83 contaminants that EPA was required to regulate by 1989. Implementation of the new regulations has been marginally successful due to the complexity of the regulations and the associated high costs. To rectify the slow implementation of the new regulations, the SDWA was amended again and re-authorized in August of 1996.

In response to the 1986 SDWA Amendments, EPA established six rules, known as the Phase I Rule, Phase II and IIb Rules, Phase V Rule, Surface Water Treatment Rule, Total Coliform Rule, and Lead and Copper Rule. The EPA regulates most chemical contaminants through the Phase I, II, IIb, and V Rules. The City's active sources are affected by many of these rules.

The EPA set two limits for each contaminant that is regulated under the rules. The first limit is a health goal, referred to as the Maximum Contaminant Level Goal (MCLG). The MCLG is zero for many contaminants, especially known cancer-causing agents (carcinogens). The second limit is a legal limit, referred to as the Maximum Contaminant Level (MCL). MCLs are equal to or higher than the MCLGs; however, most MCLs and MCLGs are the same, except for contaminants that are regulated as carcinogens. The health goals (MCLGs) for carcinogens are typically zero, because they cause cancer and it is assumed that any amount of exposure may pose some risk of cancer. A summary of each rule follows.

To fully understand the discussion that follows, a brief definition of several key terms is provided below.

- Organic Chemicals – Animal or plant produced substances containing carbon and other elements such as hydrogen and oxygen.
- Synthetic Organic Chemicals (SOCs) – Man-made organic substances, including herbicides, pesticides, and various industrial chemicals and solvents.
- Volatile Organic Chemicals (VOCs) – Chemicals, as liquids, that evaporate easily into the air.
- Inorganic Chemicals (IOCs) – Chemicals of mineral origin that are naturally occurring elements. These include metals such as lead and cadmium.

Phase I Rule

The Phase I Rule, which was the EPA's first response to the 1986 Amendments, provided limits for eight VOCs that may be present in drinking water. VOCs are used by industries in the manufacturing of rubber, pesticides, deodorants, solvents, plastics, and other chemicals. VOCs are found in everyday items such as gasoline, paints, thinners, lighter fluid, mothballs, and glue, and are typically encountered at dry cleaners, automotive service stations, and elsewhere in industrial processes. The City currently complies with all contaminant monitoring requirements under this rule.

Phase II and IIb Rules

The Phase II and IIb Rules update and create limits for 38 contaminants (organics and inorganics). Some of the contaminants are frequently applied agricultural chemicals (nitrate), while others are more obscure industrial chemicals. The City currently complies with all contaminant monitoring requirements under this rule.

Phase V Rule

The Phase V Rule sets standards for 23 additional contaminants, of which 18 are organic chemicals (mostly pesticides and herbicides) and 5 are IOCs (such as cyanide). The City currently complies with all contaminant monitoring requirements under this rule.

Surface Water Treatment Rule

Surface water sources, such as rivers, lakes, and reservoirs (which are open to the atmosphere and subject to surface runoff), and groundwater sources under the influence of surface water (GWI) are governed by the Surface Water Treatment Rule (SWTR). The SWTR seeks to prevent waterborne diseases caused by the microbes *Cryptosporidium, Legionella,* and *Giardia lamblia*, which are present in most surface waters. The rule requires disinfection of all surface water and GWI sources. All surface water and GWI sources must also be filtered, unless a filtration waiver is granted. A filtration waiver may be granted to systems with pristine sources that continuously meet stringent source water quality and protection requirements. The City's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma

Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Intertie Source.

Interim Enhanced Surface Water Treatment Rule

The Interim Enhanced Surface Water Treatment Rule (IESWTR) became effective concurrent with the Stage 1 Disinfectants/Disinfection Byproducts Rule. The rule primarily applies to public water systems that serve 10,000 or more people and use surface water or GWI sources. The rule also requires primacy agencies (i.e., DOH in Washington State) to conduct sanitary surveys of all surface water and GWI systems, regardless of size. The rule is the first to directly regulate the protozoan *Cryptosporidium* and has set the MCLG for *Cryptosporidium* at zero. The City's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Intertie Source.

Long Term 1 Enhanced Surface Water Treatment Rule

The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) addresses water systems using surface water or GWI sources serving fewer than 10,000 people. The rule extends protections against *Cryptosporidium* for smaller water systems. The City's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Intertie Source.

Revised Total Coliform Rule

The Total Coliform Rule (TCR) was published in the Federal Register on June 29, 1989, and became effective on December 31, 1990. The rule set both MCLGs and MCLs for total coliform levels in drinking water, and the type and frequency of testing that is required for water systems. The rule requires more monitoring than under prior requirements, especially for small systems. In addition, every public water system is required to develop a coliform monitoring plan, subject to approval by DOH.

On February 13, 2013, the EPA published revisions to the rule in the Federal Register, and the rule was renamed to the Revised Total Coliform Rule. This rule eliminated the coliform MCL, sets an MCL for *Escherichia Coli* (*E. coli*), and specifies the frequency and timing of coliform testing based on population served, public water system type, and source water type. When total coliform is detected, this is now known as a treatment technique trigger and public notice is no longer required. Instead, the water system must conduct an assessment of their water system facilities and operations and fix any sanitary defects. For confirmed *E. coli* incidents, now known as an *E. coli* MCL violation, the water system must perform a Level 2 assessment and provide public notice within 24 hours. If a positive sample is collected on a consecutive test sample, the City also will need to collect source samples.

Coliform are a group of bacteria that live in the digestive tract of humans and many animals and are excreted in large numbers in feces. Coliform can be found in sewage, soils, surface waters, and vegetation. The presence of any coliform in drinking water indicates a health risk and

potential waterborne disease outbreak, which may include gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and other infectious diseases.

The rule established the health goal for total coliform at zero. To comply with the legal limit, systems must not find coliform in more than 5 percent of the samples taken each month. For systems like the City, which take 30 samples per month, having more than one sample that contains coliform would exceed the legal limit and trigger the follow-up sampling requirements.

The City's current water quality and chlorination practices have resulted in compliance with this rule.

Lead and Copper Rule

The Lead and Copper Rule identifies action levels for both lead and copper. An action level is different than an MCL. An MCL is a legal limit for a contaminant, and an action level is a trigger for additional prevention or removal steps. The action level for lead is greater than 0.015 mg/L. The action level for copper is greater than 1.3 mg/L. If the 90th percentile concentration of either lead or copper from the group of samples exceeds these action levels, a corrosion control study must be undertaken to evaluate strategies and make recommendations for reducing the lead or copper concentration below the action levels. The rule requires systems that exceed the lead level to educate the affected public about reducing its lead intake. Systems that continue to exceed the lead action level after implementing corrosion control and source water treatment may be required to replace piping in the system that contains lead sources. Corrosion control is typically accomplished by increasing the pH of the water to make it less corrosive, which reduces its ability to break down water pipes and absorb lead or copper.

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery, porcelain, pewter, brass, and water. Lead can pose a significant health risk if too much of it enters the body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells, and kidneys. The greatest risk is to young children and pregnant women. Lead can slow normal mental and physical development of growing bodies.

Copper is a common, natural, and useful metal found in our environment. It is also a trace element needed in most human diets. The primary impact of elevated copper levels in water systems is stained plumbing fixtures. At certain levels (well above the action levels), copper may cause nausea, vomiting, and diarrhea. It also can lead to serious health problems in people with Wilson's disease. Long-term exposure to elevated levels of copper in drinking water also could increase the risk of liver and kidney damage. The City currently complies with all contaminant monitoring and treatment requirements under this rule.

Radionuclides Rule

The EPA established interim drinking water regulations for radionuclides in 1976 under the SDWA. MCLs were established for alpha, beta, and photon emitters, and radium 226/228. Radionuclides are elements that undergo a process of natural decay and emit radiation in the form of alpha or beta particles and gamma photons. The radiation can cause various kinds of

cancers, depending on the type of radionuclide exposure from drinking water. The regulations address both man-made and naturally occurring radionuclides in drinking water.

The 1986 Amendments to the SDWA finalized the regulations for radionuclides by eliminating the term "interim." The amendments also directed the EPA to promulgate health-based MCLGs, as well as MCLs. The EPA failed to meet the statutory schedules for promulgating the radionuclide regulations, which resulted in a lawsuit. In 1991, the EPA proposed revisions to the regulations, but a final regulation based on the proposal was never promulgated. The 1996 Amendments to the SDWA directed the EPA to revise a portion of the earlier proposed revisions, adopt a schedule, and review and revise the regulations every 6 years, as appropriate, to maintain or improve public health protection. Subsequent to the 1996 Amendments, a 1996 court order required the EPA to either finalize the 1991 proposal for radionuclides or to ratify the existing standards by November 2000.

The final rule was published in the Federal Register on December 7, 2000, and became effective on December 8, 2003. The rule established an MCLG of zero for the four regulated contaminates and MCLs of 5 picocuries per liter (pCi/L) for combined radium-226 and radium-228, 15 pCi/L for gross alpha (excluding radon and uranium), 4 millirems per year (mrem/year) for beta particle and photon radioactivity, and 30 micrograms per liter (µg/L) for uranium. The City currently complies with all contaminant monitoring requirements under this rule.

Wellhead Protection Program

Section 1428 of the 1986 SDWA Amendments mandates that each state develop a wellhead protection program. The Washington State mandate for wellhead protection, and the required elements of a wellhead protection program, is contained in WAC 246-290-135, Source Protection, which became effective in July of 1994. In Washington State, DOH is the lead agency for the development and administration of the State's wellhead protection program.

A wellhead protection program is a proactive and ongoing effort of a water purveyor to protect the health of its customers by preventing contamination of the groundwater that it supplies for drinking water. All federally defined Group A public water systems that use groundwater as their source are required to develop and implement a wellhead protection program. All required elements of a local wellhead protection program must be documented and included in either the Water System Plan (applicable to the City) or a Small Water System Management Program document (not applicable to the City).

Consumer Confidence Report

The Consumer Confidence Report (CCR) is the centerpiece of the right-to-know provisions of the 1996 Amendments to the SDWA. The annual report must be updated and re-issued to all customers by July 1st of each year thereafter.

The CCR is a report on the quality of water that was delivered to the water users during the previous calendar year. The reports must contain certain specific elements but may also contain other information that the purveyor deems appropriate for public education. Some, but not all,

of the information that is required in the reports includes the source and type of the drinking water, type of treatment, contaminants that have been detected in the water, potential health effects of the contaminants, identification of the likely source of contamination, violations of monitoring and reporting, and variances or exemptions to the drinking water regulations.

Stage 1 Disinfectants/Disinfection Byproducts Rule

Disinfection byproducts (DBPs) are formed when free chlorine reacts with organic substances, most of which occur naturally. These organic substances (called precursors) are a complex and variable mixture of compounds. The DBPs themselves may pose health risks. Trihalomethanes (THM) are a category of DBPs that had been regulated before this rule. However, systems with groundwater sources that serve a population of less than 10,000 were not previously required to monitor for THM.

The rule applies to the City and most other water systems, including systems serving fewer than 10,000 people that add a chemical disinfectant to the drinking water during any part of the treatment process. The rule reduced the MCL for total THM, which are a composite measure of four individual THM, from the previous interim level of 0.10 mg/L to 0.08 mg/L. The rule established MCLs and requires monitoring of three additional categories of DBPs (0.06 mg/L for five haloacetic acids (HAA5), 0.01 mg/L for bromate, and 1.0 mg/L for chlorite). The rule established maximum residual disinfectant levels for chlorine (4.0 mg/L), chloramines (4.0 mg/L), and chlorine dioxide (0.8 mg/L). The rule also requires systems using surface water or groundwater directly influenced by surface water to implement enhanced coagulation or softening to remove DBP precursors, unless alternative criteria are met. The City currently complies with all contaminant monitoring requirements under this rule.

Unregulated Contaminant Monitoring Rule

The EPA established the Unregulated Contaminant Monitoring Rule (UCMR) to generate data on contaminants that are being considered for inclusion in new drinking water standards. The information collected by select public water systems will ensure that future regulations established by the EPA are based on sound science.

Three separate lists of unregulated contaminants are maintained under the UCMR: List 1; List 2; and List 3. Contaminants are organized on the tiered lists based on the availability of standard testing procedures and the known occurrence of each contaminant, with List 1 containing contaminants that have established standard testing procedures and some, but insufficient, information on their occurrence in drinking water. Monitoring for contaminants on the three lists is limited to a maximum of 30 contaminants within a 5-year monitoring cycle, and the EPA is required to publish new contaminant monitoring lists every 5 years. As new lists are published, contaminants will be moved up in the lists if adequate information is found to support additional monitoring. All public water systems serving more than 3,300 people and a randomly selected group of smaller water systems are required to monitor for contaminants, except for UCMR 4 which has different threshold requirements. The City currently monitors for some unregulated contaminants.

Arsenic

Arsenic is highly toxic, affects the skin and nervous system, and may cause cancer. The Arsenic Rule sets the MCLG of arsenic at zero and reduces the MCL from the previous standard of 0.05 mg/L to 0.01 mg/L. Arsenic's monitoring requirements will be consistent with the existing requirements for other inorganic contaminants. The City complies with this rule since its sources have naturally low levels of arsenic that are below the MCL.

Filter Backwash Recycling Rule

Public water systems using surface water or groundwater under the direct influence of surface water that utilize filtration processes and recycling must comply with the Filter Backwash Recycling Rule. The rule aims to reduce risks associated with recycling contaminants removed during filtration.

The rule requires filter backwash water be returned to a location that allows complete treatment. In addition, filtration systems must provide detailed information regarding the treatment and recycling process to the state. The City's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Intertie Source.

Stage 2 Disinfectants/Disinfection Byproducts Rule

The EPA implemented the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 D/DBPR) simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule.

Similar to the Stage 1 D/DBPR, this rule applies to most water systems that add a disinfectant to the drinking water other than ultraviolet light or those systems that deliver such water. The Stage 2 D/DBPR changes the calculation procedure requirement of the MCLs for two groups of disinfection byproducts, total THM (TTHM) and HAA5. The rule requires each sampling location to determine compliance with MCLs based on their individual annual average DBP levels (termed the Locational Running Annual Average), rather than utilizing a system-wide annual average. The rule also proposes new MCLGs for chloroform (0.07 mg/L), trichloroacetic acid (0.02 mg/L), and monochloroacetic acid (0.03 mg/L).

Additionally, the rule requires systems to document peak DBP levels and prepare an Initial Distribution System Evaluation (IDSE) to identify Stage 2 D/DBPR compliance monitoring sites. IDSEs require each water system to prepare a separate IDSE plan and report, with the exception of those systems who obtain a 40/30 Certification or a Very Small System Waiver. In order to qualify for the 40/30 Certification, all samples collected during Stage 1 monitoring must have TTHM and HAA5 levels less than or equal to 0.040 mg/L and 0.030 mg/L, respectively. The City currently complies with all contaminant monitoring requirements under this rule and has qualified for 40/30 Certification and does not require an IDSE plan.

Long Term 2 Enhanced Surface Water Treatment Rule

Following the publishing of the IESWTR, the EPA introduced the LT1ESWTR to supplement the preceding regulations. The second part of the regulations of the LT1ESWTR are mandated in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The final rule was implemented simultaneously with the Stage 2 D/DBPR described in the previous section. This rule applies to all systems that use surface water or GWI sources.

This rule establishes treatment technique requirements for filtered systems based on their risk level for contamination, calculated from the system's average *Cryptosporidium* concentration. Requirements include up to 2.5-log *Cryptosporidium* treatment, in addition to existing requirements under the IESWTR and LT1ESWTR. Filtered systems that demonstrate low levels of risk will not be required to provide additional treatment. Unfiltered systems under this rule must achieve at least a 2-log inactivation of *Cryptosporidium* if the mean level in the source water remains below 0.01 oocysts/L. If an unfiltered system's mean level of *Cryptosporidium* exceeds 0.01 oocysts/L, the LT2ESWTR requires the system to provide a minimum 3-log inactivation of *Cryptosporidium*. All unfiltered systems also are required to utilize a minimum of two disinfectants in their treatment process.

The LT2ESWTR also addresses systems with unfinished water storage facilities. Under this rule, systems must either cover their storage facilities or achieve inactivation and/or removal of 4-log virus, 3-log *Giardia lamblia,* and 2-log *Cryptosporidium* on a state-approved schedule. Lastly, the rule extends the requirement of the disinfection profiles mandated under the LT1ESWTR to the proposed Stage 2 D/DBPR. The City's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Intertie Source.

Groundwater Rule

The EPA promulgated the Groundwater Rule (GWR) to reduce the risk of exposure to fecal contamination that may be present in public water systems that use groundwater sources. The GWR also specifies when corrective action (which may include disinfection) is required to protect consumers who receive water from groundwater systems from bacteria and viruses. The GWR applies to public water systems that use groundwater and to any system that mixes surface and ground waters if the groundwater is added directly to the distribution system and provided to consumers without treatment equivalent to surface water treatment.

The rule targets risks through an approach that relies on the four following major components:

1. Periodic sanitary surveys of groundwater systems that require the evaluation of eight critical elements and the identification of significant deficiencies (such as a well located near a leaking septic system). DOH conducted its most recent sanitary survey of the City's water system on September 21, 2017, under the state's existing sanitary survey program.
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions.

- Triggered monitoring for systems that do not already provide treatment that achieves at least 99.99-percent (4-log) inactivation or removal of viruses and that have a total coliform positive routine sample under the Revised Total Coliform Rule sampling in the distribution system.
- Assessment monitoring is a complement to triggered monitoring. A state has the option to require systems to conduct source water assessment monitoring at any time to help identify high risk systems.

3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options: correct all significant deficiencies; eliminate the source of contamination; provide an alternate source of water; or provide treatment that reliably achieves 99.99-percent inactivation or removal of viruses.
4. Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99-percent inactivation or removal of viruses.

Per- and Polyfluoroalkyl Substances

In 2016, the EPA established a health advisory level for per- and polyfluoroalkyl substances (PFAS) at 70 parts per trillion (ppt). DOH proposed a regulation for PFAS in 2017, and state action levels (SALs) for these substances are now in effect as of April 9, 2022. The SALs are 10 ppt for PFOA, 15 ppt for PFOS, 9 ppt for PFNA, 65 ppt for PFHxS, and 345 ppt for PFBS. All water systems in Washington State will be required to sample their sources for PFAS by December 2025. The primary source of PFAS contamination was the historical use of PFAS-based firefighting foam used by the US military, local fire departments, and airports. In June 2022, the EPA established interim health advisories of 0.004 ppt for PFOA and 0.02 ppt for PFOS, and final health advisories of 10 ppt for GenX chemicals (PFOA replacements) and 2,000 ppt for PFBS (PFOS replacement). The EPA is still evaluating other health advisories and it is not currently known when or what a federal PFAS regulation may be or its implementation schedule. All community and non-transient non-community public water systems must test for PFAS. Water systems that find PFAS in their supply are required to complete additional monitoring, and systems that exceed a SAL are required to notify all customers. The City should collect water samples to test for PFAS as soon as possible.

Future Regulations

Drinking water regulations are continuously changing in an effort to provide higher quality and safer drinking water. Modifications to the existing rules described above and implementation of new rules are planned for the near future. A summary of upcoming drinking water regulations that will most likely affect the City is presented in the following sections.

Radon

In July of 1991, the EPA proposed a regulation for radon, as well as three other radionuclides. The 1996 SDWA Amendments required the EPA to withdraw the 1991 proposal due to several concerns that were raised during the comment period. A new proposed regulation was published in the Federal Register on November 2, 1999. Comments on the proposed rule were due to the EPA by February 4, 2000. Final federal requirements for addressing radon were delayed until 2008 but have not yet been published. The rule proposes a 300 pCi/L MCL for community water systems that use groundwater or an alternative, less stringent MCL of 4,000 pCi/L for water systems where their state implements an EPA-approved program to reduce radon risks in household indoor air and tap water. It is not currently known when or what a radon regulation may require as adopted by the EPA or what the implementation schedule for the rule will be. Because the final radon rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

Unregulated Contaminant Monitoring Rule Revisions

In accordance with the original UCMR, the EPA is proposing an updated contaminant monitoring list for the next 5-year monitoring cycle, in addition to other minor revisions to the UCMR. The proposed rule was published December 20, 2016, in the Federal Register. The revisions include a list of 30 chemicals that will be monitored during the 2018 through 2020 monitoring cycle. For this cycle, all community water systems and non-transient non-community water systems serving more than 10,000 people will be required to monitor for contaminants. Large surface water and ground water under direct influence of surface water systems will monitor for 10 cyanotoxins and 20 additional contaminants (2 metals, 8 pesticides plus 1 pesticide manufacturing byproduct, 3 brominated haloacetic acid disinfection byproducts groups, 3 alcohols, and 3 semi-volatile organic chemicals). All large ground water systems will monitor for the 20 additional contaminants. Small water systems serving 10,000 or fewer people will be selected at random to monitor for cyanotoxins or the 20 additional contaminants.

SOURCE WATER QUALITY AND PLANS

This section presents the current water quality standards for groundwater sources and the results of the City's recent source water quality monitoring efforts. A discussion of the water quality requirements and monitoring results for the City's distribution system is presented in the sections that follows.

The City's last sanitary survey was completed in 2023. The City is currently addressing minor deficiencies identified in this sanitary survey and complies with all other requirements of the rule. A copy of the City's most recent Sanitary Survey Report is contained in Appendix M – Sanitary Survey.

Drinking Water Standards

Drinking water quality is regulated at the federal level by the EPA and at the State level by DOH. Drinking water standards have been established to maintain high-quality drinking water by limiting the levels of specific contaminants (i.e., regulated contaminants) that can adversely affect public health and are known or likely to occur in public water systems. Non-regulated contaminants do not have established water quality standards and are generally monitored at the discretion of the water purveyor and in the interest of customers.

The regulated contaminants are grouped into two categories of standards – primary and secondary. Primary standards are drinking water standards for contaminants that could affect health. Water purveyors are required by law to monitor and comply with these standards and notify the public if water quality does not meet any one of the standards. Secondary standards are drinking water standards for contaminants that have aesthetic effects, such as unpleasant taste, odor, or color (staining). The national secondary standards are unenforceable federal guidelines or goals where federal law does not require water systems to comply with them. However, states may adopt their own enforceable regulations governing these contaminants. The State of Washington has adopted regulations that require compliance with some of the secondary standards. Water purveyors are not required to notify the public if their water quality does not meet the secondary standards.

Source Monitoring Requirements and Waivers

The City is required to perform water quality monitoring at each of its active sources for inorganic chemical and physical substances, organic chemicals, and radionuclides. The monitoring requirements that the City must comply with are specified in WAC 246-290-300. A description of the source water quality monitoring requirements and procedures for each group of substances is contained in the City's Water Quality Monitoring Schedule, which is included as Appendix N – Water Quality Testing.

DOH has developed the Susceptibility Assessment Survey Form for water purveyors to complete in determining a drinking water source's potential for contamination. The results of the susceptibility assessment may provide monitoring waivers that allow reduced source water quality monitoring. Based on the results of the susceptibility assessment survey for each source, DOH assigned Source 04 (all spring sources) a High susceptibility rating.

Source Monitoring Results

The City's sources maintain a high level of water quality and have met or exceeded all drinking water standards since the previous Water System Plan Update in 2016. Source 04 was last monitored for IOCs in July 2017, VOCs in May 2016, nitrates in July 2019, herbicides and

pesticides in August 2017, and radionuclides in May 2016. The spring sources have a 1-year waiver for nitrates, 9-year waiver for IOCs, 6-year waiver for VOCs, 9-year waiver for herbicides, 3-year waiver for pesticides, 3-year waiver for soil fumigants, and 6-year waiver for radionuclides.

The results of inorganic chemical (including nitrate), VOC, herbicides/pesticides, and radionuclides monitoring for the City's sources indicate that all primary and secondary standards were met.

Consumer Confidence Report

The Consumer Confidence Report (CCR) is the centerpiece of how the City demonstrates to its customers that it is complying with all State and Federal water quality requirements. A copy of the City's most recent CCR is contained in Appendix N – Water Quality Testing.

Wellhead Protection Program

The City is currently working to upgrade its springs collection sources to better protect them from surface water contamination. A copy of the City's Wellhead Protection Program is included in Appendix O – Source Water Protection.

DISTRIBUTION SYSTEM WATER QUALITY

Monitoring Requirements and Results

The City is required to perform water quality monitoring within the distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, DBPs, lead and copper, and asbestos in accordance with Chapter 246-290 WAC. A description of the distribution system water quality monitoring schedule is contained in the City's Water Quality Monitoring Schedule. This schedule, along with recent testing results and Consumer Confidence Reports, is included in Appendix N – Water Quality Testing,

Since 2007, coliform monitoring regulations were met as samples did not test positive in more than 5 percent of the routine samples taken each month. All follow-up repeat samples were negative. The positive samples were likely due to error. Based on the City's estimated population of 5,400, a minimum of 6 coliform samples per month from different locations throughout the system are required to be collected. In the event that a sample tests positive for coliform, a repeat sample shall be taken at the same location as the suspect sample, and two additional samples shall be taken within five service connections upstream and downstream of the suspect sample. A description of coliform monitoring protocols, sample locations, and *E. coli* response and notification procedures are contained in the City's Coliform Monitoring Program, which is included in Appendix P – Coliform Monitoring Plan.

Disinfectant Residual Concentration Monitoring

Disinfection requirements applicable to the City are contained in WAC 246-290-310, which states that a disinfectant residual concentration of 0.2 mg/L shall be detectable in all active

parts of the distribution system, and that the maximum residual disinfectant level shall be 4.0 mg/L for chlorine and chloramines. Handheld chlorine residuals must be recorded each time a coliform sample is collected; therefore, the City collects a minimum of 2 samples each month in addition to its online chlorine analyzers. At least 95 percent of the monthly samples must have detectable levels. In addition, disinfectant residuals within the distribution system shall be reported for every calendar day and cannot be undetectable.

Disinfectants/Disinfection Byproducts Monitoring

THM and HAA5 are DBPs that are formed when free chlorine reacts with organic substances (i.e., precursors), most of which occur naturally. Formation of THM and HAA5 are dependent on such factors as amount and type of chlorine used, water temperature, concentration of precursors, pH, and chlorine contact time. THM have been found to cause cancer in laboratory animals and are suspected to be human carcinogens. In response to the Stage 1 and Stage 2 D/DBPR, the City expanded its distribution system monitoring to include THM and HAA5. The City is required to collect four THM and four HAA5 samples on an annual basis. All recent samples show concentrations below both substances MCLs. Therefore, the City is in compliance with this regulation. The City's Disinfection Byproduct Monitoring Plan is included in Appendix Q – Disinfection Byproducts Monitoring Plan.

Lead and Copper Monitoring

Specific requirements are contained in Title 40, Parts 141.86, 141.87, and 141.88 of the Code of Federal Regulations (CFR). Every 3 years, the City must collect and report a minimum of 10 samples. All previous samples indicate the City is in compliance with these regulations.

Sample sites shall be selected based on the known existence of lead pipes, copper pipes, and copper pipes with lead solder (40 CFR 141.86(a)). All samples, except for lead service line samples, shall be first draw tap samples taken at a cold water tap from which water has not been drawn for at least 6 hours, but no more than 12 hours. Sample faucets shall be flushed with cold water the evening prior to collecting the sample. Lead service line samples shall be collected with one of three methods in accordance with 40 CFR 141.86(b). The locations of future sample sites shall be the same as past sample sites, unless unavoidable conditions prevent sampling at the same locations. The City has a bilateral compliance agreement with DOH which is contained in Appendix R – Lead and Copper Bilateral Compliance Agreement.

Cross-Connection Control Program

The City has developed a Cross Connection Control policy in order to prevent contamination of the City's water supply. A copy of the City's Cross Connection Control Program has been included in Appendix S – Cross Connection Control Program.

Fluoride Concentration

Specific requirements are contained in WAC 246-290-460 for systems that are fluoridating drinking water. Wholesale water purchased from other entities may be treated with fluoride, and it is the responsibility of those distributing entities to monitor the concentrations.

Asbestos

Asbestos monitoring is required if the sources are vulnerable to asbestos contamination or if the distribution system contains more than 10 percent of asbestos cement (AC) pipe. The City has a 9-year waiver with DOH for asbestos monitoring that expired in December 2019. The last time an asbestos sample was taken was in June 2013. This sample yielded a concentration of 0.123 million fibers per liter, whereas the current MCL for asbestos is 7 million fibers per liter and greater than 10 microns in length. When the City acquires its next asbestos waiver, the required sample must be taken during the first 3-year compliance period of the 9-year compliance cycle. The water sample must be taken at a tap that is served by an asbestos cement pipe under conditions where asbestos contamination is most likely to occur.

7 | WATER SYSTEM ANALYSIS

Chlorination System

INTRODUCTION

This chapter presents the analysis of the City of Black Diamond's (City) existing water system. Individual water system components were analyzed to determine their ability to meet policies and design criteria under existing and future water demand conditions. The policies and design criteria are presented in Chapter 5 – Policies and Design Criteria, and the water demands are presented in Chapter 4 – Water Demands. A description of the water system facilities and current operation is presented in Chapter 2 – Water System Description. The last section of this chapter presents the existing and projected system capacity analyses that were performed to determine the maximum number of equivalent residential units (ERUs) that can be served by the City's water system. These analyses are based on regulatory requirements for water system design and for maintaining an acceptable level of service. The City's primary goal is to have all its facilities in compliance with federal and state requirements; the secondary goal is to have all its facilities provide the ideal level of service as defined by the City's policies and design criteria.

DISTRIBUTION SYSTEM HYDRAULIC CAPACITY ANALYSIS

The City's transmission and distribution system consists of approximately 181,163 linear feet of pipe providing water to three pressure zones within the City. Specifics regarding pipe sizes and materials, as well as the pressure zones, have been documented previously in Chapter 2 – Water System Description. Portions of the system are generally considered in need of replacement as over 11 percent of the pipes are constructed of asbestos cement materials and there are areas where water mains are undersized and unable to provide sufficient flow to meet minimum fire flow requirements. It is recommended that these pipes be removed and replaced with more appropriately sized ductile iron materials. These projects have been included in the recommended projects listed in Chapter 9 – Improvement Program.

HYDRAULIC MODEL AND CALIBRATION

Description

A computer-based hydraulic model of the existing water system was created using version 8i (SELECTseries 6) of the WaterGEMS® program developed by Bentley Systems. All facilities and water mains in the City's water system, including dead-end mains, were modeled. The water mains were entered from the City's water system mapping database, as-built records, and information obtained through discussions with City staff.

Demand Data

The hydraulic model of the existing system contains 2022 average day demand (ADD) data. System-wide demands were allocated in the model as part of the Water System Plan (WSP) preparation and were scaled to match the system's demands as necessary. The peaking factors calculated in Chapter 4 – Water Demands, were used to analyze the system under maximum day demands (MDD) and peak hour demand (PHD) conditions.

The hydraulic model of the proposed system contains 10-year and 20-year demand levels that are projected for the years 2029, and 2039, respectively. The City's future demand distribution was based on a large concentration of growth occurring within the proposed master planned development (MPD). The future demand allocations in each pressure zone are presented later is this chapter.

Facilities

The hydraulic model of the existing system for the pressure analysis contains active, existing system facilities. For the proposed system analyses in the years 2029 and 2039, the hydraulic model contained active, existing system facilities and proposed system improvements identified in Chapter 9 – Water System Improvements, and based on a general sense of what the MPD are proposing for their developments and other large undeveloped buildable land.

The facility settings for the pressure analyses correspond to a PHD event in the water system. All sources of supply that are currently available to the system, or will be available in the future, were operating at their normal summertime pumping rates during a peak period. The reservoir

levels were modeled to reflect full utilization of operational and equalization storage. All active pressure reducing valves (PRVs) were modeled as being in service and at their normal setpoints.

Separate fire flow analyses were performed on the system to size distribution system improvements and calculate fire flow availability. The hydraulic model for the fire flow analyses contained settings that correspond to MDD events. All sources of supply that are currently available to the system during a peak period were operating at their normal pumping rates with the largest pump at each facility offline. Reservoir levels were modeled to reflect full utilization of operational, equalizing, and fire flow storage based on the maximum planning-level fire flow requirement. Each pressure zone was modeled with the largest pump off during the fire flow analyses, consistent with Washington Administrative Code (WAC) 246-293-660.

Model Calibration

There were six flow tests performed to observe the water system's response. Residual pressure readings were recorded by data loggers during the tests. These field-measured residual pressures were compared to the residual pressures calculated by the City's hydraulic model for each flow rate, the results of which are shown in Table 7.1, Hydraulic Model Calibration Results. Water system demands were estimated to be equivalent to the 2022 ADD during all field flow tests and pressure measurements.

Table 7.1
Hydraulic Model Calibration Results

			Field				Model		Absolute Difference	
Test No.	Hydrant Location	Date	Static Pressure (psi)	Residual Pressure (psi)	Port Size (inch)	Flow (gpm)	Static Pressure (psi)	Residual Pressure (psi)	Static Pressure (psi)	Residual Pressure (psi)
1	Mckay Lane	October 2023	78	67	2-1/2	932	78	64	0	3
2	4th Ave	October 2023	77	74	2-1/2	856	75	69	2	5
3	Kanasket Drive	October 2023	75	68	2-1/2	840	76	67	-1	1
4	Diamond Square	October 2023	68	63	2-1/2	755	70	66	-2	-3
			72	60	2-1/2 (2)	1,337	70	59	2	1
5	Sunny Lane	October 2023	89	82	2-1/2	903	88	83	1	-1
6	Camas Place	October 2023	79	65	2-1/2	824	78	70	1	-5

psi = pounds per square inch

gpm = gallons per minute

As shown in Table 7.1, Hydraulic Model Calibration Results, with pressure drop differentials less than 3 pounds per square inch (psi) between the field and model at 5 of the 6 residual pressure locations.

Sensitivity analyses were performed to locate partially or fully closed valves that should normally be open, analyze the impact of different PRV setpoints or whether PRVs opened correctly, and analyze the impact of different pipe roughness coefficients with consideration of published values. Some sensitivity analyses allowed some of the field measurements to match the model, but it was at the detriment to the accuracy of other tests.

Acknowledging that there is a discrepancy between the hydraulic model and the City's actual water system two hydraulic model scenarios were prepared for use in identifying future water main improvements. Additional hydraulic modeling information is contained in Appendix T – Hydraulic Analysis.

PEAK HOUR DEMANDS

According to Washington State Department of Health (DOH) requirements, a water system must maintain a minimum pressure of 30 psi in the distribution system under peak hour demand conditions. In all modeling scenarios, all pressures throughout the distribution system exceeded the minimum system pressure of 30 psi. Additionally, DOH requires a maximum velocity of 8 feet per second (fps), not including fire flow. In all modeling scenarios, all pipe velocities throughout the distribution system are less than 8 fps.

FIRE FLOW ANALYSIS

A detailed fire flow analysis was completed for all hydrants within the City's water system. The analysis was conducted in conformance with DOH requirements that state a water system must provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. Table 4.11, Fire Flow Requirements provides the minimum fire flow requirements used by the City. They have been developed based on the land use classifications that are included in the City's *Comprehensive Plan*. These are the minimum fire flows to be considered in the design of system improvements. Actual fire flow requirements for proposed new structures will be as determined by the fire marshal.

DISTRIBUTION AND TRANSMISSION SYSTEM DEFICIENCIES

A summary of the primary system deficiencies is outlined as follows. Chapter 9 – Water System Improvements provides specifics on proposed improvement projects.

The transmission water main from the Black Diamond Springs to the 0.5 million gallon (MG) Reservoir was replaced in 2021.

In its existing condition, the water system will be unable to serve the projected growth that the City is anticipating. However, only a few of the proposed improvement projects outlined in Chapter 9 – Water System Improvements are development-related projects that will be required based on the actual rate at which development occurs. Most improvements needed to serve the proposed developments will be funded by the MPDs. There are a few growth-related

projects that are upsizing and improving to the existing water system to accommodate the future growth and are shown in Chapter 9 – Water System Improvements since they will be designed and constructed by the City even though they are funded by the MPDs.

There are existing deficiencies to the system, such as the inability to meet fire flow requirements. These deficiencies are eliminated through the upsizing of water mains or looping of the water system. Other deficiencies to the distribution system include water mains constructed of asbestos cement.

Selection and Justification of Proposed Improvements

Projects were selected for inclusion in the program based on the following criteria.

1. Growth Related Projects (New Development) – The City is anticipating significant development to occur within the next several years. The proposed Capital Improvement Program includes growth-related projects to serve these proposed new developments.
2. Growth Related Projects (Existing System) – These are proposed projects to upsize and improve portions of the existing system that will not be able to adequately serve the system with the anticipated growth.
3. System Improvements – These projects are included to address existing system deficiencies such as inabilities to meet minimum fire flow requirements. These projects include upsized lines and system looping improvements.
4. Small Line Replacements – Projects have been included to replace all water main that is 4 inches and smaller.
5. Asbestos Cement Line Replacements – Projects have been included to remove all asbestos cement lines and replace them with ductile iron materials.

SOURCE ANALYSIS

The City has two sources of supply for its municipal water system – the Black Diamond Spring Field and a wholesale water agreement with the City of Tacoma (Tacoma). Details regarding the capacity and allowable withdrawal rates have been included in Chapter 2 –Water System Description. Prior to the Tacoma Intertie, the springs were the only source of drinking water for the area since the early 1900s.

WATER SUPPLY EVALUATION

An evaluation of the City's existing water supply was performed to determine the sufficiency of the combined supply of the City's municipal water right and wholesale agreements with the Tacoma to meet both existing and future water demands. Table 7.2, Existing Water Supply Evaluation compares the combined maximum reliable water supply from the sources with the MDD of the system, and the combined maximum allowable annual water supply volume of the sources with the average day demand of the system. As shown in Table 7.2, Existing Water Supply Evaluation, the City has sufficient water rights and wholesale agreements to meet existing demand.

Table 7.2
Existing Water Supply Evaluation

Source	Peak Supply (Qi or Reliable Pumping Capacity)		Annual Volume (Qa)	
	(gpm)	(gpd)	(afy)	(MG/Year)
Black Diamond Springs [1]	500	600,000	551.0	179.5
Tacoma Wholesale Intertie	3,456	4,977,000	2,478	807.4
Reliable Supply Available [2]	3,956	5,577,000	3,029	986.9
Required Demand (2022)	518	745,456	334	109
Surplus or (Deficit)	3,439	4,831,544	2,695	878

(1) Represents reliable pumping capacity at North Bank Booster Pump Station.

(2) Assumes North Bank Booster Pump Station operates for no more than 20 hours per day.

Table 7.3, Future Water Supply Evaluation summarizes the results of the future water supply evaluation, which compares the combined supply of the City's municipal water right and wholesale agreements with the Tacoma with the system's future 20-year demand projections. The analyses considered future demand projections without water use reductions from the City's planned water use efficiency efforts. The only major increase in supply is from the upsizing of the pumps at the North Bank Pump Station, which will increase the reliable flow from the Springs from 500 gpm to 900 gpm when both pumps are running. The results of the future water supply evaluation indicate the City has sufficient water supply to meet the demands through the year 2039.

Table 7.3
Future Water Supply Evaluation

Source	Peak Supply (Qi or Reliable Pumping Capacity)		Annual Volume (Qa)	
	(gpm)	(gpd)	(afy)	(MG/Year)
Black Diamond Springs	750	900,000	551.0	179.5
Tacoma Wholesale Intertie	3,456	4,977,000	2,478	807.4
Reliable Supply Available	4,206	5,877,000	3,029	986.9
Required Demand (2042)	2,758	3,972,150	1,780	580
Surplus or (Deficit)	1,448	1,904,850	1,249	407

The City has a significant surplus of future water supply to meet the needs of the 20-year planning horizon. If the City's future water demands were to require the City to invest in utilizing reclaimed water, the City would need to build a wastewater treatment plant and supporting infrastructure. A portion of the City's wastewater is discharged to the Jones Lake pump Station. The City's remaining wastewater is discharged to King County wastewater facilities. As part of the agreement the Jones Lake Pump Station is operated and maintained by the King County Waste Water Division.

SUPPLY VULNERABILITY

Source Vulnerability

An engineering analysis was completed in 2003 of the Black Diamond Spring Field and the findings were documented in the *City of Black Diamond Springs – Vulnerability and Feasibility Study*. This study has been included in Appendix U – Springs Vulnerability and Feasibility Study. An additional study, *City of Black Diamond Spring Source Feasibility Analysis*, was completed in 2004 and presented a preliminary analysis of design alternatives for development of the springs. Most recently, a preliminary alternative analysis report was prepared in 2014 and is included in the appendix. This report was prepared by RH2 Engineering, Inc., to develop planning-level costs based on conceptual improvements required to improve reliability, better utilize the existing water rights, improve efficiency, reduce operating costs, and improve source quality protection of the City's existing water supply. The study shows that it may be more cost effective and more reliable to develop a new source on the north side of the Green River than to refurbish the existing facilities on the south side of the river and to provide adequate ground water under the influence of surface water (GWI) protections for the spring sources.

The intertie to the City of Tacoma was completed in 2006 and is expected to remain in service for at least the 20-year planning period covered by this WSP. At this time, the City has only used a minimal amount of water from this source – mostly only to flush the line to ensure the water remains fresh in case it is needed. This intertie was completed to plan ahead for the substantial population growth that the City is anticipating.

The City has sufficient capacity from the Spring Field and the Tacoma Intertie to accommodate current water demands, as well as projected water demands for the 6-year, 10-year, and 20-year periods. The existing transmission mains have sections that are undersized and constructed of asbestos cement (AC), so these sections will need to be upgraded.

Detailed information regarding the City's water rights has been presented in Chapter 2 – Water System Description. In addition, Chapter 4 – Water Demands includes calculations of projected water needs over the planning period. The City has sufficient water rights and reliable water supply to service the projected growth that the City is anticipated to experience over the next 20 years.

Collection Vulnerability

Potential problems with the source collection areas are primarily associated with the risks of damage due to erosion/landslides and contamination or damage to the springs by human and/or animal vandalism. In particular, Spring No. 1 has been experiencing erosion to the bank downstream of the spring. Additionally, Spring No. 3 had experienced surface water runoff crossing over the top and center of the collection area and was reconstructed to ensure the spring water is not contaminated. Spring 2 was taken offline because of GWI influence.

Transmission Vulnerability

On the south bank of the Green River, the spring transmission mains are old and undersized and are considered vulnerable to erosion, landslides, or flooding due to age and location on a very steep slope. The spring transmission main is exposed and cabled in some locations, which increases the chances of localized landslides. Additionally, tree uprooting, leaking, or natural ground erosion are concerns with this transmission main.

The transmission mains are attached to a footbridge, suspension bridge crossing the Green River. The ends of the cables suspending the bridge have suffered from significant corrosion and appear to be nearing the end of their useful life. Areas of the bridge are also in locations susceptible to tree fall. Bulkhead portions of the bridge are vulnerable to wash-out due to possible flooding of the river.

The Black Diamond Spring Field is located almost two miles southeast of the City's distribution system. Water is supplied via an existing 8-inch-diameter AC and 12-inch ductile iron (DI) transmission main to the 4.3 MG Reservoir. These lines are recommended to be upsized to accommodate future growth, and to be constructed of ductile iron materials.

TREATMENT CAPACITY ANALYSIS

CORROSION CONTROL

A 25-percent sodium hydroxide solution (NaOH) is used to reduce the acidity of the water and provide corrosion treatment for the City's water supply at the 4.3 MG Reservoir site.

DISINFECTION

Chlorination treatment for the City's water supply is provided at the North Bank Pump Station. The City produces sodium hypochlorite through the use of a 12 pound per day sodium hypochlorite generation system. This system was installed in 2016 and can be upgraded to a 24 pound per day system in the future.

STORAGE CAPACITY ANALYSIS

The City currently has two reservoirs for storage within the system. Details regarding these reservoirs have been provided in Chapter 2 – Water System Description. The 0.5 MG Reservoir was constructed in 1986 and is built of steel. The 4.3 MG Reservoir, also constructed of steel, was built in 2006. The 4.3 MG Reservoir is in good shape and considered to have sufficient remaining life over the 20-year planning period of this WSP. The 0.5 MG Reservoir needs to be recoated. The City will evaluate whether to recoat this tank or rebuild it at a better hydraulic grade line location based on future growth in the area.

Water from the springs and intertie is currently directed to the 4.3 MG Reservoir. This reservoir then supplies the 0.5 MG Reservoir as needed. The 0.5 MG Reservoir provides distribution to the 965 Pressure Zone. The 4.3 MG Reservoir provides distribution to the 850 and 750 Pressure Zones.

It is anticipated that potentially two additional reservoirs will be required during the 20-year planning period. The need for this additional storage capacity will be to serve projected growth, help maintain constant flows from the interties, and create open, as opposed to closed, pressure zones in proposed higher pressure zones in the City. Preliminary sizing of the future reservoirs has been provided by developers. It is anticipated that an additional 3.0 MG Reservoir and pump station will be constructed to serve the proposed Lawson Hills Development to provide water at a sufficient pressure in the higher elevations of the eastern portion of the service area. It is anticipated that this proposed reservoir will serve a future 1175 Pressure Zone. Additionally, a 1.3 MG Reservoir may be constructed as an elective to create an open zone in the southwestern portion of the water service area to serve the higher elevations of the Ten Trails at Black Diamond planned development. This reservoir will serve the 850 Pressure Zone and is not required to meet storage requirements or fire flow. The City will verify that service pressures, maximum pipe velocities, reliability, and redundancy are all adequately addressed at the time of design of the proposed infrastructure.

ANALYSIS CRITERIA

The existing and proposed storage facilities have been analyzed to ensure that there is sufficient capacity to meeting the existing and future storage requirements of the system. Storage needs have been analyzed based on the projected distribution of ERUs throughout the system. Table 7.4, ERU Distribution by Pressure Zone includes the assumed distribution of ERUs throughout the pressure zones as included in the computerized hydraulic model of the City's water system.

Table 7.4
ERU Distribution by Pressure Zone

Pressure Zone	2022 Existing (ERU)	2024 10-Year (ERU)	2034 10-Year (ERU)	2044 20-Year (ERU)
750 Pressure Zones (closed zone served by the 4.3 MG Reservoir)	400	4,191	4,233	4,276
850 Pressure Zones (4.3 MG Reservoir)	2,052	143	3,027	3,138
965 Pressure Zone (0.5 MG Tank)	110	465	489	515
1175 Pressure Zone (future 3.0 MG Reservoir)	0	853	898	945
Total	2,562	5,652	8,647	8,874

Basic physical data for both existing and proposed storage reservoirs has been included in Table 7.5, Storage Facility Data.

Table 7.5
Storage Facility Data

Reservoir Data	0.5 MG (Existing)	4.3 MG (Existing)	3.0 MG (Future)
Main Pressure Zone(s) Served	965 PZ	750 & 850 PZ	1175 PZ
Base Elevation (Feet)	930	780	1080 (assumed)
Diameter (Feet)	50	102	73 (assumed)
Height (Feet)	35	71	95 (assumed)
Overflow Elevation (Feet) or HGL	965	851	1,175
Volume per Height (gallon per vertical foot)	14,680	61,090	31,291
Total Volume (MG)	0.51	4.34	2.97
Highest Service Elevation (MSL)	860	760	1,080
Bottom of Standby Storage[1] (MSL)	906	806	1,126
Total Usable Volume (MG)	0.51	2.74	1.53
Percent Usable to Total Volume	100%	63%	51%

(1) Calculated as the water surface elevation at which highest service elevation can be served with 20 psi.

Storage capacity has been analyzed for the following components: 1) operational storage; 2) equalizing storage; 3) standby storage; 4) fire suppression storage; and 5) dead storage.

Operational Storage

Operational storage is the volume of the reservoirs used to supply the water system under normal conditions when the springs and/or intertie are not delivering water to the system. This volume is associated with the elevation difference required for the pump level sensors which is an operational distance of 3 feet for each of the reservoirs.

Equalizing Storage

Equalizing storage is the volume of water used to supply the system at a minimum pressure of 30 psi at all service connections under peak demand conditions and when the system demand exceeds the total rate of supply by the springs and/or intertie. The formula used for reservoirs with electronic level controls is:

ES = (PHD – Qs) * (150 min), but in no case less than zero

where, ES = Equalizing storage (gallons)

PHD = Peak Hourly Demand (gpm)

Qs = Sum of all active source of supply capacities, except emergency sources of supply (gpm).

Standby Storage

Standby storage is the volume of water used to supply the water system under emergency conditions when supply facilities are out of service due to equipment failures, loss of supply, transmission main breaks, power outages, and any other situation that disrupts the supply source. Per DOH requirements, standby storage should never be less than 200 gallons per ERU.

For this WSP storage analysis, standby storage requirements were calculated with the 200 gallons per ERU equation.

Fire Suppression Storage

Fire suppression storage is the volume of storage used to supply water to the system at the maximum rate and duration required to extinguish a building with the highest fire flow requirement. Maximum fire flow requirements served by each of the reservoirs are outlined in Table 7.6, Maximum Fire Flows by Reservoir.

FSS = (FF) x (t)

Where, FSS = Fire Suppression Storage

FF = Required Fire Flow rate (gpm)

t = Duration of time when Fire Flow rate is required (minutes).

Table 7.6
Maximum Fire Flows by Reservoir

Reservoir	Maximum Fire Flow Rate (gpm)	Duration (minutes)
0.5 MG (existing)	2,500	120
4.3 MG (existing)	3,500	120
1.3 MG (future)	3,500	120
3.0 MG (future)	3,500	120

Dead Storage

Dead storage is the volume of water in the reservoir that cannot be used because it is stored at an elevation that does not provide system pressures that meet the minimum pressure requirements established by DOH without pumping.

STORAGE REQUIREMENTS

An analysis of the required storage components indicates that there is sufficient storage capacity within the system for existing conditions as summarized in Table 7.7, Existing Storage Evaluation. Future storage evaluations looked on the reliable supply and storage available to each pressure zone. The results for the 10-year planning period of 2034 are summarized in Table 7.8, Future Storage Evaluation (2034); and for the 20-year planning period of 2044 are summarized in Table 7.9 Future Storage Evaluation (2044).

Table 7.7
Existing Storage Evaluation

Storage Component	Total System[1] (gallons)	965 Pressure Zone (Served by 0.5 MG Reservoir) (gallons)	750 & 850 Pressure Zones (Served by 4.3 MG Reservoir) (gallons)
Operational Storage	227,300	44,000	183,300
Equalizing Storage	62,500	5,800	129,900
Standby Storage	512,415	22,000	490,415
Fire Suppression Storage	420,000	300,000	420,000
Total Storage Required	1,222,215	371,800	1,223,615
Total Storage Available	3,250,700	513,800	2,736,900
Surplus or (Deficit)	2,028,485	142,000	1,513,285

(1) Total system represents the system as a whole and is not equal to the sum of the volumes required by individual pressure zones since fire flow suppression is not cumulative per pressure zone.

Table 7.8
Future Storage Evaluation (2034)

Storage Component	Total System[1] (gallons)	750 & 850 Pressure Zones (Served by 4.3 MG Reservoir) (gallons)	965 Pressure Zone (Served by 0.5 MG Reservoir) (gallons)	1175 Pressure Zone (Served by 3.0 MG Reservoir) (gallons)
Operational Storage	321,200	183,300	44,000	93,900
Equalizing Storage	22,800	69,800	0	0
Standby Storage	1,720,600	1,452,000	97,850	179,550
Fire Suppression Storage	420,000	420,000	300,000	420,000
Total Storage Required	2,163,400	2,125,100	441,850	693,450
Total Storage Available	4,777,700	2,736,900	513,800	1,527,000
Surplus or (Deficit)	2,614,300	611,800	71,950	833,550

(1) Total system represents the system as a whole and is not equal to the sum of the volumes required by individual pressure zones.

Table 7.9
Future Storage Evaluation (2044)

Storage Component	Total System[1] (gallons)	750 & 850 Pressure Zones (Served by 4.3 MG Reservoir) (gallons)	965 Pressure Zone (Served by 0.5 MG Reservoir) (gallons)	1175 Pressure Zone (Served by 3.0 MG Reservoir) (gallons)
Operational Storage	384,600	246,700	44,000	93,900
Equalizing Storage	39,200	81,200	0	0
Standby Storage	1,765,400	1,482,800	103,000	189,000
Fire Suppression Storage	420,000	420,000	300,000	420,000
Total Storage Required	2,224,600	2,230,700	447,000	702,900
Total Storage Available	4,777,700	2,736,900	513,800	1,527,000
Surplus or (Deficit)	2,553,100	506,200	66,800	824,100

(1) Total system represents the system as a whole and is not equal to the sum of the volumes required by individual pressure zones.

OVERALL SYSTEM CAPACITY ANALYSIS

This section summarizes the various components of the water system that could limit the capacity of the City to serve future customers (e.g., supply, storage, and water rights) to determine the maximum number of ERUs it can serve. System capacity is useful in determining how much capacity is available in the water system to support new customers that apply for water service through the building permit process. The system capacity information, together with the projected growth of the system expressed in ERUs, as shown in Chapter 4 – *Water Demands*, also provides the City with a schedule of when additional system capacity is needed.

ANALYSIS CRITERIA

The capacity of the City's system was determined from the limiting capacity of the reliable supply, water rights, and storage. The supply capacity analysis was based on the limiting capacity of the supply facilities and the system's MDD per ERU. The annual water rights capacity evaluation was based on the existing annual water rights, as summarized in Chapter 6 – Water Source and Quality, and the system's ADD per ERU. The instantaneous water rights capacity evaluation was based on the existing instantaneous water rights, as summarized in Chapter 6 – Water Source and Quality, and the system's MDD per ERU. The storage capacity analysis was based on the total capacity of the storage facilities and the computed storage requirement per ERU. The storage requirement per ERU was determined from the existing storage requirements presented previously in this chapter and the existing number of ERUs presented in Chapter 4 – Water Demands.

SYSTEM CAPACITY

A summary of the results of the existing system capacity analysis is shown in Table 7.10, System Capacity Analysis. The results of the 2022 system capacity analysis indicate that the system can support up to a maximum of approximately 11,344 ERUs. The limiting system component is storage.

Table 7.10
Existing System Capacity

System Component	Existing Capacity	2024	2034	2044
System Capacity (ERU)				
Reliable Supply [1]	12,393	12,393	12,393	12,393
Instantaneous Water Right (Qi)	22,549	22,549	22,549	22,549
Annual Water Right (Qa)	15,022	15,022	15,022	15,022
Storage	11,344	11,600	16,516	16,137
850 BPS Reliable Capacity [2]	1,733	1,733	1,733	1,733
System Demand				
750 Pressure Zone	400	4,191	4,233	4,276
850 Pressure Zone	2,052	143	3,027	3,138
965 Pressure Zone	110	465	489	515
1175 Pressure Zone	0	853	898	945
Total System ERUs	2,562	5,652	8,647	8,874
System Evaluation				
System Capacity Limit	11,344	11,600	12,393	12,393
Total ERUs	2,562	5,652	8,647	8,874
Surplus or Deficit	8,782	5,948	3,746	3,519

(1) Based on the reliable pumping capacity of existing North Bank Booster Pump Station and the capacity of the City of Tacoma Intertie during MDD.
(2) The capacity was assumed to be 650 gpm and run no more than 20 hours per day.

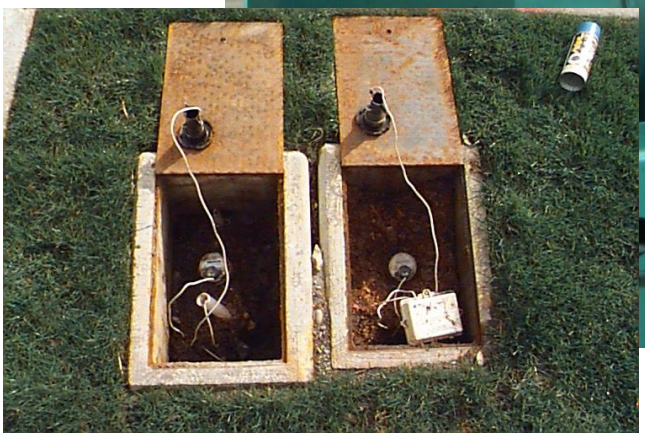
It is the City's goal to improve Water Use Efficiency (WUE) and reduce distribution system leakage. The goal will be to reduce demand by 5 percent in both the 10-year and 20-year horizons. A summary of the results of the future system capacity analysis, is shown in Table 7.10, System Capacity Analysis. The results of the system capacity analysis indicate that the system can support up to a maximum of approximately 12,393 ERUs. The limiting component is supply. This analysis assumes that the 3.0 MG Reservoir will be constructed within the next 10 years; therefore, the results are the same for both the 10-year and 20-year horizons.

In the future, the City's limiting capacity is reliable supply (pumps and pipes). With a 5 percent reduction in water usage per customer, or 171 gallons per day per ERU, the City's future storage requirement and projected MDD would decrease slightly. The reduction in water use would result in realized excess capacity of approximately 500 ERUs. This total number of ERUs does include ERUs consumed by non-metered and distribution system leakage usage.

The use of reclaimed water would require construction of a water treatment plant and revisions to the City's wastewater conveyance system. King County WTD currently operates and maintains the Black Diamond Pump Station at Jones Lake, sewer force main, and the sewage trunk line that runs to Soos Creek Sewer District lift station. The use of reclaimed water is not integrated in the City's planning horizon addressed in this plan.

8 | OPERATION AND MAINTENANCE

Emergency Power Generator



Water Meters

WATER SYSTEM MANAGEMENT AND PERSONNEL

The City of Black Diamond (City) operates with a Mayor-Council form of government with the Mayor acting as the chief administrative official and the City Council acting as the legislative function. The Mayor is assisted with the administrative oversight by a City Administrator who performs the day to day management of the organization. The Public Works Department operates the City's water system and is led by a Director who is assisted as needed by a superintendent, operator, five utility workers and admin staff.

The Public Works Director is the initiator of the department's budget proposals, which are reviewed, modified as needed, and approved through the City's administrative review and Council adoption process. The Public Works Director would also be the person who would most often respond to complaints and establish overall department policy and set department priorities.

The Public Works Superintendent is charged with the day to day operational responsibilities of the water utility. Those responsibilities include operation and maintenance responsibilities,

preventive maintenance, field installation and repair judgments, water quality monitoring, and management of the City's cross-connection control program. The Public Works Superintendent would also respond to water quality issues, system failures and manage various investigative and research programs. Utility billing for the system is accomplished through the field meter reading managed by the Public Works Superintendent, and the administrative function of creating bills and collecting payments that is provided through the City Clerk's office.

On issues requiring more formal notification or responses to the public or press, the Public Works Director would serve as a technical advisor to the City Council in formulating the appropriate responses/notifications to the public/press.

OPERATOR CERTIFICATION

The City has a responsibility to comply with regulations established by the Washington State Department of Health (DOH) Washington Administrative Code (WAC) Chapter 246-292. This requires the City to employ the services of a Water Distribution Manager (WDM) who is in responsible charge of the daily operational activities of the system. This position is required to maintain their currency in the field by obtaining not less than three continuing education units (CEUs) within a specified three-year time frame. Common sources of that training include seminars put on by the American Water Works Association (AWWA) or Washington Education and Training Resources Center (WETRC).

The City meets these requirements through the Superintendent position currently held by Mr. Jesse Stavano. Mr. Stavano is certified as a WDM-3 and is supported by the City's training budget to meet his department's ongoing training and education requirements.

It is important that anyone who assists the Public Works Superintendent be trained as well. At a minimum, the water maintenance staff should be trained in confined space, trenching and shoring, cross-connection control, asbestos cement pipe safety, and traffic flagging.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

The water system map, included in Figure 2.3 – Existing Water System, provides the location of the City's major water system components. Each major component is listed below with a description of their normal operation procedures.

Black Diamond Spring Field

The City currently collects water from a hydraulically interconnected field of springs known as the Black Diamond Spring Field. The springs have two points of collection currently in use. This currently serves as the City's primary source of water. Refer to the description provided in Chapter 2 – Water System Description for a more detailed discussion of this facility.

City of Tacoma Interties

The City also has a secondary source of water supplied by agreement from the City of Tacoma (Tacoma) by two intertie connections with Tacoma's Second Supply Pipe Line (SSPL). This will

become a primary source when the City's growth exceeds the ability of the City's spring field to meet demands. Currently, this source is accessed only to ensure reliability; it is turned off and can only be turned on for emergences by calling Tacoma.

Storage Reservoirs

The City currently operates with two storage reservoirs. The first reservoir provides 0.5 million gallons (MG) of storage and provides service to the 965 Pressure Zone. The City's supervisory control and data acquisition (SCADA) system controls the pumping system and records the volume of water pumped to this reservoir. The second reservoir provides 4.3 MG of storage and provides direct service to the 850 Pressure Zone and via pressure reducing valves (PRVs) to the lower 750 Pressure Zone. It also serves as the source of supply to the 0.5 MG Reservoir via the pumps located at the 4.3 MG Reservoir site.

Pumping Facilities

The City has two active pumping facilities for moving water from its sources of supply to its reservoirs.

The first is the pumping facility located on the north bank of the Green River. It is fed by gravity from the springs, treated with chlorine, and then pumped to the 4.3 MG Reservoir in the 850 Pressure Zone. This pumping facility is equipped with emergency power generation capability.

The second pumping facility is located at the 4.3 MG Reservoir site. It is used to pump water from the 4.3 MG Reservoir to the 0.5 MG Reservoir in the 965 Pressure Zone. This pumping facility is equipped with emergency power generation capabilities.

Water Treatment Systems

The City currently has two water treatment facilities. The first is a chlorination system located at the North Bank Pump Station used for disinfection. The City produces sodium hypochlorite through the use of a 12-pound brine generating system. The second treatment facility is a corrosion treatment system located at the 4.3 MG Reservoir site. Corrosion treatment is provided through the use of a 25-percent sodium hydroxide solution.

Valves

The City currently operates with three pressure zones. These pressure zones are defined through the utilization of four PRVs throughout the system and the use of closed valves.

Additionally, there are numerous valves throughout the system to isolate segments of water main in the event of repairs, emergencies, and construction projects. There are also numerous hydrant valves throughout the system to control flow to fire hydrants.

ROUTINE SYSTEM OPERATION AND MAINTENANCE

Routine maintenance activities help to preserve the value of the water system and to ensure that the utility can continue to operate in an efficient manner. In a water system, maintenance

is essential to ensure that the system can fulfill the safety and health requirements of the customers.

The City conforms to all recommended maintenance tasks as published by equipment suppliers as a minimum standard for maintenance activities. Regular operational tasks for City staff are outlined in Table 8.1, Routine Operations and Preventative Maintenance. Sample forms to be used in documenting and recording maintenance activities have been provided in Appendix V – Operations and Maintenance Forms.

Table 8.1

Routine Operations and Preventative Maintenance

Facility	Activity	Frequency
Black Diamond Spring Field	Clean screens. Inspect for leaks and proper operation. Inspect for animal intrusion.	2-3 times per week
	Maintaining access roads.	As Needed
	Clearing brush from area of springs. Maintain perimeter fence.	As Needed
City of Tacoma Intertie	Inspect for proper operation to ensure intertie is readily available as needed.	Monthly
	Flushing line.	Semi-Annually
Reservoirs	Inspect exterior components of the reservoirs. Inspect for vandalism. Record levels.	Daily
	Inspect screens, vents, and hatch seals. Repair or replace screens and seals as needed.	Monthly
	Operate reservoir drain and run reservoir to overflow. Inspect tank interior. Clean and/or repaint interior and exterior as needed.	Annually
Pumping Facilities	Inspect pump stations.	Bi-weekly
	Inspect condition of pump motors and lubricate as necessary. Replace pump oil. Inspect pump station buildings and piping. Repaint and repair as needed.	Annually
	Maintaining access roads.	As Needed
	Fuel and maintenance required for backup power sources. Security and communications to SCADA. Collect meter data.	As Needed
Treatment Facilities	Replenish cholrine and hypochlorite. Inspect day tanks. Maintain feed lines and metering pumps.	As Needed
Pressure Reducing Valves (PRVs)	Inspect for proper operation.	Quarterly, or additionally as system pressures require
Distribution System Valves	Inspect valves for proper operation.	Semi-Annually
Air/Vacuum Valves	Inspect valves for proper operation.	As Needed
Fire Hydrants	Inspect hydrants, exercise valves, and conduct flow testing.	Annually (by Public Works)
Blowoff Assemblies	Flush lines to remove stagnant water and debris.	Bi-Annually
Meters	Test and calibrate source meters.	Every Five Years
	Replace worn or defective meters.	As needed
Telemetry & Control Systems	Backup program and data.	Daily
	Visually inspect cabinets and panels for damage, dust, and debris. Test alarm indicator units. Clean and flush all pressure sensitive devices.	Semi-Annually

EQUIPMENT, SUPPLIES, AND CHEMICAL LISTING

The City utilizes the equipment included in Table 8.2, Operation and Maintenance Equipment to perform routine operation and maintenance of the water system.

Table 8.2
Operation and Maintenance Equipment

Equipment
2005 Dodge 4x4 Quad Cab Pickup Truck
2016 Dodge 3500 Pickup
2014 Chevy CK2500 Pickup Truck
2006 4500 Chevy Flat Bed Truck
2019 Dodge 4x4 Quad Cab
John Deere 50 Mini Traxhoe
Louisville 5-yard Dump Truck
2012 Vactor Trailer
1998 John Deere Backhoe
1974 John Deere Grader
Miscellaneous Tools, Etc.

Additionally, Table 8.3, Chemical Supplies lists chemicals that are maintained on hand in order to operate the system.

Table 8.3
Chemical Supplies

Chemical	Amount (gallons)
0.8% Sodium Hypochlorite	44
25% Sodium Hydroxide	1,200

COMPREHENSIVE MONITORING PLAN

The City conducts regular water quality testing to ensure that a safe product is being distributed to its customers in conformance with DOH regulations. A copy of the City's Coliform Monitoring Plan has been included in Appendix P – Coliform Monitoring Plan. Additionally, copies of recent water quality test results have been included in Appendix N – Water Quality Testing. Further details regarding water quality monitoring requirements have been included in Chapter 6 – Water Source and Quality.

EMERGENCY RESPONSE PROGRAM

Utility emergency planning can be defined as the activities that prepare a utility to respond to an emergency situation. Emergencies can be small or large with respect to their effects on utility operations and service.

Many utilities cope with smaller scale or routine emergency situations frequently, perhaps weekly or daily. Larger scale or "disaster emergency" situations occur far less frequently, but many aspects or effects of a disaster manifest themselves in the same way as the routine emergencies. In many respects, a disaster can be thought of as the simultaneous occurrence of many smaller scale emergencies. If a utility is well prepared to handle the routine emergencies, then they will be better prepared to handle the more serious ones as well.

PRIORITY SERVICES LIST

In certain instances, particularly during an emergency, it is not possible to provide advanced notice of a water shut down. However, there are certain water customers that must be notified in the event of a disruption of service. Critical among these in the City are kidney dialysis patients. A current list of customers with dialysis machines requiring an uninterrupted supply of water must be maintained. The list must be updated regularly by the City. Customers on the priority list are notified prior to emergency shut down of water service.

AFTER HOURS EMERGENCY CALLOUT

System operators are notified at home of an emergency condition after hours by either City staff directly or a call to the Public Works Utility Emergency cell phone. The situation is assessed by the operations staff person responding to the emergency, and the repairs are completed. As was previously indicated, there are sufficient materials available onsite to make the necessary repairs. An emergency call list has been provided in Table 8.4, Emergency Call List.

Table 8.4
Emergency Call List

Contact	Phone Numbers
Emergency Service	911
Public Works – Utility Emergency Phone	(360) 851-4568
City Hall	(360) 851-4500
Power: Puget Sound Energy and Gas	
Business & Power Outages	(800) 321-4123
Chemical Supplies	
All Pure Chemical	(360) 673-5215
Van Waters and Rogers	(800) 562-4860
Pipe and Fitting Suppliers	
H.D. Fowler	(800) 927-5699
H.D. Supply	(206) 722-4800
Testing Lab (Coliform)	
Department of Health	(206) 361-2800
Water Management Lab	(253) 531-3121
Telephone: CenturyLink Communications	
Business	(800) 603-6000
Repair	(800) 954-1211

In the event of a major disaster:

a. All staff should report to City Hall upon learning of the disaster.

b. During the ensuing survey of the system's facilities for damage, use of the radio should be kept to a minimum and limited to the transmitting of important information.

c. Upon a request to clear the air, all operators should standby for emergency instructions.

d. All contact with the media should be through the Mayor only. This is critical as it will minimize the amount of misinformation that typically accompanies such events.

e. It is important to stick to the task at hand until the damage to the system has been evaluated and City staff have declared that the water system emergency status has been terminated. The damage to the water system must be evaluated to prevent, where possible, loss of life, bodily injury, property damage, and contamination as a result of the damage to water system facilities. All City and

King County forces will be overburdened at such times, but it is not the role of the City personnel to assist Police, Fire, or other personnel unless directed to do so or until released from the emergency work associated with the water system facilities.

EMERGENCY RESPONSE PLAN

Emergency responses for the springs, reservoirs, and distribution system have been identified for the following emergencies: power failure; severe earthquake; severe snowstorm; and contamination of water supply or spring field washout.

Power Failure

Various types of weather can cause loss of power (i.e., wind, lightning, freezing rain, and freezing snowstorm). Power is provided by Puget Sound Energy, and City staff report approximately one power outage per year. Table 8.5, Power Failure Emergency Response, summarizes action recommendations for a power failure event.

Table 8.5
Power Failure Emergency Response

System Component	Action
Pumps: Electric pump will shut off and system will automatically switch to backup power	Verify backup power is working.
Reservoirs: Water level may fall if system demand exceeds supply	Check reservoir level and notify customers to curtail water use if reservoir level continues to drop – increase pumping.
Distribution System: Pressure will drop if reservoir level drops	Continuously monitor reservoir level, implement water restrictions if needed.

Severe Earthquake

Although severe earthquakes are rare, the City may be vulnerable if facilities are damaged. The City should obtain the ability to procure trucked-in water. Table 8.6, Severe Earthquake Emergency Response, summarizes action recommendations for a severe earthquake event.

Table 8.6
Severe Earthquake Emergency Response

System Component	Action
Springs: Structural damage may have occurred and/or mechanical damage to pumps or piping may have occurred	Check pumps and mechanical piping.
Reservoirs: Reservoir may be leaking or structurally damaged	Check reservoir for structural damage and drain if necessary.
	Check reservoir for cracks and leaks and seal or drain as required.
	Bypass reservoir and run system from pumps only.
Distribution System: Distribution and transmission mains may be broken	Isolate broken sections and repair.

Severe Snowstorm

Heavy snowfall will bring motor vehicle traffic to a standstill. Employees will not be able to reach the problem area. Power outages may occur. Water supply should not be interrupted. Table 8.7, Severe Snowstorm Emergency Response, summarizes action recommendations for a severe snowstorm event.

Table 8.7
Severe Snowstorm Emergency Response

System Component	Action
Pumps and Springs	No immediate effect – snow may prevent access. Clear snow from access roads.
Reservoirs	No immediate effect – snow may prevent access. Clear snow from access roads.
Distribution System	Crew transportation to monitor system and to make repairs will be limited. City crews will plow important streets – contact State Highway Department to expedite plowing to any problem area under their jurisdiction. Have chains or other snow gear in readiness for maintenance equipment. Valve location maps should be made available for maintenance personnel and should be kept current. Clear snow from fire hydrants.

Contamination of Water Supply

Contamination of the water supply might occur due to main breaks or pollution from an isolated source. Redundant source capacity and the ability to isolate the reservoirs help to reduce the City's vulnerability. Table 8.8, Contamination of Water Supply Emergency Response, summarizes action recommendations for a contamination of the water supply event.

Table 8.8
Contamination of Water Supply Emergency Response

System Component	Action
Springs: Isolate source of contamination	Close valves as required and isolate source of contamination.
	Repair and/or otherwise remove source of pollution.
	Flush previously contaminated section and test until free of contamination prior to resumption of use.
Reservoirs: Chlorinate	Isolate contaminated reservoir from system and decide method of disinfection.
	Inspect vent screens, hatches, and piping to try and identify the source of contamination.
	If reservoir water is considered unsuitable for consumption due to stagnation, etc., consider draining, cleaning, and disinfecting reservoir.
	If water surface needs skimming, consider overflow reservoir and then disinfect contents.
	Disinfect reservoir with chlorine as required by AWWA standards – take bacteriological samples and return reservoir to service when results are satisfactory.
Distribution System: Isolate source of contamination	Close valves as required to isolate source of contamination. Repair and/or otherwise remove source of pollution.
	Flush previously contaminated section and test until free of contamination prior to resumption of use.

SAFETY PROCEDURES

Safety is the highest concern and responsibility of all water operations and maintenance staff. First aid kits are available at all Public Works buildings and in each maintenance vehicle. Table 8.9, Safety Procedures identifies safety procedures to be followed for operations and maintenance tasks that are associated with the City's water system.

Table 8.9
Safety Procedures

Hazardous Condition	Safety Procedure
Use of Chlorine and Chlorine Products	Handle with care, provide adequate ventilation, and wear safety glasses and rubber gloves. Detailed handling procedures are found in the respective Material Safety Data Sheets (MSDS).
Use of Sodium Hydroxide	Handle with care, provide adequate ventilation, wear safety goggles, apron, and rubber gloves. Keep container tightly closed, store in a dry, corrosion-proof area. Never return contaminated material to its original container. Immediately contact the chemical supplier / manufacturer for handling instructions if drums of caustic appear to be swollen. Detailed handling procedures are found in the respective MSDS.
Working in Confined Spaces	Follow State requirements for confined space entry.
Working around Heavy Equipment	Obtain proper training and follow all safety procedures. Use noise protection equipment.
Working in Traffic Areas	Wear proper clothing and provide adequate signage and flagging for work area. Refer to the Manual of Uniform Traffic Control Devices (MUTCD) for current requirements.
Working on or Around Water Reservoirs	Follow proper safety harness procedures for working on tall structures.
Working in or around Pump Stations	Obtain proper training and follow all safety procedures for working on pumps and electrical equipment. Use noise protection equipment.
Working on Asbestos Cement (AC) Water Main	Obtain proper training and follow all safety procedures for working with asbestos materials.

CROSS-CONNECTION CONTROL PROGRAM

The City has developed a Cross-Connection Control policy to prevent contamination of the City's water supply. A copy of the City's Cross Connection Control Program has been included in Appendix S – Cross Connection Control Program.

CUSTOMER COMPLAINT RESPONSE PROGRAM

The City has received few written complaints, and periodically receives telephone calls from customers with questions or concerns. Any comments or concerns are recorded by the utility clerk and written on a work order form for the utility department to address on a daily basis. The calls are typically infrequent and involve low impact issues. There does not appear to be a trend or pattern to the calls that have been received to date.

RECORDKEEPING AND REPORTING

The City maintains thorough records for water system related data such as customer billing records, source meter readings, and water quality testing. All records are annually stored onto electronic media (i.e., discs or CDs) that are kept in the Public Works office at City Hall. All test results are kept and filed in the Public Works utility file cabinet at City Hall.

9 | WATER SYSTEM IMPROVEMENTS

Tee and Valve Cluster

Black Diamond Springs

INTRODUCTION

This chapter presents proposed improvements to the City of Black Diamond's (City) water system that are necessary to resolve existing system deficiencies. It also gives overview of major projects that may be necessary to accommodate the projected growth of water customers. Most of the distribution-related improvements necessary to serve the master planned developments (MPDs) are being planned and constructed by the MPDs, and details of those projects are not included in this chapter.

Water system improvements were identified from an evaluation of the results of the water system analyses presented in **Chapter 7 – Water System Analysis**. Where applicable, the water system improvements were sized to meet both the existing and future demand conditions of the system.

A Capital Improvement Program (CIP) number, herein referred to as a CIP number, has been assigned to each improvement. The locations of major water system improvements are shown in **Figure 9.1, Proposed Water System Improvements**. The improvements also are illustrated in the hydraulic profile of the future water system, which is shown in **Figure 9.2, Proposed**

Hydraulic Profile. The improvements are organized and presented in this chapter according to the following categories.

- Water Main Improvements
- Supply Improvements
- Storage Improvements
- Facility Improvements
- System-Wide Improvements

The remainder of this chapter presents a brief description of each group of improvements, the criteria for prioritizing improvements, the basis for the cost estimates, and the schedule for implementation.

IDENTIFYING AND PRIORITIZING IMPROVEMENTS

This chapter presents the proposed projects and schedule for the City's 10-year CIP in accordance with the requirements of Washington Administrative Code (WAC) 246-290-100.

The projects were selected to address existing deficiencies and expected growth within the water system customer base. In identifying projects, the plan looked at the supply system, storage requirements, and transmission and distribution needs. The projects were evaluated considering health standards, land use, supply requirements, system reliability, capital investment requirements, consistency with regional plans, and environmental impacts, among others.

Projects were selected for inclusion in the program based on the following criteria:

1. **Growth-Related Projects (New Development) –** The City is anticipating significant development to occur within the next several years. The proposed CIP includes growth-related projects to serve these proposed new developments.
2. **Growth-Related Projects (Existing System) –** These are proposed projects to upsize and improve portions of the existing system that will not be able to adequately serve the system with the anticipated growth.
3. **System Improvements –** These projects are included to address existing system deficiencies, such as inabilities to meet minimum fire flow requirements. These projects include upsized lines and system looping improvements.
4. **Small Line Replacements –** These projects have been included to replace all water mains that are 4 inches and smaller.
5. **Asbestos Cement Line Replacements –** These projects have been included to remove all asbestos cement water mains and replace them with ductile iron materials.

FUNDING SOURCES

Four major funding sources have been identified for funding the proposed improvement projects: 1) system development charges; 2) commodity rates; 3) grants; and 4) MPD funds.

System development charges have been identified as a funding source for projects that are to be funded outright by developments as extensions to the system, but do not include the MPDs, as they have a separate funding agreement, one of which being the WSFFA. Commodity rates and grants have been identified as a funding source for projects that address existing system deficiencies.

Additional discussion regarding the funding of improvements is included in **Chapter 10 – Financial Analysis**.

PROPOSED IMPROVEMENTS

This section provides general descriptions of the 10-year capital improvement projects and an overview of the deficiencies they will resolve. Several of the improvements are necessary to resolve existing system deficiencies. However, several improvements have been identified to illustrate the major facilities that will be required as development occurs. Additional developer-funded projects include localized, on-site water main improvements that are not associated with overall water distribution but are necessary when the property served by the water main is redeveloped or expanded. The costs associated with these improvements shall be borne by the developers, rather than the existing water customers.

CIP No. W1 – Springs Supply Reconstruction

Description

This project will protect and rehabilitate the City's existing springs source, replace pipes, reconstruct the Green River crossing, and update facilities. This will include new pumps, replacing pipes on steep slopes, and replacing the transmission main from the pump station to the City's distribution system.

Background

In late 2013, the City contracted with RH2 Engineering, Inc., to study and compare two alternative concepts to improve and redevelop the springs to full water right capacity. The *Springs Alternative Analysis Study* recommended that the City pursue tapping an artesian spring on the north side of the river rather than reconstructing the spring collection system on the south side. After discussions with the Washington State Department of Health (DOH) and Department of Ecology, it was determined that it was infeasible for the City to transfer its water right to the north side of the Green River. Therefore, the City will improve the springs facilities at their current locations. This is a capacity and system reliability project funded by the Water Supply and Facilities Funding Agreement (WSFFA).

CIP No. W2 – North SR 169 Water Main

Description

Replace 8-inch AC water main along the eastern shoulder of SR 169 from Summit Drive to the south of Summit Ridge hiking trail, connecting to an existing 8-inch main along the western

shoulder of SR169, and looping the water main. A total of approximately 1,630 feet of water main will be replaced.

Background

This project will improve fire flows to the Morganville area and replace substandard pipe that is nearing its useful performance life. An income survey will be required to determine eligibility for additional Community Development Block Grant Funding. Further future study of the existing AC water mains may show that a different AC water main should be replaced earlier than this section of water main. Leak history, street reconstruction projects, pavement condition, developer improvements, and AC pipe strength tests may change the priority of this replacement.

CIP No. W3 – 0.5 MG Water Reservoir Recoat

Description

Repaint the 0.5 MG Reservoir inside and out. This project will add equipment for water mixing in the tank to eliminate stagnation and ensure chlorine residuals remain at optimum levels prior to distribution.

Background

The City drained and inspected the interior of the water tank in 2015. The interior coating has deteriorated to a point where total recoating is needed. If the Lawson Hills developer were to move forward with development above this reservoir, it may be a better solution to rebuild the storage capacity at a higher elevation. However, the lower reservoir would need to last until the higher one is built. This project may be pushed out a few more years while waiting for the development schedule for Lawson Hills in order to decide to defer the project for a few more years or move forward and paint the tank and preserve it.

CIP No. W4 – 4.3-Million Gallon Reservoir Maintenance and Repairs

Description

The 4.3-million-gallon (MG) Reservoir will be 14 years old in 2020. The interior will need inspection. The exterior will need cleaning and potentially spot treatment where the coating is damaged.

Background

This project is a maintenance project and should extend the life of the coating by 10 years or more.

CIP No. W5 – 3.0 MG Reservoir for 1175 Pressure Zone

Description

New developments to the east of the City's existing water system will require service to an upper pressure zone. A 3.0 MG Reservoir will be required to provide open pressure zone service to the area.

Background

The increase in development to the east of the City's existing water system will require service to an upper pressure zone that will serve the Lawson Hills development. Future design and engineering will be necessary to determine the size and location of the reservoir. This is a capacity and system reliability project funded by the WSFFA.

CIP No. W6 – Booster Pumps to 1175 Pressure Zone

Description

New developments to the east of the City's existing water system will require service to an upper pressure zone. A booster pump station and installation of watermain will be required to provide service to the area.

Background

The increase in development to the east of the City's existing water system will require service to an upper pressure zone that will serve the Lawson Hills development. Future design and engineering will be necessary to determine the exact size and location of the booster pumps and watermain.

CIP No. W7 – Springs Power Turbine

Description

Upgrade the City's existing power generated turbine facility located on the Green River at the Black Diamond Springs site.

Background

The City has an existing non-consumptive water right at the Springs site for power generation. The existing facility is outdated and currently offline. This project will replace the turbine equipment and upgrade the existing facility. Power generated will be used to run the North Bank Pump Station or be sold to the power grid to generate money for the water utility.

CIP No. W8 – Rates Study

Description

Conduct a rate study to re-evaluate the City water utilities' financial situation to ensure that commodity rates and capital facility charges can adequately fund the operation and maintenance of the City's water system.

Background

The current rate study specifically evaluated the financial viability of the next six years of the water utility and its ability to fund the 10-year CIP. Updating the rate study should be done periodically to reflect current growth rates, financial markets, and fund balances.

CIP No. W 9 – Morganville North – AC Water Main Replacement

Description

Replace 4-inch and 6-inch AC water main on Morgan Drive from Roberts Drive to the north end of Morgan Drive, east to Union Street, and then south 350 feet to the existing ductile iron pipe. A total of 1,600 feet of water main will be replaced.

Background

This project will improve fire flows to the Morganville area and replace substandard pipe that is nearing its useful performance life. An income survey will be required to determine eligibility for additional Community Development Block Grant Funding. Further future study of the existing asbestos water mains may show that a different AC water main should be replaced than this particular section of water main. Leak history, street reconstruction projects, pavement condition, developer improvements, and AC pipe strength tests may change the priority of this replacement.

CIP No. W10 – Pacific Street Loop – AC Water Main Replacement

Description

Construct 2,000 linear feet of 8-inch ductile iron water main from the intersection with Pacific Avenue to Old Lawson Road to provide system looping.

Background

The homes on 5th Avenue, Pacific Avenue, Pacific Street, and Old Lawson are all on dead-end mains that can cause water quality issues, reduce fire flow availability, and cause interruption of service to more people when a water main needs to be shut down. Easements will be needed to complete the water main loop.

CIP No. W11 – 3rd Ave and Park Street Water Main Replacement

Description

Construct 1,750 linear feet of 8-inch ductile iron water main from the intersection of Roberts Drive and 3rd Avenue along 3rd Avenue to Park Street.

Background

This project will replace old AC main along 3rd Avenue and improve water main looping in the downtown area improving water system reliability.

CIP No. W12 – Morgan Street – AC Water Main Replacement Phase 1

Description

Replace 1,800 feet of 6-inch AC water main from Roberts Drive to Abrams Avenue with a 12-inch ductile iron water main.

Background

The City recently completed the downtown water main improvement project, and this would continue improvements down Morgan Street. The remainder of Morgan Street will be completed in the future.

CIP No. W13 – Morgan Street – AC Water Main Replacement Phase 2

Description

Replace 1,400 feet of 6-inch AC water main from Abrams Avenue to the Railroad Avenue with a 12-inch ductile iron water main.

Background

The City recently completed the downtown water main improvement project, and this would continue improvements down Morgan Street. The remainder of Morgan Street will be completed in the future.

CIP No. W14 – Diamond Square Water Main

Description

Install a 12” ductile iron water main along the eastern shoulder of SR 169 fronting the Diamond Square property. The project will connect 2 existing 12” water mains and create a more complete loop along SR 169. A total of approximately 400 feet of water main will be installed.

Background

This project will improve fire flows to the SR 169 area and provide the ability for future development further north along SR 169 to continue. Further future study of the existing AC water mains may show that a different AC water main should be replaced earlier than this section of water main. Leak history, street reconstruction projects, pavement condition, developer improvements, and AC pipe strength tests may change the priority of this replacement.

CIP No. W15 – Develop Water Quality Analysis Strategy

Description

The City has recently constructed a new intertie with the City of Tacoma. As the City continues to grow and upgrade its spring facilities, more water from the Tacoma interties will be required to supply the water system. This project would analyze the flows through the interties in conjunction with water sampling data to develop operating procedures. The goal would be to improve the blending and combined quality of the two water sources.

Background

This project will improve monitoring procedures and operational considerations for utilizing multiple sources that supply the City's water system.

CIP No. W15 – Leak Detection Program

Description

Prepare and implement a leak detection program to identify, monitor, and reduce non-billed and unauthorized water uses.

Background

Over the last three years, the City's unauthorized and/or distribution system leakage has increased substantially. This program will conduct a leak detection program and develop improved ways to monitor and reduce unauthorized uses.

CIP No. W16 – O&M Programs

Description

Develop various programs to help operate and maintain the City's water system.

Background

Prepare and implement various programs as needed, including a unilateral flushing program, fire hydrant and valve programs, a meter replacement and calibration program, and other projects to facilitate the effective operation of the City's water system.

The proposed improvement projects are presented in **Table 9.1, Proposed 10-Year CIP.**

Table 9.1
Proposed 10-Year CIP

CIP No.	Description	Catergory	Size	Estimated Total Project Cost	City's Share of Cost	Year
10-Year CIP						
W1	Springs Supply Recontruction	Water Main and Supply	3,170 LF	WSFFP	$ 0	2024
W2	North SR 169 Water Main	Water Main	1,000 LF	$ 750,000	$ 750,000	2025
W3	0.5 MG Reservoir Recoat	Storage	entire tank	$ 500,000	$ 500,000	2026
W4	4.3 MG Reservoir Maintenance and Repairs	Storage	spot repairs	$ 1,000,000	$ 1,000,000	2026
W5	3.0 MG Reservoir for 1175 Pressure Zone	Storage	3.0 MG	Developer	$ 0	2026
W6	Booster Pumps to 1175 Pressure Zone	Supply	1,000 gpm	Developer	$ 0	2026
W7	Springs Power Turbine	System-Wide	1 each	$ 40,000	$ 40,000	2027
W8	Rates Study	System-Wide	1 each	$ 20,000	$ 20,000	2027
W9	Morganville North - AC Water Main Replacement	Water Main	2,500 LF	$ 1,900,000	$ 1,900,000	2027
W10	Pacific Street Water Main Loop	Water Main	2,000 LF	$ 1,500,000	$ 1,500,000	2027
W11	3rd Ave and Park Street to Roberts Drive Replacement	Water Main	1,750 LF	$ 1,320,000	$ 1,320,000	2028
W12	Morgan Street AC Replacement Ph 1	Water Main	1,800 LF	$ 1,400,000	$ 1,400,000	2028
W13	Morgan Street AC Replacement Ph 2	Water Main	1,400 LF	Developer	$ 0	2029
W14	Diamond Square Water Main	Water Main	400 LF	Developer	$ 0	2029
W15	Develop Water Quality Analysis Strategy	System-Wide	1 each	--	$ 25,000	2030
W16	Leak Detection Program	System-Wide	annually	$ 20,000/year	$ 20,000/year	2024-2034
W17	O&M Programs	System-Wide	annually	$ 10,000/year	$ 10,000/year	2024-2034

Planning, prioritizing, scheduling, and funding capital improvements for the next 10 years after the 10-Year CIP projects have been completed is more speculative, and many adjustments and additions to the 20-year CIP are to be expected. The 20-year CIP included in this plan is mainly meant to help the City plan for future repair and replacement projects. The proposed improvement projects for potential projects in the years 2029 to 2039 are presented in **Table 9.2, Proposed 20-Year CIP**.

Table 9.2
Proposed 20-Year CIP

CIP No.	Description	Category	Size	Estimated Total Project Cost	City's Share of Cost	Year
20-Year CIP						
W18	Water System Plan Update	System-Wide	1 each	--	$ 200,000	2034
W19	SCADA Improvements	System-Wide	per year	--	$ 50,000/year	Annual
W20	3rd Ave and Lawson St to Lawson St and Newcastle Dr Water Main Replacement	Water Main	2,000 LF	$ 1,500,000	$ 1,500,000	2035
W21	5th Ave and Lawson St to 5th Ave and Baker St Water Main Replacement	Water Main	1,000 LF	$ 800,000	$ 800,000	2035
W22	3rd Ave and SE 332nd St to 3rd Ave and Lawson St Water Main Replacement	Water Main	2,250 LF	$ 1,700,000	$ 1,700,000	2036
W23	Miner Street Water Main Loop	Water Main	1,500 LF	$ 1,200,000	$ 1,200,000	2037
W24	Abrams Ave Water Main Extension	Water Main	2,800 LF	$ 2,100,000	$ 2,100,000	2038
W25	4th Ave Water Main Loop	Water Main	800 LF	$ 600,000	$ 600,000	2040
W26	Baker Street Water Main Replacement	Water Main	200 LF	$ 200,000	$ 200,000	2042

ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed water projects in Black Diamond and around the Puget Sound area and are presented in 2024 dollars. The cost estimates include the estimated construction cost of the improvement and indirect costs estimated at 35 percent of the construction cost for engineering preliminary design, final design, and construction management and contract administration services, permitting, legal, and administrative services. The construction cost estimates include a 10-percent contingency and sales tax.

The unit costs for each water main size are based on estimates of all construction-related improvements, such as materials and labor for the water main installation, water services, fire hydrants, fittings, valves, connections to the existing system, trench restoration, asphalt surface restoration, and other work necessary for a complete installation. Additional costs were added to some water main improvements to cover anticipated increased costs related to the project location and degree of difficulty.

All cost estimates shown in the tables are presented in year 2024 dollars. Therefore, it is recommended that future costs be adjusted to account for the effects of inflation and changing construction market conditions at the actual time of project implementation. Future costs can be estimated using the Engineering News Record (ENR) Construction Cost Index for the Seattle area, or by applying an estimated rate of inflation that reflects the current and anticipated future market conditions.

10 | FINANCIAL ANALYSIS

INTRODUCTION

The financial analysis assesses the ability of the City's water utility to remain financially viable during the planning period, considering its recent historical performance as well as anticipated future needs. It also evaluates the affordability of the City's water rates, both at existing levels and with any rate increases needed to support the planned capital program.

FINANCIAL HISTORY

Table 10.1, Summary of Historical Financial Performance summarizes the financial performance of the City's water utility from 2018 – 2023. Key findings include:

- Consisting primarily of revenue from water sales, the water utility's income from charges for services increased by 104% from 2018 – 2023. Given that the City did not increase its water rates during this period, the observed growth in revenue is fully attributable to growth in the City's water customer base.

- The water utility's 2023 operating expenses were approximately $1,359,000, representing an increase of approximately 121% over the utility's 2018 operating expenses. Labor costs increased by 77%, from $258,000 to $457,000, over this period. Services and charges tripled from 2018 – 2023, notably due to increases in water purchases from Tacoma (which increased due to growth in water demand as well as Tacoma's wholesale water rate increases), electricity (for pumping water), and taxes (which increased proportionately with the utility's revenue growth).

- The operating ratio provides a means of evaluating the self-sufficiency of the City's water utility as an enterprise, measuring the ability of annual operating revenues to cover annual operating costs. A ratio of 1.0 indicates that the City's water utility is collecting exactly enough revenue to pay for its operating costs. Table 10.1, Summary of Historical Financial Performance indicates that the water utility was able to cover its expenses from 2018 – 2023. However, as will be shown in the financial projections later in this chapter, the water utility's expenses begin to outstrip its revenues in FY 2024.

- Days of cash on hand is a measure of financial security, quantifying how long the City would be able to fund daily operating and maintenance costs if it received no additional revenue. It is calculated by dividing unrestricted cash by the average daily cost of operations. While there is no minimum standard for this metric, bond rating agencies have recently expressed a preference for a minimum of 180 days of cash on hand for utilities seeking the highest bond ratings. The City maintained 474 – 878 days of cash on hand between 2018 and 2023.

Table 10.1
Summary of Historical Financial Performance[1] ($000s)

	2018	2019	2020	2021	2022	2023
Beginning Cash & Investments	$827	$1,183	$1,338	$2,503	$1,647	$3,213
Operating Revenues						
Charges for Goods and Services	$865	$938	$1,105	$1,416	$1,642	$1,764
Intergovernmental Revenues	-	-	-	84	270	-
Miscellaneous Revenues	571	878	2,226	3,162	329	282
Total Operating Revenues	$1,436	$1,816	$3,330	$4,663	$2,241	$2,046
Operating Expenses	$614	$823	$1,040	$1,325	$1,409	$1,359
Net Operating Income	$822	$993	$2,290	$3,337	$833	$687
Operating Ratio	*2.34*	*2.21*	*3.20*	*3.52*	*1.59*	*1.51*
Nonoperating Revenues						
Transfers In	$ -	$ -	$ -	$235	$1,946	$134
Other Financing Sources	-	2	-	-	-	-
Total Nonoperating Revenues	$ -	$2	$ -	$235	$1,946	$134
Nonoperating Expenditures						
Debt Service	$317	$316	$314	$313	$311	$303
Capital Expenditures	138	515	801	4,105	890	1,412
Transfers Out	10	10	10	10	11	35
Total Nonoperating Expenditures	$466	$841	$1,125	$4,428	$1,212	$1,750
Increase (Decrease) in Cash and Investments	$357	$154	$1,165	($856)	$1,566	($929)
Ending Cash & Investments						
End Fund Balance – Reserved	$272	$251	$1,240	$498	$257	$213
End Fund Balance – Unreserved	911	1,086	-	-	-	-
End Fund Balance – Assigned	-	-	1,262	1,148	2,955	2,072
Total Ending Cash & Investments	$1,183	$1,338	$2,503	$1,647	$3,213	$2,284
Days of Cash on Hand	*703*	*593*	*878*	*474*	*832*	*613*

[1] *Source: City of Black Diamond Annual Comprehensive Financial Reports 2018-2023*

CAPITAL FUNDING RESOURCES

Other than cash financing, the City may fund the water CIP from a variety of sources, described in further detail below.

GRANT AND LOW-COST LOAN PROGRAMS

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs.

Appendix Y includes a document published by the Washington State Department of Commerce that outlines current State programs, eligibility requirements, and contact information.

CAPITAL FACILITES CHARGE (CFC)

CFCs are a form of connection charge authorized in Section 35.92.025 of the Revised Code of Washington (RCW). CFCs are imposed on new customers connecting to the water system as a condition of service and are in addition to any other costs related to connecting a customer. Typically based on a blend of historical and planned future capital investment in system infrastructure, the underlying premise is that growth (future customers) will pay for growth-related costs that the utility has incurred (or will incur) to provide capacity to serve new customers.

BONDS AND LOANS

While general obligation bonds pledge the full faith and credit of the issuing entity, revenue bonds are typically secured by utility revenues. With this limited commitment, revenue bonds normally bear higher interest rates than other types of debt and also require additional security conditions intended to protect bondholders from default risk. These conditions may include the maintenance of dedicated reserves and minimum standards of financial performance (e.g. debt service coverage).

Revenue bonds can be issued in Washington State without a public vote. While there is no explicit statutory bonding limit, the conditions that come with revenue bonds often impose practical limits on a utility's level of indebtedness. An excessive debt burden may reduce a utility's flexibility to phase in rate increases, also resulting in a higher overall cost of capital investment given the related interest payments. It is worth noting that bond rating agencies also consider a utility's debt service coverage when assigning a rating – higher levels of indebtedness make it more difficult for a utility to meet the coverage ratios that the rating agencies require for the highest ratings (and the lowest interest rates). The water utility has not had any outstanding debt requiring coverage in recent years.

FINANCIAL PLAN

The primary goal of the financial analysis is to develop a viable financial plan to support the execution of the planned capital projects while funding ongoing operations and maintaining affordable rates. This study defines the amount of revenue needed to meet the system's financial obligations including:

- Operation and maintenance costs
- Administrative and overhead costs
- Policy-based needs (e.g. reserve funding)
- Capital costs
- Existing/new debt service obligations

The City operates its water utility as an enterprise, relying on revenue from its water rates (as opposed to taxes or other external resources) to cover the expenses outlined above. The rate-setting process includes both operating and capital elements:

- The revenue requirement analysis determines the amount of revenue necessary to fund the ongoing operation, maintenance, and administration of the utility on an annual basis, focusing specifically on the needs funded from operating revenues. It includes a framework of policies intended to promote long-term financial stability and viability.

- The capital funding plan develops a funding strategy for the CIP that considers rate revenues, existing reserves, CFCs, debt financing, and any other anticipated resources (e.g. grants, developer contributions, etc.). It can impact the revenue requirement analysis through the use of debt financing (resulting in annual debt service) and capital funding embedded in rates.

FINANCIAL POLICIES

The ensuing discussion summarizes the key financial policies used in this analysis.

Utility Reserves

Reserves are a key component of any utility financial strategy, as they provide flexibility to manage variations in costs and revenues that could otherwise have an adverse impact on ratepayers. For the purpose of this analysis, resources are separated into the following funds:

- Water Fund (Operating Reserve): This reserve provides an unrestricted cash balance to accommodate the short-term cycles of revenues and expenses. These reserves are intended to address variations in revenues and expenses, whether anticipated (e.g. billing/receipt cycles, payroll cycles) or unanticipated (e.g. weather, economic conditions). Consistent with the utility's financial policy, the financial analysis assumes a minimum balance target of 90 days of cash on hand for this reserve. Based on the near-term expense forecast, this target equates to roughly $491,000.

- Water Capital Fund: This reserve provides a source of cash for unanticipated capital expenditures such as emergency asset replacements or capital project overruns. In the context of the longer-term financial analysis, it also enforces an appropriate segregation of resources restricted (or otherwise designated) for capital purposes including ongoing infrastructure renewal and replacement. This analysis includes a recommended minimum balance for this reserve equal to 5% of the rolling six-year capital expenditure.

Based on the near-term CIP, this target varies between $132,000 and $443,000 over the planning period.

- WSFFA Fund: The City tracks costs and resources dedicated to facilities that will be constructed as part of the Water Supply and Facilities Funding Agreement (WSFFA). All projects and spending from this fund are planned to be completed by the end of 2026. The financial analysis excludes the WSFFA Fund on the grounds that its activity is driven by and will be paid for by developers as outlined in the WSFFA.

- Debt Reserve: Bond covenants establish reserve requirements as a means of protecting bondholders against the risk of nonpayment. These reserves are typically funded at the time of borrowing, often as part of the amount issued. Though the City currently has no outstanding water utility debt that requires a reserve, the forecast assumes a debt reserve balance equal to one yearly payment of debt service if and when the City issues revenue bonds.

- This analysis also targets a combined balance of 180 days of cash on hand in the Water Fund and Water Capital Fund. Though not a formal requirement, this policy is based on recommendations from the bond rating agencies for borrowers seeking high bond ratings. Given the near-term expense forecast, the combined target balance would be roughly $1,000,000.

Financial Performance Standards

The revenue requirement analysis uses a pair of sufficiency tests to establish the amount of revenue needed to meet the City's financial obligations on an annual basis.

- Cash Flow Test: To satisfy this test, operating revenues must be adequate to fund all known cash requirements including O&M expenses, debt service, rate-funded capital outlays, and reserve funding.

- Coverage Test: Though the water utility currently has no debt requiring coverage, the financial analysis assumes that the utility's net revenue would need to be greater than or equal to 2.0 times annual parity debt service – though this target is somewhat higher than the minimum coverage ratio of 1.25 times annual parity debt service that is typically outlined in bond covenants, it is consistent with the recommendations of the bond rating agencies and provides extra protection in the event of future debt issuance.

The annual revenue requirement is broadly defined as the amount of revenue needed to satisfy both of these tests. Short-term cash flow deficits may occur as part of a strategy to phase rate increases in, as long as the utility has sufficient reserves on hand to absorb them. The financial analysis assumes that any applicable debt service coverage requirements must always be met.

Capital Funding Plan

As shown below in Table 10.2, Water Capital Funding Plan, the 2024 – 2033 CIP includes $8.8 million in project costs escalated to the year of project spending. Construction cost inflation is assumed to be 3.5% per year, in line with historical long-term averages for inflation in the Consumer Price Index for All Urban Consumers (CPI-U) for the Seattle/Tacoma/Bellevue Metropolitan Area. There is no developer funding anticipated to offset capital costs, aside from what the City has received and will receive through the WSFFA (which as noted is excluded from this analysis). Table 10.2, Water Capital Funding Plan indicates that the City's cash resources (including existing cash balances, interest earnings, cash generated through rates, and CFCs) will not be adequate to fully cover the projected capital costs. Given the need for additional funding beyond the City's cash resources, the capital funding strategy includes $5.0 million in bond proceeds in 2026. This analysis assumes that the City issues 20-year bonds at an interest rate of 4.0% – factoring in estimated issuance costs and reserve requirements, this new debt is expected to result in annual debt service payments of approximately $401,000.

Table 10.2
Water Capital Funding Plan ($000s)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total
Projected Capital Expenditures											
Water Reservoir Maintenance	34	-	-	-	-	-	-	-	-	-	34
SCADA/Telemetry	20	21	21	22	23	24	25	25	26	27	235
Comp Plan	249	-	-	-	-	-	-	-	-	-	249
Water Loop 169	464	480	-	-	-	-	-	-	-	-	944
Power Generator Facility	-	54	-	-	-	-	-	-	-	-	54
North SR 169 Water Main	-	-	1,071	-	-	-	-	-	-	-	1,071
SCADA Improvements	-	-	803	-	-	-	-	-	-	-	803
Morganville North - AC Water Main Repl.	-	-	-	2,107	-	-	-	-	-	-	2,107
3rd Ave and Park Street to Roberts Dr. Repl.	-	-	-	-	1,515	-	-	-	-	-	1,515
Morgan Street AC Replacement Ph 1	-	-	-	-	1,607	-	-	-	-	-	1,607
Morgan Street AC Replacement Ph 2	-	-	-	-	-	-	-	-	-	-	-
Diamond Square Water Main	-	-	-	-	-	-	-	-	-	-	-
Leak Detection Program	10	10	11	11	11	12	-	-	-	-	65
O&M Programs	10	10	11	11	11	12	12	13	13	14	117
Total Projected Expenditures	787	575	1,917	2,151	3,167	48	37	38	40	41	8,801
Capital Reserve Projections											
Beginning Balance	-	798	459	4,273	2,935	559	1,332	2,240	3,217	4,266	-
Plus: Funding from Rates/Operating Res.	1,415	100	600	605	609	684	793	844	897	953	7,500
Plus: CFC Revenue	120	121	122	123	124	125	126	127	128	129	1,241
Plus: Debt Proceeds	-	-	5,000	-	-	-	-	-	-	-	5,000
Plus: Interest Earnings	50	16	9	85	59	11	27	45	64	85	452
Less: Capital Expenditures	(787)	(575)	(1,917)	(2,151)	(3,167)	(48)	(37)	(38)	(40)	(41)	(8,801)
Ending Balance	798	459	4,273	2,935	559	1,332	2,240	3,217	4,266	5,392	5,392

REVENUE REQUIREMENT

The revenue requirement analysis evaluates the water utility's ability to cover its projected costs under its currently adopted rates. In the event of any projected deficiencies, this analysis will serve as the basis for a strategy of recommended rate revenue adjustments.

Projected Financial Performance

The revenue requirement analysis is developed from the City's adopted 2024 Budget with other assumptions:

- The forecast of rate revenue is based on the adopted 2024 Budget provided by the City, adjusted for customer growth. Based on the population projections noted in Chapter 3, the financial analysis assumes 0.78% annual growth.

- The operating forecast generally holds most of the water utility's non-rate revenues at 2024 levels moving forward, aside from interest earnings (which are calculated on the water utility's projected fund balances, assuming an interest earnings rate of 2.00% throughout the forecast).

- The forecast of operating expenses generally adjusts the 2024 budgeted expenditures for inflation as follows:

    1. General Cost Inflation: 3.5% per year, based loosely on long-term inflation in the CPI-U for the Seattle-Tacoma-Bellevue Metropolitan Area.
    2. Construction Cost Inflation: 3.5% per year, based loosely on long-term inflation in the Engineering News Record (ENR) Construction Cost Index (20-city average).
    3. Salaries/Benefits: 5.0% per year, based loosely on recent increases in the Bureau of Labor Statistics' Employment Cost Index.

- Taxes are calculated based on the projected revenues and prevailing rates:

    1. State Excise Tax (Water Distribution): 5.029%
    2. Business & Occupation (B&O) Tax: 1.75%.
    3. City Utility Tax: 6.00%

Table 10.3, Projected Financial Performance & Revenue Requirements summarizes the water utility's projected financial performance and rate revenue needs.

Table 10.3
Projected Financial Performance & Revenue Requirements ($000s)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenue										
Rate Revenue at 2024 Rates	$1,811	$1,825	$1,840	$1,854	$1,868	$1,883	$1,897	$1,912	$1,927	$1,942
Other Operating Revenues	239	199	199	199	199	199	199	199	199	199
Interest Earnings	24	13	15	10	10	12	14	15	15	16
Total Revenues	$2,074	$2,037	$2,053	$2,062	$2,077	$2,094	$2,110	$2,125	$2,141	$2,156
Expenses										
Operating Expenses	$1,992	$1,977	$1,912	$1,990	$2,065	$2,144	$2,220	$2,300	$2,383	$2,470
Debt Service	297	-	401	401	401	401	401	401	401	401
Transfers to Water Capital Fund	-	-	600	605	609	614	619	624	629	634
Total Expenses	$2,289	$1,977	$2,914	$2,996	$3,076	$3,159	$3,241	$3,325	$3,413	$3,505
Net Operating Cash Flow	($215)	$60	($860)	($933)	($999)	($1,065)	($1,131)	($1,200)	($1,273)	($1,349)
Annual Rate Adjustment Needed	*0.00%*	*17.00%*	*17.00%*	*15.00%*	*6.00%*	*3.50%*	*3.50%*	*3.50%*	*3.50%*	*3.50%*
After Rate Increases										
Rate Revenue	$1,811	$1,981	$2,518	$2,918	$3,117	$3,251	$3,391	$3,537	$3,690	$3,849
Net Operating Cash Flow	($215)	$198	($257)	$14	$113	$152	$199	$246	$296	$348
Debt Service Coverage	N/A	N/A	2.18	3.06	3.25	3.25	3.42	3.59	3.78	3.98
Projected Ending Balances										
Water Fund	$655	$753	$496	$510	$623	$705	$730	$756	$784	$812
Water Capital Fund	798	459	4,273	2,935	559	1,332	2,240	3,217	4,266	5,392
Total	$1,452	$1,212	$4,769	$3,444	$1,182	$2,037	$2,970	$3,973	$5,049	$6,204
Combined Balance as Days of O&M	266	224	910	632	209	347	488	630	773	917

Table 10.3, Projected Financial Performance & Revenue Requirements indicates that rate increases are necessary to correct net operating cash flow deficiencies that will grow throughout the projection period as operating expenses rise at a higher rate than customer growth. The rate increases shown are expected to enable the water utility to optimize its bond rating by meeting financial performance standards recommended by the rating agencies, specifically maintaining a debt service coverage ratio of at least 2.0 and a combined reserve balance of at least 180 days of operating expenses. Table 10.3, Projected Financial Performance & Revenue Requirements shows the near-term rate increase being phased in from 2025 to 2028, with inflationary rate increases thereafter.

It is important to note that these financial projections are based upon current assumptions and projections. Circumstances can change over time, potentially impacting the rate adjustments that will actually be required to cover the utility's costs. It would be prudent for the City to monitor the water utility's financial status regularly, revisiting the analysis periodically or in the event of significant changes to the assumptions outlined above.

CURRENT AND PROJECTED RATES

Shown below in Table 10.4, Water Rate Forecast, the City's current water rate structure consists of a fixed charge assigned based on meter size and a consumption charge based on water usage within three tiers. The utility measures water consumption in units of 100 cubic feet (CCF).

Table 10.4
Water Rate Forecast

	Current	Proposed	*Projected*							
	2024	2025	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*2032*	*2033*
Fixed Charge by Meter Size										
5/8" and 3/4"	$35.63	$41.69	*$48.77*	*$56.09*	*$59.46*	*$61.54*	*$63.69*	*$65.92*	*$68.23*	*$70.61*
1"	$45.05	$52.71	*$61.67*	*$70.92*	*$75.17*	*$77.81*	*$80.53*	*$83.35*	*$86.26*	*$89.28*
1 1/2"	$48.59	$56.85	*$66.51*	*$76.49*	*$81.08*	*$83.92*	*$86.86*	*$89.90*	*$93.04*	*$96.30*
2"	$84.80	$99.22	*$116.08*	*$133.50*	*$141.50*	*$146.46*	*$151.58*	*$156.89*	*$162.38*	*$168.06*
3"	$102.89	$120.38	*$140.85*	*$161.97*	*$171.69*	*$177.70*	*$183.92*	*$190.36*	*$197.02*	*$203.92*
4"	$193.22	$226.07	*$264.50*	*$304.17*	*$322.42*	*$333.71*	*$345.39*	*$357.48*	*$369.99*	*$382.94*
6"	$499.96	$584.95	*$684.40*	*$787.05*	*$834.28*	*$863.48*	*$893.70*	*$924.98*	*$957.35*	*$990.86*
Water Consumption Charge										
0-600 CCF	$2.76	$3.23	*$3.78*	*$4.34*	*$4.61*	*$4.77*	*$4.93*	*$5.11*	*$5.29*	*$5.47*
601-1,200 CCF	$3.17	$3.71	*$4.34*	*$4.99*	*$5.29*	*$5.47*	*$5.67*	*$5.86*	*$6.07*	*$6.28*
Over 1,200 CCF	$3.65	$4.27	*$5.00*	*$5.75*	*$6.09*	*$6.30*	*$6.52*	*$6.75*	*$6.99*	*$7.23*

Affordability

The Washington State Department of Health and the Public Works Board have historically used an affordability index to prioritize low-cost loan awards. One typical threshold looks at whether the combined water and sewer bill for an average single-family customer exceeds 4.5% of median household income (MHI) for the demographic area – if monthly bills are below this level, they are generally considered affordable.

The reported MHI for households in the City of Black Diamond was $134,076 in 2022 dollars. This evaluation conservatively estimates the MHI in 2024 to equal $134,076 as it is the most recently available data. Table 10.5, Affordability Evaluation, Average Monthly Bill (7 ccf) summarizes the affordability evaluation of the City's rates for the ten-year planning period, using the 2022 estimate of MHI adjusted annually by the assumed CPI inflation rate of 3.5% per year to reflect assumed cost-of-living salary increases.

Table 10.5
Affordability Evaluation, Average Monthly Bill (7 ccf)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Monthly Water Bill at 7 ccf	$ 55.36	$ 64.77	$ 75.78	$ 87.15	$ 92.38	$ 95.61	$ 98.96	$102.42	$106.01	$109.72
Monthly Sewer Bill – City[1]	26.50	27.50	28.88	30.32	31.84	33.43	35.10	36.86	38.70	40.64
Monthly Sewer Bill – King County[2]	55.11	58.28	62.36	66.73	71.41	77.31	83.69	90.60	98.99	108.15
Total Monthly Water/Sewer Bill	$136.97	$150.55	$167.02	$184.20	$195.63	$206.35	$217.75	$229.88	$243.70	$258.51
Annual MHI[3]	$134,076	$138,769	$143,626	$148,652	$153,855	$159,240	$164,814	$170,582	$176,552	$182,732
Avg. Monthly Bill as a % of Monthly MHI	1.2%	1.3%	1.4%	1.5%	1.5%	1.6%	1.6%	1.6%	1.7%	1.7%

[1] Assumes 5% annual increases to the City sewer rate per Figure 27 of the City's 2024 Comprehensive Sewer Plan.

[2] Per King County's Preliminary 2025 – 2034 Sewer Rate Projection, dated February 28, 2024.

[3] Source: U.S. Census Bureau.

Table 10.5, Affordability Evaluation, Average Monthly Bill (7 ccf) suggests that the City's rates are and will remain within the affordability threshold of 4.5% of median household income during the forecast period. However, there has been a growing consensus in the utility industry that MHI is of limited value in assessing the impact of utility rates on customers with income levels considerably below the area median. As discussions about rate affordability continue to evolve, two additional metrics have been gaining traction as providing a more meaningful basis for evaluating affordability:

- *Hours at Minimum Wage (HM):* HM quantifies the amount of time that someone earning minimum wage (currently $16.66 per hour in Washington State) would need to work in order to pay their combined water/sewer bill, assuming that they use a "lifeline" volume of 50 gallons per day per capita (gpcd). Based on the City's average household size of 2.68 people, this assumption equates to roughly 5 ccf per month. The literature discussing HM recommends 8.0 hours as a threshold for defining "affordable" rates.

- *Affordability Ratio at the 20th Income Percentile (AR_{20}):* AR_{20} expresses the combined water/sewer bill (at 50 gpcd) as a percentage of the net disposable income (NDI) of a

household at the 20th income percentile after accounting for the cost of food, housing, power, healthcare, and taxes. NDI has been calculated as the estimated gross annual income of a household in the 20th income percentile ($89,081 in 2024) minus the estimated annual essential expenses for a household of three ($44,875 in 2024), resulting in an estimated NDI of $44,206 per year or $3,684 per month. The literature discussing AR_{20} recommends 10% of NDI as a threshold for defining "affordable" rates.

Table 10.6, Affordability Evaluation, Lifeline Monthly Bill (5 ccf) summarizes the projections of HM and AR_{20} for the ten-year planning period.

Table 10.6
Affordability Evaluation, Lifeline Monthly Bill (5 ccf)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Monthly Water Bill at 5 ccf	$ 49.43	$ 57.83	$ 67.66	$ 77.81	$ 82.48	$ 85.37	$ 88.36	$ 91.45	$ 94.65	$ 97.96
Monthly Sewer Bill – City	26.50	27.50	28.88	30.32	31.84	33.43	35.10	36.86	38.70	40.64
Monthly Sewer Bill – King County	55.11	58.28	62.36	66.73	71.41	77.31	83.69	90.60	98.99	108.15
Total Monthly Water/Sewer Bill	$131.04	$143.61	$157.66	$172.32	$181.81	$190.73	$200.24	$210.39	$222.12	$234.73
Prevailing Hourly Minimum Wage[3]	$16.28	$16.66	$17.24	$17.85	$18.47	$19.12	$19.79	$20.48	$21.20	$21.94
Combined Water/Sewer Bill as HM	8.0	8.6	9.2	9.8	10.1	10.3	10.5	10.7	11.0	11.2
Monthly NDI @ 20th Inc. Percentile[4]	$3,684	$3,813	$3,946	$4,084	$4,227	$4,375	$4,528	$4,687	$4,851	$5,021
Combined W/S Bill as % of NDI (AR_{20})	3.6%	3.8%	4.0%	4.3%	4.4%	4.5%	4.6%	4.7%	4.8%	4.9%

[1] Assumes 5% annual increases to the City sewer rate per Figure 27 of the City's 2024 Comprehensive Sewer Plan.

[2] Per King County's Preliminary 2025 – 2034 Sewer Rate Projection, dated February 28, 2024.

[3] Source: Washington State Department of Labor & Industries. Escalated by assumed CPI inflation (3.5% per year) per RCW 49.46.020 (2)(b).

[4] Source: U.S. Census Bureau (Table B19080) and U.S. Bureau of Labor Statistics. Income and expenses assumed to increase with CPI at 3.5% per year.

Table 10.6, Affordability Evaluation, Lifeline Monthly Bill (5 ccf) suggests that the combined water/sewer bill at the City's current rates is at the upper limit of the affordability threshold of 8 hours of work at minimum wage and will rise above the threshold during the forecast period. The AR_{20} values suggest that the combined water/sewer bill at 5 ccf is and is expected to remain affordable (as defined by the threshold of 10% of the monthly NDI of a household at the 20th percentile) during the forecast period. Together, these metrics suggest that the combined water/sewer bill is relatively affordable for a household at the 20th income percentile, which earns significantly more than minimum wage (assuming a 40-hour work week, the annual income of $89,081 for a household at the 20th percentile equates to an average hourly wage of $42.83, which is more than 2.5 times the 2025 minimum wage of $16.66 per hour).

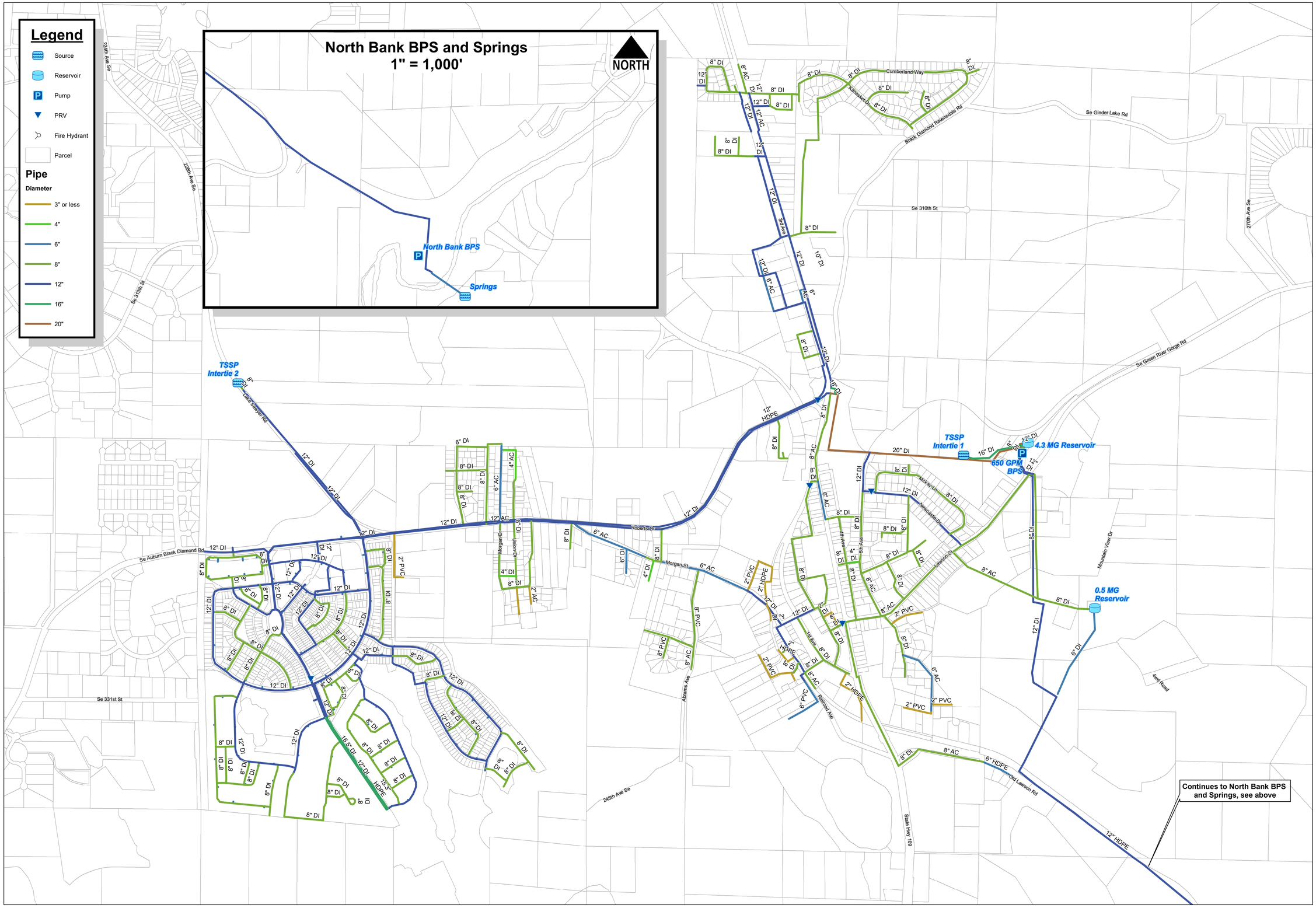
The City's Lifeline Utility Discount program currently offers a 50% discount on water and City sewer rates (excluding King County's charges) to low-income seniors, disabled residents, and veterans with a service-connected disability. For customers receiving this discount, the HM values shown in Table 10.6, Affordability Evaluation, Lifeline Monthly Bill (5 ccf) would vary from 5.7 – 8.1 hours and the AR_{20} values would vary from 2.5 – 3.5% of NDI.

Conclusion

The revenue requirement analysis indicates that the City will need to increase its water rates by a cumulative amount of approximately 67% between 2025 and 2028 to cover its costs and meet the applicable reserve targets. Considering the need to keep up with rising operating costs, the recommended rate strategy envisions rate increases of 17% per year for 2025 and 2026, starting in July 2025, 15% in 2027, 6% in 2028, and inflationary adjustments of 3.5% per year from 2029 – 2033. Even with these increases, the City's water and sewer rates are expected to remain relatively affordable for the City's customers.

It would be prudent for the City to regularly monitor the financial position of its water utility, revisiting the key underlying assumptions to ensure that the utility's revenues remain sufficient to meet its financial obligations.

Figures



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Vicinity Map

Figure 2.3
Existing Water System

City of Black Diamond Water System Plan

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2.3 EX SYSTEM.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

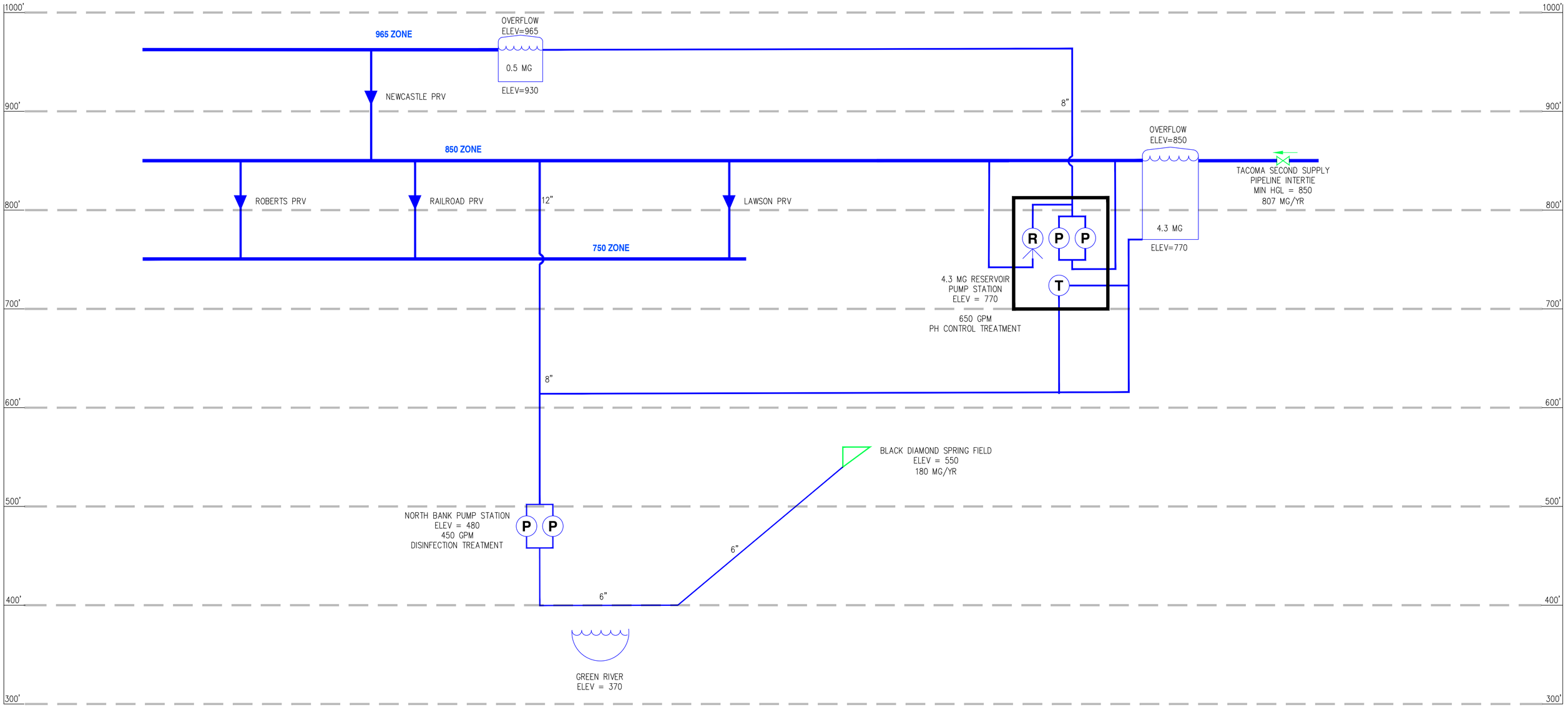
1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH



LEGEND

- Existing System
- Pump Station
- Relief Valve
- Treatment
- PRV
- Intertie
- Water Tank
- Spring
- River

City of Black Diamond

EXISTING HYDRAULIC PROFILE

RH2

FIGURE 2.4

2/12/2020

J:\Data\BD\519-092\CAD

Legend

- Source
- Reservoir
- Pump
- PRV
- Zone Valve
- Parcel

Pipe

- Pipe

Pressure Zone

Zone

- 750
- 850
- 965

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

TSSP
Intertie 2

TSSP
Intertie 1

4.3 MG
Reservoir
&
650 GPM BPS

0.5 MG
Reservoir

Continues to North Bank BPS and Springs, see above

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Vicinity Map

Figure 2.5
Existing Pressure Zones

City of Black Diamond
Water System Plan

CITY OF BLACK DIAMOND
STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE
WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2.5 PRESSURE ZONE.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Diameter

- 3" or less
- 4"
- 6"
- 8"
- 12"
- 16"
- 20"

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

TSSP
Intertie 2

TSSP
Intertie 1

4.3 MG
Reservoir

650 GPM BPS

0.5 MG
Reservoir

Continues to North Bank BPS and Springs, see above

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Vicinity Map

Figure 2.6
Existing Pipe Sizes

City of Black Diamond
Water System Plan

CITY OF BLACK DIAMOND
STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE
WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2.6 PIPE SIZE.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Material

- Asbestos Cement
- Cast iron
- Ductile Iron
- HDPE
- PVC

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

TSSP
Intertie 2

TSSP
Intertie 1

4.3 MG
Reservoir

650 GPM BPS

0.5 MG
Reservoir

Continues to North Bank BPS and Springs, see above

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Vicinity Map

Figure 2.7
Existing Pipe Materials

City of Black Diamond
Water System Plan

CITY OF BLACK DIAMOND
STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE
WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2.7 PIPE MATERIAL.MXD BY: JRIBAIL PLOT DATE: MAR 5, 2025 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel
- Retail Water Service Area
- City Limits
- UGA Boundary

Pipe

- Pipe

TSSP Intertie 2

TSSP Intertie 1

4.3 MG Reservoir

650 GPM BPS

0.5 MG Reservoir

North Bank BPS

Springs

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Vicinity Map

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Figure 2.8
Water Service Area
City of Black Diamond Water System Plan

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2.8 WSA.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

1 inch = 1,200 feet

0 600 1,200 2,400 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

Legend

- Parcel
- City Limits

Land Use

- Business Park & Light Industrial
- Community Commercial
- Industrial
- Low Density Residential
- Medium Density Residential
- Neighborhood Commercial
- Public
- Town Center
- Master Planned Development (flexible land use area)

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Vicinity Map

J:\DATA\BD\519-092\GIS\MAP\FIGURE 3.1 LAND USE.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Figure 3.1
City Land Use Designation

City of Black Diamond Water System Plan

1 inch = 1,200 feet

0 600 1,200 2,400 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

Legend

- Parcel
- City Limits

County Zoning

- Other
- A1
- B4
- C1
- C9
- DV
- I1
- P3
- P4
- P7
- P8
- R1
- R3
- R4
- R5
- U1

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Vicinity Map

Figure 3.2
County Land Use Designation

City of Black Diamond Water System Plan

J:\DATA\BD\519-092\GIS\MAP\FIGURE 3.2 COUNTY LAND USE.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

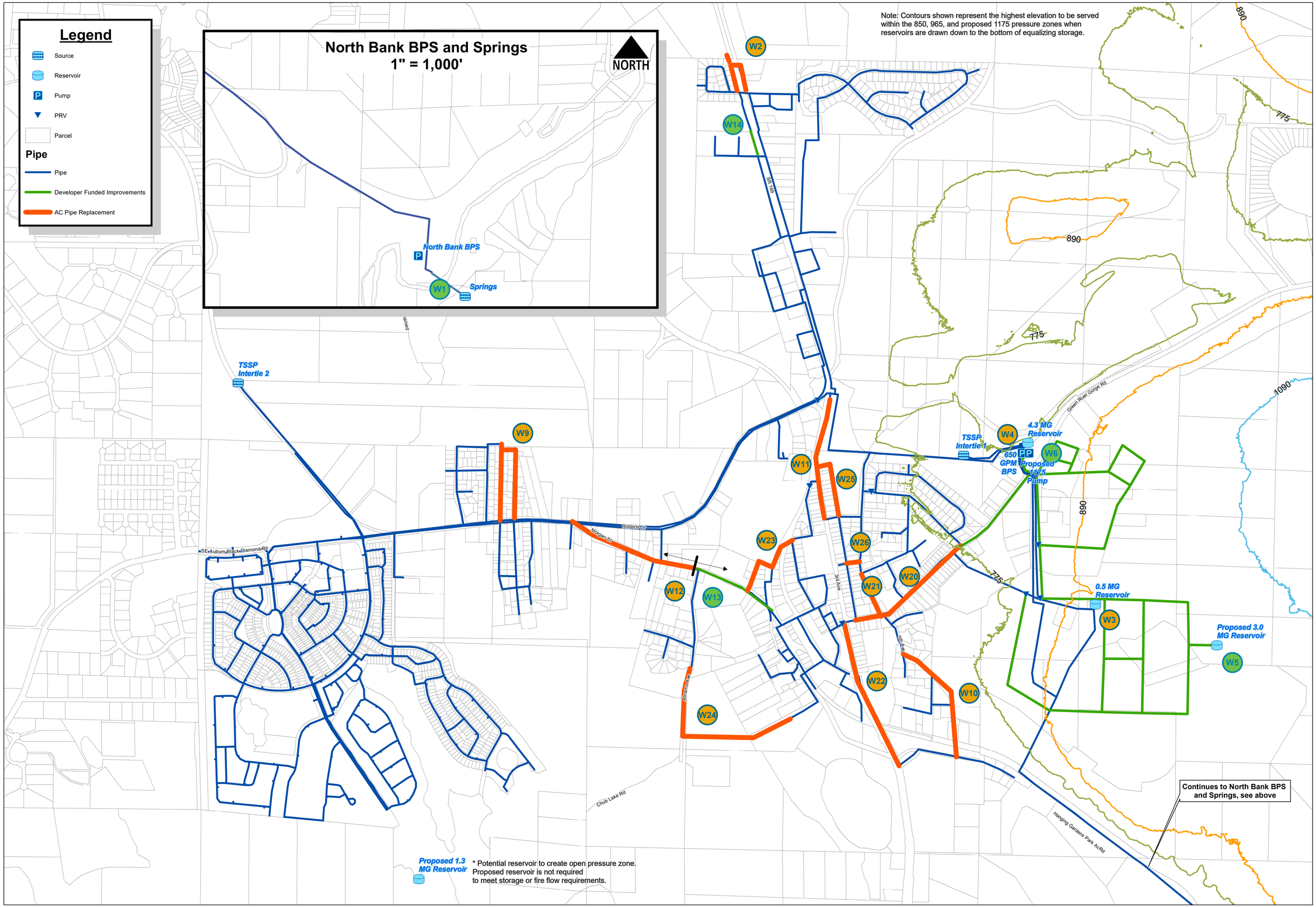
1 inch = 1,200 feet

0 600 1,200 2,400 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH



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Vicinity Map

Figure 9.1
Proposed Water System Improvements
City of Black Diamond Water System Plan

CITY OF BLACK DIAMOND STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE 9.1 CITY PROPOSED IMPROVEMENTS.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

- Pipe
- Developer Funded Improvements
- AC Pipe Replacement

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

W1

Note: Contours shown represent the highest elevation to be served within the 850, 965, and proposed 1175 pressure zones when reservoirs are drawn down to the bottom of equalizing storage.

890

775

1090

W2

W9

W11

W25

W23

W26

W12

W21

W20

W22

W10

W24

W4

W3

W1

TSSP Intertie 2

TSSP Intertie 1

650 GPM BPS

4.3 MG Reservoir

Proposed 1175 Pump

0.5 MG Reservoir

Proposed 3.0 MG Reservoir

Proposed 1.3 MG Reservoir

North Bank BPS

Springs

Continues to North Bank BPS and Springs, see above

* Potential reservoir to create open pressure zone. Proposed reservoir is not required to meet storage or fire flow requirements.

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Vicinity Map

Figure 9.2
Proposed Developer Water System Improvements
City of Black Diamond Water System Plan

1 inch = 1,200 feet

0 600 1,200 2,400 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE 9.2 DEVELOPER PROPOSED IMPROVEMENTS.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Diameter

- 3" or less
- 4"
- 6"
- 8"
- 12"
- 16"
- 20"

Junction

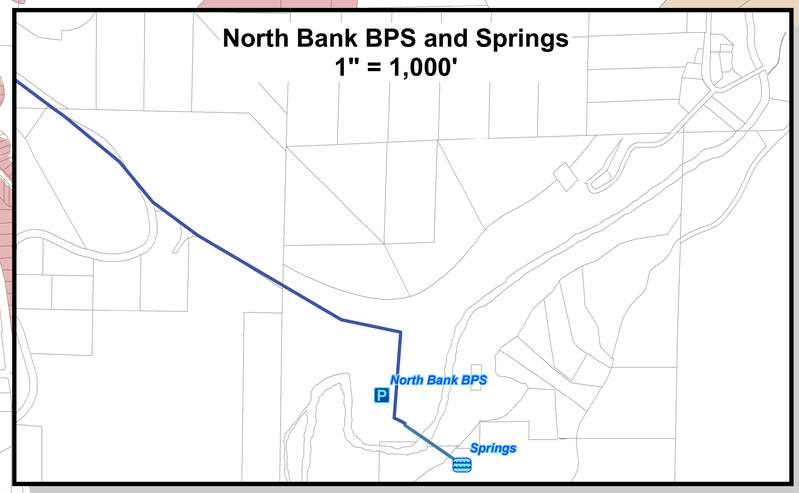
Available Fire Flow

- 0 - 1,000 GPM
- 1,000 - 2,500 GPM
- 2,500 - 3,000 GPM
- 3,000 - 3,500 GPM
- > 3,500 GPM

Land Use

- Business Park & Light Industrial
- Community Commercial
- Industrial
- Low Density Residential
- Medium Density Residential
- Neighborhood Commercial
- Public
- Town Center

North Bank BPS and Springs
1" = 1,000'



TSSP Intertie 2

TSSP Intertie 1

4.3 MG Reservoir

650 GPM BPS

0.5 MG Reservoir

Continues to North Bank BPS and Springs, see above

This map is a graphic representation derived from the City of Black Diamond Geographic Information System. It was designed and intended for the City of Black Diamond staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Black Diamond.

This material is owned and copyrighted by the City of Black Diamond.

Vicinity Map

Figure A
Existing Water System MDD

City of Black Diamond Water System Plan

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE A JUNCTIONSMDD.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Diameter

- 3" or less
- 4"
- 6"
- 8"
- 12"
- 16"
- 20"

Junction

Pressure

- 0 - 30 psi
- 30 - 100 psi
- > 100 psi

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

TSSP Intertie 2

4.3 MG Reservoir

TSSP Intertie 1 1650 GPM BPS

0.5 MG Reservoir

Continues to North Bank BPS and Springs, see above

This map is a graphic representation derived from the City of Black Diamond Geographic Information System. It was designed and intended for the City of Black Diamond staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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This material is owned and copyrighted by the City of Black Diamond.

Vicinity Map

Figure B
Existing Water System PHD

City of Black Diamond Water System Plan

CITY OF BLACK DIAMOND — STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE B JUNCTIONSPHD.MXD BY: JRIBAIL PLOT DATE: SEP 10, 2024 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

1200'
1100'
1000'
900'
800'
700'
600'
500'
400'
300'

1175 ZONE

3.0 MG

OVERFLOW
ELEV=1175

PROPOSED PRV

965 ZONE

OVERFLOW
ELEV=965

0.5 MG

ELEV=930

NEWCASTLE PRV

8"

NOTE: POTENTIAL RESERVOIR TO CREATE OPEN PRESSURE ZONE. PROPOSED RESERVOIR IS NOT REQUIRED TO MEET STORAGE OR FIRE FLOW REQUIREMENTS.

OVERFLOW
ELEV=850

1.3 MG

ELEV=790

850 ZONE

ROBERTS PRV

RAILROAD PRV

12"

LAWSON PRV

OVERFLOW
ELEV=850

TACOMA SECOND SUPPLY
PIPELINE INTERTIE
MIN HGL = 850
807 MG/YR

4.3 MG

ELEV=770

R P P

T

4.3 MG RESERVOIR
PUMP STATION
ELEV = 770

650 GPM
PH CONTROL TREATMENT

750 ZONE

8"

BLACK DIAMOND SPRING FIELD
ELEV = 550
180 MG/YR

NORTH BANK PUMP STATION
ELEV = 480
450 GPM
DISINFECTION TREATMENT

P P

6"

6"

GREEN RIVER
ELEV = 370

LEGEND

- Existing System
- Proposed System
- Pump Station
- Relief Valve
- Treatment
- PRV
- Intertie
- Water Tank
- Spring
- River

City of Black Diamond

PROPOSED HYDRAULIC PROFILE

RH2

FIGURE 9.2

2/12/2020

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Appendix A

Water Facilities Inventory (WFI) Form

WATER FACILITIES INVENTORY (WFI) FORM

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

ONE FORM PER SYSTEM

Quarter: 1
Updated: 04/05/2022
Printed: 11/27/2023
WFI Printed For: On-Demand
Submission Reason: Source Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822 or email wfi@doh.wa.gov

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
07220 7	BLACK DIAMOND WATER DEPT	KING	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

JESSE A. STAVANO [PWD]
PO BOX 599
BLACK DIAMOND, WA 98010

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 24301 ROBERTS DR
CITY BLACK DIAMOND STATE WA ZIP 98010

7. OWNER NAME & MAILING ADDRESS

BLACK DIAMOND, CITY OF
CAROL BENSON MAYOR
PO BOX 599
BLACK DIAMOND, WA 98010

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS 24301 ROBERTS DR
CITY BLACK DIAMOND STATE WA ZIP 98010

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone:		Owner Daytime Phone: (360) 886-5703	
Primary Contact Mobile/Cell Phone: (253) 736-5984		Owner Mobile/Cell Phone: (253) 797-2608	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail:	Fax: (360) 886-2592	E-mail: cxxxxxn@ci.blackdiamond.wa.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [x] Commercial / Business
- [ ] Day Care
- [x] Food Service/Food Permit
- [ ] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [x] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

4,800,000

15	16	17	18									19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY									USE				TREATMENT						DEPTH		SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	SOFA SPRING ENCLOSED							X					X			Y		X				X		500	NE SW	19	21N	07E
S02	MATTRESS SPRING ENCL							X							X	Y		X				X		500	NE SW	19	21N	07E
S03	LEAF SPRING ENCLOSED							X					X			Y		X				X		500	NE SW	19	21N	07E
S04	All Springs						X						X			Y		X				X		1500	NE SW	19	21N	07E
S05	Tacoma/Intertie (2)	86800 N													X	Y		X						3800	SE SE	11	21N	06E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
07220 7	BLACK DIAMOND WATER DEPT	KING	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		1314	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	1297		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	17		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	7	7	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	34	34	
28. TOTAL SERVICE CONNECTIONS		1355	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 2251

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
B. How many days per month is water accessible to the public?	31	29	31	30	31	30	31	31	30	31	30	31

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT already included in the residential population?	100	100	100	100	100	100	10	10	100	100	100	100
B. How many days per month are they present?	20	20	20	20	20	15	20	20	15	20	20	15

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	2	2	2	2	2	2	2	2	2	2	2	2

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

WS ID	WS Name
07220	BLACK DIAMOND WATER DEPT

Total WFI Printed: 1

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

Water Facilities Inventory (WFI)

Report Create Date:	11/27/2023		
Water System Id(s):	072207		
Print Data on Distribution Page:	ALL		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	ALL		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

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Appendix B

DOH Checklists and Correspondence

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

Local Government Consistency Determination Form

Water System Name: Black Diamond Water Department PWS ID: 07220

Planning/Engineering Document Title: Water System Plan Plan Date: Spring 2024

Local Government with Jurisdiction Conducting Review: City of Black Diamond

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.	Chapter 3, Pgs 3-2 to 3-3	
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.	Chapter 4, Pgs 4-14 to 4-15	
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.	Chapter 5	
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.	Chapter 5, Pgs 5-1 to 5-4	
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.	Chapters 3, 9 & 10	

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

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 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 noncommunity 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 (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) 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 relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) 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.*

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

e) **Other relevant elements** the Department of Health determines are related to water supply planning. 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 explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: 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 review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

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

Local Government Consistency Determination Form

Water System Name: Black Diamond Water Department PWS ID: 07220

Planning/Engineering Document Title: Water System Plan Plan Date: Spring 2024

Local Government with Jurisdiction Conducting Review: Covington Water District

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.	Chapter 3, Pgs 3-2 to 3-3	
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.	Chapter 4, Pgs 4-14 to 4-15	
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.	Chapter 5	
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.	Chapter 5, Pgs 5-1 to 5-4	
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.	Chapters 3, 9 & 10	

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

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.

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b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) 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.*

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

Local Government Consistency Determination Form

Water System Name: Black Diamond Water Department PWS ID: 07220

Planning/Engineering Document Title: Water System Plan Plan Date: Spring 2024

Local Government with Jurisdiction Conducting Review: King County

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.

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	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Chapter 3, Pgs 3-2 to 3-3	
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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

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

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Appendix C

Black Diamond Urban Growth Area Agreement

BLACK DIAMOND
URBAN GROWTH AREA AGREEMENT

among

King County, Washington

and

City of Black Diamond, Washington

and

Palmer Coking Coal Company

and

Plum Creek Timber Company, Limited Partnership

TABLE OF CONTENTS

PAGE

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BLACK DIAMOND URBAN GROWTH AREA AGREEMENT

THIS AGREEMENT is entered into by and between KING COUNTY, a Washington home rule charter county, the CITY OF BLACK DIAMOND, a Washington municipal corporation, PLUM CREEK TIMBER COMPANY, L.P. and PALMER COKING COAL COMPANY.

WHEREAS King County is a home rule charter county under the laws of the State of Washington with authority to enact laws and enter into agreements to promote the health, safety and general welfare of its citizens, including land use plans and development regulations, annexation agreements, and development agreements; and

WHEREAS the City of Black Diamond is a municipal corporation incorporated under the laws of the State of Washington with authority to enact laws and enter into agreements to promote the health, safety, and welfare of its citizens and thereby to control the use and development of property within its jurisdiction and to annex territory and specify zoning and development standards for annexed areas; and

WHEREAS Plum Creek Timber Company, L.P. and Palmer Coking Coal Company are owners of property within and in the vicinity of the Urban Growth Area for the City of Black Diamond; and

WHEREAS the King County Countywide Planning Policies ("CPPs") designated Joint Planning Areas for those cities, including Black Diamond, where agreement on the boundaries of each city's urban growth area had not been reached and required that they be designated by the end of 1995 or be subject to ratification; and

WHEREAS the CPPs designated a maximum 3000-acre Joint Planning Area (JPA) for the City of Black Diamond, within which a UGA could be designated by King County; and

WHEREAS in Ordinance 12065, adopted in December 1995, the King County Council designated a 1927-acre UGA for the City of Black Diamond, shown on the King County Comprehensive Plan Land Use Map as "New Rural City Urban Growth Area," which includes 1767 acres of the former JPA and 160 acres in the area known as Lake 12 Neighborhood; and

WHEREAS Ordinance 12065 also provided that by December 31, 1996 the following must occur or the New Rural City Urban Growth Area shall expire and automatically revert to a Rural designation: the King County Council must designate up to 915 acres of the lands within the New Rural City Urban Growth Area for future urban development and the remainder, excluding the Lake 12 Neighborhood, according to specified ratios, as Open Space or Natural Resource Use lands; and King County, the City of Black Diamond, and the affected property owners must address and resolve in a Potential Annexation Area and/or development agreement the issues delineated in Section 3 of the Ordinance; and

WHEREAS the CPPs establish policies for designating City potential annexation areas within the countywide urban growth boundary and require each City with a potential annexation area to enter into an interlocal agreement with the County for defining service delivery responsibilities; and

WHEREAS this agreement is intended to implement the provisions Ordinance 12065 and the CPPs;

WHEREAS, RCW 39.34 provides authority for jurisdictions to enter into interlocal agreements and state law authorizes contracts between jurisdictions and property owners defining conditions of land use development and approvals;

NOW, THEREFORE, King County, the City of Black Diamond, Plum Creek Timber Company L.P., and Palmer Coking Coal Company do hereby agree as follows:

1. PARTIES AND MUTUAL CONSIDERATION

The parties to this Agreement are King County (hereinafter referred to as "County"), the City of Black Diamond (hereinafter referred to as "City"), Plum Creek Timber Company, L.P. (hereinafter referred to as "Plum Creek") and Palmer Coking Coal Company (hereinafter referred to as "Palmer"). The parties acknowledge that they have diverse and potentially conflicting objectives with regard to the City's Urban Growth Area, and this Agreement is entered into to resolve those issues in a mutually beneficial way. The parties covenant to perform such acts as may be called for by this Agreement. In consideration of the mutual promises set forth herein, including, but not limited to, the County agreeing to support annexation consistent with the terms of this Agreement, the City agreeing to seek annexations consistent with the terms of this Agreement, and Plum Creek and Palmer agreeing to use and develop their property consistent with the terms of this Agreement, the parties hereby mutually promise to be bound by the terms and conditions of this Agreement.

2. DEFINITIONS

"County Open Space" means approximately 984.2 acres of land outside the Urban Growth Area within unincorporated King County to be dedicated as permanent open space under this Agreement upon annexation of the West and South Annexation Area, shown as "County Open Space" on Appendix A, Map 5.

"East Annexation Area" means approximately 50 acres along the eastern boundary of the City in the Urban Growth Area intended for urban development upon annexation under this Agreement and shown as "East Annexation Area" on Appendix A, Map 1.

"In-City Forest Land" means approximately 50 acres of land within the existing City limits subject to a limited-term conservation easement under this Agreement and shown as "In-City Forest Land" on Appendix A, Map 6.

"In-City Open Space" means approximately 542 acres of land within the existing City limits to be preserved as permanent open space, trails, parks, or treasured places, either by having their development rights purchased pursuant to a City TDR Program or by having their conservation otherwise provided for upon annexation of the West and South Annexation Area under this Agreement.

"Master Planned Development" or "MPD" means the 783 acres located in Section 22 and in the southeast quarter of Section 15 which were annexed into the City of Black Diamond in December, 1994.

"Lake 12 Annexation Area" means approximately 160 acres in the northeast corner of the Urban Growth Area intended for annexation under this Agreement and shown as "Lake 12 Annexation Area" on Appendix A, Map 1.

"Potential Annexation Area" or "PAA" means approximately 782.2 acres within unincorporated King County intended for annexation under this Agreement, which is also the City's Urban Growth Area designated in King County Ordinance 12533. It is shown as "Black Diamond Urban Growth Area/Potential Annexation Area" on Appendix A, Map 1.

"Potential In-City Open Space" means planned or potential open space, trails, parks and treasured places within the existing City designated as "Potential In-City Open Space" in Appendix A, Map 4 which may be amended by the City from time to time consistent with Section 3.2 and within which In-City Open Space shall be provided under this Agreement.

"South Annexation Area" means approximately 233.6 acres in the southern portion of the Urban Growth Area intended for annexation under this Agreement and shown as the "South Annexation Area" on Appendix A, Map 1.

"Transfer of Development Rights or TDR Program" means the program to be established by the City pursuant to Section 7.4 that will allow the transfer of development rights off of priority open space parcels located inside the City's boundaries to residential lands in the West, South and East Annexation Areas as well as within the existing City.

"Urban Development Areas" means approximately 416.9 acres within the West and South Annexation Areas intended for urban development upon annexation and shown as "Urban Development Areas" on Appendix A, Map 7.

"Urban Growth Area" or "UGA" means approximately 782.2 acres in unincorporated King County designated as the City's Urban Growth Area in Ordinance 12533 and shown on the County Comprehensive Land Use Map as "Rural City Urban Growth Area" and on Appendix A, Map 1 as "Urban Growth Area/Potential Annexation Area."

"UGA Open Space" means approximately 145 acres within the West and South Annexation Areas intended to be preserved as permanent open space upon annexation and shown as "UGA Open Space" on Appendix A, Maps 2, 3, & 7.

"West Annexation Area" means approximately 328.6 acres within the western portion of the Urban Growth Area intended for annexation under this Agreement shown as the "West Annexation Area" on Appendix A, Map 1.

"West Boundary Adjustment" means approximately 10 acres of land along the west boundary of the City intended for annexation in order to provide a road and utility corridor for future development in the City, shown as "West Boundary Adjustment" on Appendix A, Map 1.

3. AREAS COVERED BY AGREEMENT

3.1 **Potential Annexation Area.** The area intended for annexation under this Agreement is the City's Potential Annexation Area, which is the UGA designated for the City by King County Ordinance 12533 and

shown on Appendix A, Map 1 as "Black Diamond Urban Growth Area/Potential Annexation Area". The Potential Annexation Area, which consists of approximately 782.2 acres located in unincorporated King County, is comprised of the following:

3.1.1 West Annexation Area. The West Annexation Area, shown on Appendix A, Map 1 as "West Annexation Area", consists of approximately 328.6 acres of land owned by Plum Creek in the western portion of the UGA. Within the West Annexation Area, approximately 265.3 acres are intended for urban development upon annexation and are shown as "Urban Development Areas" on Appendix A, Map 2 and approximately 63.3 acres are to be set aside permanent open space upon annexation and are shown as "UGA Open Space" on Appendix A, Map 2.

3.1.2 South Annexation Area. The South Annexation Area, shown on Appendix A, Map 1 as "South Annexation Area", consists of approximately 233.6 acres of land owned by Plum Creek in the southern portion of the UGA. Within the South Annexation Area, approximately 151.9 acres are intended for urban development upon annexation and are shown as "Urban Development Areas" on Appendix A, Map 3 and approximately 81.7 acres are to be set aside as permanent open space upon annexation and are shown as "UGA Open Space" on Appendix A, Map 3.

3.1.3 East Annexation Area. The East Annexation Area, shown on Appendix A, Map 1 as "East Annexation Area", consists of approximately 50 acres of land owned by Palmer in the UGA along the eastern border of the City which is intended for urban development upon annexation to the City.

3.1.4 Lake 12 Annexation Area. The Lake 12 Annexation Area, shown on Appendix A, Map 1 as "Lake 12 Annexation Area", consists of approximately 160 acres of existing residential development in the northeast portion of the UGA including that segment of the Green River Gorge Road between the existing City limits and the existing residential development surrounding Lake 12 which is intended for possible annexation into the City for future urban development

3.1.5 West Boundary Adjustment. Approximately 10 acres of land along the west boundary of the existing City limits shown on Appendix A, Map 1 as "West Boundary Adjustment", is intended for annexation into the City in order to facilitate proper alignment of the transportation and utility corridor to serve future urban development.

3.2 In-City Open Space. As detailed below in Section 5, approximately 542 acres of land within the existing City limits are to be set aside as permanent open space under this Agreement either by having their development rights purchased on or before annexation pursuant to a City TDR Program or by having their conservation otherwise provided for pursuant to Section 7.3. The areas that are eligible for use as sending sites for purchase of development rights or otherwise for provision of In-City Open Space are shown on Appendix A, Map 4 as "Potential In-City Open Space." This map may be amended by the City from time to time to add qualifying open space, trails, treasured places, or parks. Open space amendments shall be consistent with the Natural Resource Principles in Appendix E.

3.3 County Open Space. As detailed below in Section 5, approximately 984.2 acres of land outside the UGA within unincorporated King County are to be dedicated as permanent open space under this Agreement upon annexation of the UGA and are shown on Appendix A, Map 5 as "County Open Space".

3.4 In-City Forest Land. Approximately 50 acres of land owned by Palmer within the existing City limits, and shown as "In-City Forest Land" on Appendix A, Map 6, are intended to have their development rights transferred no later than the annexation of the East Annexation Area.

3.5 Acreage Chart. The acres reflected in this Agreement and in the chart attached as Appendix B are estimates based on the King County Department of Development and Environmental Services Geographic Information System and database used to generate the maps in Appendix A and are subject to change following more detailed study and survey, except that the combined County Open Space, UGA Open Space and In-City Open Space shall be no less than four times the combined acres in the Urban Development Areas in the West and South Annexation Areas.

4. PRE-ANNEXATION TERMS AND CONDITIONS

4.1 Land Use Designations and Zoning for PAA. Until annexed, the Potential Annexation Area shall be designated on the King County Comprehensive Land Use Map as "Rural City UGA". The Potential Annexation Area shall be zoned UR-P (Urban Reserve, one dwelling unit per 5 acres, with a P-suffix condition) until annexation occurs, as shown on Appendix A, Map 8, provided that any uses or development of land within the West and South Annexation Areas shall be subject to the use limitations and restrictions contained in the conservation easements covering these lands consistent with Section 4.2.1, provided further, that use and development of the lands within the East Annexation Area shall be consistent with the zoning regulations and standards including density (1 du/80 acres) that apply to F (Forest)-zoned property.

4.2 Interim Conservation Easements

4.2.1 On Plum Creek Lands. Upon the effective date of this Agreement, Plum Creek shall convey conservation easements to the County covering: (a) approximately 328.6 acres of land within the PAA and designated "West Annexation Area" on Appendix A, Map 1; (b) approximately 233.6 acres of land within the PAA and designated "South Annexation Area" on Appendix A, Map 1; and (c) approximately 942 acres of land outside the PAA designated "County Open Space" on Appendix A, Map 5. Except as provided in Section 7.5, and except as is necessary for the implementation and use of the King County Green River to Cedar River Regional Trail, these interim conservation easements will prohibit all use and development of the lands covered by the easements except as follows: Plum Creek may continue to conduct forest practices consistent with State law and regulations, the Environmental Principles - Resources adopted by Plum Creek and attached hereto as Appendix C, and the Plum Creek Harvest Plan attached hereto as Appendix D. Plum Creek shall conduct timber harvests consistent with the areas shown on Appendix D and shall not modify these Appendices without prior approval of the County and the City. It is acknowledged that Plum Creek will harvest its tree farm in Section 23 at times 10 to 20 years in the future, but that no plan has been prepared for that harvest. For that future harvest in Section 23, Plum Creek shall comply with all applicable statutes and regulations and will

adhere to its Environmental Principles - Resources attached hereto as Appendix C, provided however, that prior to future harvests in Section 23, Plum Creek shall submit a harvest plan to the County for informational purposes. The conservation easements conveyed to the County pursuant to this section shall be for a term of twenty (20) years from the effective date of this Agreement, revocable only upon annexation of the lands subject to the conservation easements consistent with the terms of the Agreement or termination of the Agreement pursuant to Section 9.3.

4.2.2 **On Palmer Lands.** Upon the effective date of this Agreement, Palmer shall convey a conservation easement to the City covering approximately 50 acres designated In-City Forest Land on Appendix A, Map 6. This conservation easement shall be for a term of twenty (20) years from the effective date of this Agreement, revocable only upon the five year anniversary of this agreement, or any extension of such revocation date as is provided below. This conservation easement shall preserve the In-City Forest Land in its natural state, without any resource extraction for the term of this easement; provided, however, the City and Palmer may agree to limited use of the surface of this land to support underground mining extraction techniques so long as the proposed use does not detract from the open space and viewshed purposes and subject to adequate measures to mitigate the impacts. The County in cooperation with the City will exercise its best efforts to secure funding to purchase any timber rights at the appraised fair market value in which event the conservation easement becomes perpetual. If the County and City cannot obtain funds to purchase the timber rights within the five year period provided above, the five year period for revocation shall be extended to one year after annexation of the West Annexation Area or one year after termination of the Agreement pursuant to Section 9.3, whichever occurs sooner.

At any time from the effective date of this Agreement to the revocation of the above-referenced conservation easement, the City, and or its assigns, shall have the right to purchase the remaining surface rights of the property, including timber rights, at the appraised fair market value. Palmer shall retain the coal and mineral rights, to the extent that there is no right to disturb the surface, provided, the City and Palmer may agree to limited use of the surface to support underground mining extraction techniques so long as the proposed use does not detract from the open space and viewshed purposes and subject to adequate measures to mitigate the impacts.

The fair market value shall be determined as follows:

1. The City shall give written notice to Palmer of its intent to purchase the timber and/or surface rights. In that notice the City shall provide the names of 5 M.A.I. certified appraisers with experience in valuing timber and surface rights.
2. Palmer shall have 14 calendar days from the date of the written notice to select an appraiser from the list provided by the City. If a selection is not timely made the City shall choose an appraiser from the list.
3. The selected appraiser shall provide a written appraisal within 90 days from the date the selection is made. The date for valuation shall be the date the City gave its notice of intent to purchase.
4. The selected Appraiser shall be deemed to be representing Palmer and the City and they shall each pay one half of the appraisal fee.
5. If either party disagrees with the appraised value, then they may give written notice of disagreement within 5 working days from the date the first appraisal is provided. The protesting party may then have a second appraisal done at their expense utilizing a M.A.I. certified appraisal.

6. If the second appraisal is not provided within 90 days from the date of the written notice of disagreement, or if the second appraisal differs from the first appraisal by 5 percent or less on the fair market value of the interest appraised, then the fair market value of the first appraisal shall be binding on the City and Palmer. Otherwise a third appraiser shall be selected to evaluate the first two appraisals and give an opinion on the fair market value. The third appraisal shall be binding on the City and Palmer.

7. The third appraiser shall be selected from a list of 5 M.A.I. certified appraisers provided by the King County Executive. Palmer and the City will meet within 5 working days from the date the list is provided and attempt to agree on the third appraiser. If they are unable to agree then at that meeting the Palmer and the City shall alternately strike names from the list of appraisers, with Palmer making the first strike until only one name is left, who shall be deemed the third appraiser.

8. The purchase shall close for cashwithin 90 days from the date a binding appraisal is obtained.

Acquisition and valuation shall be determined as if under the threat of condemnation pursuant to state law. The purchase price does not include the development rights as Palmer is obligated to transfer the development rights to other properties. The County acknowledges the City does not currently have funds to purchase the timber rights and will assist the City in obtaining the necessary funding.

4.2.3. Parcel Descriptions. Until the time of annexation, the lands and parcels that are the subject of this Agreement may be described generally by section, parts of section, roads, natural features, and similar means of identification. Maps showing the locations and general boundaries of such lands and parcels are attached as Appendix A to this Agreement. Plum Creek and Palmer may, at any time prior to annexation and at their own expense, do surveying and create legal descriptions for any of the lands or parcels that are the subject of this Agreement; provided, however, that legal descriptions shall be required at the time of annexation for all parcels that are to be dedicated or subject to conservation easements pursuant to this Agreement.

4.3 Pre-annexation Water and Sewer Service to Lake 12 Annexation Area. Following the effective date of this Agreement and prior to annexation of the Lake 12 Annexation Area, the City may provide water and sewer services to the existing lots in the Lake 12 Annexation Area subject to amendment of the Soos Creek Water and Sewer District interlocal agreement, ifnecessary, and provided water and sewer service can be provided without adversely impacting the ability of the City to provide such services to development within the existing City limits. Provision of any such water and sewer service is dependent upon attainment of a funding package that may include some combination of local improvement district (LID) revenues, grants, and County sources and shall provide for future contributions from property owners for service to new residential development. The parties acknowledge that the City shall incur no expense to provide water and sewer service to the Lake 12 Area.

5. ANNEXATION TERMS AND CONDITIONS

5.1 Annexation of PAA. The City agrees to annex, and the County agrees to support annexation of, lands within the Potential Annexation Area consistent with the terms of this Agreement. If the conditions in this Agreement governing annexation of any of the lands within the Potential Annexation Area are satisfied, Plum Creek and Palmer agree, with respect to their properties, to each to petition for and the City agrees to approve annexation of such lands except for the Lake 12 Annexation Area. The effective date of the annexations for the South, West, and East Annexation Areas shall be no later than

the award of construction contracts for infrastructure in the respectivePotential Annexation Areas, or earlier, at the time that commitments to construct and provide such infrastructure are in place consistent with Sections 5.2(b), 5.3(b) and 5.4(b).

5.2 **Annexation of West Annexation Area.** The West Annexation Area shall not be annexed unless and until all of the following conditions are met:

(a) The following planning and implementation actions are completed:

(1) Update of the City's Comprehensive Plan to address annexation of and urban development in the Potential Annexation Area and adoption of implementing development regulations;

(2) Adoption of a comprehensive sewer plan for the existing City and Potential Annexation Area which includes analysis of existing capacity of the current system, projected infrastructure needed to meet future growth, phasing/timeline for infrastructure construction, and a strategy for financing the construction and maintenance of each phase in accordance with applicable federal, state and local standards;

(3) Execution of an interlocal agreement between the City and Soos Creek Water and Sewer District (or other provider) for provision of sewer service above the current population equivalent of 3600.

(4) Adoption of an updated comprehensive water plan for the existing City and the Potential Annexation Area which includes analysis of existing capacity of the current system, projected infrastructure needed to meet future growth, phasing/timeline for infrastructure construction, and a strategy for financing the construction and maintenance of each phase;

(5) Execution of an interlocal agreement between the City and County regarding any needed road improvement identified by the City or County.

(6) Adoption by the City of a TDR program pursuant to Section 7.4 below.

(b) Water and sewer service and major road access, which shall include an east-west connection ("Pipeline Road"), for the West Annexation Area are available at the time of annexation or contracts for construction of such infrastructure have been awarded, or the County, City and Plum Creek agree that commitments to construct and provide such infrastructure are in place so that service can be provided at the time of project completions; and

(c) Open space is provided as follows:

(1) Approximately 63.3 acres of UGA Open Space within the West Annexation Area, shown as "UGA Open Space" on Appendix A, Map 2, shall be subject to conservation easements consistent with Section 7.2 of this Agreement;

(2) Approximately 645.2 acres of County Open Space, shown as "County Open Space" on Appendix A, Map 2, shall be dedicated to the County consistent with Section 7.1 of this Agreement; and

(3) Approximately 347 acres of In-City Open Space shall be protected or conserved as open space consistent with Section 7.3 of this Agreement.

5.3 **Annexation of the East Annexation Area.** The East Annexation Area shall not be annexed unless and until all of the following conditions are met:

(a) The West Annexation Area is annexed; provided, however, that annexation of the East and West Annexation Areas may occur simultaneously so long as all annexation conditions for both annexation areas are satisfied and;

(b) Water and sewer service and major road access for the East Annexation Area are available at the time of annexation or contracts for construction of such infrastructure have been awarded, or

commitments to construct and provide such infrastructure are in place so that service can be provided at the time of project completions.

5.4 **Annexation of the South Annexation Area.** The South Annexation Area shall not be annexed unless and until all of the following conditions are met:

(a) The West and East Annexation Areas are annexed into the City; provided, however, that the annexation of the South, East and West Annexation Areas, or the South and East Annexation Areas, may occur simultaneously so long as all annexation conditions for all annexation areas are satisfied and provided further, when the South Annexation Area is ready for annexation, the East Annexation Area must also proceed to annexation, and provided further that the annexation of the South Annexation Area may precede annexation of the East Annexation Area if the East Annexation Area has not been annexed by December 31, 2006 despite all reasonable efforts by the owners of the East Annexation Area;

(b) Water and sewer service and major road access for the South Annexation Area are available at the time of annexation or contracts for construction of such infrastructure have been awarded or the County, City and Plum Creek agree that commitments to construct and provide such infrastructure are in place so that service can be provided at the time of project completions; and

(c) Open space is provided as follows:

(1) Approximately 81.7 acres of UGA Open Space within the South Annexation Area, shown as "UGA Open Space" on Appendix A, Map 3, shall be subject to conservation easements consistent with Section 7.2 of this Agreement;

(2) Approximately 339 acres of County Open Space, shown as "County Open Space" on Appendix A, Map 3, shall be dedicated to the County consistent with Section 7.1 of this Agreement; and

(3) Approximately 195 acres of In-City Open Space shall be protected or conserved as open space consistent with Section 7.3 of this Agreement.

5.5 **Annexation of the Lake 12 Annexation Area.** The Lake 12 Annexation Area shall not be annexed unless and until all of the following conditions are met:

(a) The West Annexation Area is annexed; provided, however, that annexation of the West Annexation Area and Lake 12 Annexation Area may occur simultaneously so long as all annexation conditions for both annexation areas are satisfied;

(b) A pre-annexation agreement is entered into between the City and County with a funding package anticipated to include some combination of local improvement district (LID) revenues, and federal, state, and County sources;

(c) Water and sewer service can be provided upon annexation without adversely impacting the ability of the City to provide such services to development within the existing City limits;

(d) A traffic study is completed to determine the appropriate City road standards to which the Green River Gorge Road will be improved, if necessary, following annexation; and

(e) Lake 12 water quality shall meet or exceed state water quality standards pursuant to WAC 173-201A-030 (5) (c).

5.6 **Annexation of the West Boundary Adjustment.** The West Boundary Adjustment may be annexed at any time following the effective date of this Agreement.

5.7 **Phasing Areas within West Annexation Area.** The West Annexation Area may be annexed in three phases comprising the north area in Sections 2 and 3 , the west area in Section 15, and the south area in Section 27 if approved by the City and County Councils; provided that for any such phasing the City and County Councils must determine the proportional provision of County, In-City and UGA Open Space required in Section 5.2(c) to fulfill the four to one requirements of open space to urban development; and provided further that infrastructure to the areas to be annexed must be provided consistent with Section 5.2(b).

6. URBAN DEVELOPMENT IN THE ANNEXED LANDS

6.1 Development Agreement. On or before annexation of the West and South Annexation Areas, the City shall enter into a development agreement with Plum Creek which shall establish land uses, zoning and development standards for the Urban Development Areas in the West and South Annexation Areas consistent with the standards and service levels set forth below.

6.2 Land Uses and Zoning. Upon annexation of the West and South Annexation Areas, the City shall adopt land use designations and zoning for the Urban Development Areas that will permit the land uses as shown on Appendix A, Map 7; provided that the City and Plum Creek may agree to such other mixes of urban land uses within the Urban Development Areas of the West and South Annexation Areas as may be necessary to respond to real estate market and finance conditions. Upon annexation of the East Annexation Area, the City shall adopt land use designations and zoning that will permit urban residential development in this area. Upon annexation of the Lake 12 Annexation Area, the City shall adopt land use designation and zoning that will permit urban residential development at one dwelling unit per acre in the Lake 12 Annexation Area.

6.3 Residential Density. Following annexation, the West, South and East Annexation Areas shall be developed at a minimum average residential density of four units per acre. Maximum densities shall be determined prior to annexation as part of a development agreement between the City and property owners. Innovative planning, zoning and design shall be used to provide a variety of housing types serving all market segments. The base residential densities shall be two dwelling units per acre. The additional zoned residential density shall be achieved through participation in the City's TDR Program.

In the event development rights cannot be purchased through the City's TDR Program from either a private party or the TDR bank, or it is demonstrated to the City that, despite commercially reasonable efforts, development rights cannot be purchased on terms and conditions that allow annexation or development approvals to proceed, In-City Open Space created through other mechanisms consistent with Section 7.3 of this Agreement may be used as a density credit in the subject receiving area.

6.4 Development Standards. Following annexation the West, East, South, and Lake 12 Annexation Areas shall be developed under the jurisdiction of the City and shall at a minimum comply with the following County standards:

6.4.1 Affordable Housing. The parties will work with other local governments and appropriate agencies to maintain Black Diamond's fair-share of affordable housing and in that regard will take into account the City's existing housing stock.

6.4.2 Surface and Ground Water. The City shall adopt either the King County Surface Water Design Manual or Department of Ecology Stormwater Management Manual or standards substantially consistent either of the above.

6.5 Water, Sewers and Roads. The parties anticipate relying on a variety of funding sources and mechanisms to finance the planning, engineering and construction of water, sewer and road infrastructure to serve the East, West, South and Lake 12 Annexation Areas. The parties acknowledge that the City's existing infrastructure may not be able to serve future development without modifications to the existing system. The City's existing utility and transportation systems will likely need to be expanded and/or upgraded to serve the Potential Annexation Area and the properties already in the City adjacent to the Potential Annexation Areas that are owned by Palmer or Plum Creek. New, expanded and/or upgraded infrastructure to serve the Potential Annexation Area will be analyzed in the updates of the City's Comprehensive Plan and Water and Sewer Comprehensive Plans. The planning for this infrastructure will proceed on the schedule shown in Section 8.1. The City, with the assistance of the other parties, will seek federal, state, local government (County, City and utility districts) and public/private funding for the infrastructure planning, engineering and construction necessary to implement this Agreement. The parties anticipate that local improvement districts (LIDs) will be formed for these purposes. The City shall have the right, but not the obligation, to use LIDs as a funding mechanism. Where necessary and appropriate, the City agrees to form, or support the formation of, such LIDs. Plum Creek and Palmer agree to participate in such LIDs, and not to protest the formation of said LIDs, to the extent their properties are benefited, on a fair share basis, as provided in state law. Furthermore, Palmer shall convey to the City the necessary right of way for the east-west road ("Pipeline Road"). In such case Palmer shall be entitled to a credit for the fair market value of the conveyed right of way and any existing improvements utilized for the new roadway against any LID assessments on its property resulting from the construction of the Pipeline Road improvements. The value for the right of way, and the improvements, if any, shall be determined using the appraisal mechanism set forth in Sec. 4.2.2 provided, however, acquisition and valuation shall be as if under the threat of condemnation pursuant to state law. If an LID is not used as the funding mechanism, Palmer shall be entitled to a credit against other City charges to the extent authorized by State law.

6.6 Open Space within the Urban Development Areas. Since the City, County and Plum Creek agree that the development potential of the unconstrained lands in the West and South Annexation areas should be maximized, it is agreed that the provisions made for open space under this Agreement fulfill all open space requirements for development of the Urban Development Areas in the West and South Annexation Areas. Developers and builders may, solely at their own discretion, provide additional open space for design or market reasons so long as they achieve the minimum densities in the residential areas. This section is not intended to be a limitation upon the City's right to exercise its authority to require the provision of parks, playfields, or other active recreational amenities as part of the development permit process to the extent those requirements are consistent with the City's policies and regulations in place at the time a complete development permit application is submitted. If the UGA Open Space does not include sufficient park and recreation facilities to satisfy development standards, the City may require such park and recreation facilities in the Urban Development Areas.

6.7 **Permit Processing.** The City agrees to process project permit applications within the review period mandated by State law.

6.8 **Additional Conditions Relating to Lake 12 Annexation Area.** In addition to the standards governing development in the UGA set forth in this Section 6, the Lake 12 Annexation Area shall be subject to the following standards and service levels upon annexation to ensure that urban growth does not occur in the adjacent rural and resource lands and to minimize impacts to such lands from development in the Lake 12 Annexation Area:

(a) Any new residential development in the Lake 12 Annexation Area shall be sited and clustered away from the adjacent rural and resource lands and required to create a buffer of permanent open space between the residential development and rural and resource lands;

(b) Water and sewer systems shall be sized to accommodate the Lake 12 Annexation Area only and connections by property owners in the adjacent rural and resource lands shall be prohibited;

(c) No Four-to-One Program proposals pursuant to Comprehensive Plan policies I-204 and I-205 shall be approved along the Lake 12 Annexation Area UGA Boundary; and

(d) Any new residential development shall contribute as appropriate its fair share to the funding of any improvements required by the City to the Green River Gorge Road.

7. OPEN SPACE

7.1 **County Open Space.** On or before the effective date of annexation of the West Annexation Area, provided said date is within 20 years of the effective date of this agreement, Plum Creek shall convey to King County fee title to approximately 645.2 acres of land designated "County Open Space" on Appendix A, Map 2. On or before the effective date of annexation of the South Annexation Area, provided said date is within 20 years of the effective date of this Agreement, Plum Creek shall convey to King County fee title to approximately 339 acres of land designated "County Open Space" on Appendix A, Map 3. These County Open Space lands shall be dedicated as permanent open space and shall be owned and managed by the County as part of the King County Open Space and Trail System or for their forest resource value. Title to County Open Space conveyed by Plum Creek pursuant to this section shall be subject to any reservations, easements, and other encumbrances of record as of September 1, 1996 that are agreed to by King County. It is acknowledged that Plum Creek does not own oil and gas rights and that the County shall take title subject to these oil and gas rights.

7.2 **UGA Open Space.** On or before the effective date of annexation of the West Annexation Area, provided said date is within 20 years of the effective date of this Agreement, Plum Creek shall convey to the City and County conservation easements covering approximately 63.3 acres of land within the West Annexation Area designated as "UGA Open Space" on Appendix A, Map 2. On or before the effective date of annexation of the South Annexation Area, provided said date is within 20 years of the effective date of this Agreement, Plum Creek shall convey to the City and County conservation easements covering approximately 81.7 acres of land within the South Annexation Area designated as "UGA Open Space" on Appendix A, Map 3. Such conservation easements shall preserve UGA Open Space as permanent open space as provided in Section 7.5. County Open Space shall be conveyed in a reasonably fit condition and prior to conveyance of the fee to the County Open Space, King County shall be afforded reasonable time to conduct due diligence inspections.

7.3 In-City Open Space. On or before the effective date of annexation of the West Annexation Area, provided said date is within 20 years of the effective date of this Agreement, approximately 347 acres of Potential In-City Open Space shall be protected or conserved. On or before the effective date of annexation of the South Annexation Area, provided said date is within 20 years of the effective date of this Agreement, approximately 195 acres of Potential In-City Open Space shall be protected or conserved. Such In-City Open Space shall be protected or conserved through any of the following methods:

(a) The purchase or transfer of development rights from Potential In-City Open Space, whether purchased by Plum Creek or others, including without limitation, owners or developers of the proposed MPD, pursuant to the City's TDR Program, so long as all such lands are subject to conservation easements., provided however, that development rights from the In-City Forest Land shall not be counted unless development rights have been purchased for use in the West or South Annexation Areas or the MPD. Where the development rights to Potential In-City Open Space have been applied as development credit within the City as it existed prior to the annexation of the MPD, such land may still qualify as In-City Open Space for the purposes of satisfying the open space acreage requirements identified above in this Section where the party requesting such designation has provided compensation to the city equal to 75 percent of the fair market value of such development right. Any such funds received by the City under this provision shall be dedicated solely to the acquisition and stewardship of open space, trails, parks, or other treasured places.

(b) In addition to the In-City Open Space conserved pursuant to Section 7.3(a) above, any permanent open space, park, trails or treasured places created within the City from the Potential In-City Open Space through dedication to the City or County, through conveyance of conservation easements to the City or County, or through other mechanisms, including any land acquired by the City or County for open space, parks, trails, or treasured places.

(c) Such other equivalent open space or mechanisms for providing open space within, or in the vicinity of, the City as agreed to by the City, County and Plum Creek.

Conservation easements required under this Section shall be conveyed in perpetuity to the City. Some conservation easements may be limited to development rights only as provided by the City TDR Program. Conservation easements may be for broader purposes in which case they shall preserve In-City Open Space as permanent open space intended to be used in a manner consistent with the purposes included in King County Code 26.04.020L, such as preservation of wetlands and other critical areas, buffers, recreational areas and natural areas, or as an urban separator and/or urban/rural buffer. At times In-City Open Space serves different functions than rural or suburban open space. Should those properties marked for potential parks use on Appendix A, Map 4 be acquired in accord with the terms of this Agreement, active recreational and park uses can be used on those sites notwithstanding any of the above. A copy of King County Code 26.04. 020L is attached hereto as Appendix G and by reference incorporated herein.

7.4 City's Open Space Transfer of Development Rights Program. The City, with the cooperation of the parties, shall establish a Transfer of Development Rights Program for Open Space ("TDR Program"). The TDR Program shall be used to transfer development rights off of priority open space parcels located inside the City's boundaries and shown as "Potential In-City Open Space" on Appendix

A, Map 4. Development rights shall be transferable to the residential lands in the West, South and East Annexation Areas as well as within the existing City. The TDR Program may assign a larger number of transfer units to higher priority open space parcels.

To facilitate preservation of open space within the existing City limits and to facilitate planning and marketing of the residential lands in the Potential Annexation Area, the City's TDR Program shall be established during the first year of implementation of this Agreement. The TDR Program shall be designed so that it is responsive to market conditions. Specifically, the TDR Program will, among other features, include a TDR bank or similar mechanism to buy, sell and hold development rights and credits. Development rights and credits shall be transferable both through and outside of a TDR bank. T he City will explore in good faith, possibilities for providing capital to fund a TDR bank or other mechanism, but it is under no such obligation to provide such funds.

In those instances where a bank or other mechanism has been established and has acquired development rights to Potential In-City Open Space, the owners of the West Annexation Area or the MPD may enter into an agreement to purchase such development rights that are needed for purposes of satisfyingthe In-City Open Space requirements in Section 7.3. The purchase price shall be the fair market value at the time of purchase. The purchase shall close no later than the effective date of the South Annexation or the termination of this Agreement, whichever sooner occurs.

7.5 **Open Space Uses.** Except as otherwise provided in this Agreement, UGA Open Space within the West and South Annexation Areas can only be used for the purposes included in K.C.C. 26.04.020 L, such as preservation of wetlands and other critical areas, buffers, recreational areas and natural areas or as an urban separator and/or urban/rural buffer. Open space within the West and South Annexation Areas and the County Open Space immediately south of the City in Sections 23 and 27 may also be used for stormwater management and for utility and transportation corridors; provided that the "South Connector" road included in the City's Comprehensive Plan may be constructed through Section 23 prior to annexation of the South Annexation Area to provide access to the MPD; provided that substitute open space of similar value must also be provided if more than five contiguous acres of open space provided by Plum Creek or if more than twenty acres of open space provided by Plum Creek, whether contiguous or not, are used for road purposes. Such proposals for substitutions of open space shall be reviewed by the City and County as appropriate and in the case of County Open Space, must be adjacent to other County Open Space parcels. UGA Open Space in the West and South Annexation Areas may be disturbed as reasonably necessary for construction activities but must be restored and replanted with native vegetation. Furthermore, dedications of County Open Space shall not cut off road and utility access to adjacent Plum Creek parcels. Temporary access across County Open Space and permanent buried utility lines will be permitted so long as disturbed land is restored. Reasonably necessary permanent road access will be permitted so long as substitute open space is provided on a one to one basis, unless otherwise agreed by the County and Plum Creek.

7.6 **In-City Forest Land.** On or before the effective date of annexation of the East Annexation Area, all the development rights to the In-City Forest Land (100 dwelling unit equivalent) will be completely transferred to the East Annexation Area so that the East Annexation Area achieves an average minimum density of 4 units per acre, or transferred to another receiving site, or sold to Plum Creek at fair market value. If transferred other than to the East Annexation Area, or if sold, Palmer shall purchase or transfer development rights to bring the East Annexation Area up to the minimum 4 units per acre.

8. IMPLEMENTATION

8.1 Schedule of Implementation. The parties agree to implement this Agreement pursuant to the following schedule:

Date	Year of Agreement	Requirements
1996		• Issue requests for proposals for planning work required in Section. 5.2 (a) • Seek grant funding.
1997	1	• Mayor of City and County Executive to designate contract administrators. Contract administrators to develop work plan which identifies tasks, schedules and responsibilities of each party. • Initiate planning work for updates to City Comprehensive Plan , comprehensive water plan and comprehensive sewer plan. • City to begin revising or establishing development regulations. • City to adopt Transfer of Development Rights (TDR) Program for open space. • Complete and publish drafts of comprehensive water plan update and comprehensive sewer plan. • City to adopt Comprehensive Plan update covering Potential Annexation Area. • Parties to develop and implement Joint Marketing Plan.
1998	2	• Complete Water and sewer plans. • Adopt comprehensive water and sewer plans and revise City Comprehensive Plan as necessary as a result of adoption of water and sewer plans. • City to adopt development regulations for the Potential Annexation Area.
1999	3	• Initiate engineering for West Annexation Area roads, water and sewer (and East or South Annexation Areas if to be annexed simultaneously with West).
2000	4	• Complete engineering for West Annexation Area roads, water and sewer infrastructure (and East or South Annexation Areas if to be annexed simultaneously with West). • Request bids for infrastructure construction for roads, water and sewer;
2001	5	• Contracts awarded for West Annexation Area roads, water, and sewer construction (and including East or South Annexation Areas if to be annexed simultaneously with West). • Annexation of West Annexation Area occurs.

8.2 **Joint Funding and Marketing Plans.** The parties agree to fund the 1997 implementation activities in Section 8.1 in accordance with the letter of understanding attached as Appendix J. The parties agree to negotiate an additional joint funding and implementation agreement to support the remaining planning efforts scheduled in Section 8.1. The parties also agree to support development and funding of a marketing plan pursuant to the Black Diamond Urban Growth Area Economic Development Vision, Appendix F to this Agreement.

8.3 **City and County Agreement on Administration.** The City and County may enter into an interlocal agreement for the County to administer the planning and/or permit review for the implementation of this Agreement.

8.4 **Adjustments to Boundaries and Parcels.** Adjustments of boundaries and substitutions of parcels in the West and South Annexation Areas and County Open Space may be permitted so long as the ratios of open space lands to urban lands contained in this Agreement are maintained and so long as the open space lands are part of significant natural systems, corridors, trails and are otherwise consistent with the other open space principles that have formed the basis for this Agreement. Both the City and County must approve any such adjustments or substitutions within the West and South Annexation Areas prior to annexation and the County must approve any such adjustments or substitutions to County Open Space. Any such approval shall be in writing. County Council approval will be required for any adjustments or substitutions of County Open Space which individually exceed 50 acres or cumulatively exceed 100 acres.

8.5 **SEPA/GMA Integration.** The City will be the lead agency for future environmental review to implement this agreement. Since the planning and environmental review for the Potential Annexation Area will be integrated and tiered, the projects in the Potential Annexation Area may be anticipated and their environmental impacts considered in City environmental impact statements, supplements and addenda prepared during the planning and annexation phases. If the responsible official for environmental review determines that existing and future environmental documents prepared during environmental review for the Potential Annexation Area adequately address all environmental concerns relative to any project, then those environmental documents shall be adopted by reference as the environmental documents for a project application and further environmental review may not be required. Pursuant to RCW Chapter 43.21C, projects in the Potential Annexation Areas may not require environmental impact statements and may be designated planned actions. If designated planned actions, the projects shall still be subject to environmental review and mitigation consistent with RCW 43.21.C.031.

9. GENERAL PROVISIONS

9.1 **Effective Date.** This Agreement shall become effective on the date of its execution by all four parties. The Mayor and County Executive shall execute the Agreement pursuant to authorization by the legislative bodies of the two jurisdictions.

9.2 **Duration of the Agreement.** This Agreement shall remain in effect for a period of twenty (20) years from the effective date of this Agreement unless mutually extended or terminated by the parties, except that the terms and conditions of the Agreement shall continue in effect with respect to any lands annexed, dedicated or subject to conservation easements pursuant to the terms of this Agreement. Any lands not annexed to the City within 20 years of the effective date of this Agreement shall be considered by the Metropolitan King County Council during the next appropriate Comprehensive Plan amendment cycle for redesignation to non-urban land uses and shall not be annexed to the City unless and until the County and City enter into a potential annexation area agreement covering such lands.

9.3 **Termination.** The parties recognize that the amount of Plum Creek property affected by this Agreement is substantial and that the period of time Plum Creek, or its successors and assigns, must hold the

property during the pre-annexation phase is long. Therefore, Plum Creek shall have the option, but not the requirement, to terminate the Agreement under the following circumstances:

9.3.1 **Termination Due to Delays In Infrastructure Planning and Construction.** The schedules for infrastructure planning, engineering, finance and construction, for the West and South Annexation Areas are detailed in Section 8.1. As an alternative to completing any of the scheduled infrastructure planning and construction set forth in Section 8.1, the City, County, and Plum Creek may agree that annexation should proceed based on commitments to construct and provide infrastructure so it will be in place and capable of providing service at the time of project completion. If the planning and implementation actions set forth in Section 5.2 (a) have not been completed by December 31, 1999, or if infrastructure engineering or bids for infrastructure construction for the West Annexation Area have not been completed by December 31, 2000, or if construction contracts for infrastructure for the West Annexation Area have not been awarded and annexation has not occurred by December 31, 2001, Plum Creek may at any time thereafter give written notice of its intent to terminate this Agreement in twelve months. Unless Plum Creek, the City and County agree to a longer cure period, a notice of termination extends for one year the above stated deadline(s) at which the notice was directed.

Following any notice of termination, this Agreement shall terminate in twelve months unless: 1) Plum Creek withdraws the notice; 2) the extended deadline has been met, or 3) Plum Creek, the City and County agree to a longer termination cure period.

If the original schedules or extended schedules, if applicable, for the West Annexation area have been met in all respects except that water rights or service cannot, despite the best efforts of the parties, be obtained, the deadline for providing water service shall be extended for up to two additional years.

Plum Creek may also give notice of termination consistent with the process described above if infrastructure engineering for the South Annexation Area has not been completed by December 31, 2008, or if the South Annexation Area has not been annexed by December 31, 2010.

9.3.2 **Termination by Fixed Dates.** In addition to the notice of termination, cure and extension provisions in the preceding section, Plum Creek shall have the unqualified right to terminate this Agreement unless the West Annexation Area has been annexed by December 31, 2006 and the South Annexation has been annexed by December 31, 2014. In any event, consistent with Section 9.2, this Agreement shall terminate twenty years from the effective date of this Agreement.

9.3.3 **Effect of Termination.**

9.3.3.1 **On Annexed Lands.** Upon termination of the Agreement, the terms and conditions of the Agreement shall continue to apply to any lands covered by this Agreement that have been annexed, dedicated, or subject to conservation easements pursuant to the terms of this Agreement.

9.3.3.2 **On Non-Annexed Lands.** Upon termination of the Agreement, the terms and conditions of this Agreement shall not apply to any of the lands covered by this Agreement that have not been annexed, dedicated, or subject to conservation easements pursuant to the terms of this Agreement. Any such lands within the Potential Annexation Area shall be considered by the Metropolitan King County Council during the next appropriate Comprehensive Plan amendment cycle for redesignation to non-urban land uses and shall not be annexed to the City unless and until the County and City enter into a potential annexation area agreement covering such lands. If lands within the West and South Annexation Areas are redesignated to a land use classification other than urban, they shall retain their original rural zoning classification (or its

equivalent) that existed as of December 18, 1995 (Appendix I) and shall retain the same development rights that existed under the original zoning classification for a period of five years following redesignation. Interim conservation easements that have been recorded on any of the lands covered by this Agreement shall expire upon termination of the Agreement, in which case the Plum Creek lands identified as County Open Space shall retain, for a period of five years, the same land use designation and zoning classification (or its equivalent) that existed as of December 18, 1995 (Appendices H and I).

9.4 **Amendment.** Unless otherwise provided in this Agreement, this Agreement shall not be amended without the express written approval of the parties. All amendments to this Agreement must be approved by the County Council or City Council, as applicable.

9.5 **Binding on Successors and Assigns.** The terms of this Agreement shall be binding on the parties and their successors and assigns.

9.6 **Recording.** This Agreement shall be recorded against the Plum Creek and Palmer properties covered by this Agreement as a covenant running with the land and shall be binding on Plum Creek, Palmer, and their successors and assigns.

9.7 **Indemnification, Hold Harmless and Duty to Defend.** Each party shall protect, defend, indemnify and hold harmless the other parties and their officers, agents, and employees, or any of them, from and against any and all claims, actions, suits, liability, loss, costs, expenses, and damages of any nature whatsoever, which are caused by or result from any negligent act or omission of the party's own officers, agents, and employees in performing services pursuant to this agreement. In the event that any suit based upon such a claim, action, loss, or damage is brought against a party or parties, the party or parties whose negligent action or omissions gave rise to the claim shall defend all parties at the party's or parties' sole cost and expense; and if final judgment be rendered against the other parties and their officers, agents, and employees or jointly the parties and their respective officers, agents, and employees, the parties whose action or omissions gave rise to the claim shall satisfy the same; provided that, in the event of concurrent negligence, each party shall indemnify and hold the other parties harmless only to the extent of that party's negligence.

9.8 **Severability.** In the event that any provision of this Agreement is declared invalid or illegal, such declaration shall in no way affect or invalidate any other provision thereof, and such other provisions shall remain in full force and effect.

9.9 **Dispute Resolutions.** In the event of any dispute relating to this Agreement, all parties upon the request of any other party shall meet within fourteen (14) days to seek in good faith to resolve the dispute. The City and County shall send a department director or an authorized representative thereof and person with information relating to the dispute, and Plum Creek and Palmer shall send an owner's representative and any consultant or other person with technical information or expertise relating to this dispute.

9.10 **Integration.** This Agreement represents the entire agreement of the parties with respect to the subject matter thereof. There are no other agreements, oral or written, except as expressly set forth herein.

9.11 **Notice.** All communications, notices and demands of any kind which a party under this Agreement requires or desires to be given to any other party shall be in writing deposited in U.S. mail, certified mail postage prepaid, return receipt requested, and addressed as follows:

If to the County:	King County King County Courthouse 516 Third Avenue Seattle, Washington 98014 Attn.: King County Executive
with copy to:	King County Prosecuting Attorney's Office E-550 Fifth Floor King County Courthouse 516 Third Avenue Seattle, Washington 98104 Attn.: Chief of Civil Division
with Copy to:	Clerk of the Council King County Courthouse 516 Third Avenue Seattle, Washington 98104
If to the City:	City of Black Diamond P. O. Box 599 Black Diamond, WA 98010 Attn.: Mayor
with copy to:	City of Black Diamond P. O. Box 599 Black Diamond, WA 98010 Attn.: City Administrator
If to Plum Creek	Plum Creek Timber Company, L.P. 999 Third Avenue, Suite 2300 Seattle, WA 98104 Attn.: Land Use Planning Manager
with copy to:	Cairncross & Hemplemann. 701 5th Avenue, Seattle, WA 98104 Attn.: John Hemplemann
If to Palmer	Palmer Coking Coal Company P. O Box 10 31407 Highway 169 Black Diamond, WA 98010 Attn.: Manager
with copy	Phillips, McCullough, Wilson & Fisko Market Place Town, Suite 1130 2025 First Avenue Seattle, WA 98121 Attn.: Jack McCullough

IN WITNESS WHEREOF, the parties have executed this agreement as of the last date signed below.

KING COUNTY

King County Executive

Dec. 31, 1996
Date

CITY OF BLACK DIAMOND

Mayor

12-24-96
Date

Approved as to Form

King County Prosecutor

12/4/96
Date

Approved as to Form

for L. Comes
City Attorney

12/24/96
Date

Plum Creek Timber Company, L.P.

Vice President, Resources

12/23/96
Date

Palmer Coking Coal Company

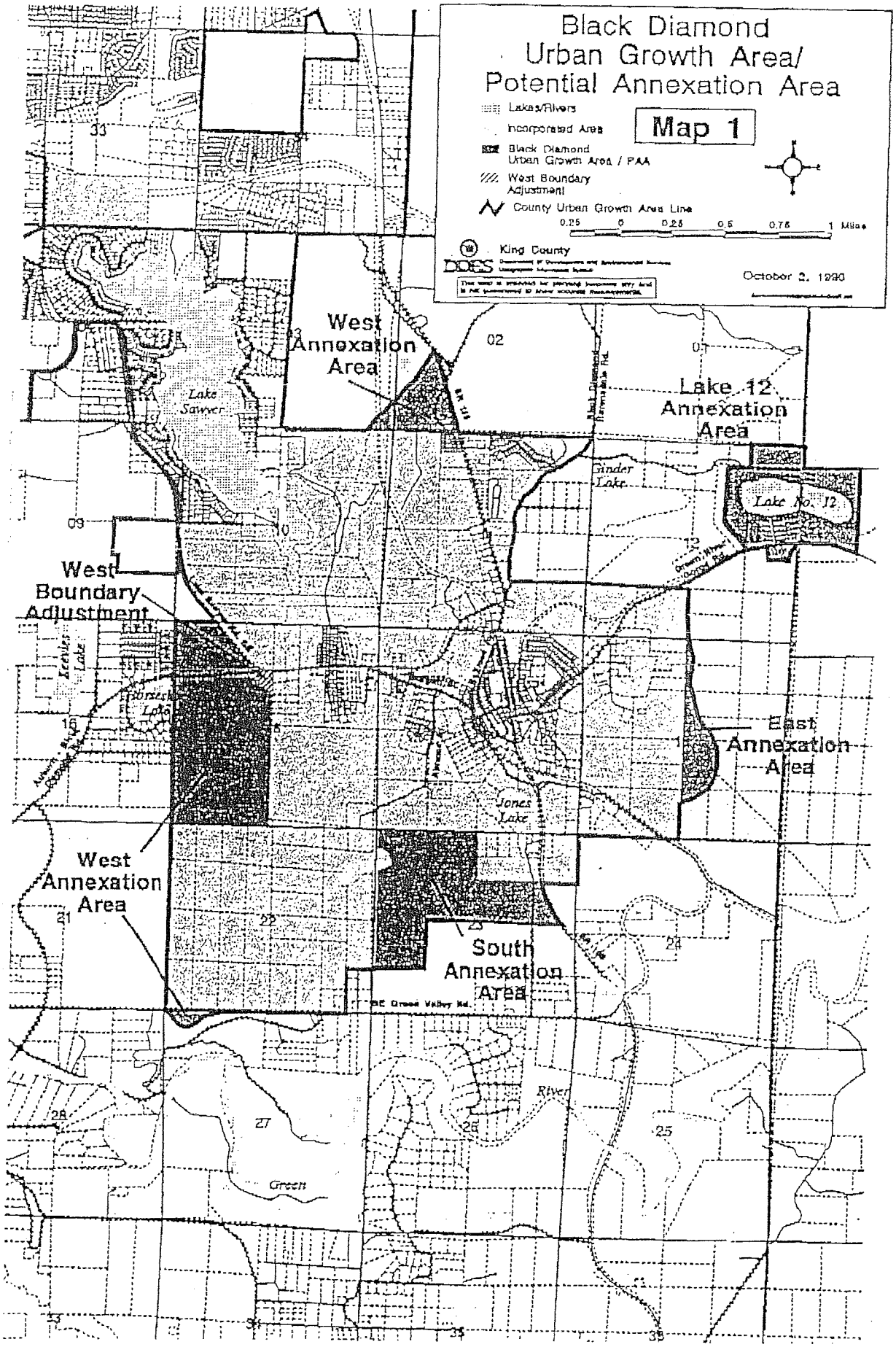
Manager

12-24-96
Date

APPENDIX A

MAPS

Map 1:	Urban Growth Area/Potential Annexation Area
Map 2:	West Annexation Area with County Open Space
Map 3:	South Annexation Area with County Open Space
Map 4:	Potential In-City Open Space
Map 5:	County Open Space
Map 6:	In-City Forest Land
Map 7:	Urban Development Areas
Map 8:	Zoning


Black Diamond
Urban Growth Area/
Potential Annexation Area
Map 1
Lakes/Rivers
Incorporated Area
Black Diamond Urban Growth Area / PAA
West Boundary Adjustment
County Urban Growth Area Line
0.25 0 0.25 0.5 0.75 1 Miles
King County
DOES
October 2, 1990
West Annexation Area
Lake 12 Annexation Area
Lake Sawyer
Ginder Lake
Lake No. 12
West Boundary Adjustment
Keevies Lake
Jones Lake
East Annexation Area
West Annexation Area
South Annexation Area
Green River
Green
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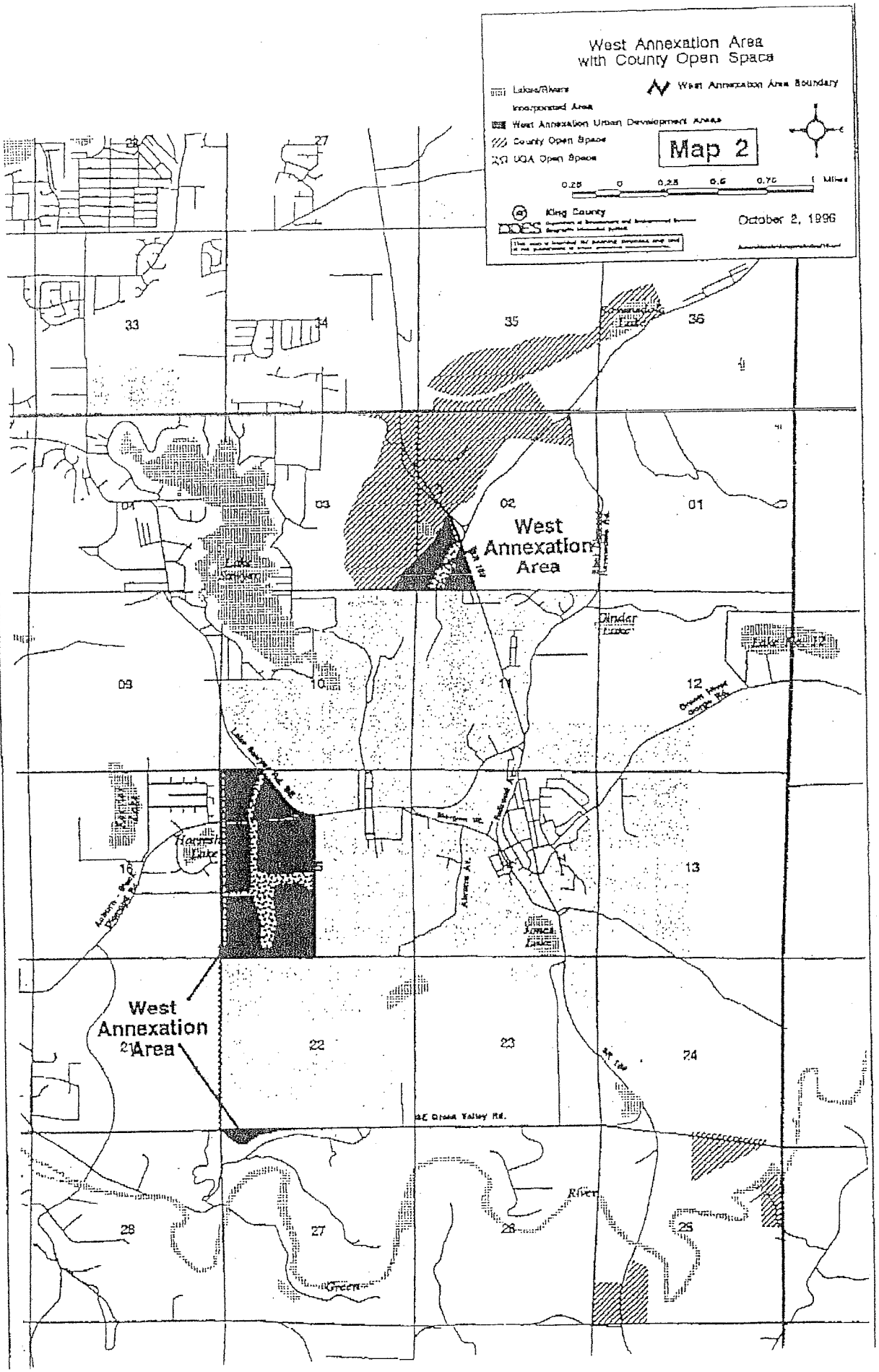
West Annexation Area
with County Open Space
Lakes/Rivers
Incorporated Area
West Annexation Urban Development Areas
County Open Space
UGA Open Space
West Annexation Area Boundary
Map 2
0.25 0 0.25 0.5 0.75 1 Miles
King County
October 2, 1996
West Annexation Area
West Annexation Area
Dinder Lake
Lake Sawyer
Lake Rd. 12
Horrest Lake
Jones Lake
Green River
Green Valley Rd.
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APPENDIX J

BLACK DIAMOND UGA AGREEMENT

FUNDING FOR 1997 IMPLEMENTATION ACTIVITIES

Funding and/or services to be provided for the 1997 implementation activities referenced in Section 8.1 of the Black Diamond Agreement:

King County

1. Survey the wells and septic systems in the Lake 12 Annexation Area. Estimated cost is $10,000.

2. Technical assistance in preparing grant and other funding source applications for alternative funding sources for Agreement implementation activities.

3. Technical assistance for economic development activities for the existing city and UGA area.

4. Funding for consultants to provide technical support to the City in areas where the City does not have the personnel with technical expertise necessary to complete the 1997 implementation activities. $90,000 will be provided for that purpose. King County would administer the contracts for these tasks.

5. Provide all parties with monthly progress and funding status reports.

City of Black Diamond

1. Hire one full time person whose time will be devoted exclusively to drafting the documents contemplated in the 1997 implementation activities as set forth in Section 8.1. The other parties shall have an opportunity to review and comment on the qualifications of all candidates prior to the City making the hiring decision.

2. Devote at least one half-time person equivalent of current City staff time to project administration.

3. Coordinate and oversee the work of consultants involved in the 1997 implementation activities

4. Provide all parties with monthly progress and funding status reports.

Palmer Coking Coal Company

1. No later than January 1, 1997, contribute $25,000 to the City to help fund the 1997 implementation activities.

Plum Creek

1. No later than December 30, 1996, contribute $50,000 to the City to help fund the 1997 implementation activities.

2. No later than July 1, 1997 contribute an additional minimum amount of $50,000 to the City to help fund the 1997 implementation activities. An additional $25, 000 shall be contributed unless at least $25,000 in grants or other funding sources are obtained to help fund the 1997 implementation activities. Any grants or other alternative funds shall be used prior to the expenditure of this additional $25,000 Plum Creek contribution.

Summary of 1997 Implementation Contributions

DATE	Contributor	Amount	Cumulative
12/31/96	Plum Creek	$ 50,000	$ 50,000
1/1/97	Palmer Coking coal	$ 25,000	$ 75,000
1/1/97	King County	$100,000	$175,000
7/1/97	Plum Creek	$ 50,000	$225,000
7/1/97	Plum Creek	$ 25,000 contributed by Plum Creek unless at least $25,000 grant funds are made available by this date	$250,000

General

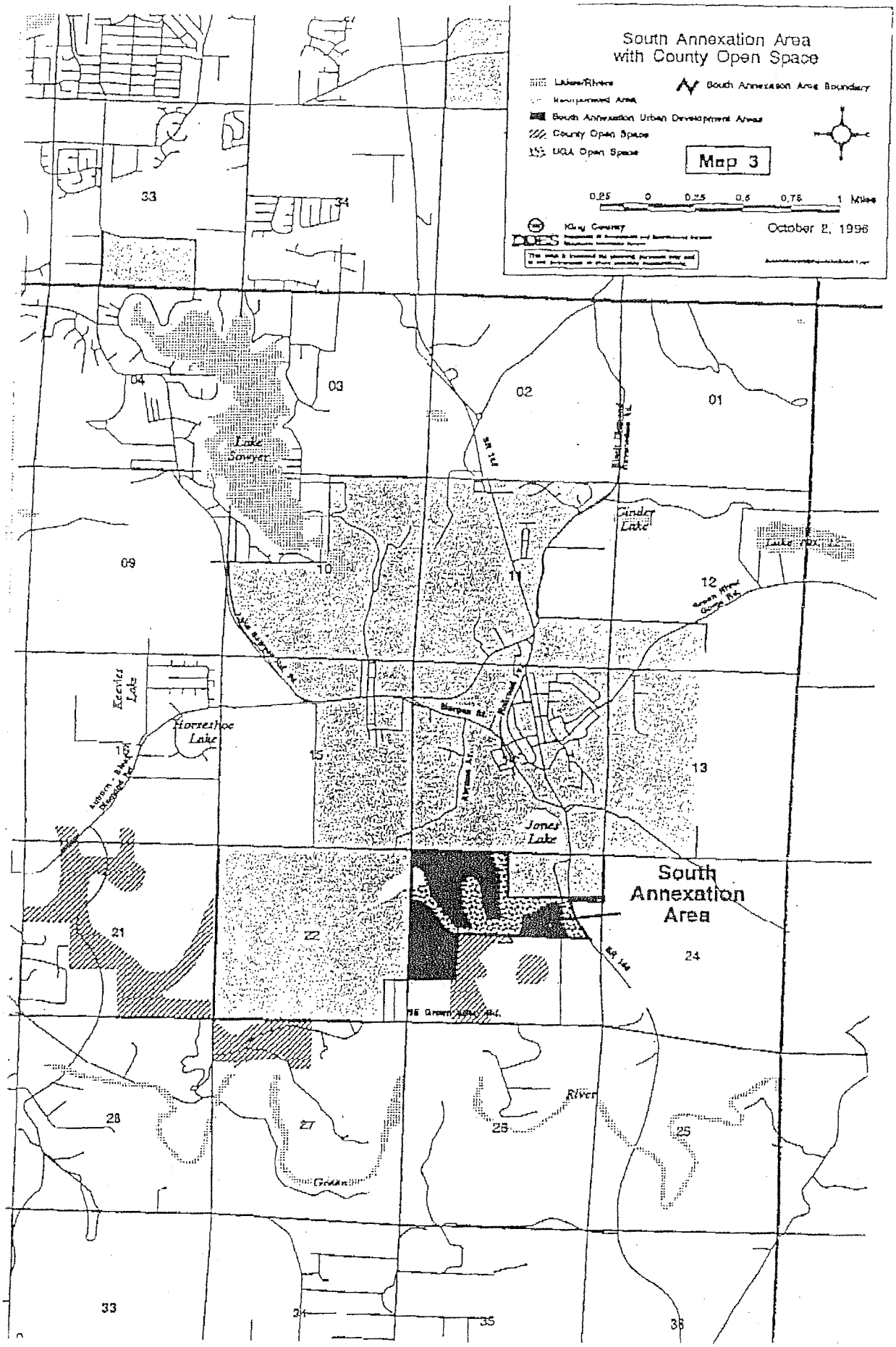
The amounts and ratios of funding for 1997, and the commitments for County and City staffing and financial contributions do not establish any precedent for future years.

The funding and staff resources described above will be used exclusively for 1997 implementation activities in the Black Diamond UGA Agreement. All parties shall have the right to review and comment on qualifications and assignments of proposed consultants and City staff and on the scope, work plans, schedule, payment and other terms of consultant contracts.

The parties agree that public and private participation is necessary for the funding and implementation of the Black Diamond UGA Agreement. The parties recognize that the City has no resources to fund implementation activities and will not have such resources until development in the Potential Annexation Areas occurs after annexation.

The County and City agree to use their best efforts to secure a public share of the implementation costs for the Black Diamond UGA Agreement for 1998 and subsequent years. Such contributions may be in the form of staff support, funding, loans, grants or other resources.

Prior to December 1 of each year, the parties shall agree on a budget and cost sharing agreement to implement in subsequent years the tasks detailed in Section 8.1 of the Agreement. If the parties do not have a signed budget and cost sharing agreement by December 1 of each year, recognizing the burden of the interim conservation easements on Plum Creek's properties, at the request of Plum Creek, the County and the City shall consider the need to modify or terminate the Plum Creek interim conservation easements recorded pursuant to Section 4 of this agreement.


South Annexation Area
with County Open Space
Lakes/Rivers
Incorporated Area
South Annexation Urban Development Areas
County Open Space
UGA Open Space
South Annexation Area Boundary
Map 3
0.25 0 0.25 0.5 0.75 1 Miles
King County
DOES
October 2, 1996
Lake Sawyer
Ginder Lake
Keevies Lake
Horseshoe Lake
Jones Lake
South Annexation Area
River
Green
33
34
04
03
02
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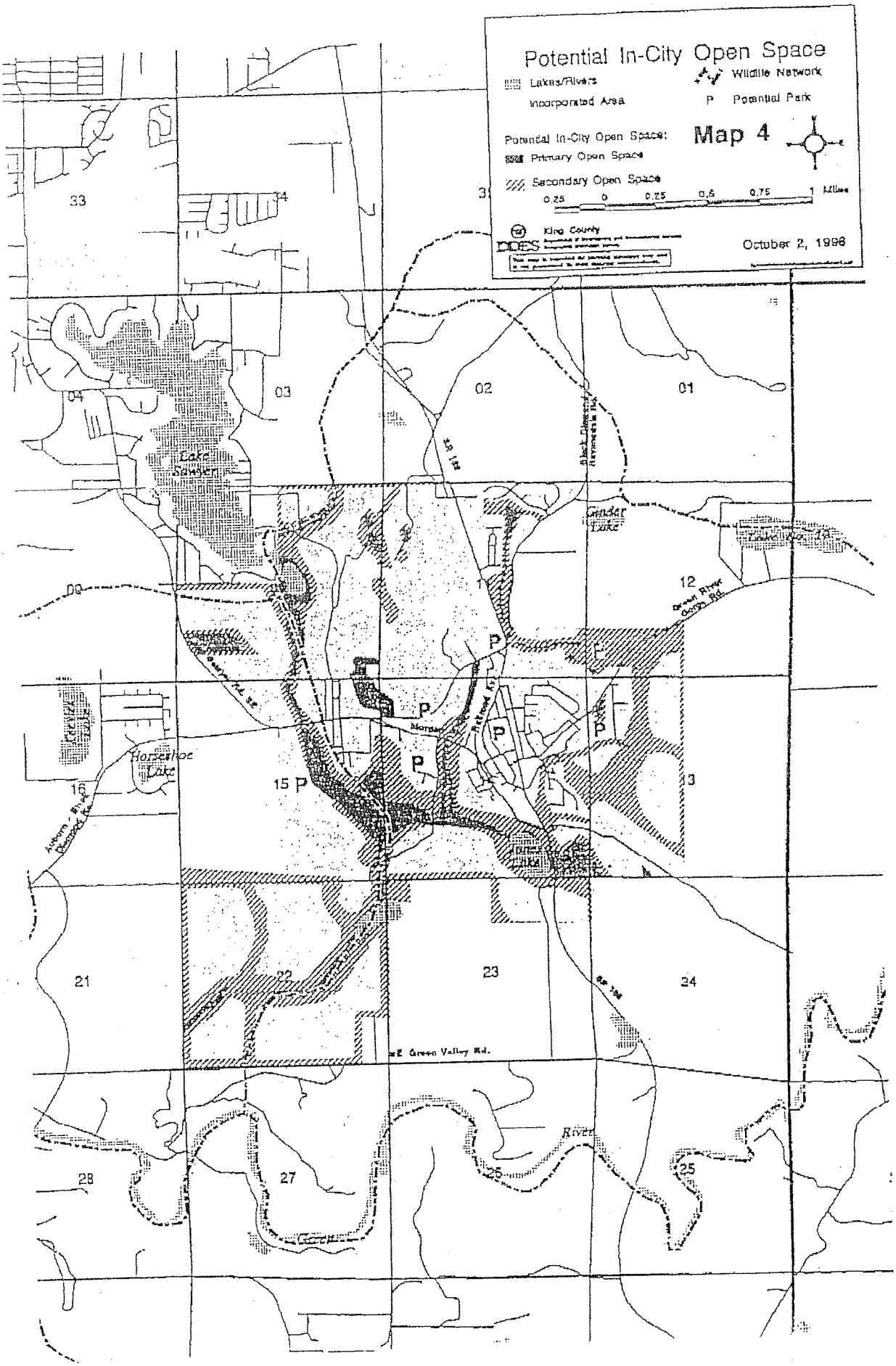
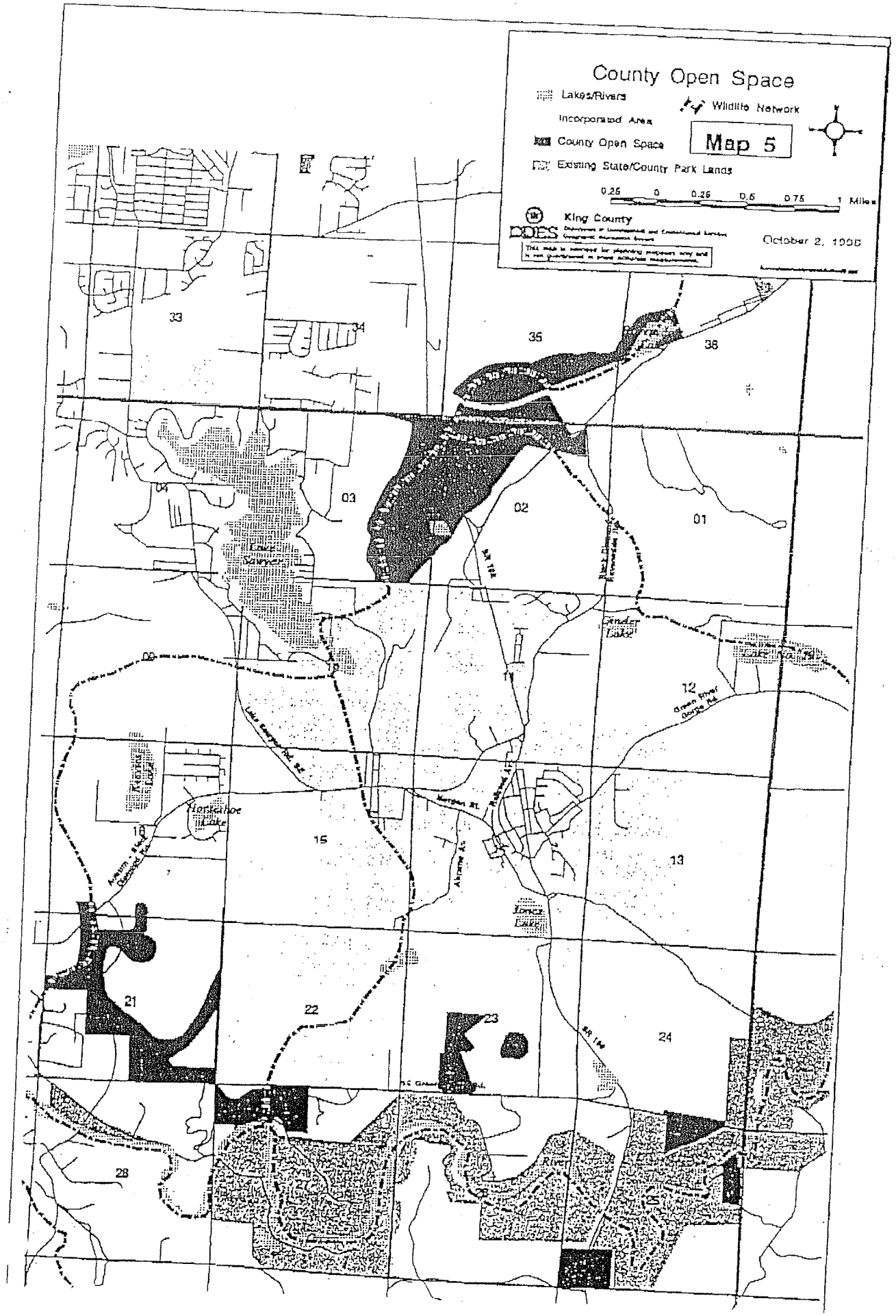

Potential In-City Open Space
Lakes/Rivers
Incorporated Area
Wildlife Network
P Potential Park
Potential In-City Open Space:
Primary Open Space
Secondary Open Space
Map 4
0.25 0 0.25 0.5 0.75 1 Miles
King County
DDES
October 2, 1998
33
34
04
03
02
01
Lake Sawyer
Gander Lake
12
Green River Gorge Rd.
Horseshoe Lake
16
15
13
21
22
23
24
E Green Valley Rd.
River
28
27
26
25


County Open Space
Lakes/Rivers
Incorporated Area
County Open Space
Existing State/County Park Lands
Wildlife Network
Map 5
0.25 0 0.25 0.5 0.75 1 Miles
King County
DDES
October 2, 1996
33
34
35
36
04
03
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09
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11
12
16
15
13
21
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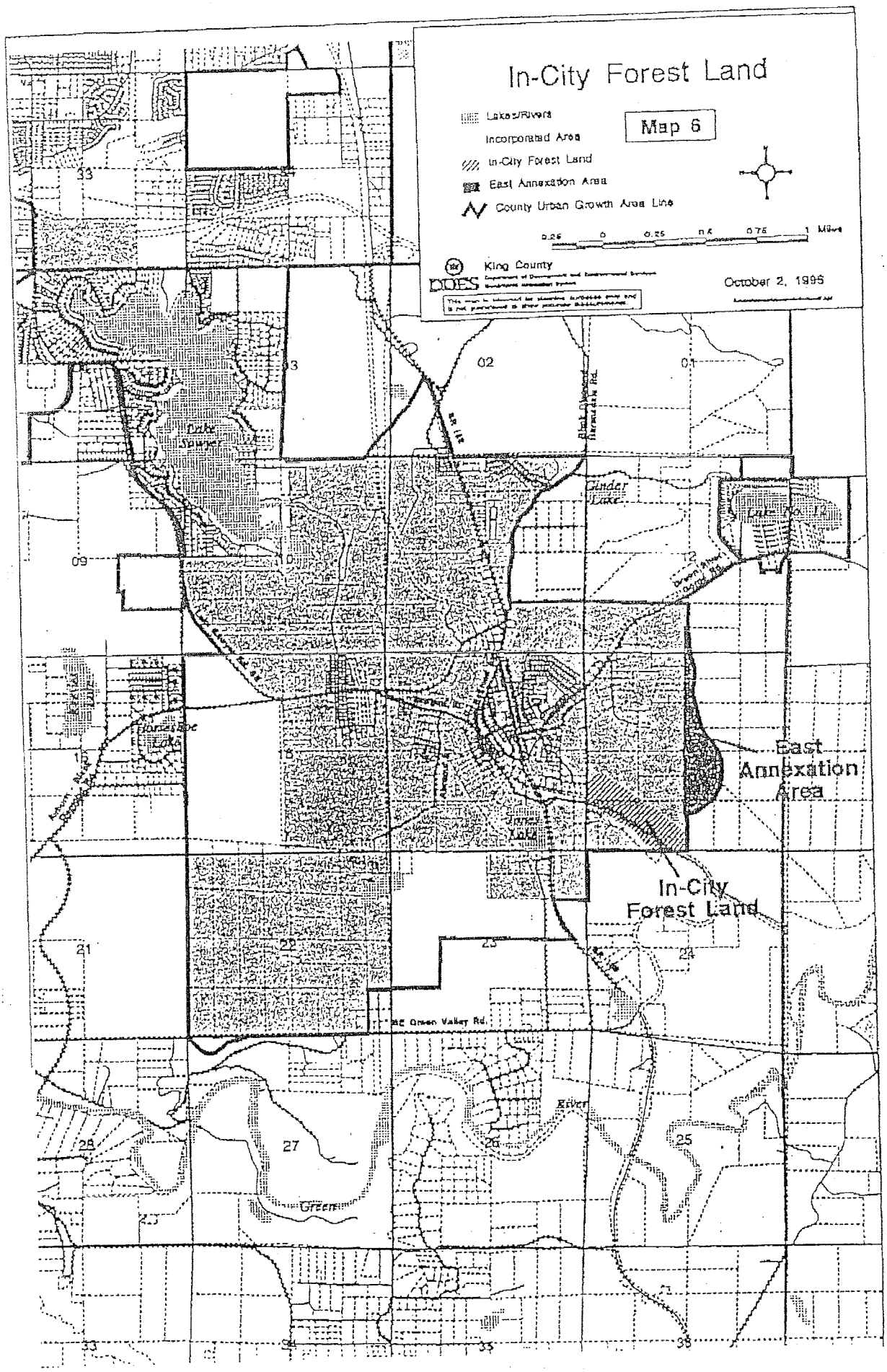
25
Lake Sawyer
Ginder Lake
Lake No. 19
Green River Gorge Rd.
Horseshoe Lake
Jones Lake
River


In-City Forest Land
Map 6
Lakes/Rivers
Incorporated Area
In-City Forest Land
East Annexation Area
County Urban Growth Area Line
0.25 0 0.25 0.5 0.75 1 Miles
King County
DOES
October 2, 1995
Lake Sawyer
Ginder Lake
Lake No. 12
Horseshoe Lake
East Annexation Area
In-City Forest Land
Green Valley Rd.
River
Green
33
02
01
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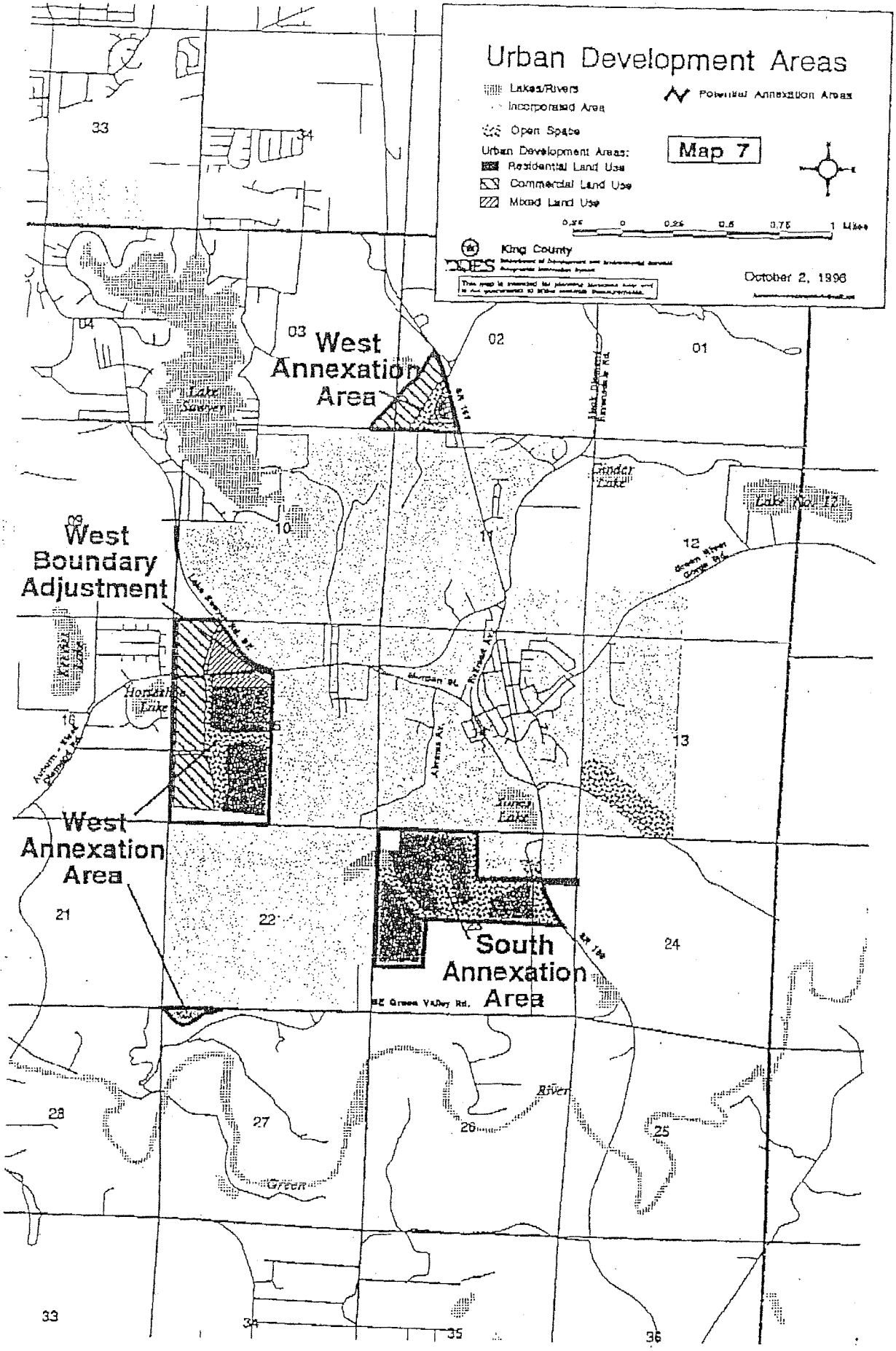
Urban Development Areas
Lakes/Rivers
Incorporated Area
Open Space
Urban Development Areas:
Residential Land Use
Commercial Land Use
Mixed Land Use
Potential Annexation Areas
Map 7
0.25 0 0.25 0.5 0.75 1 Miles
King County
October 2, 1996
West Annexation Area
West Boundary Adjustment
West Annexation Area
South Annexation Area
Lake Sawyer
Ginder Lake
Lake No. 12
Horseshoe Lake
Green River
Green Valley Rd.
33
34
04
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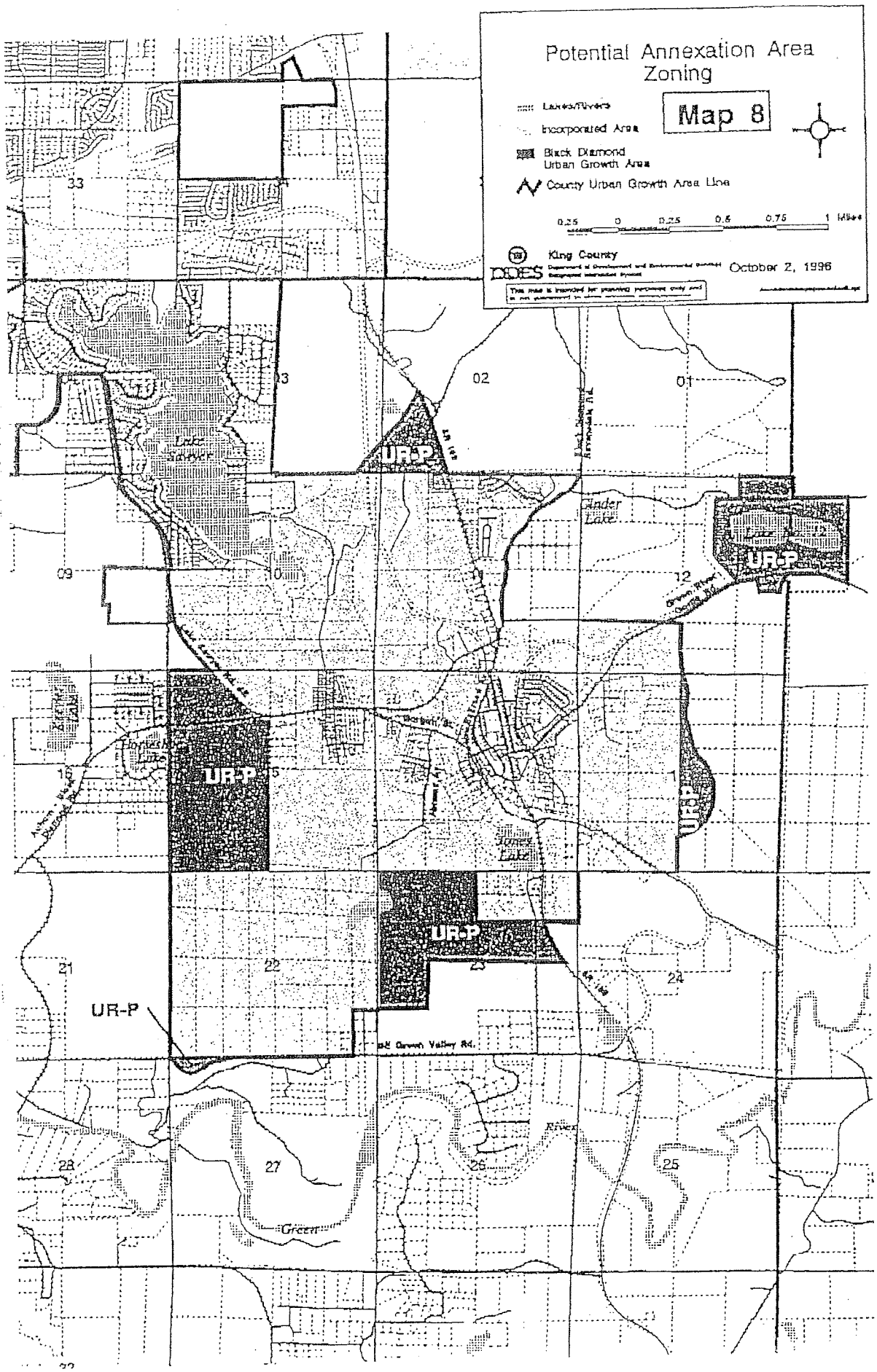

Potential Annexation Area
Zoning
Map 8
Lakes/Rivers
Incorporated Area
Black Diamond
Urban Growth Area
County Urban Growth Area Line
0.25 0 0.25 0.5 0.75 1 Miles
King County
DDES
October 2, 1996
33
02
01
09
10
12
UR-P
Lake Sawyer
Cinder Lake
Green River
Jones Lake
21
22
23
24
28
27
26
25
Green Valley Rd.
Green
River

APPENDIX B

Black Diamond Urban Growth Area Agreement: Four to One Open Space Acreage Calculation Table

Black Diamond UGA Agreement:

Four to One Open Space Acreage*

Calculation Table

FOUR TO ONE PROPOSAL

NEW UGA		OPEN SPACE REQUIRED				
		Total Needed	Actual	Plum Creek	In City	Balance
West Annexation	265.3	1,061.2	1,055.5	708.5	347	-5.7
South Annexation	151.9	607.6	615.7	420.7	195	8.1
Total	417.2 (417.2x4)=	1,668.8	1,671.2	1,129.2	542	2.4

WEST ANNEXATION

	New UGA		Open Space
Section 15		Ravensdale Lake	39.5
Residential	87.3	Ravensdale Cr (N of RR)	99.2
Commercial	93.6	Ravensdale Cr (S of RR)	32.9
Mixed Use	33.1	Sec 2 (E of Hwy 169)	174.7
		Sec 2 & 3 (W of Hwy 169)	177
North Triangle		UGA Open Space	63.3
Residential	11.7	Trail Link	12.2
Commercial	31.1	Green River Corridor	109.7
		Plum Creek Open Space	708.5
Section 27			
Residential	8.5	In-City Open Space	347
Total West Annexation	265.3		1,055.5

SOUTH ANNEXATION

	New UGA		Open Space
Section 23		Crisp Creek	206.5
Residential	151.9	Sec 27	68.9
		Sec 23 Rural	63.6
		Sec 23 UGA Open Space	81.7
		Plum Creek Open Space	420.7
		In City Open Space	195
Total South Annexation	151.9		615.7

* East Annexation Area, Lake 12 Annexation Area and West Boundary Adjustment Area are not subject to the Four to One open space requirements.

APPENDIX C

Environmental Principles - Resources, Plum Creek Timber Company

Environmental Principles – Resources

Plum Creek practices stewardship that protects and enhances the environmental values of the forests while providing for economical timber growth and harvest. Plum Creek will be responsive to public expectations for water and air quality, and for wildlife and ecological diversity. Plum Creek practices forestry on sound scientific and economic principles, and is dedicated to the future growth, productivity, diversity and health of its forests.

We conduct our forest management activities according to the following environmental principles:

- **Sustainable Forest Management** – Manage our forests in a sustainable, socially responsible, economical manner.
- **Ecological and Structural Diversity** – Enhance ecological and structural diversity where feasible and prudent by using a variety of silvicultural techniques, by retaining a diversity of vegetation and leaving trees of various sizes and species, snags, culls and other organic debris.
- **Water Quality** – Meet and where appropriate exceed, state and federal standards to protect water quality and fisheries by using Best Management Practices for all forest management activities, including the retention of buffers along streams and wetlands.
- **Air Quality** – Protect air quality by burning only when required by law for hazard abatement or when burning is an appropriate silvicultural technique to improve forest conditions or improve aesthetics in visually sensitive areas.
- **Reforestation** – Ensure future forest productivity and sustained forest growth by using the most ecologically and economically appropriate reforestation methods. Ensure that reforestation has occurred in all harvest areas — within two years in the westside forests of our Cascade Region and within five years in the Rocky Mountain Region and the east slopes of the Cascade Region.
- **Soil Conservation** – Maintain soil and site productivity by minimizing soil disturbance during harvest, and by recycling harvest residue for nutrient preservation.
- **Wildlife and Habitat Management** – Protect and enhance wildlife species and habitat areas through judicious control of road access, harvest management and cooperation with state and federal wildlife agencies.
- **Visual Quality** – Recognize and manage for aesthetic values near communities and major travel corridors by using appropriate design standards, harvest methods and tree retention.
- **Adjacent Land Management** – Cooperate with neighboring landowners in addressing and minimizing potential cumulative effects of resource management activities.
- **Research and Development** – Learn, experiment, innovate and respond to changing scientific knowledge, public concerns and economic conditions to optimize both financial and environmental performance.
- **Auditing** – Conduct regular audits to ensure that we meet or exceed the commitments made through our environmental principles.

APPENDIX D

Plum Creek Harvest Plan

BLACK DIAMOND AGREEMENT

Plum Creek Timber Company, L.P.
Harvest Plan Summary (October 7, 1996)

Plum Creek Timber Company, L.P. owns approximately 10,000 acres of land in urban and rural designated lands in the Maple Valley and Black Diamond vicinity. Due to the increasing urbanization and rural residential growth in the area, Plum Creek does not intend to own these lands as commercial forest lands. Since Plum Creek is not a developer, the company expect to sell these properties (over the next several years) to development entities or individuals who better suited to own or develop urban and rural lands.

Plum Creek Timber Company, L.P. and its predecessors have continually conducted forest management activities on these lands over the last 20 years. The lands consist primarily of well stocked second and third growth Douglas Fir forests. Today, only a small portion of these lands have mature commercially valuable timber. Plum Creek anticipates continued silvicultural and general land management activities on the lands which are a part of the Black Diamond Agreement, however the company does not expect to conduct extensive timber harvesting on these lands over the next five years with the exception of the plantation thinnings and the three final harvest plans depicted on the attached maps. A brief description of those harvest plans is provided below.

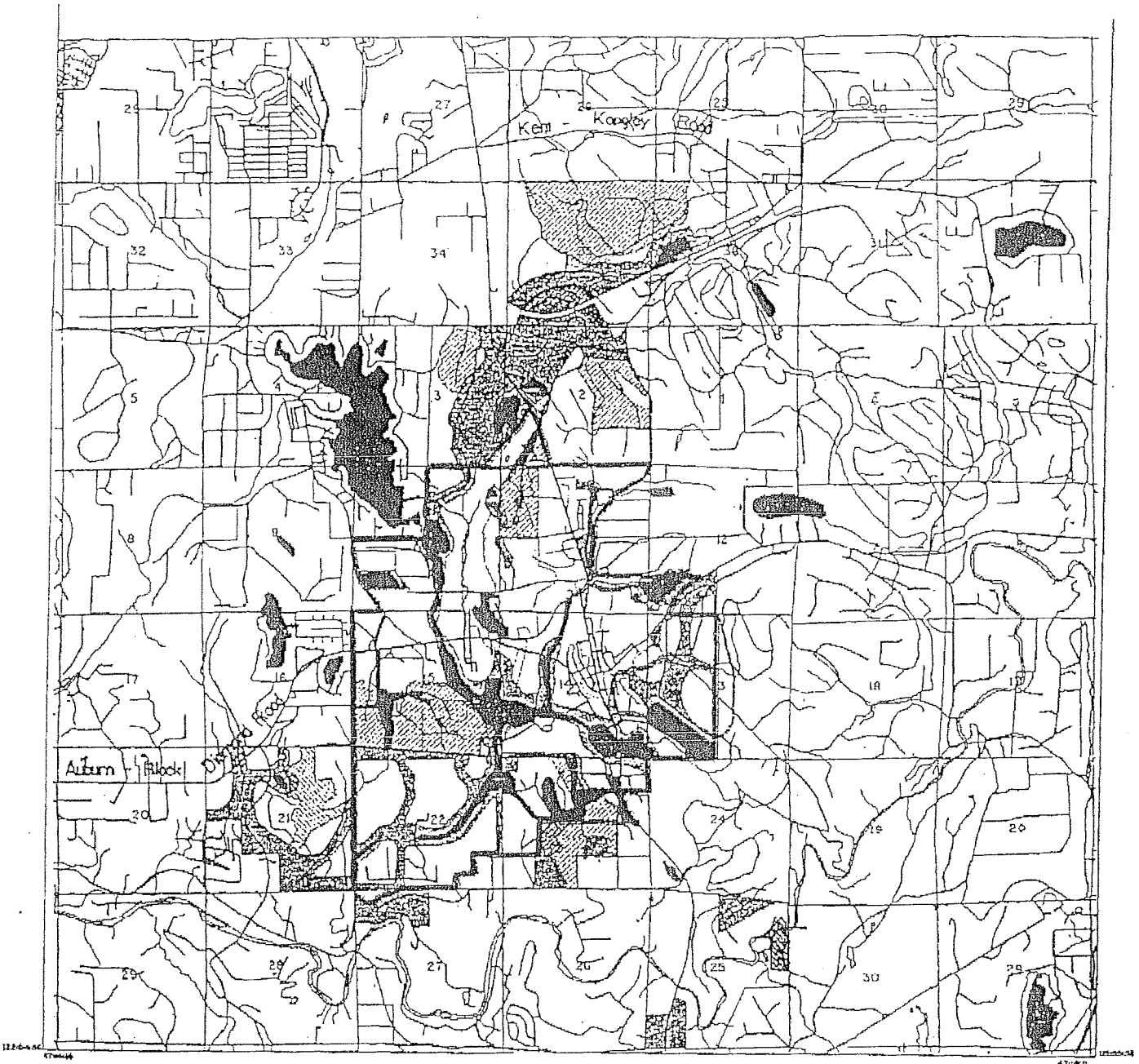
1. Crisp Creek (Section 21, Township 21 North, Range 6 East) - this is an 89 acre hardwood conversion harvest which is scheduled for November or December, 1996. The majority of the harvest is outside the lands identified for open space conservation under the Black Diamond Agreement. Members of the Muckleshoot Indian Tribe have been given tours and a harvest plan. The buffers surrounding the class 3 wetland will be nearly double the buffers required by the Forest Practices Act. The area is scheduled to be replanted in the spring of 1997.

2. North Black Diamond (Sections 2 & 3, Township 21 North, Range 6 East) - unit one is a 20 acre clear-cut and unit two is a five acre clear-cut immediately east of Highway 169. These units are separated by Ravensdale Creek and wetland. The buffers to these features will be nearly double the buffers required by the Forest Practices Act. The harvests will be conducted in November or December, 1996. The area is scheduled to be replanted in the spring of 1997.

3. Icy Creek (Section 25, Township 21 North, Range 6 East) - is a 20 acre clear-cut of mature Douglas Fir. A 200 foot buffer extending approximately 1,000 feet will be left between the harvest and the Green River. This harvest is scheduled for early winter, 1997. The unit located away from the State's fish rearing pond and is scheduled to be replanted in the spring of 1997.

4. Plantation Thinnings (see map) - thinnings will be conducted a various times over the next several years depending upon silvicultural, market and weather conditions. Thinnings are considered a prudent silvicultural practice which will improve the quality of the timber stands and should have little or no impact on the property's future open space value.

5. South Annexation - thinnings will be conducted in this area over the next five years. A final harvest is expected to be conducted prior to the area's conversion to urban uses but, in any event, prior to 2020. A harvest plan has not been prepared at this time. When a harvest plan has been prepared it will be submitted to the County for informational purposes. The final harvest will comply fully with state forest practice regulations and Plum Creek's Environmental Principles.



Black Diamond

Five Year Harvest Plan and Open Space

Harvest Plan	Open Space
Final Harvest	Primary
Commercial Thin	Secondary

Significant Features

- Paved Roads
- Other Roads
- UGA Boundary
- Hydro

Scale: 1" = Mile

Date: 9/20/96

Prepared By: RJE - RPIS

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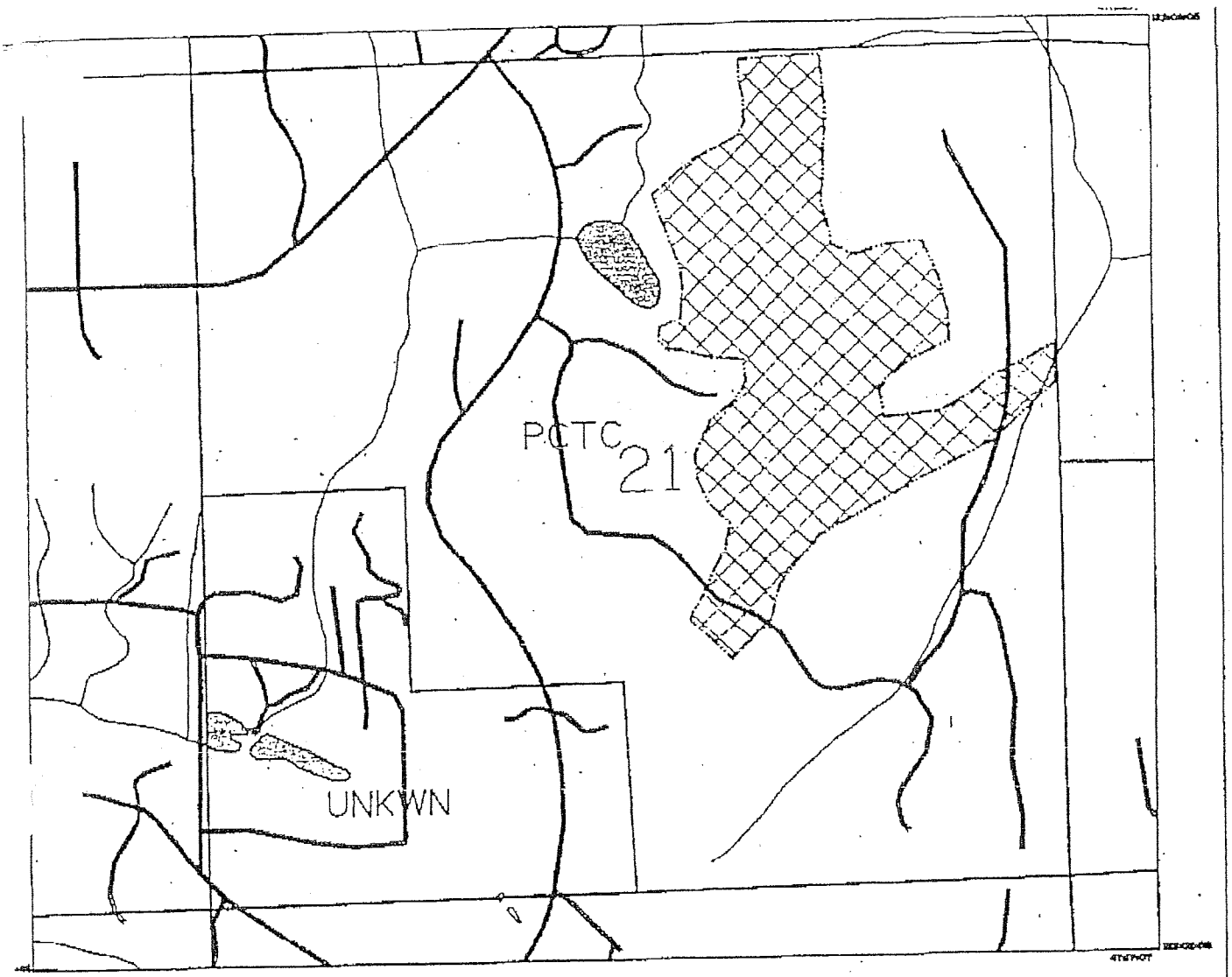


roposed Harvest Map

Proposed Harvest Area

Lines:
Paved Roads
Other Roads
Hydrology
Ownership
Harvest Boundary

Symbols:
PCTC - Ownership Name

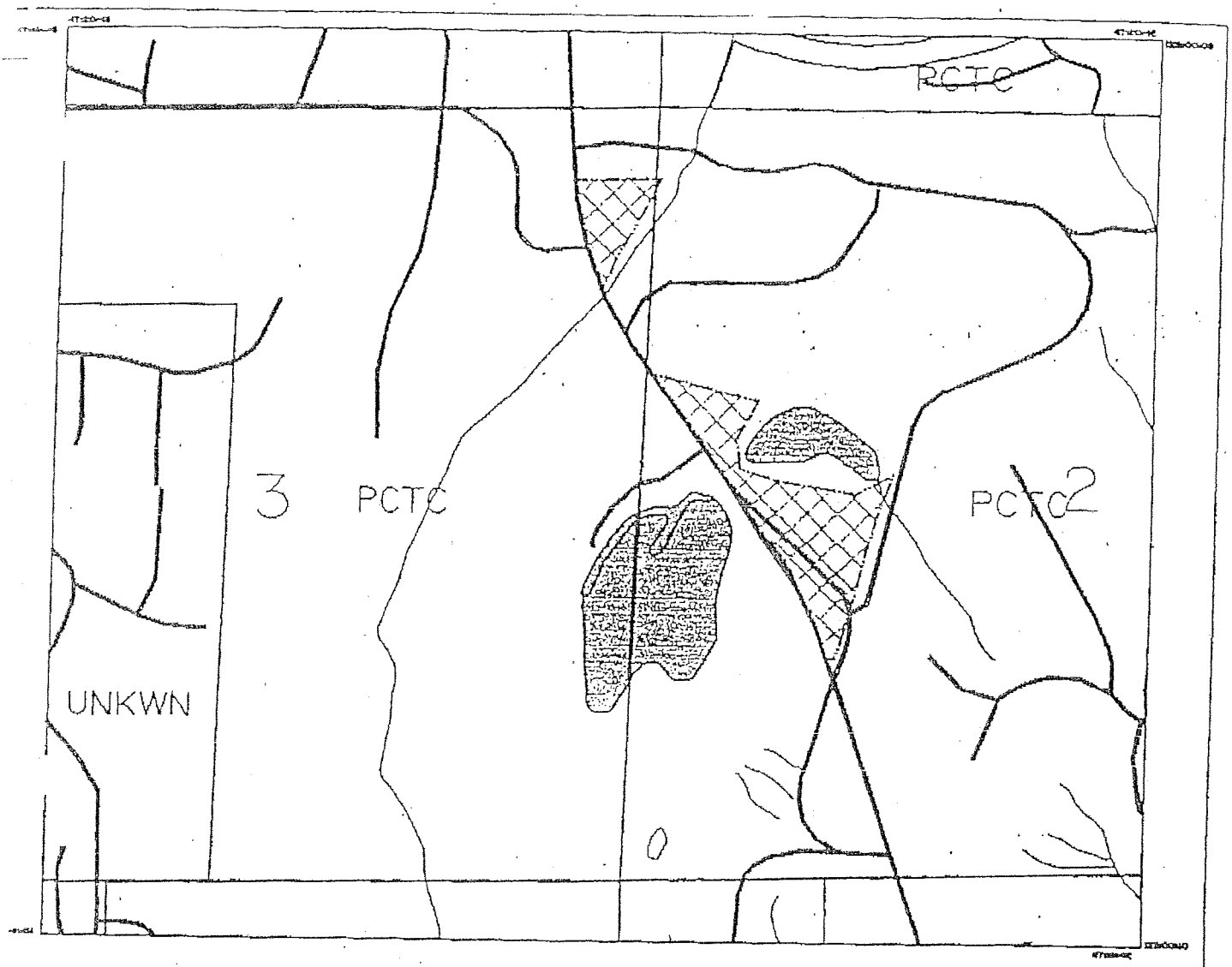
Map Type: Harvest
County: King
Unit Name: Puget Sound
Legal: Sec: 21; Twp: 21; Rng 06E

N

Prepared By: RJE - RPIS
Date: 9/20/96
Scale: 1:12000

PC Plum Creek

12.



Proposed Harvest Map

Proposed Harvest Area

Lines:
- Paved Roads
- Other Roads
- Hydrology
- Ownership
- Harvest Boundary

Symbols:
PCTC - Ownership Name

Map Type: Harvest

County: King

Unit Name: Puget Sound

Legal: Sec: 2, 3; Twp: 21N; Rng: 06E

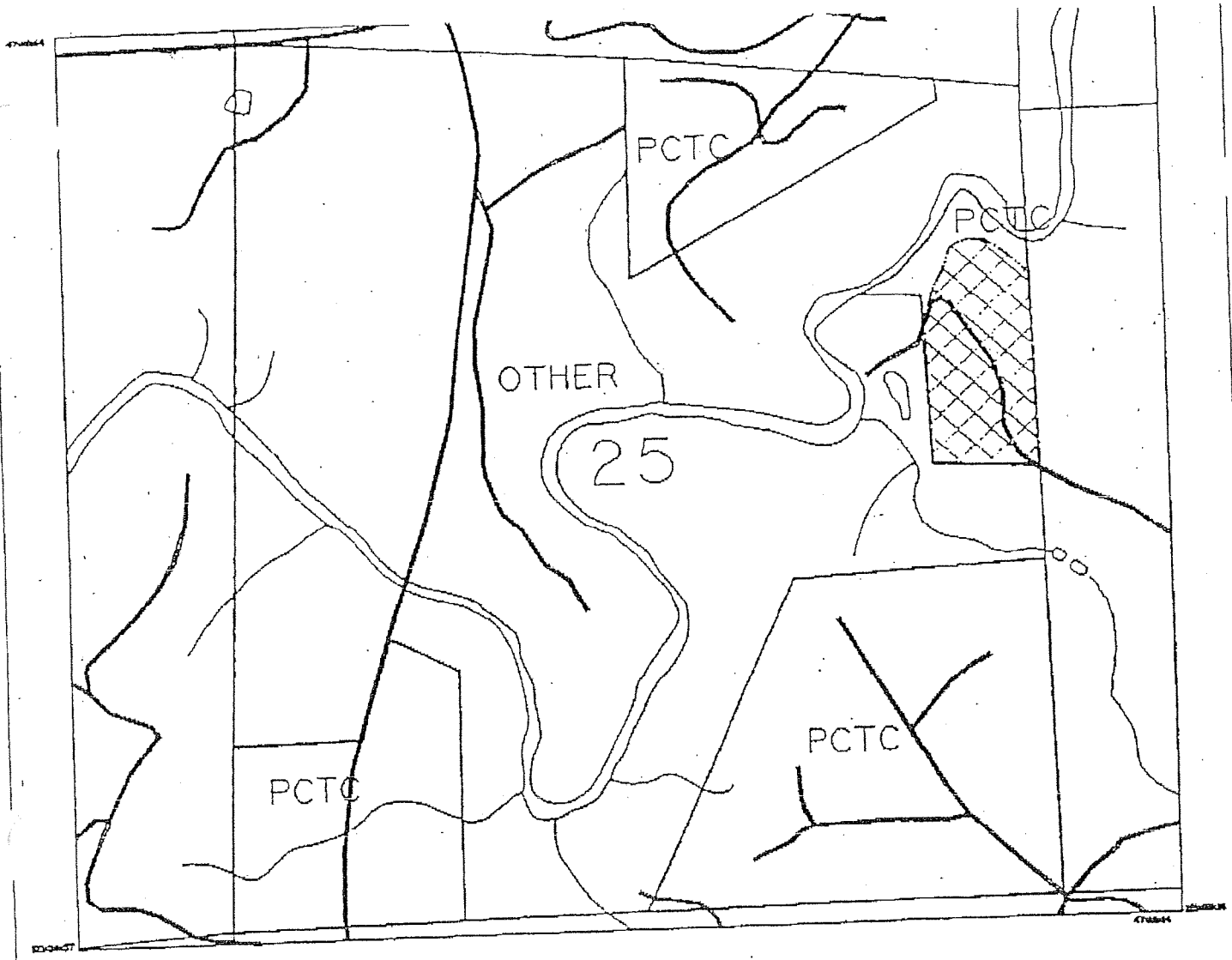
N

Prepared By: RJE - RPIS

Date: 9/20/96

Scale: 1:12000

PC Plum Creek



Proposed Harvest Map

Proposed Harvest Area

Lines:
- Paved Roads
- Other Roads
- Hydrology
- Ownership
- Harvest Boundary

Symbols:

PCTC - Ownership Name

Map Type: Harvest

County: King

Unit Name: Puget Sound

Legal: Sec 25; Twp: 21; Rng: 06E

N

Prepared By: RJE - RPIS

Date: 9/20/96

Scale: 1:12000

PC PlumCreek

APPENDIX E

Natural Resource Principles: Based on Soos Creek Basin Plan Goals and Objectives for Fish and Wildlife Conservation

These natural resource principles have been used to guide the location of land uses and open space in the Black Diamond Urban Growth Areas. They can also guide how development is planned and constructed. These principles carry out the goals and objectives of the Soos Creek Basin Plan for the conservation of fish and wildlife, especially salmon and trout and their habitats. Furthermore, these principles can reduce or prevent many of the adverse effects to the water quality of Lake Sawyer.

The Natural Resource Principles are based on an understanding of the relationship between land use and management activities, and the effects on habitats and species, especially aquatic habitats such lakes, streams and wetlands. These principles recognize that the structure and function of habitats depend upon a variety of processes that are geologic, hydrologic and biologic in nature. Many of these processes--such as runoff, stream channel migration and erosion--originate on the landscape surrounding the habitat, so it is important to conserve areas necessary to allow these habitat-forming processes to continue without adverse effects on their location, frequency and magnitude. Where impacts are unavoidable, mitigation measures based on these principles may help prevent or reduce the more serious effects associated with land use and resource management activities.

The Principles

The Goal: To preserve the natural patterns and processes on the landscape fundamental to the conservation of fish and wildlife.

1. Preserve the diversity and distribution of habitat types in sufficient quantities to sustain species and populations, especially rare or unusual habitats.

2. Preserve corridors and linkages within and among habitat types.

3. Do not obstruct natural processes such as runoff, stream channel migration, erosion.

4. Provide buffers between land development or resource management activities and habitats.

5. Protect headwater catchments.

6. Restore habitats and linkages where possible.

Applying the Natural Resource Principles

Applying these principles to development design and mitigation requires some further explanation.

1. Development should be sited away from critical habitats.

2. Design development and land management activities to allow movement of animals to and from habitats. Locate and orient open space to connect with adjacent habitat types such as woodlands and stream corridors. Limit corridor interruptions such as roadways, utility crossings and stream crossings. Orient utilities and roads parallel to corridors if possible.

3. Site developments to avoid obstructing natural processes such as runoff. Design stream crossings to pass floods and debris as well as fish.

4. Design development to provide transition areas between habitats and the developed landscape. Orient roadways and other intense uses away from the habitat area.

5. Limit development in the headwater catchments of Rock Creek and Ravensdale Creek.

6. Restore habitat types on disturbed landscapes set aside for open space; replant cutover land as soon as possible.

7. Where links between habitats have been severed or interrupted, restore connections by revegetating and replacing culverts with bridges.

APPENDIX F

BLACK DIAMOND URBAN GROWTH AREA ECONOMIC VISION

The City of Black Diamond, local property owners and King County are working to create a high-quality, attractive industrial job and tax base in the Black Diamond area. The participants in this process view themselves as partners, jointly creating and realizing a vision. The partners envision attractive industrial facilities, appropriately landscaped and buffered from neighboring uses, where high-value products are manufactured by a local workforce that is well trained and well paid.

The partners are creating a coherent and attractive plan for the area, and anticipating infrastructure and labor force needs. King County will assist the City of Black Diamond and property owners to apply for and receive low-interest loans and grants to fund public improvements as companies finalize their location decisions. Manufacturing facilities may have common design, material or construction standards that create an attractive and inviting appearance.

The economic base that will be created by this collaboration will produce sufficient tax revenue to support quality municipal services and school programs. The local retail and commercial businesses will benefit from the expenditures of workers employed in the basic industries that will be attracted by this initiative. Industries attracted to the area are likely to be environmentally clean and have relatively low transportation requirements.

JOINT IMPLEMENTATION

While creating a vision and plan are important, implementation is the ultimate objective of all the partners. To help make this vision a reality, property owners will collaborate in developing joint marketing strategies and materials. The City of Black Diamond will streamline and revise its building codes, development regulations and permit process to ensure protection of human health and the environment while providing certainty and responsiveness for businesses. King County will provide technical assistance for planning, permitting and financing infrastructure to the City and property owners.

ECONOMIC DEVELOPMENT ASSISTANCE

King County staff will provide support based on their significant expertise in economic development, including success in receiving grants and low-interest loans for infrastructure. There are three state and federal programs that County staff can access when property owners find businesses interested in locating in the Black Diamond area. Generally, these programs are competitive based on the number, type and certainty of jobs to be created. Grant programs require up to a 50 percent local match and can be used to fund any publicly-owned infrastructure. Local matching funds can be provided by the local public agency, the benefiting business, or the property owner. County staff will prepare the application with the assistance and concurrence of the City of Black Diamond, the property owners and the businesses.

DEVELOPMENT REGULATIONS/PROCESSES

King County may enter into separate agreements with the City to provide technical assistance and, potentially, permitting services to the City of Black Diamond relating to the urban growth areas. These services may be provided on a contractual basis, at terms, rates and conditions to be determined in future agreements. In addition, King County may provide technical assistance to the City for the purpose of amending their zoning code, development regulations and permit process.

MARKETING PLAN

The property owners will collaborate to create an aggressive, effective marketing plan that will realize the potential being created through the planning, zoning and regulatory reform process. This is viewed as an essential element to realize the vision. Costs will be shared among the property owners in proportion to the anticipated pro rata benefits to be gained. The materials will stress the shared vision created by the partners, and present the community and development opportunities as outlined in the vision and plans.

APPENDIX G

King County Code 26.04.020(L)

acres in 1959 to approximately fifty thousand acres in 1979, with much of this loss having been caused by actual or prospective urban development.

F. Generally, farmlands and open space lands which are close to urban centers have a greater market value for future urban development than their market value for commercial farming or other open space uses. This fact encourages the speculative purchase of these lands at high prices for future development, regardless of the current zoning of such lands. Farmlands which have a market value greater than their agricultural value do not attract sustained agricultural investment and eventually these lands are sold by farmers and removed from commercial agricultural uses.

G. The permanent acquisition by the county of voluntarily offered interests in farmlands and open space lands within the county, as provided in this chapter and as authorized by the Constitution and statutes of the state of Washington, will permit these lands to remain in farm and open space uses in a developing urban area and provide long-term protection for the public interests which are served by farmlands and open space lands within the county.

H. The acquisition of interests in farmlands and open space lands as provided in this chapter is a public purpose of King County and financing such acquisition requires that the county issue its general obligation bonds in the principal amount of not to exceed fifty million dollars. (Ord. 4341 § 2, 1979).

26.04.020 Definitions. A. "Agricultural rights" means an interest in and the right to use and possess land for purposes and activities related to horticultural, livestock, dairy and other agricultural and open spaces uses.

B. "Appendices A, B, C, D, E and F" of the ordinance codified in this title means the maps which describe designated areas of eligible lands for purposes of priority of acquisition as provided in Section 26.04.040. Official large scale maps describing such areas in detail are filed with the clerk of the council and incorporated herein by this reference. Smaller scale maps generally illustrating such areas are appended to the ordinance codified in this title for more readily accessible public reference.

C. "Bonds" means the general obligation bonds of the county described in Section 26.04.110.

D. "Council" means the King County council.

E. "Development rights" means an interest in and the right to use and subdivide land for any and all residential, commercial and industrial purposes and activities which are not incident to agricultural and open space uses.

F. "Eligible land" means farmland and open space land for the purchase of which bond proceeds are authorized to be used pursuant to this chapter.

G. "Executive" means the King County executive.

H. "Farmland" means:

1. "Farm and agricultural land" as now defined in RCW 84.34.020(2); or

2. Land which is in a single ownership of twenty or more contiguous acres, at least eighty percent of which is open or fallow and which has produced a gross income from agricultural uses of one hundred dollars or more per acre per year for three of the ten calendar years preceding the date of the owner's application. The "date of application" as used in (1.) or (2.) of this subsection shall be the date of the owner's application for purchase by the county.

I. "Food producing farmland" means farmland which has been used for the commercial, soil-dependent cultivation of vegetables, berries, other fruits, cereal grains and silage corn.

J. "Full ownership" means fee simple ownership.

ACQUISITION OF INTERESTS

K. "Governmental agency" means the United States or any agency thereof, the state of Washington or any agency thereof, any county, city or municipal corporation.

L. "Open space land" means "open space land" as now defined in RCW 84.34.020(1) and "open space use" means any of the uses provided in such definition.

M. "Owner" means the party or parties having the fee simple interest, a real estate contract vendor's or vendee's interest, a mortgagor's interest or a grantor of a deed of trust's interest in land.

N. "Selection committee" means the committee formed pursuant to Section 26.04.050 to advise the council in the selection of eligible lands for purchase.

O. "Value of development rights" means the difference between the fair market value of full ownership of the land, excluding the buildings thereon, and the fair market value of the agricultural rights to that land. (Ord. 4341 § 3, 1979).

26.04.030 Authorization. A. The county is authorized to issue its general obligation bonds to acquire the farmlands and open space lands described and prioritized in Section 26.04.040. The property interest acquired may be either the development rights, full ownership or any lesser interest, easement, covenant or other contractual right. Such acquisition may be accomplished by purchase, gift, grant, bequest, devise, covenant or contract but only at a price which is equal to or less than the appraised value determined as provided in this chapter. The proceeds of the bonds shall be used to acquire such property interests only upon application of the owner and in a strictly voluntary manner.

B. If the owner so elects, the executive is authorized to pay the purchase price in a lump-sum single payment at time of closing, or to enter into contracts for installment payments against the purchase price consistent with applicable federal arbitrage regulations. When installment purchases are made, the county is authorized to pay interest on the declining unpaid principal balance at a legal rate of interest consistent with prevailing market conditions at the time of execution of the installment contract and adjusted for the tax-exempt status of such interest.

C. The executive is further authorized to contract with other governmental agencies to participate jointly in the acquisition of interests in eligible lands on such terms as shall be approved by the council consistent with the purposes and procedures of this chapter.

D. The county may acquire full ownership in eligible lands of first priority only where the owner will voluntarily sell only the full ownership of the property. The county shall acquire only development rights or interests which are less than full ownership in eligible lands of second and third priority.

E. After county acquisition of development rights or some interest less than full ownership in any eligible lands, the county may purchase the remaining agricultural rights or other property interests in such land only when requested by the owner and when such acquisition is necessary to maintain agricultural or open space uses of the property.

F. If the county shall acquire full ownership in any eligible lands, the executive shall as soon as practicable offer the agricultural rights to such land for public sale at a price not less than the appraised value of such rights. If no offer for such rights is received at the appraised value, the executive may,

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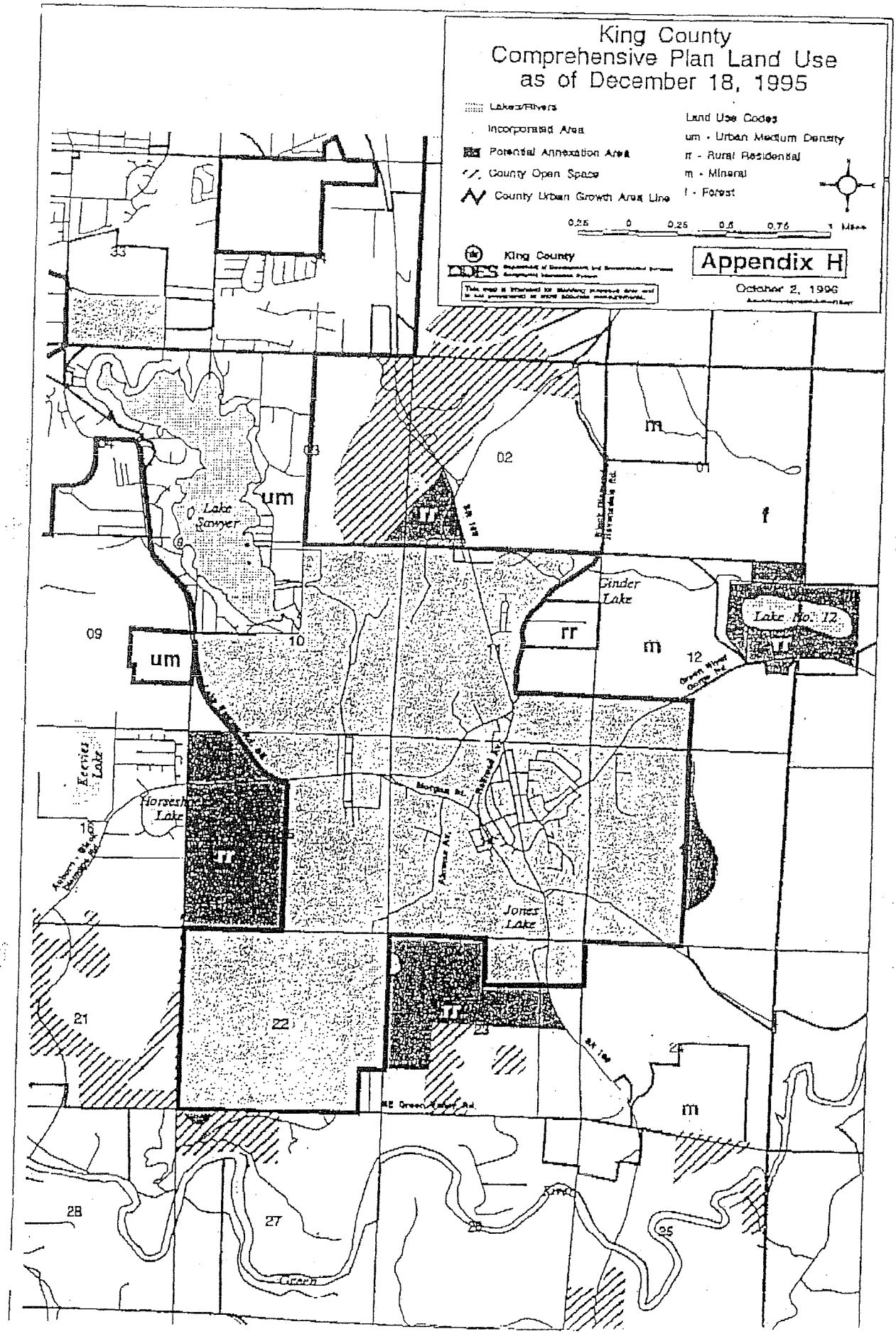
King County
Comprehensive Plan Land Use
as of December 18, 1995
Lakes/Rivers
Incorporated Area
Potential Annexation Area
County Open Space
County Urban Growth Area Line
Land Use Codes
um - Urban Medium Density
rr - Rural Residential
m - Mineral
f - Forest
0.25 0 0.25 0.5 0.75 1 Miles
King County
DDES
Appendix H
October 2, 1996
Lake Sawyer
Ginder Lake
Lake No. 12
Keevies Lake
Horseshoe Lake
Jones Lake
Green River
um
rr
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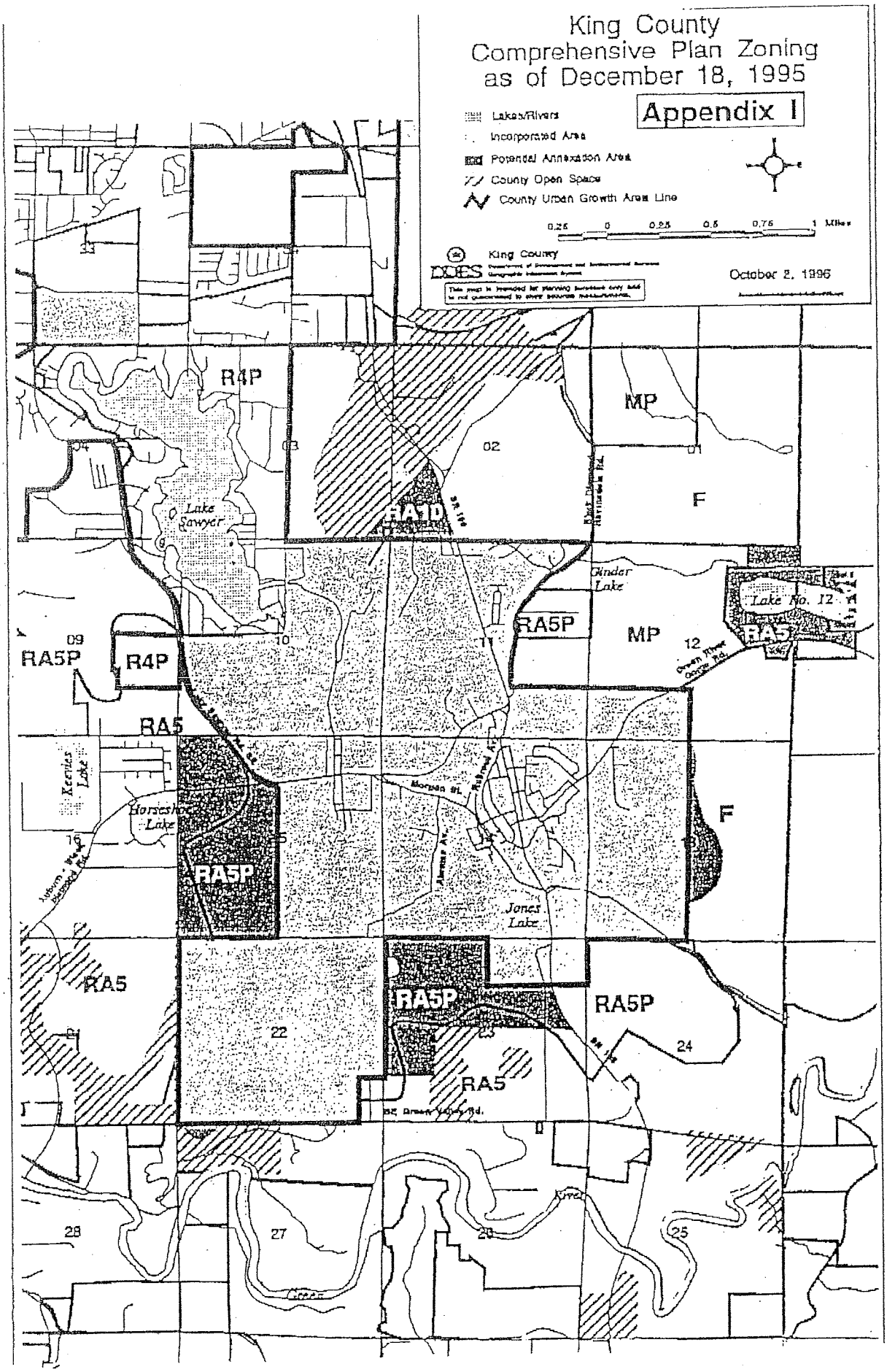
King County
Comprehensive Plan Zoning
as of December 18, 1995
Appendix I
Lakes/Rivers
Incorporated Area
Potential Annexation Area
County Open Space
County Urban Growth Area Line
0.25 0 0.25 0.5 0.75 1 Miles
King County
DOES
October 2, 1996
R4P
MP
F
RA10
Lake Sawyer
Ginder Lake
Lake No. 12
RA5P
MP
RA5
R4P
RA5P
RA5
Keenes Lake
Horseshoe Lake
RA5P
F
Jones Lake
RA5
RA5P
RA5P
RA5
22
24
28
27
26
25
Green River
Green Valley Rd.
Morgan St.
Rutland Av.
Alvatar Av.
Auburn - West Hartford Rd.
Hartford Rd.
Ravensdale Rd.
Green River Gorge Rd.
02
03
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Appendix D

Agency Review Comments

City of Black Diamond - 2020 Water System Plan

Review Comments on Draft Plan – Issues Potentially Related to MDRT and MPD Projects

September 1, 2020

Included below are comments from a preliminary review of the draft 2020 Water System Plan. The plan was delivered to Varius Inc via email and includes "Draft" on the cover (the plan is denoted "Spring 2020, Final XX 2020). Our review was conducted to identify text or policies that might impact MDRT work on the MPDs. Our review does not include recommendations for revisions, we assume those conversations will be conducted by staff in conjunction with inter-departmental review.

Comment 1

Text from the Executive Summary (below) indicates that some projects are Developer-Related, and some are a result of system deficiencies. We could not find text or a description of the relationship between the two categories when BOTH situations exist. For example, if a Developer completes a development-related project that simultaneously fixes an existing system deficiency (i.e. both situations exist) is the City obligated to participate in a cost sharing venture with the developer? Conversely, if the City completes a system deficiency project that benefits the Developer, is the Developer obligated to participate in the project? This could affect the entitlements and the Connection Charge calculations in the existing Development Agreements.

> A complete hydraulic analysis of the system has been conducted and numerous projects are recommended to improve the system. Projects selected for the WSP are:
>
> 1. Growth-related projects associated with extensions to the existing system to serve proposed new master planned developments;
> 2. System improvements to address existing system deficiencies, such as inabilities to meet minimum fire flow requirements;

Comment 2

It appears that changes in growth (population) and changes in demand were applied in a linear fashion wherein the normalized demand per customer was used for planning and future system demand projections. This approach has the potential to misrepresent the actual future demands from in-fill customers (who may have larger lots and significant landscape areas) and from MPD customers (who may have small lots and little or no landscaping). In addition, since most of the landscape irrigation in the MPD is accomplished through separate irrigation meters (most of which are owned by the association HOA) this approach has the potential to double-count some of the irrigation water demands (which are embedded in the infill meter records but separated in the MPD meter records). We attempted to quantify this relationship, but it is unclear if this approach yields demand data that is significantly or insignificantly different than actual future demands.

EXISTING WATER CONSUMPTION

Water consumption is the amount of water used by all customers of the system, as measured by the customer's meters. Historical billed consumption for the City is shown in **Table 4.2, Historical Consumption.**

Table 4.2
Historical Consumption

Year	Billed Consumption	
	(CF/Year)	(MG/Year)
2014	8,825,280	66.0
2015	8,987,178	67.2
2016	9,100,279	68.1
2017	9,971,281	74.6
2018	11,548,410	86.4
2019	11,277,936	84.4

Table 4.13, Projected Water Demands (City In-Fill with MPDs) summarizes the projected water demands for future years including the MPDs.

Table 4.13
Projected Water Demands (City In-Fill with MPDs)

Year	Customers (ERUs)	ADD (gpd)	MDD (gpd)	PHD[1] (gallons/hour)	PHD/MDD
2019	1,822	327,960	819,900	59,959	1.76
2020	2,126	382,680	956,700	69,079	1.73
2021	2,650	477,000	1,192,500	84,799	1.71
2022	3,364	605,520	1,513,800	106,219	1.68
2023	4,129	743,220	1,858,050	129,169	1.67
2024	4,944	889,920	2,224,800	153,619	1.66
2025	5,869	1,056,420	2,641,050	181,369	1.65
2026	6,744	1,213,920	3,034,800	207,619	1.64
2027	7,459	1,342,620	3,356,550	229,069	1.64
2028	7,789	1,402,020	3,505,050	238,969	1.64
2029	7,804	1,404,720	3,511,800	239,419	1.64
2030	7,819	1,407,420	3,518,550	239,869	1.64
2031	7,834	1,410,120	3,525,300	240,319	1.64
2032	7,850	1,413,000	3,532,500	240,799	1.64
2033	7,866	1,415,880	3,539,700	241,279	1.64
2034	7,882	1,418,760	3,546,900	241,759	1.64
2035	7,898	1,421,640	3,554,100	242,239	1.64
2036	7,914	1,424,520	3,561,300	242,719	1.64
2037	7,930	1,427,400	3,568,500	243,199	1.64
2038	7,946	1,430,280	3,575,700	243,679	1.64
2039	7,962	1,433,160	3,582,900	244,159	1.64
2040	7,979	1,436,220	3,590,550	244,669	1.64

[1]PHD is calculated using DOH's Water Sytem Design Manual Equation 3-1 which varies with system size.

Comment 3

The Comp Plan includes a service area policy that prohibits wheeling water through the city, either for wholesale supply purposes or for hydraulic benefit. This policy could potentially conflict with previous discussions regarding the MPDs (for example, if the Tacoma Supply Line is out of service and the disruption is within City limits, City pipelines could be used to restore regional service through wheeling which would allow construction to occur over a broader time window). In addition, it is possible that a future large-scale commercial operation may want to use city infrastructure for wholesale supply, or the City may want to use some or all of its water right on the springs for environmental mitigation. If so, this policy could be used to limit opportunities or benefits available to the City.

Table 5.1
Service Area Policies

Policy Name	*Reference*
Wholesaling Water Policy	
It is the City's policy to not allow wholesaling of water from the City's water system.	*Water System Plan*
Wheeling Water Policy	
It is the City's policy to not allow wheeling of water through the City's water system.	*Water System Plan*

Comment 4

The following excerpts, from Table 5.2, appear to be in conflict. The SKCCWSP criteria is less stringent than the DOH criteria and its inclusion could confuse the reader, and regulators, of which policy is applicable.

Fire Flow Rate a	If fire flow is to be provided, the distribution system shall be designed to provide the required fire flow at a pressure of at least 20 psi at the fire location, and positive pressure shall be maintained throughout the system during maximum instantaneous demand conditions.	***SKCCWSP Design Standards***

Table 5.2
Minimum Design Standards (continued)

	MINIMUM DESIGN STANDARDS	
	Design Standard	**Reference**
ystem Pressure	The system must be capable of delivering PHD at the required pressure of 30 psi at every existing and proposed service connection. If fire flow is to be provided, the distribution pipelines must also be capable of delivering the MDD rate, in addition to the fire flow, at the required pressure of 20 psi throughout the distribution system.	***DOH Design Manual***

Comment 5

It appears from this text (page 7-2), and from a review of the hydraulic model in Appendix T, that demand data was uniformly distributed to each node in the existing water system for the analysis of 2029 and 2039 demands and hydraulics. If this is the approach that was used, it would likely not be an accurate representation of the actual future demands which are likely to be concentrated in new MPDs (for example the Palmer Pit), and not uniformly distributed throughout the city. A cursory review indicates this could be a significant issue as the infrastructure that would be used to supply that future demand is being designed now in conjunction with Lawson Hills and Ten Trails.

Demand Data

The hydraulic model of the existing system contains 2019 average day demand (ADD) data. System-wide demands were allocated in the model as part of the Water System Plan (WSP) preparation and were scaled to match the system's demands as necessary. The peaking factors calculated in **Chapter 4 – Water Demands,** were used to analyze the system under maximum day demands (MDD) and peak hour demand (PHD) conditions.

In addition, existing demands in the hydraulic model were scaled to match projected demands within the City's existing water service area and projected demands (based on the following ERU distribution table) were added to the hydraulic model based on the preliminary/placeholder pipe alignments in the MPD areas to simulate demands and estimate system performance in these locations. The distribution of projected demands in the model appears to be based on ERU projections per pressure zone (outlined in the following table) rather than based on land use planning information. Pressure zone boundaries were not shown on the figures included in Appendix T of the WSP and were not reviewed.

Table 7.5
ERU Distribution by Pressure Zone

Pressure Zone	2019 Existing (ERU)	2029 10-Year (ERU)	2039 20-Year (ERU)
750 Pressure Zones (4.3 MG Reservoir)	400	4,233	4,276
850 Pressure Zones (4.3 MG Reservoir)	1,312	2,184	2,226
965 Pressure Zone (0.5 MG Tank)	110	489	515
1175 Pressure Zone (future 3.0 MG Reservoir)	0	898	945
Total	**1,822**	**7,804**	**7,962**

Comment 6

A description of the hydraulic model calibration process is included in Chapter 7. RH2 used the hydrant flow / system pressure testing that was conducted in 2015 to calibrate the model and a memo from that calibration effort recommended additional testing and calibration to yield accurate model results. The WSP (excerpt below) notes that the flow test data does not have a strong correlation to the results of the hydraulic model scenarios. Since additional testing and modeling has been recommended (to ensure that the model is producing results that are representative of the existing 2020 water system) we are unsure of the accuracy and effectiveness of modeling in the existing system (it should be noted that modeling in the MPDs should be accurate because of the quality and consistency of the as-built records). This could be a significant issue in planning and modeling the Lawson Hills and Ten Trails developments because it could affect the hydraulic gradeline assumptions used by the MDRT for project modeling.

Acknowledging that there is a discrepancy between the hydraulic model and the City's actual water system, two hydraulic model scenarios were prepared for use in identifying future water main improvements. One scenario is based on the west portion of the City's 750 Pressure Zone correlating well during the low flow (675 gpm single-port) flowing condition, as shown in **Table**

7.1, Hydraulic Model Calibration Results (Low Flow). The second scenario is based on the west portion of the City's 750 Zone correlating well during the high flow (1,000 gpm dual-port) flowing condition, the results of which are shown in **Table 7.2, Hydraulic Model Calibration Results (High Flow)**.

Comment 7

There is a discussion in the WSP regarding the existing, and proposed, facilities in Lawson Hills and Ten Trails, especially in areas that have not yet been planned or approved for construction. This discussion includes the following potential discrepancies with current MDRT planning activities:

- Redundant supply facilities to the Lawson Hills 965 and 1175 pressure zones,
- Disposition of the 0.5 Mg Reservoir in Lawson Hills,
- Locations of PRVs in Lawson Hills,
- Configuration of the 850 Zone Pump Station (or a second pump station) for redundancy purposes,
- Configuration of a second 1.3 MG reservoir in Ten Trails,
- Sizing of the Lawson Hills reservoir in conjunction with its hydraulic relationship to the 965 and 850 pressure zones (does it supply just the 1175 zone or does it provide standby storage for the 850 zone as well?).

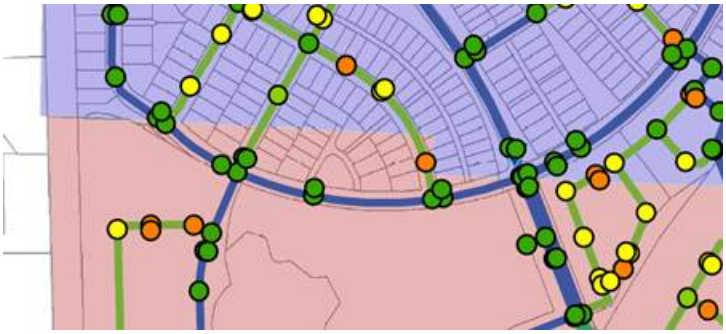
Table 7.9
Future Storage Evaluation (2029)

Storage Component	Total System[1] (gallons)	750 & 850 Pressure Zones (Served by 4.3 MG Reservoir) (gallons)	965 Pressure Zone (Served by 0.5 MG Reservoir) (gallons)	1175 Pressure Zone (Served by 3.0 MG Reservoir) (gallons)
Operational Storage	321,200	183,300	44,000	93,900
Equalizing Storage	0	0	0	0
Standby Storage	1,560,800	1,283,400	97,850	179,550
Fire Suppression Storage	420,000	420,000	300,000	420,000
Total Storage Required	**1,980,800**	**1,886,700**	**441,850**	**693,450**
Total Storage Available	4,777,700	2,736,900	513,800	1,527,000
Surplus or (Deficit)	2,796,900	850,200	71,950	833,550

[1]Total system represents the system as a whole and is not equal to the sum of the volumes required by individual pressure zones.

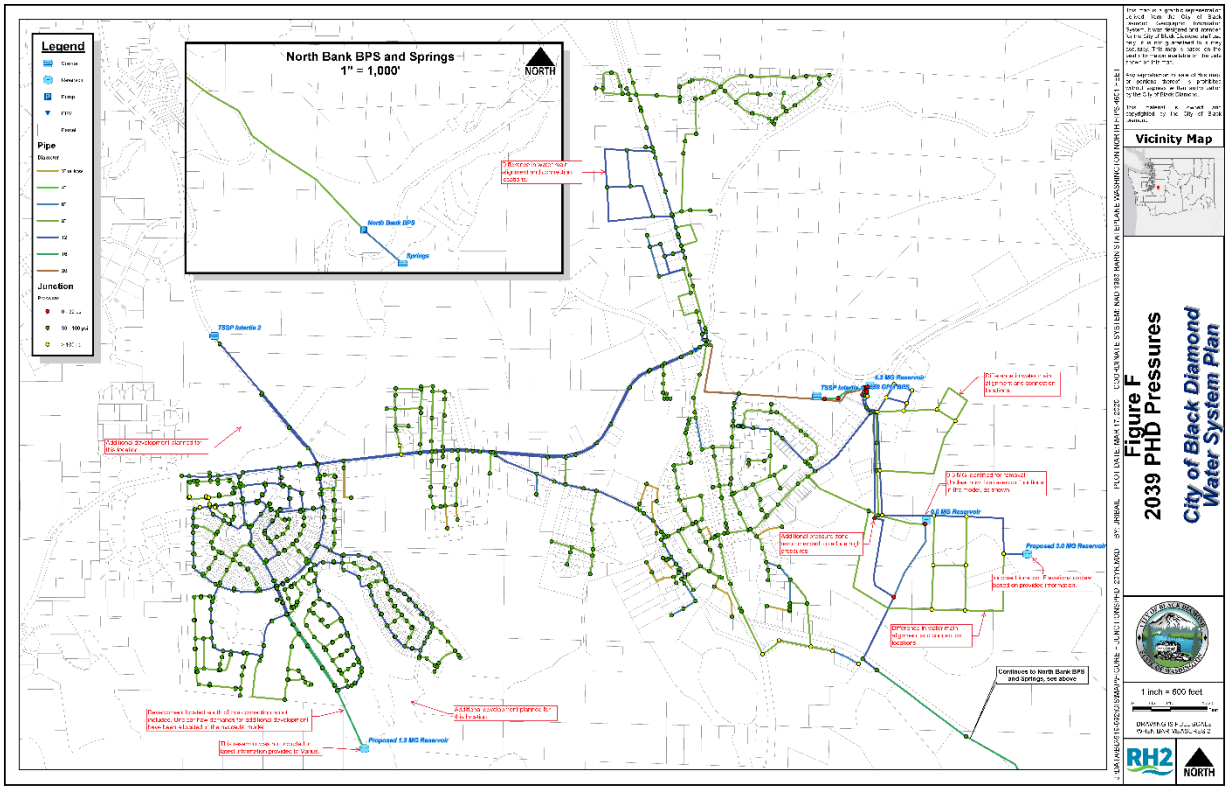
Comment 8

The land use information presented in Appendix T appears to roughly correspond to the data presented on the "Future Land Use Map" included in the City's 2018 Comp Plan (below). This data doesn't appear to have been modified to correspond to the proposed parcel layouts, so there are some inconsistencies between the two data sets as seen in the image, below.



Comment 9

Several differences were noted between the hydraulic model that Varius developed and the model that was developed as part of the WSP. Attached is the 20-year scenario figure from Appendix T, noting some of the most apparent differences. Additional differences may include elevations, demands, roughness coefficients, etc. that are not apparent based on the provided information. It might be helpful to instruct the reader that some city areas are accurately modeled and some are future/hypothetical and subject to change.



COMMISSIONERS:
Alan Eades
Kevin Fuhrer
Brad Lake
David B. Roselle
Tal Weberg
GENERAL MANAGER:
Thomas Keown, P.E.

Covington WATER DISTRICT

June 15, 2020

Geoff Dillard, P.E.
RH2 Engineering, Inc.
1201 Pacific Avenue, Suite 1750
Tacoma, WA 98042

RE: COVINGTON WATER DISTRICT COMMENTS ON THE CITY OF BLACK DIAMOND 2020 WATER SYSTEM PLAN UPDATE

To Mr. Dillard,

Covington Water District (District) has reviewed the Draft City of Black Diamond 2020 Water System Plan Update pursuant to your request dated 4/17/2020. Below are the recommended Draft Plan comments pertinent to the District.

- Page 2-5. Please replace Draft Plan update write-up for CWD to, "The District serves all of the City of Covington, portions of the City of Maple Valley, portions of Ravensdale, and portions of a west area in the City of Black Diamond, along with portions of un-incorporated King County. The District is a partner with Tacoma Public Utilities, Lakehaven Utility District and the City of Kent in planning and use of a Regional Water Supply System (RWSS). The RWSS operates a pipeline from an intake and headworks on the Green River to serve the partners and wholesale customers which are supplied by water allocations from Tacoma Public Utilities. The District's water distribution system consists of more than **318 miles** of pipeline, 12 wells and pumps, 11 water storage tanks, 4 booster pump stations, 6 interties, 14 pressure reducing stations, and 28 control valve stations. As previously mentioned, CWD is the current purveyor for the Lake Sawyer Area within the City limits. CWD and the City were in dispute over 94 acres in West Black Diamond, caused by conflicts between the *South King County Coordinated Water System Plan Map* and other planning documents including the BDUGAA, the City's approved WSP and annexation ordinances. The service area dispute was resolved by an agreement between CWD and the landowner/developer of the dispute area. CWD has relinquished claims to the dispute area."

- Page 2-7. Replace the number of CWD connections to 18,663 in the table.

- Page 3-3. Delete reference that CWD is a member of Cascade in the 3rd paragraph. Add in that the District is a partner with Tacoma Public Utilities, Lakehaven Utility District and the City of Kent in planning and use of the RWSS.

- Figures 2.3 to 2.8 does not appear to be provided for within the main WSP document yet it is listed in the Table of Contents (page vi). The District would like to review these figures.

- Table 2-1, the table with Covington Water District type of source should also include the District's Green River w/ RWSS Intertie (i.e. not just our well field).

The Covington Water District would like to thank you for the opportunity to review the Draft City of Black Diamond Water System Plan. If you have any questions regarding these comments, please contact Steve Lee at 253.867.0940.

Sincerely,

Thomas Keown, P.E.
General Manager

OAKPOINTE

November 20, 2020

Seth Boettcher
Public Works Director
City of Black Diamond
24301 Roberts Drive
Black Diamond, WA 98010

RE: MPD Water System Components of BD Water Comprehensive Plan Update

Dear Mr. Boettcher:

As CCD Black Diamond Partners LLC ("Oakpointe") undertakes long range planning efforts for the Ten Trails and Lawson Hills MPDs, there is certain information that we need to plan effectively. We understand that the City is currently updating the City's Water Comprehensive Plan and that there will be a public comment period provided as part of that effort. We will submit official comments at that time, but we thought it might be helpful, given the size of Oakpointe's landholdings within the City and the collaborative relationship we have sought to foster with City staff, to provide an overview of the information that we would like to see in the update. That information is as follows:

1. Ten Trails Main Property
    a. Confirmation that, as indicated in the attached "Water Model Update" provided by Varius Engineering, dated June 19th, 2019, the extension of two 850 pz 12-inch diameter water mains into the southerly reaches of the property will provide sufficient fire flow for build-out without the previously planned reservoir. We understand that this theory depends on the second connection to the City of Tacoma main at Lake Sawyer Road as proposed in current design documents under permit review at the City.
    b. Depiction of anticipated extents of 750 pz and 850 pz pressure zones within the property.
2. Lawson Hills Main Property
    a. Clarification of the pressure zone requirement for the proposed reservoir at the high point of the property. Will adjoining homes close to the reservoir be able to have supplemental in-home boosting of water pressure?
    b. Clarification of redundancy requirements of reservoir design.
    c. Depiction of anticipated extents of 1150 (if expected), 950 (if expected) and 850 pressure zones.
3. Ten Trails/Lawson Hills Property at North City Limit (Parcels A and B)
    a. Depiction of anticipated extents of 850 pz and 750 pz pressure zones.

3025 112TH AVENUE NE
SUITE 100
BELLEVUE, WA 98004

WWW.OAKPOINTE.COM

b. Depiction of alternate looping strategies from existing 850 pz facilities within SR 169.
    i. Guidance to developing properties along SR 169 as to required extension of looping stubs to adjoining properties.
    ii. The Pipeline Road and North Connector water mains and their pressure zone transitions should be shown.

As I said, we will provide official comments during the public comment period, but we thought it would be helpful for you to have this information sooner rather than later. If you have any questions or need any additional information, please do not hesitate to contact me.

Sincerely,

Justin Wortman
Senior Project Manager
Oakpointe

State of Washington
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310 • Kent Washington 98032-2388

June 17, 2020

SETH BOETTCHER
PUBLIC WORKS DIRECTOR
BLACK DIAMOND WATER DEPARTMENT
PO BOX 599
BLACK DIAMOND WA 98010

RE: Black Diamond Water Dept., ID# 07220
King County
Water System Plan Review - 2020
Submittal #20-0308

Dear Mr. Boettcher:

Thank you for submitting the Water System Plan (WSP) for the City of Black Diamond (the City), received in this office on March 20, 2020. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

Description of Water System

1. Please verify the City is asking for a 10-year WSP approval period.
2. Table 2-1 identifies numerous "Additional Water Systems" within the City's water service boundaries. Does the City have policies to consolidate systems into the City's water system if requested by these existing systems?
3. Provide a Statement of Local Government Consistency from the City's Planning and Land use Dept.
4. Prior to WSP approval, provide an adoption ordinance from the King County Council.
5. Point of clarification on page 2-5, Covington Water District is no longer a member of Cascade Water Alliance.
6. Table 2.4 Tacoma Wholesale Intertie Water Supply references a pending agreement, Amendment No. 2, to add a second intertie (also referenced in Table 6.2). What is the status of this agreement? Please provide Amendment No. 2 if available. Include the second intertie in the proposed hydraulic profile provided in Figure 9.2.

Basic Planning Data

7. Please provide a description of the seasonal variations in consumption patterns of each customer class.
8. Page 4-2 text references 841 active service connections, which does not correspond with those presented in Table 4.1. Table 4.4 shows 874 accounts for 2019. Please clarify.

Policies

9. Please check Table 5.2 Minimum Design Standards, water quality parameters design standards for accuracy and update. It might be appropriate to update the reference (SKCCWSP) given the outdated citations. For example, chapter 248-54 of the WAC has been recodified in chapter 246-290 of the WAC.
10. The construction certification section described on pages 5-9 and 5-10 is confusing. Consider revising for clarity. Note the following, for projects reviewed by the DOH, the City needs to submit a construction completion report to the DOH. For distribution main replacement projects that do not require DOH review, the City needs to retain a construction completion report form in their records.

System Analysis

11. Page 7-8. Please elaborate on how the reliable pump capacity of 500gpm was determined for the Black Diamond Springs source. Were the capacity (ERUs) numbers presented in Tables 7.11 and 7.12 based on the North Bank pump station pumping for 24 hours continuously? We recommend calculating reliable pump capacity for the Black Diamond Springs source (Table 7.3) based on 20 hours of operation per day.
12. Please evaluate the capacity of the 4.3MG reservoir pump station to serve the 965 pressure zone.

Water Use Efficiency Program (WUE) and Water Rights Assessment

13. Please include the evaluation of opportunities for the use of reclaimed water.

Source Protection

14. The source water protection plan appears to replicate the text from the 2008 WSP and be incomplete. For example, omission of sample notification letters sent to landowners about potential contaminant sources. Work on updating this plan.
15. Please include the map showing the delineated protection areas.
16. Please note that the contaminant inventory is required to be updated every two years. An updated contaminant inventory should be included in this plan. Once the inventory is updated the City needs to clearly identify specific land use concerns within protection areas. This applies to areas both inside and outside of the City's jurisdiction. Discuss efforts the City will undertake to improve coordination with King County.

Water Quality

17. Point of clarification on page 6-11 and 6-14 regarding unregulated contaminant monitoring. The American Water Infrastructure Act of 2018 changed the threshold for systems required to conduct this monitoring from those serving more than 10,000 people to those serving more than 3,300 people (not applicable to UCMR4).
18. Please address the comments for improving the Coliform Monitoring Plan and *E.coli* Response Plan provided by email on February 11, 2020.
19. Please think about developing a distribution water quality analysis or strategy. Parameters such as pH, alkalinity, conductivity, chlorine residual, heterotrophic plate count, oxidation-reduction potential and others that can be used to establish seasonal baseline data. Data can be used to ensure optimized corrosion control, inform O&M decisions, inform asset management decisions, and provide baseline water quality data with which to compare in an emergency contamination situation. It would also be interesting to note how these parameters change as the system begins to utilize surface water from Tacoma.

Operations & Maintenance

20. Please include the City's Water Shortage Response Plan.
21. Does the City's valve maintenance program include testing air/vacuum valves? If not, please consider including these very important valves in the program.
22. Thank you for including the ordinance providing legal authority to implement the Cross-Connection Control Program (CCCP). The draft sent by email June 7, 2020 appears to have all the required elements of a CCCP. Please include the CCCP in this plan.

Distribution Facilities Design and Construction Standards

23. Reduced Pressure Backflow Assemblies must discharge to airgap, i.e. not inside of a vault. Please revise the standard detail.

Capital Improvement Program

24. Please describe the City's Asset Management Program.

Financial Planning

No comment.

Other Documentation

25. Provide a signed SEPA Checklist and Threshold Determination with the final WSP submittal.
26. The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.
27. Prior to DOH approval, the governing body of the City must approve and adopt the WSP.

28. Please provide copies of any comments made by adjacent purveyors or other interested parties, along with the City's response to those comments.

Closing

We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before **September 18, 2020.** In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents have been adopted (WAC 246-290-990). The total cost is **$3,705.00**. An itemized invoice for the review of this project has been sent to the primary contact on file for your water system. Please note that this fee covers our current review and one more submittal for this project. If additional submittals are required, then an invoice for additional fees will be included with our final approval letter. Please remit complete payment in the form of a check or money order within thirty days of the date of this letter in the enclosed envelope or mail payment to: WSDOH, Revenue Section, PO Box 1099, Olympia WA 98507-1099.

Thank you again for submitting your revised Water System Plan for our review. If you have any comments or questions concerning our review, please contact me at (253) 395-6771.

Sincerely,

Richard Rodriguez

Richard Rodriguez
Regional Planner

Enclosure (invoice)

cc: Jae Hill, King County UTRC
Seattle/King County Health
Ria Berns, WSDOE – NWRO
Geoff Dillard, RH2 Engineers
Dan Dalsanto, Utilities Superintendent, Black Diamond Water Department

ecc: Brietta Carter, PE, Regional Engineer, DOH

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Appendix E

City of Tacoma Wholesale Agreement

CITY OF BLACK DIAMOND
RECEIVED
OCT 19 2020
CITY HALL

AMENDMENT NO. 2 TO WHOLESALE WATER AGREEMENT BETWEEN CITY OF TACOMA AND CITY OF BLACK DIAMOND

THIS AMENDMENT is made and entered into this 3rd day of September, 2020, by and between the City of Tacoma, Department of Public Utilities, Water Division d/b/a Tacoma Water, a municipal corporation (hereafter "Tacoma"), and the City of Black Diamond, a municipal corporation (hereafter "Black Diamond"). Tacoma and Black Diamond collectively shall be referred to as the "Parties" or either Tacoma or Black Diamond may be referred to as "Party" when appropriate.

RECITALS

WHEREAS, On February 1, 2007, the Parties executed Amendment No. 1 to a Wholesale Water Agreement that stipulated certain regulatory treatment and reporting requirements, and identified additional quantities of wholesale water to be purchased and the terms of that purchase.

WHEREAS, On August 1, 2003, the Parties entered into a Wholesale Water Agreement that remains in full effect.

WHEREAS, the Parties are operating under a Franchise Agreement that specifies terms and conditions for operation of Tacoma owned pipelines and appurtenances in Black Diamond's rights-of-way, including a 40% Black Diamond cost share for required relocation of said pipelines and appurtenances;

WHEREAS, Through the Wholesale Water Agreement and Amendment No.1 to the Wholesale Water Agreement, Black Diamond paid System Development Charges to purchase 2,212,000 gallons per day (GPD) for average day use, 4,977,000 GPD for peak day use and 4,728,150 GPD for four-day maximum use, which Tacoma committed for Black Diamond's immediate and permanent use and this remains in full effect;

WHEREAS, Black Diamond has requested an additional point of connection, or intertie, between the Parties' systems, and approval for this additional point of connection was authorized by the Regional Water Supply Partners on January 8, 2016.

NOW, THEREFORE, in consideration of the mutual promises and obligations hereinafter set forth, the Parties agree as follows:

1. **INTERTIE CONSTRUCTION**. As provided for in the Wholesale Water Agreement, the Parties shall design, construct, and install an additional point of connection or intertie between the Parties' systems at approximate Second Supply Pipeline (SSP) Station 1298+00 (hereafter "Project") per the details of this Amendment, and as shown in Exhibit B hereto. The Parties have agreed to design, engineer and construct the additional point of connection, or intertie,

between their systems as follows: (1) Black Diamond will design, engineer, and construct the infrastructure required to successfully complete the intertie, including all necessary facilities to meter, monitor and control the intertie, (2) Tacoma shall review and comment on Black Diamond's engineering plans and designs prior to construction, (3) Black Diamond will pay all the costs, including Tacoma's, for design, engineering and construction of the intertie.

2. CAPITAL COSTS. The Cost of Construction of the proposed intertie shall be the responsibility of Black Diamond. As used in this paragraph, "Cost of Construction" shall include, but not be limited to: (a) all facilities and equipment necessary to deliver water from the Second Supply Pipeline ("SSP") connection point; (b) the equipment and installation costs for the associated meter, vault, monitoring and control systems, and connection to Tacoma's Second Supply Pipeline; (c) all actual costs of labor, materials, permitting, equipment, engineering, legal, publications, inspection, and SEPA compliance; (d) any and all property rights necessary to complete construction, and (e) any costs customarily incurred in such projects.

3. DESIGN, ENGINEERING, AND CONSTRUCTION. Black Diamond will complete all engineering and construction work for the components of the additional intertie that Tacoma will own including the tap and stub off Tacoma's main, the meter and vault. Tacoma shall provide an estimate of fees for all Tacoma's engineering and inspection work associated with the Project. Black Diamond shall complete all engineering and construction work for the components of the additional intertie that Black Diamond will own. Ownership of components shall be as shown on Exhibit B hereto.

4. APPROVALS, FINAL ACCEPTANCE, AND OWNERSHIP. Prior to construction, Black Diamond will provide the design for the intertie to Tacoma for review and comment. Final acceptance of the physical point of connections, the connecting piping, the meter and vault up to the point of connection between facilities owned, or to be owned by Tacoma, control and monitoring systems, and facilities owned or to be owned by Black Diamond, will require approval by Tacoma and such approval shall not be unreasonably withheld.

5. WATER DELIVERY. Black Diamond agrees to water delivery at the below points of connection.

*Intertie Location	Intertie Type	Connection (Main Size)	Meter Size	**Meter Reading	***Zone Elevation		Max Flow Capacity***** (GPM)
					****Tacoma	Black Diamond	
SSP Sta. 1407+20 Existing Intertie (#1)	W	12"	8"	SCADA	839-874	850	3,456
~SSP Sta. 1298+00 Proposed Intertie (#2)	W	12"	8"	SCADA	818-874	850	3,456

* See Exhibits A and B for further detail.
** Meter reading shall be read through data transmitted electronically through the SCADA system to Tacoma Water and the City of Black Diamond. Meters may be converted to AMI in the future.
***The zone elevations vary in Tacoma's Pipeline based on the flow conditions in the SSP.
**** Tacoma's zone elevation is dependent on flows in the SSP. Tacoma cannot guarantee water to Black Diamond if the flow in the pipeline is outside of the hydraulic parameters necessary to supply water into their specified zones.
*****Max Flow Capacity represents the Tacoma system's ability to deliver flow at a specific flow rate from the SSP and at a specific HGL in Black Diamond's system. The intent of the second intertie is to match the 1st intertie (full redundancy). Black Diamond shall not exceed the maximum flow rates documented elsewhere in this agreement at any time.

6. INDEMNIFICATION. Each Party, to the extent provided by law, agrees to indemnify and hold the other harmless from any and all claims arising from their respective acts of negligence in the performance of their scope of work pursuant to this Amendment, including but not limited to the claims of the other Party's employees. Accordingly, the Parties waive the immunity provided by Chapter 51, RCW. This provision shall be deemed mutually negotiated.

7. INSURANCE REQUIREMENTS. Tacoma will require special provisions in contract specifications between Black Diamond and its contractor ensuring Tacoma is appropriately insured for all work in Black Diamond's right-of-way, or within Tacoma's easement. Appropriately insured means:

- The City of Tacoma be named as an additional insured under the Contractor's Commercial General Liability policy;
- The coverage be primary and non-contributing to the City's insurance program;
- The coverage shall be no less than $2,000,000 Combined Single Limit (CSL) per occurrence for bodily injury and property damage;
- The Contractor's Commercial General Liability Policy shall include Employer's Stop Gap coverage;
- The policy is not subject to a self-insured retained limit of more than $10,000;
- The Contractor have in place a Commercial Auto Liability policy with policy limits of no less than $2,000,000, and;
- A certificate of insurance shall be delivered to Tacoma Water's Project Manager prior to the start of construction reflecting the required coverage.
- The Contractor agrees to pay on behalf of the City any self-insured retained limit of liability required by the Commercial General Liability or Commercial Auto Policies required above.

8. EASEMENT. If the Intertie facilities agreed to by the Parties under this Amendment are to be constructed on property owned by Black Diamond then Black Diamond will provide

Tacoma an additional permanent easement that includes all Intertie facilities to be owned by Tacoma, and a minimum of 20 feet clearance around those facilities to ensure access for operation and maintenance purposes. Black Diamond's obligation to provide easements is limited to only those Intertie locations agreed to by the Parties and only when the Intertie will be located on property owned by Black Diamond. Any such required easement must be conveyed to Tacoma prior to final acceptance of the project, and approval for its use.

9. OPERATIONS. The Parties agree to jointly develop and maintain operating protocols for items including the scheduling of water supply to assure consistent flow control and treatment, routine operational communication, emergency shutdown, emergency contacts and other items the Parties determine appropriate ("Operating Protocols"). The Operating Protocols shall be subject to mutual agreement, which such approval shall not be unreasonably withheld, conditioned or delayed by either Party.
Black Diamond will be the owner of the valve of demarcation. Tacoma Water shall have the right to operate this valve, to be able to perform maintenance work on the meter, or isolate the turnout for any other reasons, if necessary. The right to operate the valve of demarcation includes the right to access the property owned by the City of Black Diamond. The right of entry shall be conveyed to Tacoma prior to final acceptance of the project, and approval for its use.

10. PARTIES' STATUS. This Amendment is not intended to create any partnership, joint venture, or other arrangement between the Parties. The Parties intend that the rights, obligations, and covenants in this Amendment shall be exclusively enforceable by the parties, their successors, and assigns. No term or provision of this Amendment is intended to be, or shall be, for the benefit of any person, firm, organization, or corporation not a Party hereto, and no such other person, firm, organization, or corporation shall have any right or cause of action hereunder, except as may be otherwise provided herein.

11. CONTINUATION OF UNDERLYING AGREEMENTS. Except as otherwise modified in this Amendment No. 2, the previously executed Wholesale Water Agreement and Amendment No.1 to the Wholesale Water Agreement remain in full force and effect.

APPROVED AND AGREED BY:

CITY OF TACOMA

By_____
Water Superintendent

CITY OF BLACK DIAMOND

By_____
Mayor

Approved as to Form & Legality:

By_____
Deputy/Assistant City Attorney

Approved as to Form & Legality:

By_____
City Attorney

EXISTING POINT OF DELIVERY
(FOR CITY OF BLACK DIAMOND)

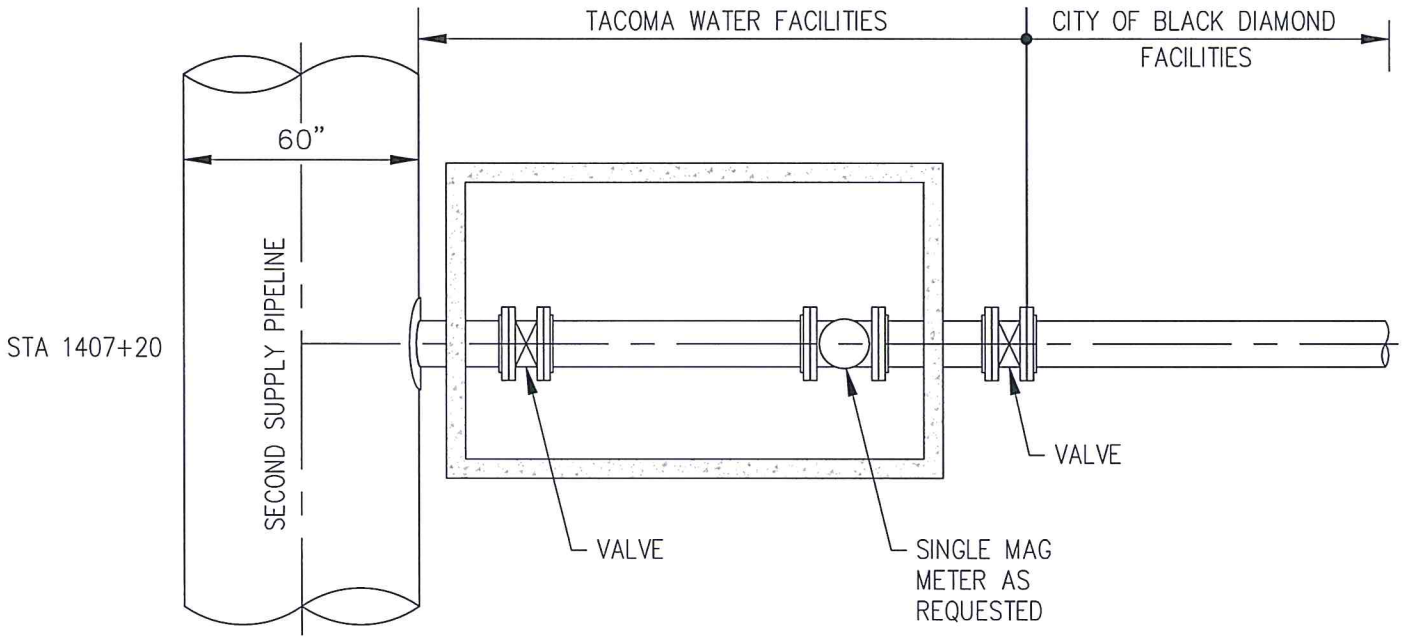

EXHIBIT A

PROPOSED POINT OF DELIVERY
(FOR CITY OF BLACK DIAMOND)

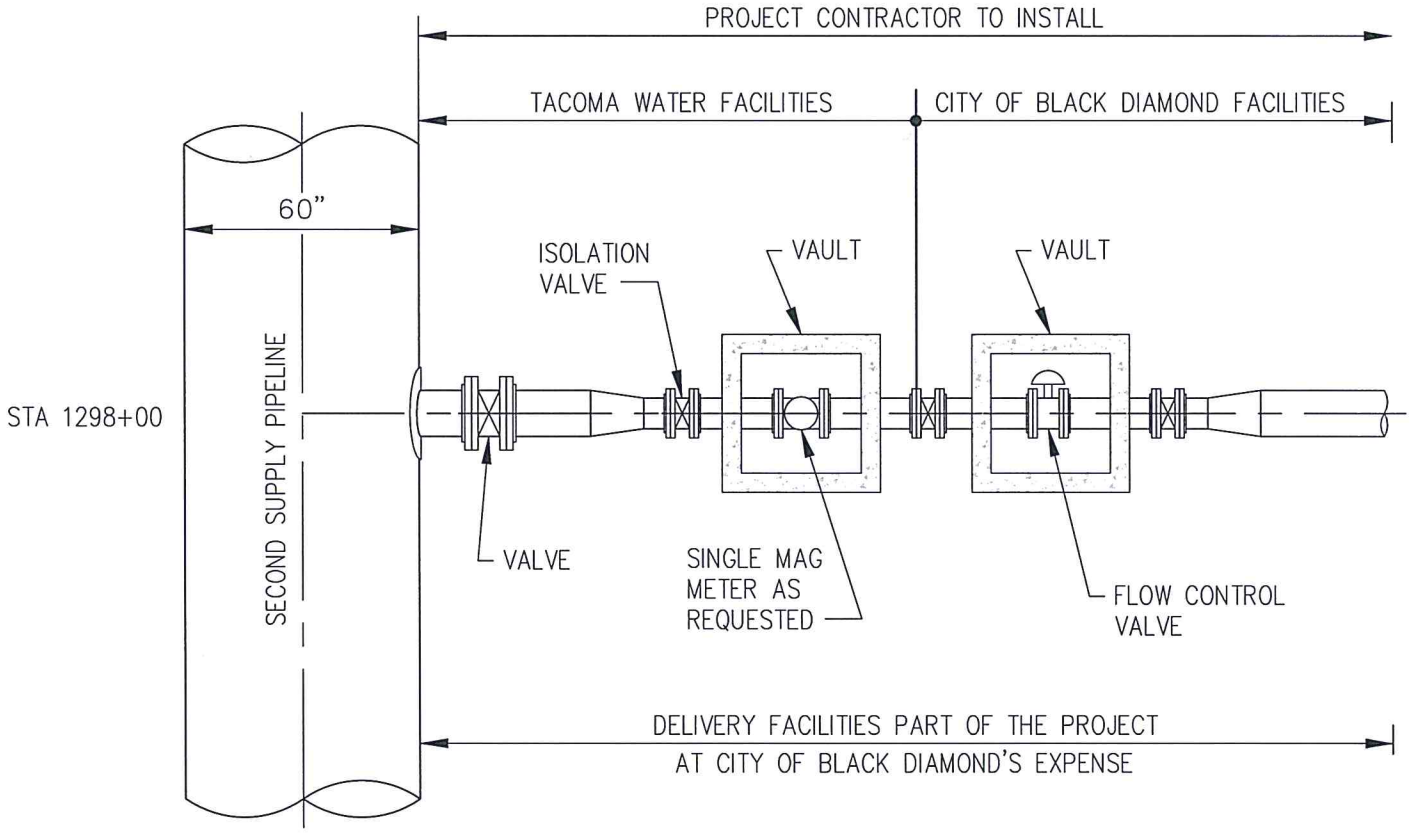

EXHIBIT B

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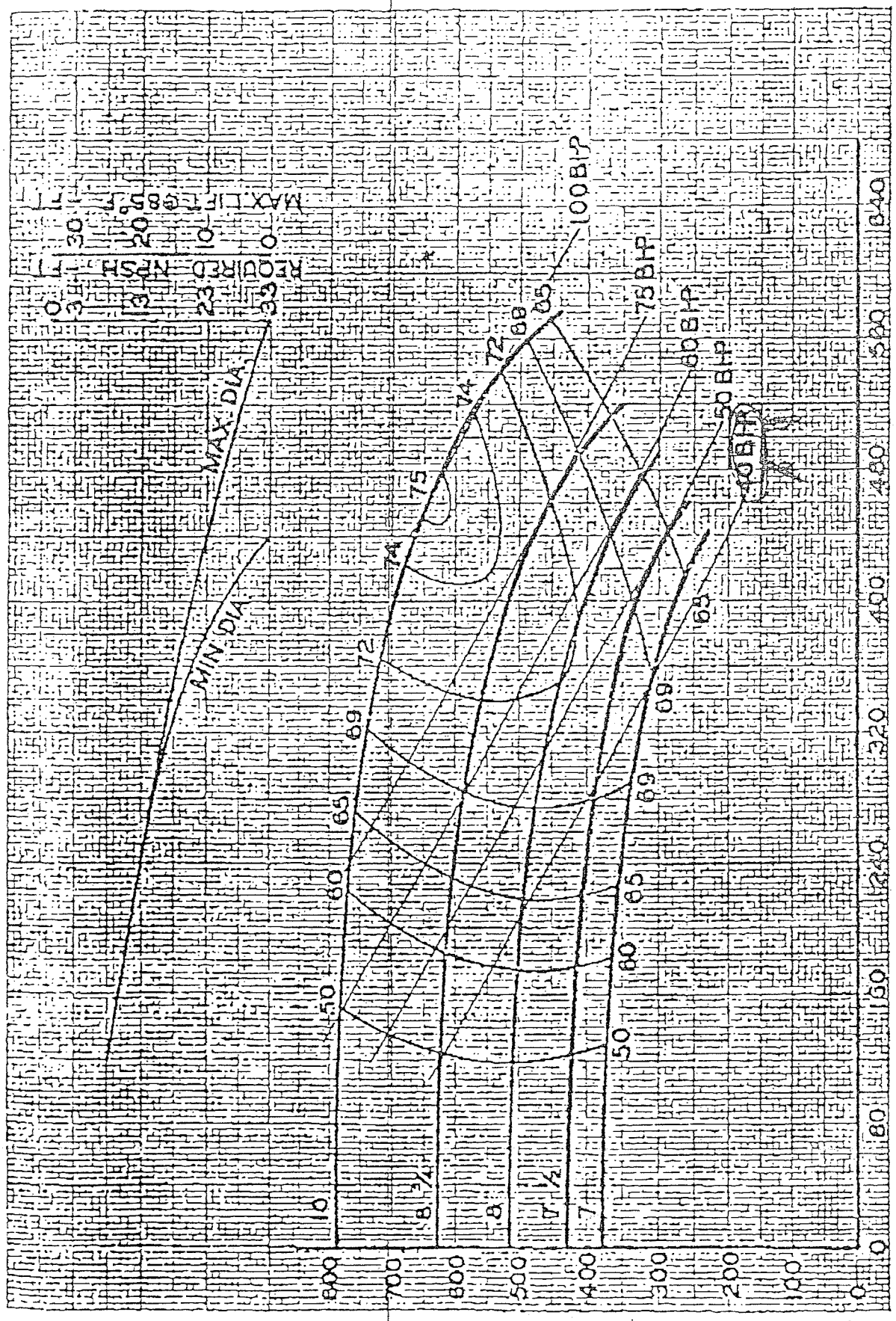
Appendix F

Pump Curves

DATE: Sept., 1953
SUPERSEDES: June, 1953

SECTION 1753
Page - 1-



PUMP TYPE AND SIZE	2 IS 4/3	SPEED	3550	ENG. H.B.S.	DATE JUNE 53
EYE AREA	5.74 SQ. IN.	IMPELLER STANDARD	PS-3452 PS-3453		

DE LAVAL STEAM TURBINE COMPANY

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Appendix G

Soils Information

APPENDIX BB - SOIL DESCRIPTIONS

As provided by the United States Department of Agriculture – National Cooperative Soil Survey

ALDERWOOD SERIES

The Alderwood series consists of moderately deep to a densic contact, moderately well drained soils formed in glacial drift. Alderwood soils are on glacially modified foothills and valleys and have slopes of 0 to 65 percent. The mean annual precipitation is about 1,000 mm and the mean annual temperature is about 10 degrees C.

TAXONOMIC CLASS: Loamy-skeletal, isotic, mesic Aquic Dystroxerepts

TYPICAL PEDON: Alderwood gravelly sandy loam - forested. (Colors are for moist soil unless otherwise noted.)

A--0 to 18 cm; very dark grayish brown (10YR 3/2) gravelly sandy loam, brown (10YR 5/3) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; few fine irregular pores; 20 percent gravel; moderately acid (pH 5.8); abrupt smooth boundary. (7 to 18 cm thick)

Bw1--18 to 53 cm; dark yellowish brown (10YR 4/4) very gravelly sandy loam, yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; many fine tubular and irregular pores; 35 percent gravel; gradual smooth boundary; moderately acid (pH 5.8).

Bw2--53 to 75 cm; brown (10YR 4/3) very gravelly sandy loam, pale brown (10YR 6/3); dry; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine roots; few very fine tubular pores; 40 percent gravel; moderately acid (pH 5.8); clear wavy boundary. (Combined Bw1 and Bw2 horizons is 35 to 67cm thick)

Bg--75 to 89 cm; 50 percent olive brown (2.5Y 4/4) very gravelly sandy loam, light yellowish brown (2.5Y 6/4) dry and 50 percent dark grayish brown (2.5Y 4/2) iron-manganese nodules with strong brown (7.5YR 5/6) coatings on fragments, light brownish gray (2.5Y 6/2) and reddish yellow (7.5YR 6/6) dry; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; common fine tubular and interstitial pores; 45 percent gravel; moderately acid (pH 6.0); abrupt wavy boundary. (8 to 38 cm thick)

2Cd1--89 to 109 cm; dark grayish brown (2.5Y 4/2) very gravelly sandy loam, light brownish gray (2.5Y 6/2) dry; dark yellowish brown (10YR 4/4), olive (5Y 4/4), yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) coatings in cracks; massive; extremely hard; extremely firm, nonsticky and nonplastic; few fine roots; few fine tubular pores; 40 percent gravel; moderately acid (pH 6.0); abrupt irregular boundary. (13 to 51 cm thick)

2Cd2--109 to 150 cm; grayish brown (2.5Y 5/2) dense glacial till that breaks to very gravelly sandy loam, light gray (2.5Y 7/2) dry; massive; extremely hard, extremely firm,

nonsticky and nonplastic; 40 percent gravel; moderately acid (pH 6.0).

TYPE LOCATION: Snohomish County, Washington; about 8 km east of Lynnwood on Maltby road; 61meters south and 122 meters east of the center of section 28, T. 27 N., R. 5 E.

RANGE IN CHARACTERISTICS:
Depth to densic contact - 50 to 100 cm
Mean annual soil temperature - 8 to 13 degrees C.
Moisture control section - dry 60 to 75 consecutive days following the summer solstice
Reaction - strongly acid to slightly acid above the 2Cd horizon
Particle-size control section - averages 35 to 50 percent total rock fragments and 5 to 15 percent clay
Depth to redox features with chroma of 2 or less - 45 to 75 cm

A horizon
Hue - 10YR or 7.5YR
Value - 2 or 3 moist, 3 to 5 dry
Chroma - 2 to 4 moist and dry
Rock fragments - 15 to 65 percent total, 15 to 65 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

An E horizon less than 3 cm thick is sometimes present.

Bw horizons
Fine earth texture - SL, L, or COSL
Hue - 10YR or 7.5YR
Value and chroma - 2 to 6 dry or moist
Rock fragments - 15 to 65 percent total, 15 to 65 percent gravel, 0 to 15 percent cobbles, and 0 to 5 percent stones

Bg horizon (2BC or 2CB horizon)
Fine-earth texture - SL, L, or COSL
Hue - 10YR or 2.5Y
Value - 5 to 7 dry
Chroma - 2 to 4 moist and dry
Redox concentrations - beginning within 75 cm of the surface
Rock fragments - 35 to 85 percent total, 35 to 60 percent gravel, 0 to 25 percent cobbles, and 0 to 5 percent stones

2Cd horizons
Fine-earth texture - SL, LS, COSL, or FSL
Hues - 10YR or 2.5Y
Value - 4 to 8 dry
Chroma - 1 to 3 moist and dry
Rock Fragments - 15 to 45 percent total, 0 to 45 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones.
Reaction - slightly to moderately acid

COMPETING SERIES: This is the Whidbey series. Whidbey soils are dry 75 to 90 consecutive days following the summer solstices.

GEOGRAPHIC SETTING: These soils are on till plains and moraines at elevations of 0 to about 245 meters. Slope is 0 to 65 percent. The soils formed in glacial till. Alderwood soils are in a cool marine climate. The summers are cool and dry, and the winters are mild and wet. Mean annual precipitation is 200 to 1500 cm, most of which falls as rain from November through March. Mean January temperature is 3 degrees C, mean July temperature is 16 degrees C, and mean annual temperature is 10 degrees C. The growing season (-2 degrees C) is about 200 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Beausite, Dick, Everett, Hoogdal, Indianola, Kitsap, Norma, Quilcene, Skipopa and Whidbey series. All of these soils except Whidbey soils lack a densic layer within 100 cm. In addition, the Beausite soils have a lithic contact at 50 to 100 cm. Dick, Hoogdal, Indianola, Kitsap, and Skipopa soils have less than 35 percent coarse fragments. Everett soils are sandy-skeletal. McKenna soils have an aquic moisture regime. Norma soils have an aquic moisture regime of less than 35 percent coarse fragments in the upper part of the control section. Quilcene soils are in a fine family.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Moderately well drained; high saturated hydraulic conductivity above the densic layer and low saturated hydraulic conductivity in the densic material. A perched water table is at its highest from January through March.

USE AND VEGETATION: Used mostly for woodland, field crops, hay and pasture, orchards, vineyards, wildlife habitat, watershed, and non-farm uses. The natural vegetation is Douglas-fir, western hemlock, western redcedar, and red alder with an understory of salal, Oregon-grape, western brackenfern, western swordfern, Pacific rhododendron, red huckleberry, evergreen huckleberry, and Orange honeysuckle.

DISTRIBUTION AND EXTENT: Northwestern Washington; MLRA 2. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Snohomish County, Washington 1936.

REMARKS: Diagnostic horizons and features recognized in this soil:
Ochric epipedon
Cambic horizon - from 18 to 89 cm
Densic contact - from 89 to 150 cm
Aquic feature - redox depletions with chroma of 2 or less at 75cm.
Humic subgroup - meet color requirement from 0 to 18 cm
Particle-size control section - 25 to 89 cm.
The current typical pedon is borderline in meeting the Aquic subgroup criteria and is also borderline in meeting Humic subgroup criteria. Based on the range of characteristics, the

present classification is marginal to being Aquic subgroup and marginal to not meeting Humic subgroup criteria. It is recommended a new typical pedon be selected to represent the series concept and classification.

The series has had a long history in classification, much of it involves the cementation or not of the upper part of the glacial till. The series in 1978 started as a loamy-skeletal, mixed, mesic Dystric Entic Durochrepts, then in 1988 to a loamy-skeletal, mixed, mesic, ortstein Aquic Haplorthods, then in 1994 to a loamy-skeletal, mixed, mesic Vitrandic Durochrepts, then in 2000 to a loamy-skeletal, isotic, mesic Vitrandic Dystroxerepts and in 2011 to a loamy-skeletal, isotic, mesic Aquic Dystroxerepts. The 89 to 109 cm horizon is the horizon in question as to cementation or not, and if cemented, what is the cementing agent. The material was studied in the late 1960's and early 1970's and it was though at that time to be cemented, but the cementing agent was not easily identifiable. The strength of Vitrandic properties in the upper part of the solum is very weak. Given all this change in classification the typical pedon has remained the same and the concept of a moderately deep and moderately well drained soil has remained the same.

An in depth study of the glacial till is needed throughout the Puget Sound foothills on several similar soil series.

ADDITIONAL DATA: Partial data available for this series. Sample # S71WA033002, 71WA033003, S04WA-061-002, and S09WA053098.

BEAUSITE SERIES

The Beausite series consists of moderately deep, well drained soils formed in sandstone and conglomerate. These soils are on foothills. Slopes are 0 to 90 percent. The average annual precipitation is about 40 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, isotic, mesic Vitrandic Dystroxerepts

TYPICAL PEDON: Beausite gravelly sandy loam - forested. (Colors are for moist soil unless otherwise noted.)

Oi--0 to 2 inches; slightly decomposed needles, leaves, twigs, bark, moss, and wood fragments.

Oa--2 to 3 inches; highly decomposed; black (5YR 2/1) forest litter; moderately acid (pH 5.6).

A--3 to 5 inches; dark brown (7.5YR 3/2) gravelly sandy loam, brown (7.5YR 5/2) dry; weak fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; 30 percent rounded pebbles; moderately acid (pH 5.9); clear wavy boundary. (2 to 5 inches thick)

Bw1--5 to 9 inches; dark brown (7.5YR 4/3) very gravelly sandy loam, light brown (7.5YR 6/3) dry; weak medium and coarse subangular blocky structure; slightly hard, very friable,

nonsticky and nonplastic; many fine and medium roots; 35 percent rounded pebbles; moderately acid (pH 6.0); gradual wavy boundary. (3 to 10 inches thick)

Bw2--9 to 17 inches; dark brown (10YR 4/3) very gravelly sandy loam, pale brown (10YR 6/3) dry; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and medium roots; common fine and medium tubular pores; 40 percent rounded pebbles; moderately acid (pH 6.0); gradual wavy boundary. (6 to 10 inches thick)

Bw3--17 to 25 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam, light yellowish brown (10YR 6/4) dry; massive; hard, firm, nonsticky and nonplastic; common small and medium roots; 35 percent rounded pebbles; slightly acid (pH 6.1); gradual irregular boundary. (6 to 10 inches thick)

C--25 to 36 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) very gravelly sandy loam, very pale brown (10YR 7/4) dry; massive; very hard, very firm, nonsticky and nonplastic; few fine roots; 55 percent rounded pebbles; slightly acid (pH 6.1); clear irregular boundary. (3 to 12 inches thick)

R--36 inches; grayish brown (10YR 5/2) and brown (10YR 5/3); massive; very gravelly conglomerate.

TYPE LOCATION: Jefferson County, Washington. 900 feet south and 600 feet west of northeast corner of SW1/4SW1/4 sec. 36, T. 29 N., R. 2 W.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is 47 to about 53 degrees F. These soils are usually moist but are dry in all parts between 8 and 24 inches for 60 to 75 consecutive days. Content of coarse fragments in the control section ranges from 35 to 75 percent. Content of clay in the control section is 5 to 15 percent. Depth to bedrock ranges from 24 to 40 inches. Thickness of solum ranges from 20 to 35 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 through 4 moist and dry, and chroma of 1 through 4 moist and dry.

The Bw horizon has hue of 5YR through 2.5Y, value of 2 through 4 moist, 4 through 6 dry, and chroma of 2 through 4 moist and dry. It is gravelly sandy loam, very gravelly loam, very gravelly sandy loam, or extremely gravelly sandy loam. Reaction is moderately acid or slightly acid.

The C horizon has hue of 7.5YR through 2.5Y, value of 2 through 5 moist, 4 through 6 dry, and chroma of 2 to 5 moist and dry. It is very gravelly sandy loam or extremely gravelly sandy loam. It is slightly acid or moderately acid.

COMPETING SERIES: These are the Ahl, Barnhardt, Blethen, Heisler, Kanasket, Ogarty, Pickett, Squire, Tunnel, and Vanzandt series. Ahl soils have very gravelly loam or very gravelly silt loam control sections and have solums thinner than 20 inches. Barnhardt, Blethen, Heisler, Kanasket, and Tunnel soils are deeper than 40 inches. Ogarty, Pickett,

and Squires soils are finer than sandy loam in the fine earth fraction. Vanzandt soils have a paralithic contact with dense glacial till at 20 to 40 inches.

GEOGRAPHIC SETTING: Beausite soils are on glaciated mountains and foothills at elevations of near sea level to about 1,500 feet. They formed in glacial till and colluvium and slope alluvium from sandstone and conglomerate. These soils occur in a mild cool marine climate having an average annual precipitation of 30 to 50 inches, most of which falls as rain during the fall, winter, and spring months; an average January temperature of 40 degrees F, an average July temperature of 60 degrees F, and a mean annual growing season (28 degrees F) of 200 to 300 days and (32 degrees F) 160 to 220 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These include Alderwood, Blethen, Chuckanut, Everett, and Hoodsport soils and the competing Ahl and Blethen soils. These soils are deeper than 40 inches.

DRAINAGE AND PERMEABILITY: Well drained; moderate permeability; and runoff is medium to rapid.

USE AND VEGETATION: Timber production. The native vegetation is Douglas-fir, western hemlock, western red cedar, and red alder, with an understory of salal, Oregon-grape, oceanspray, red huckleberry, blueleaved huckleberry, and western swordfern.

DISTRIBUTION AND EXTENT: Northwestern Washington. Series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Jefferson County, Washington, 1968.

REMARKS: Diagnostic horizons and features recognized in this pedon are an ochric epipedon.

EVERETT SERIES

The Everett series consists of very deep, somewhat excessively drained soils formed in glacial outwash or alluvium with an admixture of volcanic ash on terraces, moraines, and terrace escarpments. Slopes are 0 to 65 percent. The average annual precipitation is about 40 inches. The average annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Sandy-skeletal, isotic, mesic Vitrandic Dystroxerepts

TYPICAL PEDON: Everett very gravelly sandy loam, forest. (Colors are for moist soil unless otherwise noted.)

A--0 to 2 inches; very dark brown (10YR 2/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) dry; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many roots; 55 percent gravel; moderately acid (pH 5.6); clear smooth boundary. (1 to 3 inches thick)

Bw1--2 to 8 inches; dark yellowish brown (10YR 3/4) very gravelly sandy loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many roots; 55 percent gravel; moderately acid (pH 5.8); gradual wavy boundary. (5 to 7 inches thick)

Bw2--8 to 19 inches; dark brown (7.5YR 3/4) extremely gravelly coarse sandy loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic, many roots; 70 percent gravel; moderately acid (pH 6.0); clear wavy boundary. (0 to 15 inches thick)

2C--19 to 49 inches; olive brown (2.5Y 4/4) extremely gravelly sand, brown (10YR 5/3) dry; single grain; loose; 65 percent gravel; few roots; pale brown (10YR 6/3) manganese stains on underside of gravel; moderately acid (pH 5.8)

TYPE LOCATION: Pierce County, Washington; 200 feet west and 200 feet south of NE corner of sec.28, T. 19 N., R. 4 E.

RANGE IN CHARACTERISTICS: Depths to diagnostic horizons and features start from the mineral soil surface.

Average annual soil temperature - 48 to 54 degrees F.
Soil moisture control section - dry for 60 to 75 consecutive days
Reaction - slightly acid to very strongly acid
Particle-size control section:
Rock fragments - 35 to 80 percent.

A horizon
Hue - 10YR, 7.5YR, or 5YR
Value - 2 to 5 moist, and 4 to 6 dry
Chroma of 1 to 3 moist or dry.

Bw horizons
Hue - 10YR or 7.5YR
Value - 3 to 6 moist, and 3 to 6 dry
Chroma - 2 to 6 moist or dry.
Texture L or SL

BC horizon
Hue - 10YR or 7.5YR
Value - 3 or 4 moist, 4 to 6 dry
Chroma - 3 or 4 moist or dry
Texture - SL or LS

2C horizon
Hue of 7.5YR to 2.5Y
Value of 2 to 4 moist, and 5 to 7 dry

Chroma of 1 to 4.
Texture LS or COS

COMPETING SERIES: These are no competing series in this family.

GEOGRAPHIC SETTING: The Everett soils are on glacial outwash terraces and terrace escarpments at elevations of 30 to 700 feet. Slopes are 0 to 65 percent. These soils formed in alluvium or glacial outwash from granite, quartzite, shale, sandstone, schist, basalt, and andesite with an admixture of volcanic ash in the upper part. the climate is mild, summer is cool and dry, and winter is mild and wet. Mean annual precipitation ranges from 30 to 50 inches. Average January temperature is 36 degrees F., average July temperature is 63 degrees F., and the average annual temperature is 50 degrees F. The average frost-free season ranges from 145 to 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Alderwood, Baldhill, Indianola, and Kapowsin soils. Alderwood soils have a densic contact at a depth of 20 to 40 inches. Indianola soils are sandy throughout. Kapowsin soils are coarse-loamy. Baldhill soils are loamy-skeletal.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat excessively drained; high to very high saturated hydraulic conductivity.

USE AND VEGETATION: Some areas are used for pasture and others are cultivated and used for growing berries and small fruits. Some are used for homesites, sanitary landfills and as a source of sand and gravel. They now support second growth Douglas-fir and some red alder and western hemlock, with an understory of salal, Oregon-grape, vine maple, western brackenfern, red huckleberry, creambush oceanspray and trailing blackberry.

DISTRIBUTION AND EXTENT: Northwest Washington; MLRA A2, Northern part. Series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: 1910 Reconnaissance Survey of Eastern Puget Sound Basin, Washington.

REMARKS: Classification changed 4/94 and 1/00 because of amendments to Soil Taxonomy. Estimated content of volcanic glass of >5 percent and >0.4 percent Al + 1/2 Fe by acid-oxalate. Diagnostic horizons and features recognized in this pedon are an ochric epipedon and a cambic horizon from 2 to 19 inches.

ADDITIONAL DATA: Laboratory data is available for this series. National Soil Survey Laboratory Pedon Numbers 71C0045, 71C0046, and 04N0759

RAGNAR SERIES

The Ragnar series consists of very deep, well drained soils that formed in glacial outwash. Ragnar soils are on rolling areas of esker and kame relief and have slopes of 0 to 70 percent. The average annual precipitation is about 47 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, isotic over mixed, mesic Vitrandic Dystroxerepts

TYPICAL PEDON: Ragnar fine sandy loam, forested. (Colors are for moist soil unless otherwise noted.)

Oe--0 to 1 inch; black (10YR 2/1) partially decomposed leaves and twigs; many roots; abrupt smooth boundary. (1 to 2 inches thick)

A--1 to 5 inches; very dark grayish brown (10YR 3/2) and very dark gray (10YR 3/1) fine sandy loam, grayish brown (10YR 5/2) dry; massive; slightly hard, very friable, nonsticky, nonplastic; many roots; many very fine pores; NaF pH 10.5; moderately acid (pH 6.0); abrupt wavy boundary. (3 to 9 inches thick)

Bs--5 to 18 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) fine sandy loam, brown (10YR 5/3) dry; massive; slightly hard, very friable, nonsticky, nonplastic; many roots; many very fine pores; NaF pH 11.5; moderately acid (pH 6.0); clear smooth boundary. (5 to 13 inches thick)

2BC--18 to 28 inches; yellowish brown (10YR 5/4) loamy fine sand, brown (10YR 5/3) dry; massive; slightly hard, very friable, nonsticky, nonplastic; common roots; many very fine pores; NaF pH 10.5; slightly acid (pH 6.2); clear smooth boundary. (6 to 12 inches thick)

2C--28 to 41 inches; olive brown (2.5Y 4/4) loamy sand, yellowish brown (10YR 5/3) dry; massive; loose; few roots; many very fine pores; NaF pH 10.0; slightly acid (pH 6.2).

TYPE LOCATION: King County, Washington; 330 feet north, 230 feet east of center of section 3, T.21N., R.5E.

RANGE IN CHARACTERISTICS: The mean annual soil temperature is 47 to 53 degrees F. These soils are usually moist, but are dry in all parts between depths of 8 and 24 inches for 60 to 80 consecutive days in most years. The upper part of the 10 to 40 inch control section contains 2 to 10 percent clay. The lower part of the control section is loamy sand or sand. Depth to the 2C horizon ranges from 20 to 35 inches. Rock fragments in the control section range from 0 to 15 percent by volume. Reaction is moderately acid or slightly acid.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 moist, 4 or 5 dry, and chroma of 1 through 3 moist or dry.

The Bs horizon has hue of 10YR or 7.5YR, value of 3 through 5 moist, 4 through 7 dry, and chroma of 4 through 6 moist or dry. It contains 0 to 5 percent iron concretions.

The 2C horizon has hue of 10YR through 5Y, value of 3 through 7 moist, 4 through 7 dry, and chroma of 1 through 4 moist or dry. It is loamy sand, sand, or fine sand.

COMPETING SERIES: These are the Birchbay, Lystair, and Winston series. Birchbay and Winston soils are sandy-skeletal in the lower part of the particle-size control section. Lystair soils are mottled in the C horizon.

GEOGRAPHIC SETTING: These soils are on esker and kame like relief along the edges of major valleys at elevations of 300 to 1,000 feet. Slopes are 0 to 70 percent. The soils formed in glacial outwash. They have cool, dry summers and mild, wet winters. The average annual precipitation ranges from 35 to 65 inches, most of which falls between October and April. Some snow falls in winter. The average January temperature is about 38 degrees F.; the average July temperature is 66 degree F.; and the frost free season ranges from 150 to 212 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Alderwood, Everett, Harstine, Indianola, and Kitsap soils. Alderwood and Harstine soils have dense glacial till at a depth of 20 to 40 inches. Everett soils average more than 35 percent rock fragments in the 10 to 40 inch control section. Indianola soils have a sandy control section. Kitsap soils are a fine-silty.

DRAINAGE AND PERMEABILITY: Well drained; medium to slow runoff; rapid permeability.

USE AND VEGETATION: Most of the Ragnar soils are used for growing timber. They are used to a small extent for growing hay, pasture, early berries and truck crops. Many areas are used for homesites. The dominant overstory is Douglas-fir, Pacific madrone. western hemlock, red alder, and western redcedar with an understory of salal, Oregon-grape, huckleberry, western brackenfern, western swordfern, trailing blackberry, and evergreen huckleberry.

DISTRIBUTION AND EXTENT: Northwestern Washington. This series is moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: King County, Washington, 1943.

REMARKS: Classification updated 3/94 and 1/00 because of amendments to Soil Taxonomy. Estimate that the 0 to 17 inch zone has >5.0 percent volcanic glass and >0.4 percent by ammonium-oxalate extract. Diagnostic horizons and features recognized in this pedon are an ochric epipedon from 1 to 5 inches, a cambic horizon from 5 to 18 inches, and a lithologic change at 18 inches from coarse-loamy to sandy soil material.

Depths to diagnostic horizons and features are measured from the to of the first mineral horizon.

INDIANOLA SERIES

The Indianola series consists of very deep, somewhat excessively drained soils formed in sandy glacial drift. Indianola soils are on hills, terraces, terrace escarpments, eskers, and kames of drift or outwash plains at elevations of near sea level to 1,000 feet. Slopes are 0 to 70 percent. Mean annual precipitation ranges from 20 to 55 inches and the mean annual temperature is about 50 degrees F.

TAXONOMIC CLASS: Isotic, mesic Dystric Xeropsamments

TYPICAL PEDON: Indianola loamy sand-forested. (Colors are for moist soil unless otherwise stated.)

Oi--0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.

A--1 to 6 inches; very dark grayish brown (10YR 3/2) loamy sand, black (10YR 2/1) moist; single grain; loose, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral (pH 6.8); clear wavy boundary.

Bw1--6 to 17 inches; yellowish brown (10YR 5/4) loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; common very fine, fine, and common medium roots; many very fine and fine interstitial pores; neutral (pH 6.8); clear wavy boundary.

Bw2--17 to 27 inches; yellowish brown (10YR 5/4) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; neutral (pH 6.6); clear wavy boundary.

BC--27 to 37 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; common fine roots; many very fine and fine interstitial pores; neutral (pH 6.8); gradual wavy boundary.

C--37 to 60 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; neutral (pH 6.6).

TYPE LOCATION: Thurston County, Washington; about 2 miles southeast of Tumwater, north end of Munn Lake near Department of Game boat launching site; 2,200 feet east and 2,550 feet north of the southwest corner sec. 1, T. 17 N., R. 2 W. Willamette Baseline Meridian; USGS Maytown NE quarter quadrangle; lat. 46 degrees 59 minutes 18 seconds N. and long. 122 degrees 52 minutes 40 seconds W., NAD83.

RANGE IN CHARACTERISTICS: Depths to diagnostic horizons and features start from the mineral soil surface.

Mean annual soil temperature - 47 to 52 degrees F.
Moisture control section - dry for 60 to 75 consecutive days following summer solstice
Reaction - neutral to strongly acid

Particle-size control section:
Rock fragments - 0 to 15 percent

A horizon
Hue - 10YR, 7.5YR or 5YR
Value - 2 to 4 moist, 3 to 6 dry
Chroma - 1 to 6 moist and dry

Bw horizon
Hue - 10YR, 7.5YR or 5YR
Value - 2 to 4 moist, 4 to 6 dry
Chroma - 1 to 4 moist and dry
Texture - LS or LFS

BC horizon
Hue - 10YR or 2.5Y
Value - 4 or 5 moist, 6 or 7 dry
Chroma - 3 or 4 moist and dry
Texture - LS, LFS, S, or FS

C horizon
Hue - 10YR, 2.5Y or 5Y
Value - 4 through 6 moist, 5 through 7 dry
Chroma - 2 through 4 moist and dry
Texture - LS, LFS, S, or FS

COMPETING SERIES: This is the Keystone series. Keystone soils are dry in the moisture control section for 75 to 90 consecutive days following the summer solstice. Similar series classified in a mixed mineralogy family but are likely isotic as well are Birdsview, Greenwater, and Pilchuck series. Birdsview soils are dry in the moisture control section for 45 to 60 consecutive days following the summer solstice. Greenwater soils have 5 to 25 percent volcanic ash, cinders, and pumice in the control section. Pilchuck soils have chroma of 2 or less throughout the control section, and have an irregular decrease in organic carbon with depth.

GEOGRAPHIC SETTING: Indianola soils are on hills, terraces, terrace escarpments, eskers, or kames of drift or outwash plains at elevations of near sea level to 1,000 feet. Slopes are 0 to 70 percent. These soils formed in sandy glacial drift and minor amounts of volcanic ash. They are in a maritime climate of cool dry summers and mild wet winters. Mean annual precipitation ranges from 30 to 55 inches most of which falls between October and April. Mean January temperature is 36 degrees F., the average July temperature is 62 degrees F., and mean annual temperature is 50 degrees F. The frost-free season ranges from 180 to 240 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Alderwood, Cassolary, Everett, Hoypus, Kitsap, Nisqually, Quilcene, Sinclair, Spanaway, and Tokul soils. Alderwood, Sinclair, and Tokul soils have dense glacial till at a depth of 20 to 40 inches.

Cassolary soils are fine-loamy. Everett, Hoypus and Spanaway soils are sandy-skeletal. Kitsap soils are fine- silty. Nisqually soils have an umbric epipedon. Quilcene soils have a fine control section and are underlain by weathered shale at depths of 20 to 40 inches.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat excessively drained. Saturated hydraulic conductivity is very high.

USE AND VEGETATION: Timber production, forage production, and pasture. Potential natural vegetation is Douglas-fir, western redcedar, western hemlock, red alder and bigleaf maple, with an understory of salal, Oregongrape, red huckleberry, western brackenfern, western swordfern, trailing blackberry, evergreen huckleberry, and vine maple.

DISTRIBUTION AND EXTENT: Puget lowlands in Northwestern Washington, MLRA 2, northern part. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Portland, Oregon

SERIES ESTABLISHED: Kitsap County, Washington, 1935.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon
Particle-size control section - 10 to 40 inches

This revision (7/2009) reflects a new description of the type location which adds an Oi horizon to this soil which is naturally forested.

Previous revision (5/2006) reflects a change in the mineralogy class from mixed to isotic, based on laboratory data

ADDITIONAL DATA: Laboratory data is available for this series. National Soil Survey Laboratory Pedon Numbers 74C0046 and 04N0755.

2.4.3 SOILS

Figure 2.3 Black Diamond Soils Figure 2.3 shows the various major soil type groups found in the City of Black Diamond. The darker shades of the same color represent the same soil type but steeper slopes. The various soil types are discussed in more detail below. For technical information about soils, refer to **Appendix E – Soil Descriptions.**

Everett Series Soil Most of western Black Diamond has an Everett Series soil type. This soil typically contains various grades of gravelly sand or sandy gravels with very little gravelly loamy sand top soil. These areas are very well drained. The water tables are typically deeper than 15 feet except in low elevations near Lake Sawyer, Oak Lake, Frog Lake or Horseshoe Lake. Typically drainage is very good and water tables in the range of normal depth of sewer collection systems are non-existent.

Alderwood Series Soil The area through the middle of the City north and south of the Rock Creek core wetland complex has an Alderwood Series Soil type. These soils are characterized by approximately 3' to 5' of gravelly sandy loam overlying very dense and slowly permeable glacial till. Where the slopes are shallow the ground water will tend to perch on the glacial till and drain laterally subsurface during high winter water table conditions. Wherever there are local depressions, wetlands tend to form.

The soils along the Rock Creek wetlands and the Ginder Creek wetlands are either **Billingham Silt Loams or Seattle Muck.**

Beausite Series Soil The soils on the higher elevations in the old part of Black Diamond and the higher elevations in east Black Diamond have a Beausite soil type. These soils are characterized by gravelly loams and gravelly sandy silt loams over impermeable sandstone. Since the underlying restricting layer is impermeable and the overlying soil is typically slowly permeable the high winter water tables tend to rise close to the surface. The runoff from the Beausite soil areas is typically very high during high winter water table conditions.

Indianola Series Soil ***Figure 2.3 Black Diamond Soils*** shows there is small spot of Ragnar-Indianola series soil in the Morganville area. Actually the Indianola series soil covers much more of the Morganville area than the map shows but both the Everett and Indianola series soil in this area are well drained soils with deep water tables. An Indianola Series soil is characterized by 18 inches of light brown loamy medium sand over clean medium to fine sand. The east edge of the Indianola soils transitions to Alderwood approximately 200 to 300 feet east of the east boundary of the cemetery.

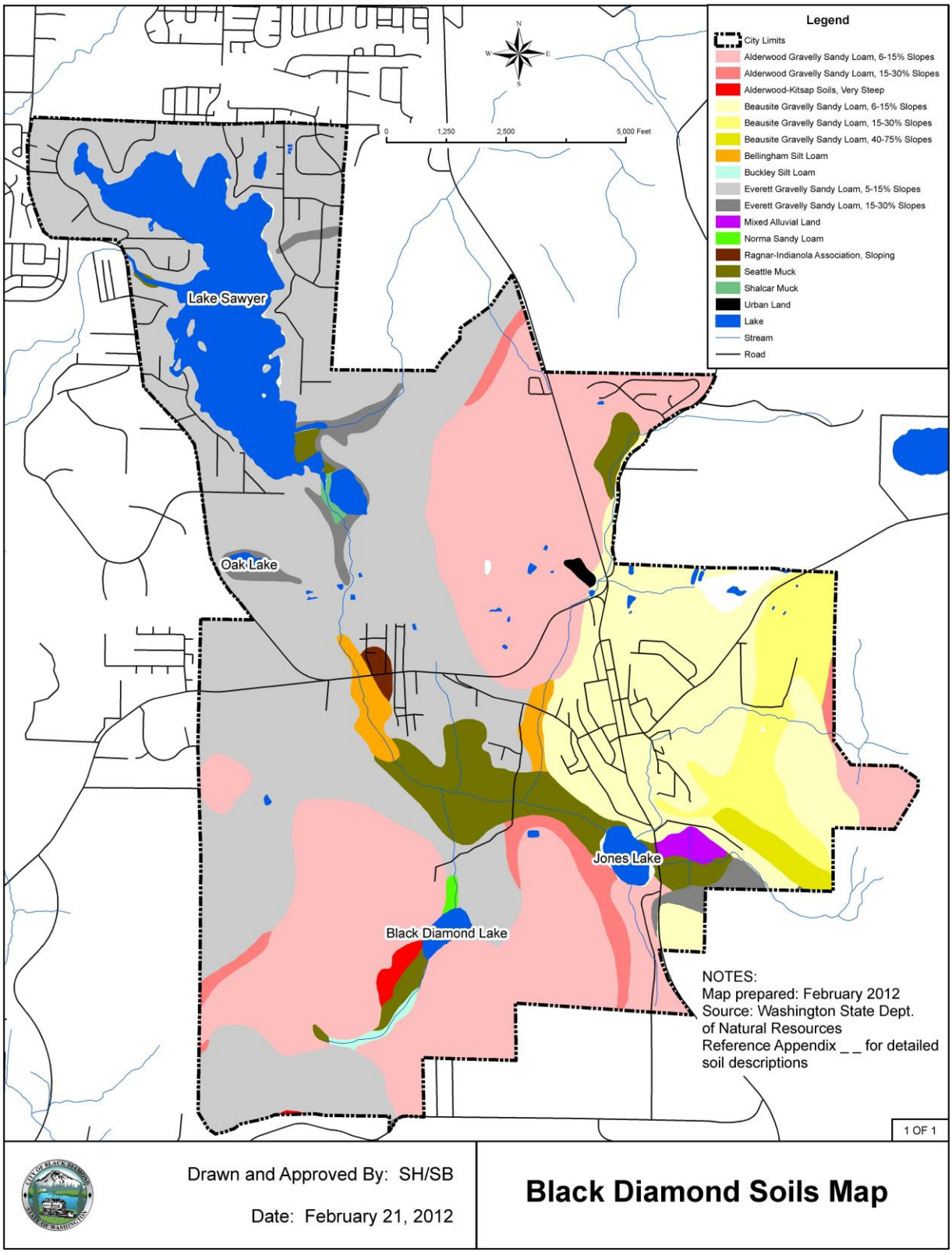

Figure 2.3 Black Diamond Soils (refer to Appendix E – Soil Descriptions)

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Appendix H

SKCRWA Joint Operating Agreement

ORIGINAL

SOUTH KING COUNTY REGIONAL WATER ASSOCIATION
JOINT OPERATING AGREEMENT

January 1995

WHEREAS, an adequate and safe water supply for South King County Regional Water Association (SKCRWA) is vital to both existing citizens and implementing the long-term comprehensive plans of SKCRWA; and

WHEREAS, the State and SKCRWA prepared a Coordinated Water System Plan (CWSP) for South King County; and

WHEREAS, projects that provide for the joint use and operation of supply, transmission, storage, treatment, and pumping facilities to minimize cost, provide for improved water quality, protect the environment, provide for emergency needs, and maximize the best use of the resource is in the best interest of the citizens of the region;

WHEREAS, the current and near-term water needs of the local governments and SKCRWA require steps to establish a cooperative subregional water supply system; and

WHEREAS, the SKCRWA is committed to cooperate toward regional solutions for long range water supply needs.

NOW THEREFORE, the SKCRWA members as the initial developers of this Joint Operating Agreement (JOA), agree as follows:

1. GENERAL

A. The Members acknowledge the requirement to incorporate land use planning as defined by the Growth Management Act with water supply planning; and

B. The Members recognize the benefits of developing a subregional water supply system that will allow the optimum use of surface and groundwater to better manage and protect the area's water resources; and

C. The Members will hold a joint meeting at least annually about September 30th to review the status of this JOA and any Amendments as well as other problems of mutual concern. The specific date, time, and location of the meeting will be set by mutual agreement.

Exhibit "A" Resolution No. 2568

2. INTENT

A. The general intent of the Members is to cooperatively provide the additional facilities needed to develop a South King County Subregional Water Supply System (Subregional System). The Members may choose by Interlocal Agreement to produce additional water and distribute it within the Subregional System, with or without change to their retail service area.

B. The JOA provides a framework for joint development of specific projects that may include two or more of the Participants. Each facility project and/or intertie shall be developed under a separate Interlocal Agreement (IA) consistent with this JOA subject to approval by appropriate affected city council and/or water district boards. The specific intent of this JOA is to make provisions for a standardized method to create or expand the Subregional System to meet the public water supply needs for both emergency and long-term use, and to establish a basis for agreement between the Participants for financing, ownership, construction, and operation of projects required for the Subregional System. These projects may include common facilities with other Agencies outside the SKCRWA.

It is further the specific intent of this JOA to preserve existing water rights and protect the established or planned interest and needs of each Participant with respect to sources of water.

Exhibit A is a suggested content of what should be included in each Interlocal Agreement.

C. It is the desire of the Members that this JOA be incorporated into the South King County CWSP at the next update.

D. The term "Participant" as used in this JOA shall mean all the signatories of an IA consistent with and implemented subsequent to this JOA.

E. The term "members" as used in this JOA shall mean all the members of the SKCRWA whether they have signed this JOA or not.

3. SUBREGIONAL SUPPLY SYSTEM AND SERVICE AREA

A. "Subregional System" shall mean:

(a) that portion of the Participants' sources, interties, transmission, and storage systems required to supply water to the service area of the Participants or new facilities as defined by a separate IA.

(b) those designated capacities within a Participant system as specifically defined in the appropriate IA.

B. "Service Area of the Subregional System" shall mean the Participants' Designated Water Service Areas identified in the CWSP as shown on Exhibit B or as approved by amendments to the CWSP or the Participants' Comprehensive Water Plan.

C. "Facility Ownership". Ownership of the physical facilities that exist on the date of this JOA shall remain with the individual Participants. Unless otherwise agreed to within a specific IA, ownership and operational responsibilities of new facilities shall be based generally on location in designated service areas, with capacity rights defined by appropriate IA.

4. WATER SUPPLY - CAPACITY RIGHTS

A. Capacity Rights - Each Participant may purchase capacity in planned improvements to the Subregional System. Any changes in these capacity rights shall be recognized by an IA, approved by the appropriate affected city councils and/or water district boards.

B. Additional JOA Participants - Other agencies may purchase capacity rights in the Subregional System with consent of the SKCRWA. Such consent shall not be unreasonably withheld. If other agencies become a JOA Participant in future projects, past costs recognized by the JOA including, but not limited to cost associated with development of this JOA, Water Rights, negotiations, and any Feasibility Studies will be assessed to the new agency..

C. Wholesaling Water - The Participants may wholesale water through lease or otherwise, delivered through the Subregional System to areas outside of Participant's respective Service Area, so long as the other Participants' capacity rights are not negatively impacted. Members of the SKCRWA shall have right of first refusal for excess capacity which would be sold to non-members.

D. Conservation and Curtailment. All Participants will develop and implement a conservation plan that is consistent with State guidelines and will incorporate guidance to ensure that their program is compatible with the Conservation Plan implemented by the source of supply agency. In addition, if a source of supply agency develops and implements a curtailment plan all purchasers shall develop and implement a compatible curtailment plan.

E. Quality - An objective of the Members is to maintain the quality of the water in the Subregional System at or above the quality required by the State drinking water standards. The purchasing Participant will be responsible for ensuring water quality blending analyses and other water quality issues are resolved to their own

satisfaction. The Participants will meet periodically to ensure that water quality and operational issues are addressed, and that needed information is exchanged in a timely fashion. The written results of these meetings will be circulated in a timely manner to all members and participants and reviewed at the annual meeting.

F. Additional Facilities - Projected needs will be identified by the Participants based on the Participant's designated service areas. As five or more years may be needed to bring major new source capacity capabilities on line, five-year and ten-year forecasts are required, and must be updated whenever a Participant becomes aware of any significant change in their forecast demand. These will be discussed jointly as they arise, and reviewed at the annual meeting.

G. Financing - Each Project IA will include pertinent details of financing for that project. Financial participation in existing and additional facilities will be based on each Participant's projected need for each facility, as designated capacity rights.

H. Cost of Service Charge - The Members and Participants will establish wholesale water sales charges for both emergency and long-term supply that include: (1) capital cost, (2) fixed operating cost, and (3) a variable operating cost based on quantity of water delivered based on actual costs of providing the service.

Fixed and variable operating and maintenance costs payments will be made monthly per meter and use rates. Projected annual rate adjustments and documentation shall be provided at the annual meeting. Any rate increase will be effective beginning January 1, of the following year.

(1) The Rates and Charges for the capital, operation, and maintenance of the system shall be based on the following:

(a) Capital Cost - Those construction related costs incurred for Capacity Rights. Capital Costs for facilities contracted solely for a specific project (described in an IA) are allocated based on designated capacity to be purchased.

Capital costs shall include the debt service for each Participant. Such debt service shall be defined as the actual debt service on debt issued for the Participant's proportionate share of capacity rights, or if no debt is issued for the Participant's costs by the financing Participant, the amortized value at the interest rate of the most recent revenue bond issued by the financing Participant over 20 years. However, should all capital costs be paid in full by any Participant purchasing capacity rights prior to the time of the financing Participant incurring the costs, no interest charges shall be assigned to the Participant purchasing capacity rights.

Capital Costs associated with a supplying Participant's construction of their internal water system facilities may be included in the fixed and variable operating costs as appropriate, using cost of service principles, in the same manner as those costs are included in the supplying Participant's customer rate base.

(b) Fixed Operating Cost - The cost of labor, supervision, supplies, utilities, services, taxes, insurance, and all other costs required to operate and maintain the system other than those items included under Variable Operating Cost. The operating cost will include an allocation for renewal and replacement.

(c) Variable Operating Cost - Those costs directly proportionate to the volume of water produced, including chemicals, electric power, and other costs required to meet customer and system needs not included in (a) and (b) above.

(2) Accounting

Subregional System accounting shall be documented in accordance with generally accepted accounting practices acceptable to the Participants.

5. ADMINISTRATIVE, LEGAL AND OTHER PROVISIONS

A. Each Participant shall designate in writing their representative responsible for coordination and implementation of the JOA and the subsequent IAs. The designated individuals will be the primary contact for all project approvals and communication and shall prepare and publish a schedule and plan to facilitate the planning, design and day-by-day operation of facilities associated with the JOA.

An Annual Meeting of the Members and Participants shall be held to review past activity and to propose efforts that may lead to further Amendments to this JOA.

B. This JOA shall remain in full force unless terminated by mutual agreement. Any Member may request Amendment to this JOA at any time with approval subject to SKCRWA Bylaws.

IN WITNESS WHEREOF, the SKCRWA members hereto have caused this agreement to be executed by their proper Officers on the 10th day of June 1995.
26 July

By: Charles A. Booth
Title: Mayor Charles A. Booth
City of Auburn

Attest:

By: Robin Wohlhueter
Robin Wohlhueter, City Clerk

Approved As To Form:

By: Michael J. Reynolds
Michael J. Reynolds,
City Attorney

By: Howard Botts
Title: MAYOR
City of Black Diamond

Attest:

By:_____

Approved As To Form:

By:_____

By: Lyn Hornsby
Title: Board President
Covington Water District

Attest:

By:_____

Approved As To Form:

By:_____

By: Jim Kitchle
Title: Mayor
City of Kent

Attest:

By: Brenda Jacober
City Clerk

Approved As To Form:

By: Hilarie C. Ballehr
ASS'T. CITY ATT'Y

By: Charles Ellis
Title: President Board of Commissioners
King County Water District #111

Attest:

By:_____

Approved As To Form:

By:_____

By:_____
Title:_____
Date:_____

Attest:

By:_____

Approved As To Form:

By:_____

By:_____
Title:_____
Date:_____

Attest:

By:_____

Approved As To Form:

By:_____

By:_____
Title:_____
Date:_____

Attest:

By:_____

Approved As To Form:

By:_____

EXHIBIT A

SOUTH KING COUNTY REGIONAL WATER ASSOCIATION
JOINT OPERATING AGREEMENT
CHECKLIST FOR INTERLOCAL AGREEMENTS

1. Project Title

2. General

- ☐ List of Utilities to be Parties to the Interlocal Agreement (IA) and approval of appropriate city councils and/or water district boards.
- ☐ Consistency with Joint Operating Agreement (JOA).
- ☐ Description of need for project.
- ☐ Listing of potential Wholesale customers for water per Section 4.C of the JOA.
- ☐ Recognition of assessment of costs associated with development of JOA per Section 4.B of the JOA.
- ☐ Recognition South King County Regional Water Association (SKCRWA) members have right of first refusal on excess capacity per Section 4.C of the JOA.
- ☐ Recognition that capacity and water rights are available to meet the needs of the IA.

3. Description of the Project

Inclusion of a drawing (or description) which identifies all the facilities to be considered within the IA. Included within the description should be all jointly and solely owned facilities that are to be operated or paid for by a Party to the IA.

The information within the description should include the following:

- ☐ Long-term ownership of the facility
- ☐ Party responsible for long-term maintenance of the facility
- ☐ Party responsible for payment for design and construction for the facility

4. Project Costs, Financing, and Capacity Rights

- ☐ Description of all project costs and the allocation to each Party.
- ☐ Definition of Capacity rights for all facilities.

- ☐ Definition of cost sharing for long-term maintenance for each facility.
- ☐ Definition of methods of reimbursement for monies expended (if required).
- ☐ Description of any applicable latecomer fees or hook-up charges.
- ☐ Description of requirements for record keeping and monitoring of costs.
- ☐ Description of manner to finance project and to pay for purchased water including initial costs and method to adjust costs over time.

5. Project Design and Construction Management

- ☐ Definition of overall project management responsibilities.
- ☐ Definition of design and construction management responsibilities for individual facilities.
- ☐ Description of basic periodic meeting schedule for project review.

6. Conditions of Service

- ☐ Limitations to source sharing or delivery of water (if any).
- ☐ Design Criteria for full project.
- ☐ Minimum and maximum flow rates and pressures.
- ☐ Items specifically excluded from the project.

7. Term of Duration of the Agreement

Discussion of the length of time the agreement is in effect as well as the method to terminate the agreement and succeeding agencies' obligations.

8. Amendments

Methods by which the agreement could be amended.

9. Hold harmless, liability language, etc.

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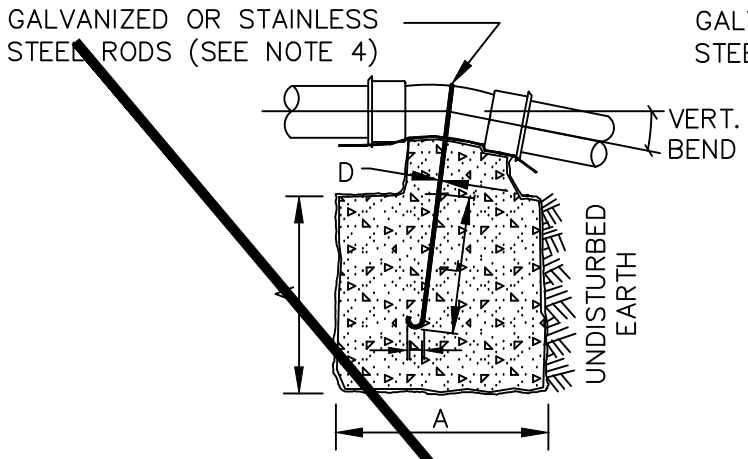
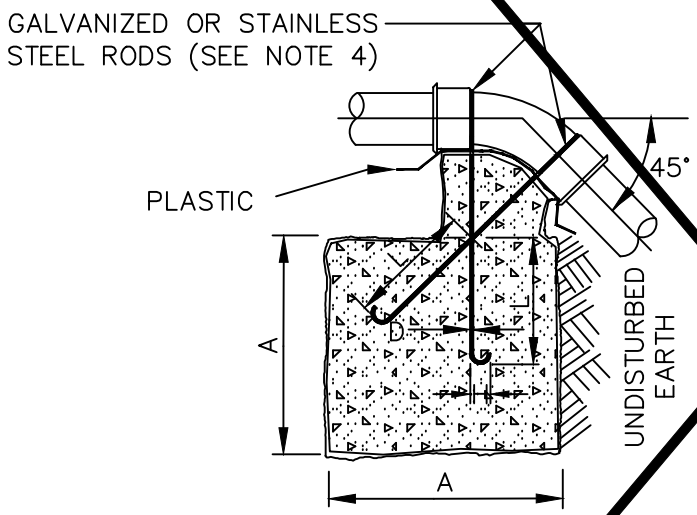
Appendix I

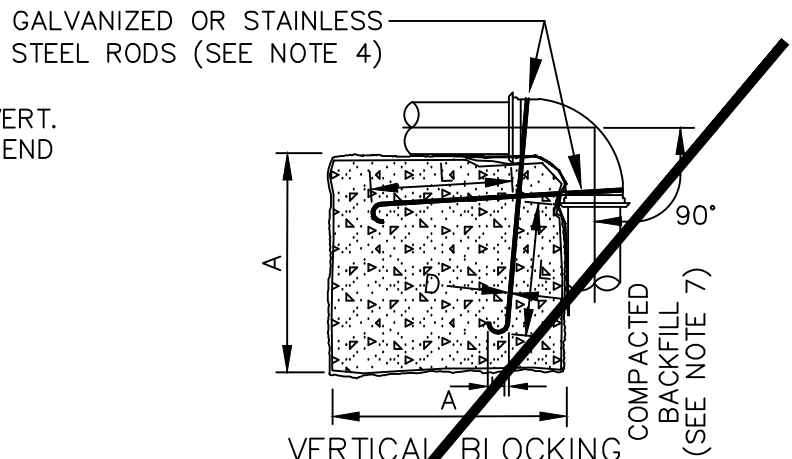
Black Diamond Public Works Standards



VERTICAL BLOCKING
11 1/4° & 22 1/2° BENDS



VERTICAL BLOCKING
FOR 45° BENDS



VERTICAL BLOCKING
FOR 90° BENDS
(SEE NOTE 6)

VERTICAL BLOCKING SIZE W/RESTRAINED JOINTS
SOIL TYPE = COHESIVE GRANULAR [GC+SC]
SAND, GRAVEL, CLAY MIXTURE
A: LENGTH OF CONCRETE BLOCKING
D: DIAMETER OF DEFORMED REINFORCEMENT BARS.
L: LENGTH OF DEFORMED REINFORCEMENT BAR IN CONCRETE.
H: DISTANCE FROM REINFORCEMENT BAR TO END OF HOOK.

PIPE SIZE	V B	CU FT	CU YARDS	A	D	L	H
4"	11 1/4°	*	*				
	22 1/2°	*	*				
	45°	*	*				
	90°	25	1	3.0'	3/4"	2.0'	6.0"
6"	11 1/4°	*	*				
	22 1/2°	*	*				
	45°	40	1.5	3.5'	3/4"	2.0'	6.0"
	90°	57	2.1	3.9'	3/4"	2.0'	6.0"
8"	11 1/4°	*	*				
	22 1/2°	*	*				
	45°	71	2.6	4.2'	3/4"	2.0'	6.0"
	90°	101	3.8	4.6'	3/4"	2.0'	6.0"
10"	11 1/4°	*	*				
	22 1/2°	60	2.2	3.9'	3/4"	2.0'	6.0"
	45°	111	4.1	4.8'	3/4"	2.0'	6.0"
	90°	157	5.8	5.4'	1"	3.5'	8.0"
12"	11 1/4°	*	*				
	22 1/2°	87	3.2	4.4'	3/4"	2.0'	6.0"
	45°	160	5.9	5.4'	1"	2.0'	8.0"
	90°	226	8.3	6.1'	1 1/8"	4.0'	11"

THIS TABLE IS PROVIDED AS A MINIMUM GUIDELINE ONLY. ALL BLOCKING SHALL BE DESIGNED AND STAMPED BY A LICENSED CIVIL ENGINEER.

NOTES:

1. CONCRETE BLOCKING SIZES BASED ON:
   - 36 FEET OF PIPE RESTRAINED EACH SIDE OF BEND
   - THRUST BLOCK AREAS BASED ON SAFE BEARING LOAD OF 1,000 PSF.
   - 3,000 PSI CONCRETE.
   - MINIMUM 3 FEET OF COVER.
   - PIPE THRUST BASED ON 300 PSI PRESSURE.
   - PIPE ENCASED IN POLYETHYLENE.
   - VERTICAL BLOCK SIZE BASED ON CONCRETE WEIGHT OF 150 POUNDS PER CUBIC FOOT.
   - TRENCH CONDITIONS BASED ON TYPE 2, FLAT BOTTOM TRENCH WITH LIGHTLY CONSOLIDATED BACKFILL, PER ANSI/AWWA C150/A21.50.
   - FACTOR OF SAFETY IS 1.5.
   - SOIL FRICTIONAL RESISTANCE BASED ON COHESIVE GRANULAR SOIL TYPE (GC+SC). SAND, GRAVEL, CLAY MIXTURE.
2. BLOCKING DESIGN MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
3. DEFORMED REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH ASTM A 615. BARS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 767.
4. LINE SHALL NOT BE PRESSURIZED UNTIL ALL TRENCHING WITHIN 100 FEET OF VERTICAL BEND IS BACKFILLED AND COMPACTED TO MINIMUM COVER OF 3 FEET OVER PIPE.
6. 90° VERTICAL BENDS SHALL ONLY BE INSTALLED WHERE GIVEN PRIOR APPROVAL BY THE UTILITY.
6. BACKFILL TRENCH BEYOND 90° VERTICAL BLOCK WITH CRUSHED SURFACING TOP COURSE MATERIAL COMPACTED TO 95% MAXIMUM DENSITY. CRUSHED BACKFILL SHALL EXTEND 20 FEET BEYOND BLOCK OR TO FIRM BEARING TRENCH WALL, WHICHEVER IS LESS.
7. 8 MIL PLASTIC BETWEEN PIPE AND CONCRETE.
8. BLOCKING SHALL BEAR AGAINST FITTING ONLY AND SHALL BE CLEAR OF JOINTS AND BOLTS.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**VERTICAL BLOCKING WITH RESTRAINED JOINTS FOR NEW LINES**

STANDARD DETAIL NO. **W-01**

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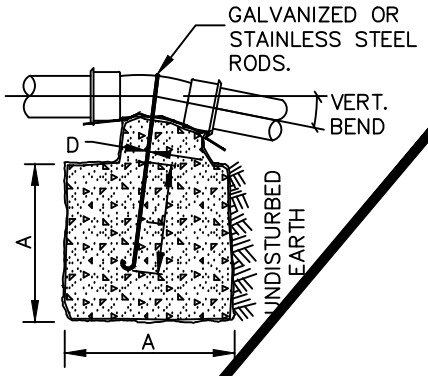
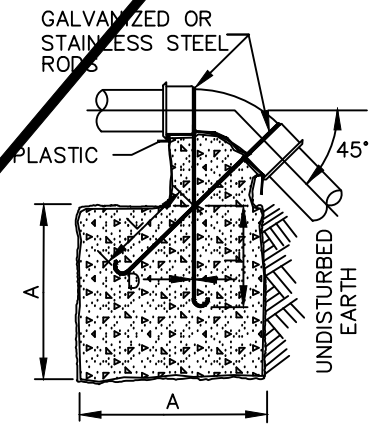
VERTICAL BLOCKING
FOR 11 1/4°–22 1/2°–30° BENDS
A: LENGTH OF CONCRETE BLOCKING.
D: DIAMETER OF REINFORCEMENT BAR.
L: LENGTH OF REINFORCEMENT BAR IN CONCRETE.

PIPE SIZE	VERTICAL BEND	CU YD	CU FT	A	D	L
4"	11 1/4°	.41	11	2.2'	3/4"	2.0'
	22 1/2°	.78	21	2.7'		2.0'
	30°	1	27	3.0'		2.0'
6"	11 1/4°	.81	22	2.8'	3/4"	2.0'
	22 1/2°	1.59	43	3.5'		2.0'
	30°	2.07	56	3.8'		2.0'
8"	11 1/4°	1.41	38	3.4'	3/4"	2.0'
	22 1/2°	2.74	74	4.2'		2.5'
	30°	3.56	96	4.6'	3/4"	3.0'
12"	11 1/4°	2.96	80	4.3'	3/4"	2.5'
	22 1/2°	5.81	157	5.4'	7/8"	3.0'
	30°	7.598	205	5.9'		3.0'
VERTICAL BLOCKING FOR 45° BENDS						
4"	45°	1.42	38.3	3.4	3/4"	2.0'
6"		2.94	79.3	4.3		2.0'
8"		5.04	136	5.1		2.0'
12"		10.74	290	6.6	3/4"	3.0'

THIS TABLE IS PROVIDED AS A MINIMUM GUIDELINE ONLY. ALL BLOCKING SHALL BE DESIGNED AND STAMPED BY A LICENSED CIVIL ENGINEER.



VERTICAL BLOCKING FOR
11 1/4°, 22 1/2°, & 30° BENDS



VERTICAL BLOCKING
FOR 45° BENDS

NOTES:

1. CONCRETE BLOCKING SIZES BASED ON:
   - THRUST BLOCK AREAS BASED ON SAFE BEARING LOAD OF 1,000 PSF.
   - 3,000 PSI CONCRETE.
   - MINIMUM 3 FEET OF COVER.
   - PIPE THRUST BASED ON 300 PSI PRESSURE.
   - PIPE ENCASED IN POLYETHYLENE.
   - VERTICAL BLOCK SIZE BASED ON CONCRETE WEIGHT OF 150 POUNDS PER CUBIC FOOT.
   - TRENCH CONDITIONS BASED ON TYPE 2, FLAT BOTTOM TRENCH WITH LIGHTLY CONSOLIDATED BACKFILL, PER ANSI/AWWA C150/A21.50.
   - FACTOR OF SAFETY IS 1.5
   - SOIL FRICTIONAL RESISTANCE BASED ON COHESIVE GRANULAR SOIL TYPE (GC+SC). SAND, GRAVEL, CLAY MIXTURE.
2. BLOCKING DESIGN MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
3. DEFORMED REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH ASTM A 615. BARS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 767.
4. LINE SHALL NOT BE PRESSURIZED UNTIL ALL TRENCHING WITHIN 100 FEET OF VERTICAL BEND IS BACKFILLED AND COMPACTED TO MINIMUM COVER OF 3 FEET OVER PIPE.
5. 90° VERTICAL BENDS SHALL ONLY BE INSTALLED WHERE GIVEN PRIOR APPROVAL BY THE UTILITY.
6. BACKFILL TRENCH BEYOND 90° VERTICAL BLOCK WITH CRUSHED SURFACING TOP COURSE MATERIAL COMPACTED TO 95% MAXIMUM DENSITY. CRUSHED BACKFILL SHALL EXTEND 20 FEET BEYOND BLOCK OR TO FIRM BEARING TRENCH WALL, WHICHEVER IS LESS.
7. 8 MIL PLASTIC BETWEEN PIPE AND CONCRETE.
8. BLOCKING SHALL BEAR AGAINST FITTING ONLY AND SHALL BE CLEAR OF JOINTS AND BOLTS.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**VERTICAL BLOCKING FOR UNRESTRAINED MAINS**

STANDARD DETAIL NO.
W-02

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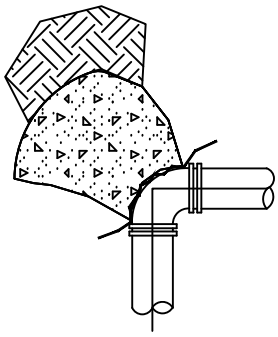
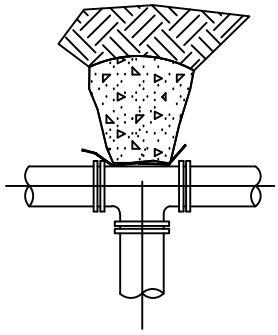
DRY BLOCK STANDARDS

THRUST BLOCK – TABLE						
		MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET				
PIPE SIZE	PRESSURE PSI	90°	TEE CAP	45°	22 1/2°	11 1/4°
4"	300	11	3.8	8	4.2	2.1
6"	300	22.4	17	16	8.6	4.4
8"	300	38.6	29	27.3	14.8	7.5
10"	300	58	43.5	41	22.2	11.3
12"	300	82	61.6	58	31.4	16
THIS TABLE IS PROVIDED AS A MINIMUM GUIDELINE ONLY. ALL BLOCKING SHALL BE DESIGNED AND STAMPED BY A LICENSED CIVIL ENGINEER.						

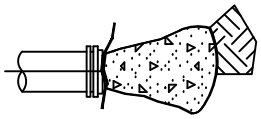
* TABLE CALCULATED AT 1000 LB/SF BEARING AREA.



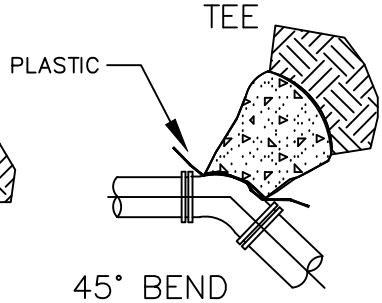
90° BEND



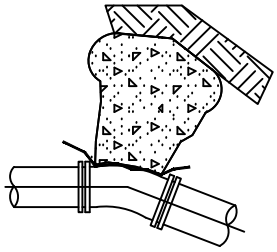
TEE



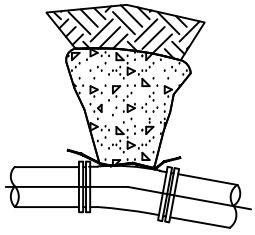
CAP



45° BEND



22 1/2° BEND



11 1/4° BEND

NOTES:

1. CONCRETE BLOCKING SIZES BASED ON:
   - 36 FEET OF PIPE RESTRAINED EACH SIDE OF BEND.
   - THRUST BLOCK AREAS BASED ON SAFE BEARING LOAD OF 1,000 PSF.
   - 3,000 PSI CONCRETE.
   - MINIMUM 3 FEET OF COVER.
   - PIPE THRUST BASED ON 300 PSI PRESSURE.
   - PIPE ENCASED IN POLYETHYLENE.
   - VERTICAL BLOCK SIZE BASED ON CONCRETE WEIGHT OF 150 POUNDS PER CUBIC FOOT.
   - TRENCH CONDITIONS BASED ON TYPE 2, FLAT BOTTOM TRENCH WITH LIGHTLY CONSOLIDATED BACKFILL, PER ANSI/AWWA C150/A21.50.
   - FACTOR OF SAFETY IS 1.5.
   - SOIL FRICTIONAL RESISTANCE BASED ON COHESIVE GRANULAR SOIL TYPE (GC+SC). SAND, GRAVEL, CLAY MIXTURE.
2. BLOCKING DESIGN MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES AND SOIL CONDITIONS.
3. THRUST BLOCK BEARING AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES & SOIL CONDITIONS.
4. CONCRETE BLOCKING SHALL BE CAST IN PLACE & HAVE MINIMUM OF 1/2 SQUARE FOOT BEARING AGAINST THE FITTING.
5. BLOCK SHALL BEAR AGAINST FITTINGS ONLY & SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
6. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
7. 8 MIL PLASTIC INSTALLED BETWEEN PIPE AND CONCRETE.
8. BLOCKING SHALL BEAR AGAINST FITTING ONLY AND SHALL BE CLEAR OF JOINTS AND BOLTS.
9. VERTICAL BLOCKING SYSTEMS REQUIRE SPECIAL DESIGN BY A LICENSED CIVIL ENGINEER.

* IN SOFT SOIL OR PEAT, ALL THRUSTS BLOCKS SHALL BE RESTRAINED BY PILES OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUST. (ENGINEERING DESIGN REQUIRED).

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**HORIZONTAL CONCRETE BLOCKING**	STANDARD DETAIL NO. **W-03**

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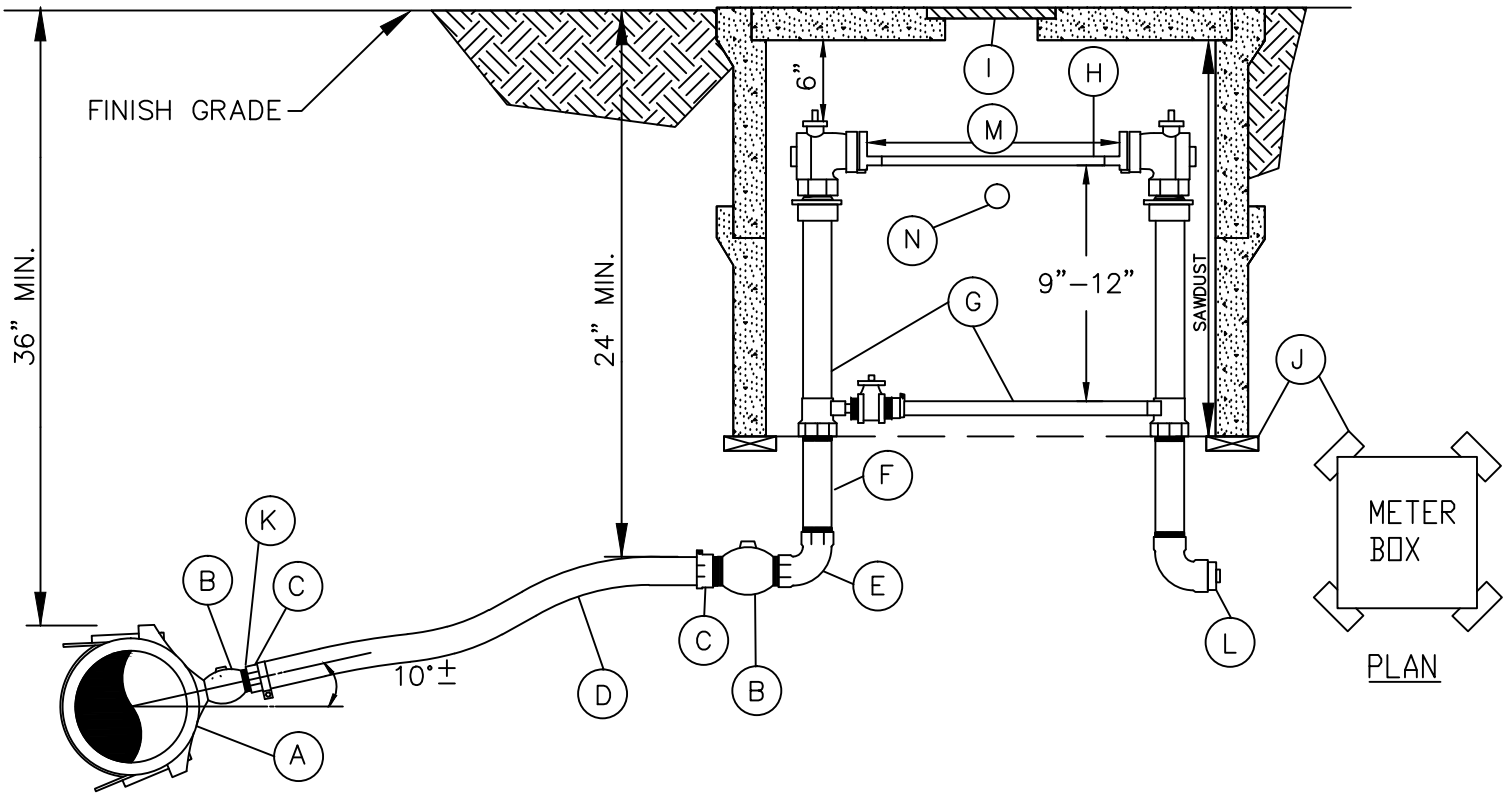

Ⓐ DOUBLE STRAP STAINLESS STEEL SERVICE SADDLE WITH TAPER (CC) TAP, ROMAC 202S, OR EQUAL. SIZE AS REQUIRED.

Ⓑ CORPORATION STOP, MALE IRON PIPE INLET BY MALE IRON PIPE THREAD OUTLET WITH BALL VALVE FORD BALLCORP FB500 MUELLER ORISEAL NO. H–9968.

Ⓒ COUPLING, FEMALE IRON PIPE THREAD BY PACK JOINT (COMPRESSION FITTING) FOR COPPER. FORD C84–66 OR C84–77. (FOR COPPER TUBING CONNECTION.)

Ⓓ COPPER TUBING, TYPE K OR SCHEDULE 40 BRASS PIPE.

Ⓔ STREET ELL, BRASS, MALE IRON PIPE THREAD BY FEMALE IRON PIPE THREAD.

Ⓕ NIPPLE, BRASS, M.I.P.T. X M.I.P.T., 12" LONG OR AS REQUIRED TO MEET PROPER GRADE.

Ⓖ BRASS AND COPPER METER SETTER WITH BYPASS, CHECK VALVE, BALL VALVE WITH PADLOCK WINGS ON INLET, AND BYPASS. VERTICAL INLET AND OUTLET FORD VFH 66X12B OR VFH 77X12B.

Ⓗ METER: ROCKWELL 1 1/2" OR 2" SR WITH BRONZE CHAMBER IN CUBIC FEET WITH TOUGH READ REGISTER, PIT LID ADAPTER, AND RADIO READ MODULE.

Ⓘ TWO (2) CONCRETE METER BOXES (STACKED), FOGTITE OR EQUAL. FOGTITE NO. 2 IN NONTRAVELED AREAS AND SIDEWALK (CONC. LID WITH ALUM. INSPECTION PLATE). FOGTITE NO. 2S DIPPED (TOP BOX ONLY). IN AREAS WITH VEHICULAR TRAFFIC LID DRILLED FOR PIT LID ADAPTER. SET AT, AND LEVEL WITH, GRADE.

Ⓙ BRICK – 3 1/2"X8"X16".

Ⓚ SWING JOINT USED WITH RIGID COPPER OR BRASS PIPE CONNECTION.

Ⓛ PLUG.

Ⓛ FACE TO FACE DIMENSIONS: 1 1/2" METER = 13 3/8" & 2" METER = 17 3/8".

Ⓛ 1" PVC CONDUIT, SEE STANDARD DETAIL W–25 FOR CONDUIT AND MXU DETAILS.

1. SERVICE LINE MUST BE INSTALLED PERPENDICULAR TO THE WATER MAIN. COMPACT TRENCH TO 95% MAX. DRY DENSITY PER ASTM D–1557.
2. SERVICE SADDLES ARE REQUIRED ON ALL PIPE EXCEPT, CLASS 52 OR THICKER DUCTILE IRON. THE CORP. STOP MAY BE TAPPED DIRECTLY INTO CLASS 52 OR THICKER DUCTILE IRON PIPE FOR 3/4" AND 1" TAPS.
3. DOH APPROVED BACK FLOW PREVENTION DEVICES MUST BE INSTALLED ON ALL IRRIGATION AND FIRE SERVICES AND SHALL BE TESTED AND APPROVED BY THE CITY PRIOR TO SERVICE ACTIVATION.
4. OFFSET METER BOX TO LEFT OR RIGHT 50%
5. INSTALL DOUBLE SERVICES WITH SINGLE 2–PORT MXU (model 505) RADIO–READ WHERE POSSIBLE.
6. ON DOUBLE SERVICES PLACE THE MXU IN THE METER BOX WITH THE METER WIRED TO PORT NUMBER 1.
7. DOUBLE SET SERVICES MUST BE NO MORE THAN 2 FEET APART.
8. SINGLE SET SERVICE MUST BE A MINIMUM OF 20' APART.
9. THE CITY SHALL MAKE ALL ELECTRICAL CONNECTIONS.
10. SERVICES SHALL BE INSTALLED BY THE CITY ON CITY OWNED MAINS.
11. METERS SHALL BE SET AT PROPERTY LINES OR IN SIDEWALK, SEE STANDARD DETAIL W–25.
12. AVOID VEHICLE TRAVEL AREAS.
13. SERVICES SHALL NOT BE TAPPED OFF HYDRANT OR FIRE SPRINKLER SYSTEM BRANCHES.
14. BYPASS WILL BE LOCKED OFF BY CONSTRUCTION INSPECTOR WHEN METER SPREADER IS INSTALLED.
15. CITY SHALL INSTALL METER UNLESS OTHERWISE APPROVED.
16. CONTRACTOR SHALL CONNECT HOUSE TO METER PRIOR TO RADIO READ METER INSTALLATION.
17. SEE STANDARD DETAIL W–25 FOR RADIO READ INSTALLATION DEATIL.
18. PROVIDE POSITIVE DRAINAGE AWAY FROM METER BOX.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**1 1/2" AND 2" WATER SERVICE**	STANDARD DETAIL NO. **W-04**

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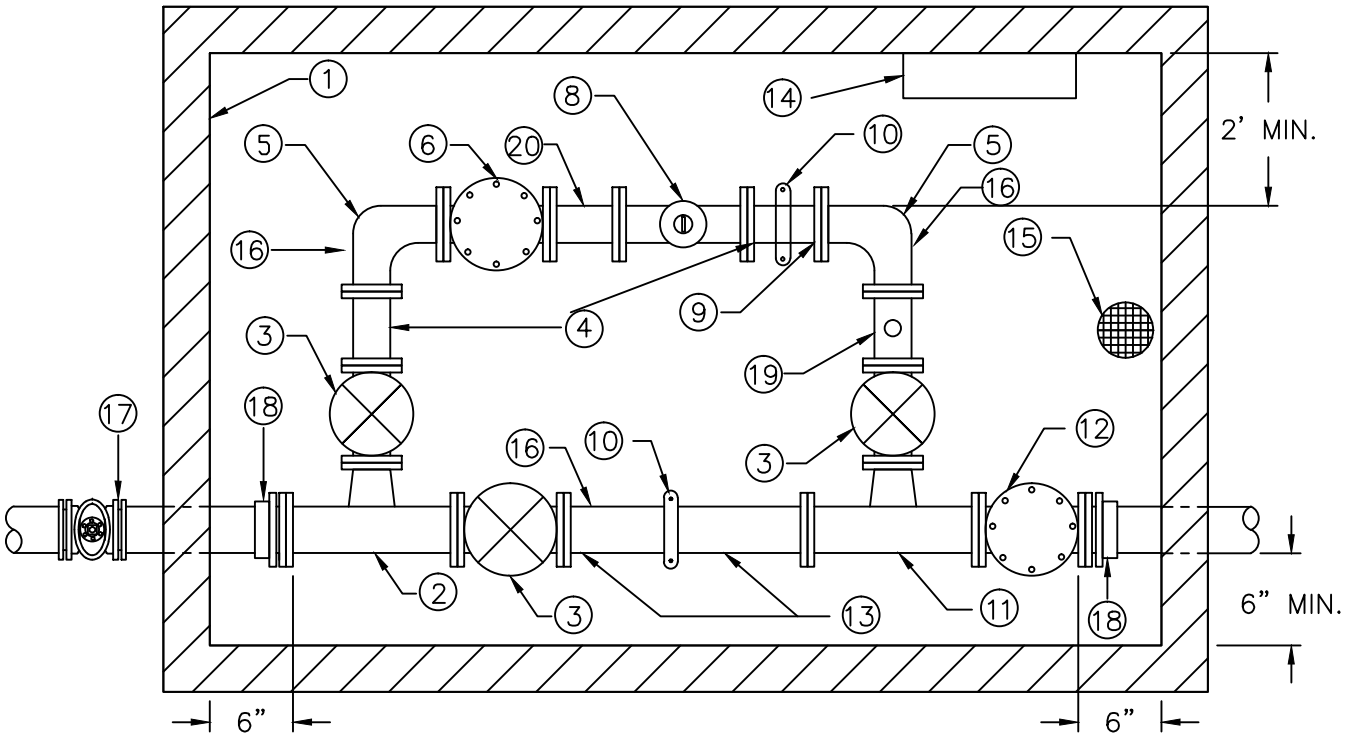

NUMBER	QUANTITY	DESCRIPTION
1	1	VAULT-SIZE TO FIT, SEE DETAIL G-08
2	1	MJ X FLG X FLG TEE
3	3	FLG X FLG GATE VALVE WITH HAND WHEEL DP C509
4	4	FLANGED SPOOL 6' LONG
5	2	FLANGED 90
6	1	BASKET STRAINER
7	13	FLANGED GASKETS
8	1	METER COMPOUND WITH TR TRPL
9	2	FLANGEDxVICTAULIC SPOOL - MADE TO FIT - MIN. 2 PIPE DIAMETERS
10	1	VICTAULIC COUPLING STYLE 31
11	1	FLG X FLG TEE
12	1	SWING CHECK FLG X FLG
13	2	FLANGE X VICTAULIC SPOOL CUT TO FIT TIGHT
14	1	LADDER - GALV. WITH LADDER UP POST
15	1	VAULT DRAIN TO DAYLIGHT OR STORM DRAIN, 6" SCHED. 40 PVC
16	3	STANCHIONS - GRINNEL #264
17	1	VALVE AT MAIN CONNECTION
18	2	VICTAULIC 341 COUPLING
19	1	SIZE X 2" FLG TEE WITH 2" X 2 1/2" MNST ADAPTER WITH BRASS CAP
20	1	FLG X FLG SPOOL - MIN. LENGTH = 2 PIPE DIAMETERS

NOTES:

1. ALL MATERIALS, INCLUDING METER SHALL BE FURNISHED BY THE CONTRACTOR.
2. ALL PIPE & FITTINGS 3" & LARGER SHALL BE CEMENT LINED DUCTILE IRON, CLASS 53 MINIMUM.
3. TEE WITH GATE VALVE REQUIRED AT DISTRIBUTION MAIN.
4. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
5. PROVIDE 24" CLEARANCE BETWEEN VAULT FLOOR AND CENTER LINE OF COMPOUND METER. WHERE ELEVATION OF VAULT FLOOR IS TOO LOW TO DRAIN TO DAYLIGHT OR STORM SYSTEM, THIS CLEARANCE CAN BE REDUCED TO A MINIMUM OF 12", IF SUBSTITUTION OF A SHORTER VAULT ALLOWS FLOOR TO DRAIN TO DAYLIGHT OR STORM SYSTEM.
6. LADDER TO BE BOLTED TO VAULT FLOOR AND TO VAULT WALL AT TWO LOCATIONS. RUNGS SHALL BE SPACED AT 12" ON CENTER. PROVIDE LADDER UP POST.
7. ALL FITTINGS OUTSIDE VAULT SHALL INCLUDE THRUST BLOCKING OR JOINT RESTRAINT DEVICES. SEE APPROVED MATERIAL LIST.
8. TOP OF VAULT SHALL BE 3" ABOVE FINISHED GRADE IN LANDSCAPE AREAS.
9. PROVIDE POSITIVE DRAINAGE AWAY FROM VAULT.
10. MOUNT PIT LID ADAPTER IN VAULT LID 4" FROM HINGE. CENTER OVER METER. (1 3/4" HOLE).
11. USE TURBINE METER FOR IRRIGATION (UNLESS OTHERWISE NOTED).
12. 3" METER USES A 4" BYPASS WITH 4" X 3" TEES.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**3" AND LARGER METER INSTALLATION**	STANDARD DETAIL NO. **W-05**

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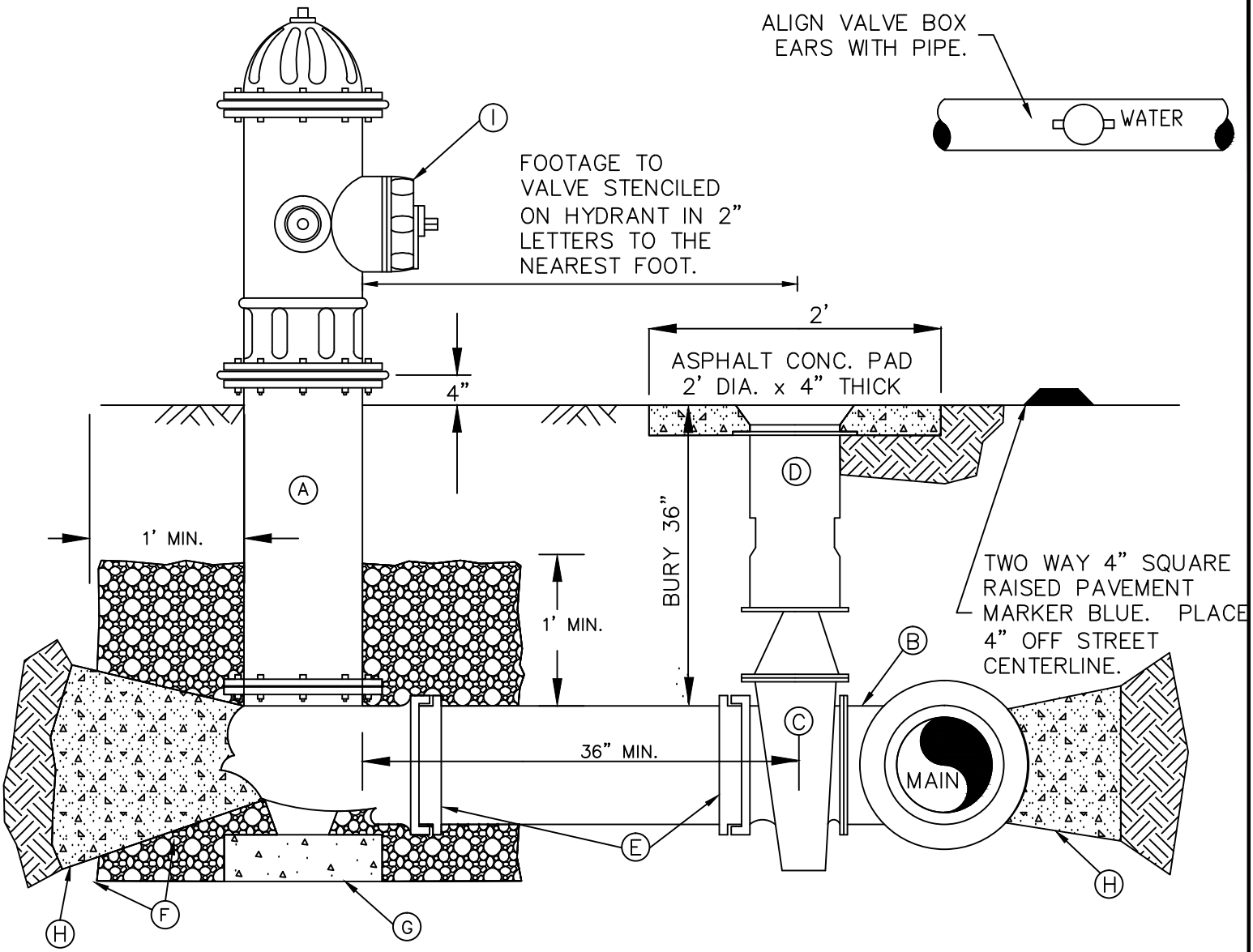

A. 1–5 1/4" M.V.O. HYDRANT WITH 2–2 1/2" N.S.T. AND 1–4" PUMPER PORTS, SEATTLE STANDARD THREAD–M.J. INLET, WITH LUGS, BRASS TO BRASS SUB–SEAT. FIRE HYDRANT TO BE PAINTED WITH TWO COATS OF HAMMERITE HIGH GLOSS WHITE SMOOTH PAINT. PUMPER PORT TO FACE STREET, OR AS DIRECTED BY THE FIRE DEPARTMENT. SEE APPROVED MATERIAL LIST.

B. 6" FLANGE OUTLET ON DUCTILE IRON TEE. OR SEE STANDARD DETAIL W–16.

C. 1–AUXILIARY GATE VALVE: 6" AWWA C509, RESILIENT SEAT, M.J.xFL. WITH LUGS. SEE APPROVED MATERIAL LIST.

D. 1–TWO–PIECE CAST IRON VALVE BOX. SEE STANDARD DETAIL W–18.

E. 1–6" DUCTILE IRON CLASS 52 CEMENT–LINED PIPE, LENGTH UP TO 50'. OVER 50', 8" CLASS 52 DUCTILE IRON IS REQUIRED. RESTRAIN PIPE WITH APPROVED SYSTEM – SEE APPROVED MATERIAL LIST.

F. 1/2 YARD WASHED DRAIN ROCK (7/8"), MIN. 1' ABOVE BOOT FLANGE PLACE 8 MIL POLYETHYLENE FILM AROUND TOP AND SIDES OF GRAVEL DO NOT BLOCK DRAIN HOLES. DEEPER EXCAVATION WITH MORE DRAIN ROCK MAY BE REQUIRED IN POOR DRAINING SOILS.

G. 16"X8"X4" MIN. SIZE CONCRETE BLOCK UNDER HYDRANT.

H. CONC. BLOCKING PER STD DETAIL W–03.

I. STORZ HYDRANT ADAPTER WITH CAP.

J. MINIMUM 3' CLEAR AREA AROUND HYDRANT.

K. HYDRANT SHALL BE EXACTLY VERTICAL (PLUMB).

L. EXTENSION KITS ARE NOT ALLOWED.

M. SPACING – 500' RESIDENTIAL, 300' COMMERCIAL.

N. MINIMUM 50' FROM BUILDING.

O. HYDRANT MUST BE VISIBLE FOR 150'.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**FIRE HYDRANT ASSEMBLY**	STANDARD DETAIL NO. **W-06**

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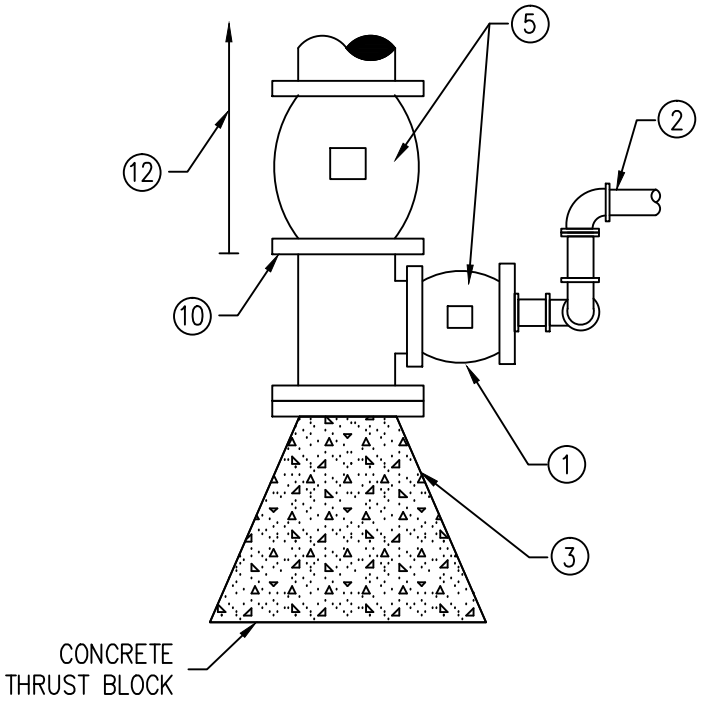
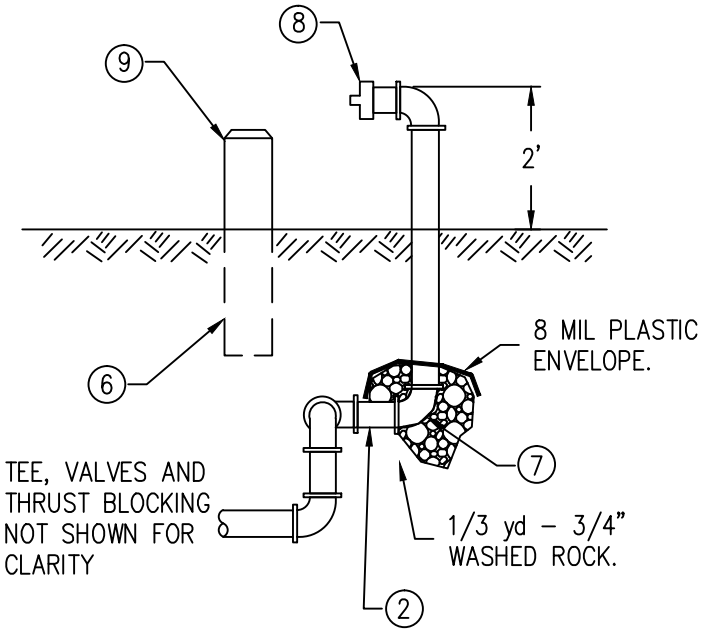


PLAN VIEW



ELEVATION VIEW

SIDE BLOW–OFF

MAIN SIZE	QUANTITY	BLOW–OFF SIZE	CONNECTION
≤ 4	1	2"	2 1/2" NST
6	1	4"	4" SST
8	1	4"	4" SST
10	2	4"	4" SST
12	2	4"	4" SST
≥16	P16		

1. MAIN SIZE x BLOW–OFF SIZE TEE, CAST IRON GATE VALVE, NRS, WITH 2" SQUARE OPERATING NUT C509 FLGXFLG WITH TAPPED FLANGE AS NEEDED.
2. BRASS OR DUCTILE IRON PIPE. PROVIDE SWING JOINTS ON THREADED PIPE.
3. BLIND FLANGE OR MJ PLUG
4. SEE STANDARD DETAIL W–18 FOR VALVE AND VALVE BOX INSTALLATION.
5. VALVE SHALL BE LOCATED AT LEAST 3' FROM GUARD POST OR STAND PIPE.
6. 90° ELBOW WITH 1/8" DRAIN HOLE.
7. BRASS FIRE THREAD ADAPTER WITH CAP. SEE SIZING CHART.
8. GUARD POSTS WHEN REQUIRED. SEE STD. DETAIL W–08.
9. GATE VALVE REQUIRED IF MAIN CAN BE EXTENDED.
10. LOCATE WITHIN 20' OF LAST SEWER MANHOLE AS NEEDED.
11. PROVIDE RESTRAINED JOINTS FOR DEAD END THROUGH VALVE. (LENGTH PER DESIGN ENGINEER.)
12. PAINT ALL ABOVE GROUND PIPE, FITTINGS WITH HAMMERITE HIGH GLOSS WHITE SMOOTH PAINT.TWO COATS.
13. STENCIL FOOTAGE TO VALVE ON GUARD POST OR DISCHARGE PIPE. 2" BLACK ENAMEL LETTERS.
14. PROVIDE DRAINAGE ADEQUATE FOR MINIMUM FLOW RATES.
15. HYDRANT ASSEMBLIES MAY BE SUBSTITUTED FOR BLOW–OFF ASSEMBLIES.
16. BLOW–OFF SIZING TO ACHIEVE 5 FPS IN THE MAIN.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**BLOW-OFF ASSEMBLY**	STANDARD DETAIL NO. **W-07**

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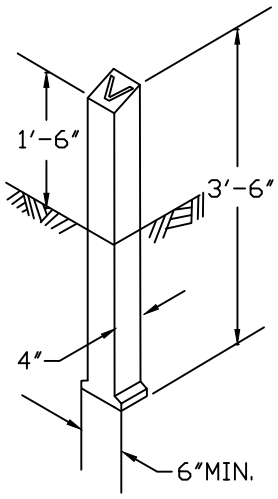
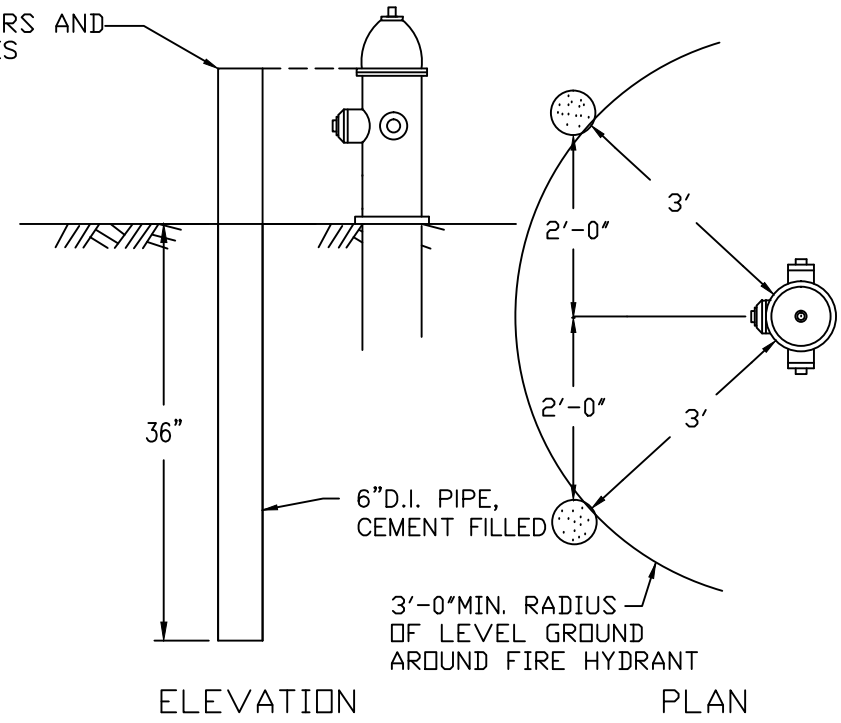


VALVE MARKER POST



FIRE HYDRANT GUARD POST

NOTES:

1. GUARD POST SHALL BE 6" CL.52 D.I. PIPE, 6' LONG, FILLED WITH CEMENT. PAINT WITH TWO COATS OF HAMMERITE HIGH GLOSS WHITE SMOOTH PAINT.
2. VALVE MARKER POST SHALL BE EQUAL TO FOG TITE METER SEAL COMPANY VALVE MARKER POSTS. PAINT WITH TWO COATS OF HAMMERITE HIGH GLOSS WHITE SMOOTH PAINT. PAINT DISTANCE FROM THE VALVE MARKER TO THE VALVE ON THE POST WITH BLACK ENAMEL PAINT.
3. VALVE MARKER POST TO BE USED FOR ALL MAINLINE VALVES OUTSIDE PAVED AREAS AS DIRECTED.
4. DI GUARD POSTS SHALL ONLY BE USED IN PARKING LOTS AS DIRECTED.
5. WOOD GUARD POSTS MAY BE USED IN ROW. SEE DETAIL G-06.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**GUARD POST & VALVE MARKER POST**	STANDARD DETAIL NO. **W-08**

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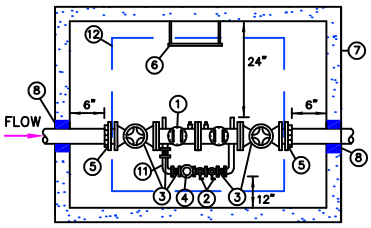
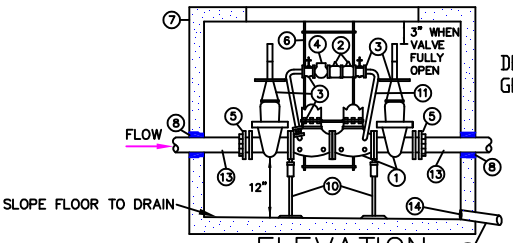


PLAN



ELEVATION

DETAIL SHOWN IS FOR BELOW GROUND INSTALLATION.

1. STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED O.S.&Y. VALVES AND (4) RESILIENT SEATED TEST COCKS, AND BRASS OR COPPER DETECTOR BY-PASS.* (ALSO, SEE # 2 FOR BY-PASS DETAIL.)
2. STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED BALL VALVES AND (4) RESILIENT SEATED TEST COCKS.
3. EACH VALVE SHALL BE MARKED WITH MODEL NUMBER WITH DESIGNATION OF RESILIENT SEAT; SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED WITH A MINIMUM OF 4MILS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
4. 3/4" METER (CUBIC FEET READING).
5. UNI-FLANGE WITH SETSCREWS.
6. ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
7. CONCRETE VAULT WITH A MINIMUM OF 2, 3'X3' DIAMOND PLATE DOORS RATED FOR H20 LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
8. WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE WITH WELDED FLANGE OR ANCHOR BLOCKS.
9. DRAIN, SLOPE TO DAYLIGHT, 4" MINIMUM DIAMETER.
10. TWO ADJUSTABLE PIPE STANCHIONS, BOLTED TO FLOOR.
11. ALL PLUMBING FOR BY-PASS TO BE COPPER AND BRASS.
12. ACCESS TO BE CENTERED OVER METER.
13. CL. 52 D.I., M.J. WITH RETAINER GLANDS.
14. INSTALL WIRE MESH RODENT SCREEN OVER DRAIN OUTLET.

SIZE	MIN. VAULT SIZE (INSIDE) W	L	H	UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
2 1/2", 3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332

NOTES:

1. #1 DOUBLE CHECK VALVE ASSEMBLY DESCRIBED ABOVE SHALL BE PURCHASED AS ONE UNIT. TYPICALLY CALLED DOUBLE DETECTOR CHECK VALVE ASSEMBLY.
2. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY CITY OF BLACK DIAMOND WATER QUALITY INSPECTOR.
4. VAULT ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE AND GATE VALVE REQUIRED ON MAIN.
6. ALL CLEARANCES SHOWN ARE MINIMUM.
7. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
8. 2 1/2" THROUGH 6" ASSEMBLIES SHALL CONNECT TO WATER MAIN WITH 8" PIPE.
9. FDC AND PIV TO BE LOCATED DOWNSTREAM OF ASSEMBLY.
10. (SEE # 13.A)
11. (SEE # 13.C)

INSTALLATION PROCEDURES AND SPECIFICATIONS FOR DOUBLE CHECK DETECTOR ASSEMBLY FIRE SUPPRESSION SYSTEMS

THE DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) CONSISTS OF TWO DOUBLE CHECK VALVE ASSEMBLIES (DCVA); EACH DCVA CONTAINING TWO INTERNALLY LOADED CHECK VALVES, EITHER SPRING LOADED OR INTERNALLY WEIGHTED, AND FOUR PROPERLY LOCATED RESILIENT SEATED TEST COCKS. THE LARGER DCVA WILL HAVE TWO RESILIENT SEATED GATE VALVES AND THE BYPASS DCVA WILL HAVE TWO RESILIENT SEATED SHUTOFF VALVES (BALL VALVES). THIS ASSEMBLY IS EFFECTIVE AGAINST BACKFLOW CAUSED BY BACK PRESSURE AND BACKSIPHONAGE, AND IS USED TO PROTECT THE WATER SYSTEM FROM OBJECTIONABLE SUBSTANCES WHICH MAY CONSTITUTE A LOW HAZARD. THE DCDA OPERATES AND FUNCTIONS EXACTLY AS THE DCVA, WITH THE ADDITION OF A FACTORY INSTALLED BYPASS FEATURE (TYPICALLY 3/4"). THIS BYPASS FEATURE IS DESIGNED TO MONITOR LOW FLOWS ON LOW HAZARD FIRE SYSTEMS. THIS ASSEMBLY SHALL BE INSTALLED AS A UNIT AS FURNISHED BY THE MANUFACTURER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, MANUFACTURER'S SPECIFICATIONS, AND THE GUIDELINES LISTED BELOW.

1. ALL FIRE SUPPRESSION SYSTEMS CLASSIFIED AS LOW HAZARD BY BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT SHALL USE DOUBLE CHECK DETECTOR ASSEMBLIES IF ASSEMBLY IS 2 1/2" AND LARGER. FOR FIRE SUPPRESSION SYSTEMS THAT USE AN ASSEMBLY 2" AND SMALLER SEE "INSTALLATION PROCEDURES AND SPECIFICATIONS FOR DOUBLE CHECK VALVE ASSEMBLIES 2" AND SMALLER".
2. OBTAIN PLUMBING PERMIT FROM THE CITY OF BLACK DIAMOND PERMIT CENTER.
3. DCDA SHALL BE A WASHINGTON STATE APPROVED DEVICE, COMPLETE FROM FACTORY WITH A DCVA AND WATER METER (CU. FT) BYPASS.*
4. ALL BELOW GROUND INSTALLATIONS REQUIRE A REINFORCED CONCRETE VAULT. (SEE VAULT SPECIFICATIONS FOR DCVA AND DCDA).
5. SIZE DCDA HYDRAULICALLY TO AVOID EXCESSIVE PRESSURE. (SEE MANUFACTURER'S SPECIFICATION).
6. INSTALL DCDA IN THE HORIZONTAL POSITION.
7. INSTALL PLUGS IN ALL TEST COCKS.
8. IF INSTALLED OUTDOORS AND ABOVE GROUND:
   A. ADEQUATE FREEZE PROTECTION MUST BE PROVIDED.
   B. DCDA MUST BE FENCED, GATED, OR OTHERWISE PROTECTED FROM VANDALISM.
9. ALL RESILIENT SEATED GATE VALVES SHALL BE OF THE O.S.&Y. TYPE.
10. INSTALL AN AUDIBLE WARNING DEVICE (OR COMPARABLE ON RESILIENT SEATED GATE VALVES.
11. STANCHIONS SHALL BE INSTALLED TO PREVENT FLANGE DAMAGE. (SEE DCDA FIRE SUPPRESSION SYSTEM DETAIL).
12. PROVIDE ADEQUATE CLEARANCE FOR TESTING AND REPAIRS:
    A. THERE MUST BE AT LEAST 12" CLEARANCE ON ALL SIDES OF DEVICE.
    B. ADEQUATE SPACE MUST BE MAINTAINED FOR TESTING AND REPAIRS OF DEVICE; IF INSTALLATION OF DCDA IS OUTSIDE, SIZE VAULT ACCORDINGLY
    C. THE DCDA SHALL BE NO HIGHER THAN 60" FROM FLOOR OR GROUND TO HIGHEST POINT OF DEVICE.
13. ONCE DEVICE IS INSTALLED:
    A. HAVE THE DEVICE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER.*
    B. HAVE THE DEVICE INSPECTED BY BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
    C. HAVE THE NECESSARY INSPECTIONS COMPLETED BY BLACK DIAMOND FIRE DEPARTMENT AND BLACK DIAMOND PUBLIC WORKS ENGINEERING.
14. THE USE OF GALVANIZED WATER FITTINGS AND PIPING IS PROHIBITED. USE COPPER, BRASS OR PLASTIC FITTINGS AND/OR PIPING.
15. THIS DEVICE WILL REQUIRE AN ANNUAL TEST TO ASSURE IT'S PROPER FUNCTION IN PREVENTING WATER BACKFLOW. THE ANNUAL TEST IS TO BE PERFORMED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. THE CITY OF BLACK DIAMOND O&M DEPARTMENT, WATER QUALITY SECTION WILL SEND THE NECESSARY FORM(S) AS THE DEVICE COMES DUE.

* THIS ITEM/INFORMATION MAY BE OBTAINED FROM THE CITY OF BLACK DIAMOND PERMIT CENTER OR PUBLIC WORKS O&M DEPARTMENT, WATER QUALITY SECTION.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**2 1/2" TO 10" DOUBLE CHECK VALVE ASSEMBLY WITH DETECTOR FOR FIRE SPRINKLER SYSTEMS**

STANDARD DETAIL NO.

W-09

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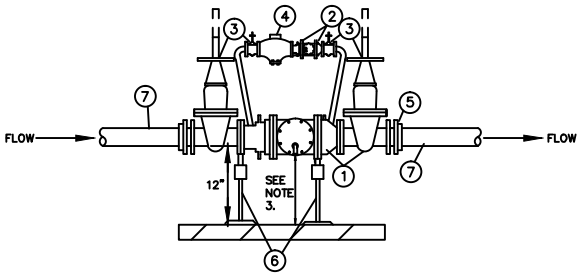
1. STATE APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED O.S.&Y. GATE VALVES AND (4) RESILIENT SEATED TEST COCKS, AND BRASS OR COPPER DETECTOR BY-PASS.* (ALSO, SEE # 2 FOR BY-PASS DETAIL.)
2. STATE APPROVED 3/4" REDUCED PRESSURE PRINCIPLE ASSEMBLY ON BY-PASS, COMPLETE WITH (2) RESILIENT SEATED BALL VALVES AND (4) RESILIENT SEATED TEST COCKS.
3. EACH VALVE SHALL BE MARKED WITH MODEL NUMBER WITH DESIGNATION OF RESILIENT SEAT: SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODY VALVES SHALL BE COATED WITH A MIN. OF 4MLS. EPOXY OR EQUIVALENT POLYMERIZED COATING.
4. 3/4" METER (CUBIC FEET READING) AS REQUIRED.
5. UNI-FLANGE WITH SETSCREWS.
6. TWO ADJUSTABLE PIPE STANCHIONS, BOLTED TO FLOOR.
7. CL. 52 D.I., M.J. WITH RETAINER GLANDS.



PROFILE

NOTES:

1. IF INSTALLED OUTDOORS, DRAIN MUST BE INSTALLED ABOVE MAXIMUM FLOOD LEVEL, AND BE ABLE TO HANDLE THE VOLUME OF WATER THAT CAN BE DISCHARGED FROM THE RELIEF VALVE PORT.
2. WHEN THE REDUCED PRESSURE ASSEMBLY IS LOCATED INSIDE A BUILDING A SIZED DRAIN LINE SHALL BE PROVIDED FOR RELIEF PORT. THERE MUST BE AN APPROVED AIR GAP BETWEEN THE RELIEF PORT AND DRAIN.
3. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION SHALL BE REQUIRED.
4. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY A CITY OF BLACK DIAMOND WATER QUALITY INSPECTOR.
5. MINIMUM CLEARANCE BETWEEN ASSEMBLY AND WALL IS 24".
6. TEE AND GATE VALVE REQUIRED ON MAIN.
7. 2 1/2" THROUGH 6" ASSEMBLIES SHALL CONNECT TO WATER MAIN WITH 8" PIPE.
8. FDC AND PIV TO BE LOCATED DOWNSTREAM OF RPBA.

INSTALLATION PROCEDURES AND SPECIFICATIONS FOR REDUCED PRESSURE DETECTOR ASSEMBLY FIRE SUPPRESSION SYSTEMS

THE REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA) CONSISTS OF TWO REDUCED PRESSURE BACKFLOW ASSEMBLIES (RPBA); EACH RPBA CONTAINING TWO INDEPENDENTLY ACTING, INTERNALLY SPRING LOADED CHECK VALVES SEPARATED BY A SPRING LOADED DIFFERENTIAL PRESSURE RELIEF VALVE AND FOUR PROPERLY LOCATED, RESILIENT SEATED TEST COCKS. THE LARGER RPBA WILL HAVE TWO RESILIENT SEATED SHUTOFF VALVES (BALL VALVES). THIS ASSEMBLY IS EFFECTIVE AGAINST BACKFLOW CAUSED BY BACKPRESSURE AND BACKSIPHONAGE, AND IS USED TO PROTECT THE POTABLE WATER SYSTEM FROM SUBSTANCES THAT CONSTITUTE A HIGH HAZARD. THE RPDA OPERATES AND FUNCTIONS EXACTLY AS A RPBA, WITH THE ADDITION OF A FACTORY INSTALLED (TYPICALLY 3/4") BYPASS FEATURE. THIS BYPASS FEATURE IS DESIGNED TO MONITOR LOW FLOWS ON HIGH HAZARD FIRE SYSTEMS. THIS ASSEMBLY SHALL BE INSTALLED AS A UNIT AS FURNISHED BY THE MANUFACTURER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, MANUFACTURER'S SPECIFICATIONS, AND THE GUIDELINES LISTED BELOW.

1. ALL FIRE SUPPRESSION SYSTEMS CLASSIFIED AS HIGH HAZARD BY BLACK DIAMOND PUBLIC WORKS OPERATIONS DEPARTMENT SHALL USE REDUCED PRESSURE DETECTOR ASSEMBLIES IF ASSEMBLY IS AND LARGER. FOR FIRE SUPPRESSION SYSTEMS THAT USE AN ASSEMBLY 2" AND SMALLER SEE ALSO "INSTALLATION PROCEDURES AND SPECIFICATIONS FOR REDUCED PRESSURE BACKFLOW ASSEMBLY (ALL SIZES).
2. OBTAIN PLUMBING PERMIT FROM PERMIT CENTER.
3. RDPA SHALL BE A WASHINGTON STATE APPROVED DEVICE, COMPLETE FROM FACTORY WITH A RPBA AND WATER METER (CU. FT) BYPASS.*
4. THE RPDA MUST BE INSTALLED ABOVE GROUND LEVEL WHERE THERE IS NO CHANCE OF FLOODING.
5. IF INSTALLED OUTDOORS:
   A. PROVIDE ADEQUATE FREEZE PROTECTION.
   B. RPDA MUST BE FENCED, GATED, OR OTHERWISE PROTECTED FROM VANDALISM.
6. PROVIDE ADEQUATE CLEARANCE FOR TESTING AND REPAIRS:
   A. RPDA MUST BE AT LEAST 12" FROM GROUND TO BOTTOM OF DEVICE, BUT NOT MORE THAN 60" IN HEIGHT FROM GROUND TO HIGHEST POINT OF DEVICE.
   B. RPBA MUST HAVE AT LEAST 24" CLEARANCE ON ALL SIDES.
   C. ADEQUATE SPACE MUST BE PROVIDED TO ALLOW IN-LINE REPAIRS TO CHECK VALVES OR RELIEF VALVE.
7. PROVIDE ADEQUATE DRAINAGE; DRAIN(S) MUST ALLOW FOR MAXIMUM DISCHARGE FROM RPDA RELIEF VALVES AT FULL MAIN PRESSURE. (SEE MANUFACTURER'S SPECIFICATIONS REGARDING DISCHARGE RATES).
8. THERE MUST BE AN APPROVED AIR GAP BETWEEN THE RELIEF PORT AND DRAIN.
9. WHENEVER POSSIBLE, DRAIN RPDA DISCHARGE INTO SEWER; DISCHARGE LINE MUST BE TRAPPED TO SEWER.
10. INSTALL RPDA IN THE HORIZONTAL POSITION ONLY.
11. SIZE THE RPDA HYDRAULICALLY TO AVOID EXCESSIVE PRESSURE LOSS.
12. INSTALL PLUGS IN ALL TEST COCKS.
13. INSTALL STANCHIONS TO PREVENT FLANGE DAMAGE. (SEE RPDA FIRE SUPPRESSION SYSTEM DETAIL_).
14. THERE WILL BE NO RPDA INSTALLATIONS IN AREAS WHERE VEHICLE TRAFFIC IS ACCESSIBLE UNLESS PRIOR APPROVAL IS GAINED FROM BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT
15. INSTALL AN AUDIBLE WARNING DEVICE (OR COMPARABLE) ON RESILIENT SEATED GATE VALVES.
16. ALL RESILIENT SEATED GATE VALVES SHALL BE OF THE O.S.&Y. TYPE.
17. THE USE OF GALVANIZED WATER FITTINGS AND PIPING IS PROHIBITED. USE COPPER, BRASS OR PLASTIC FITTINGS AND/OR PIPING.
18. ONCE THE DEVICE IS INSTALLED:
   A. HAVE THE DEVICE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER OF YOUR CHOOSING.*
   B. HAVE THE DEVICE INSPECTED BY BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
   C. HAVE ALL NECESSARY INSPECTIONS COMPLETED BY BLACK DIAMOND FIRE DEPARTMENT AND BLACK DIAMOND PUBLIC WORKS ENGINEERING.
19. THIS DEVICE WILL REQUIRE AND ANNUAL TEST TO ASSURE IT'S PROPER FUNCTION IN PREVENTING WATER BACKFLOW. THE ANNUAL TEST IS TO BE PERFORMED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. THE CITY OF BLACK DIAMOND O&M DEPARTMENT, WATER QUALITY SECTION WILL SEND THE NECESSARY FORM(S) AS THE DEVICE COMES DUE.

* THIS ITEM/INFORMATION MAY BE OBTAINED FROM THE CITY OF BLACK DIAMOND PERMIT CENTER.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**2 1/2" TO 10" REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY WITH DETECTOR FOR FIRE SPRINKLER SYSTEM**	STANDARD DETAIL NO. **W-10**

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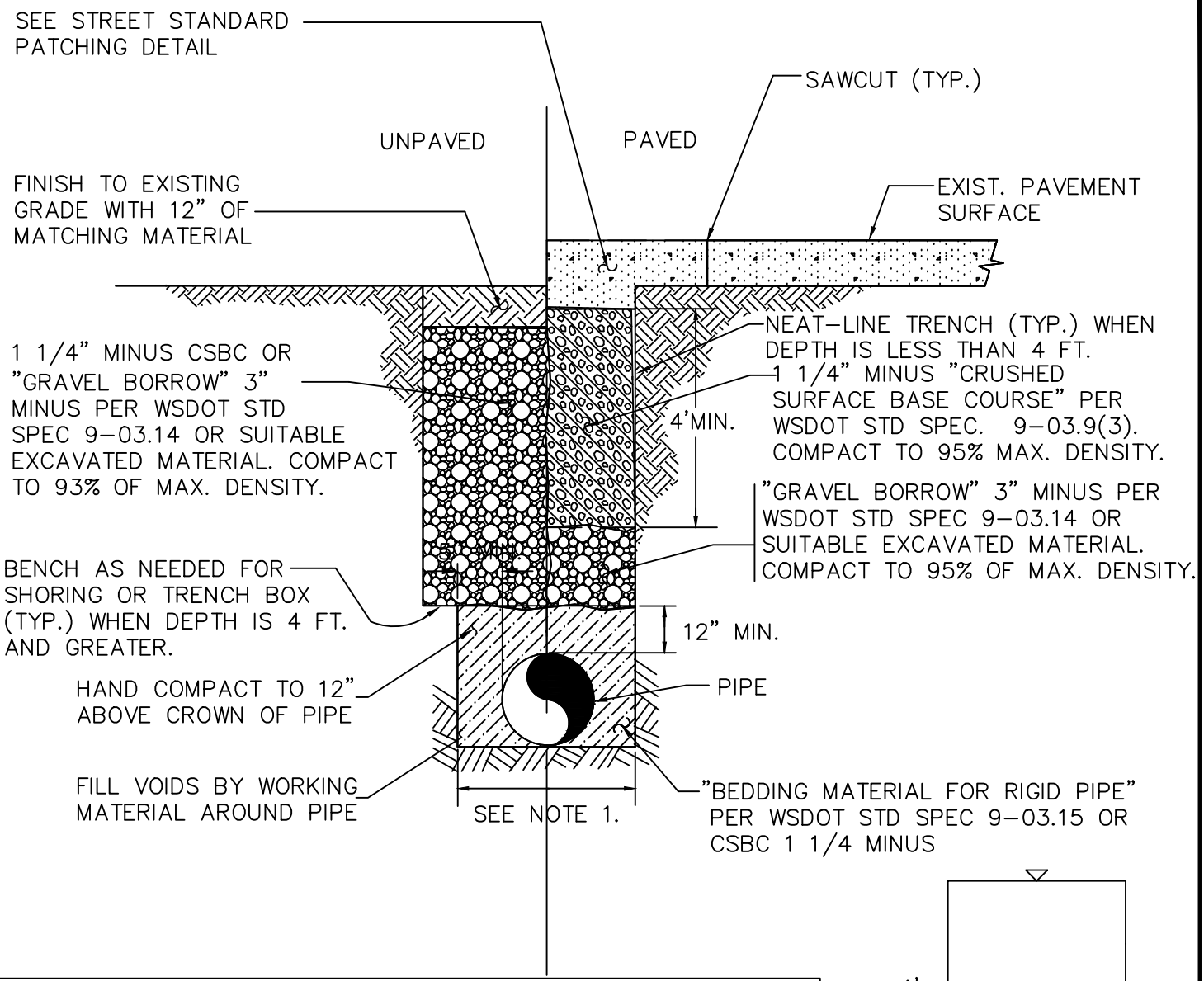
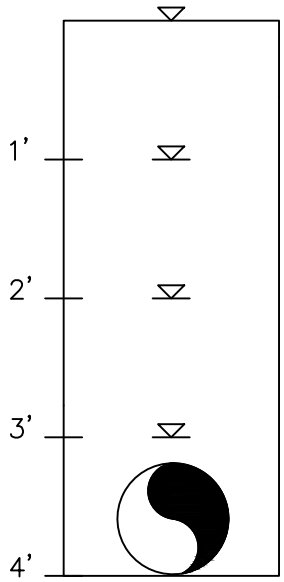


NOTES:

1. MAXIMUM WIDTH OF TRENCH AT TOP OF PIPE
   * 30" FOR PIPE UP TO AND INCLUDING 12" NOMINAL DIAMETER.
   * O.D. PLUS 16" FOR PIPE LARGER THAN 12" NOMINAL DIAMETER.
2. MAXIMUM TRENCH DEPTH SHALL BE 42". MINIMUM COVER OF 36".
3. CDF MAY BE REQUIRED FOR CROSSING EXISTING STREETS.
4. CDF SHALL BE CADMAN PRO FLOW 5 HR. 110021, OR EQUIVALENT.
5. COMPACTION TESTING AND PROCTOR REQUIRED. ONE TEST PER LIFT PER 100' OF TRENCH. MINIMUM OF TWO TESTS PER LIFT.
6. RAISE WATER MAIN TO AVOID UTILITY CONFLICTS.



COMPACTION TESTING CROSS SECTION

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**TYPICAL WATER PIPE TRENCH DETAIL**	STANDARD DETAIL NO. **W-11**

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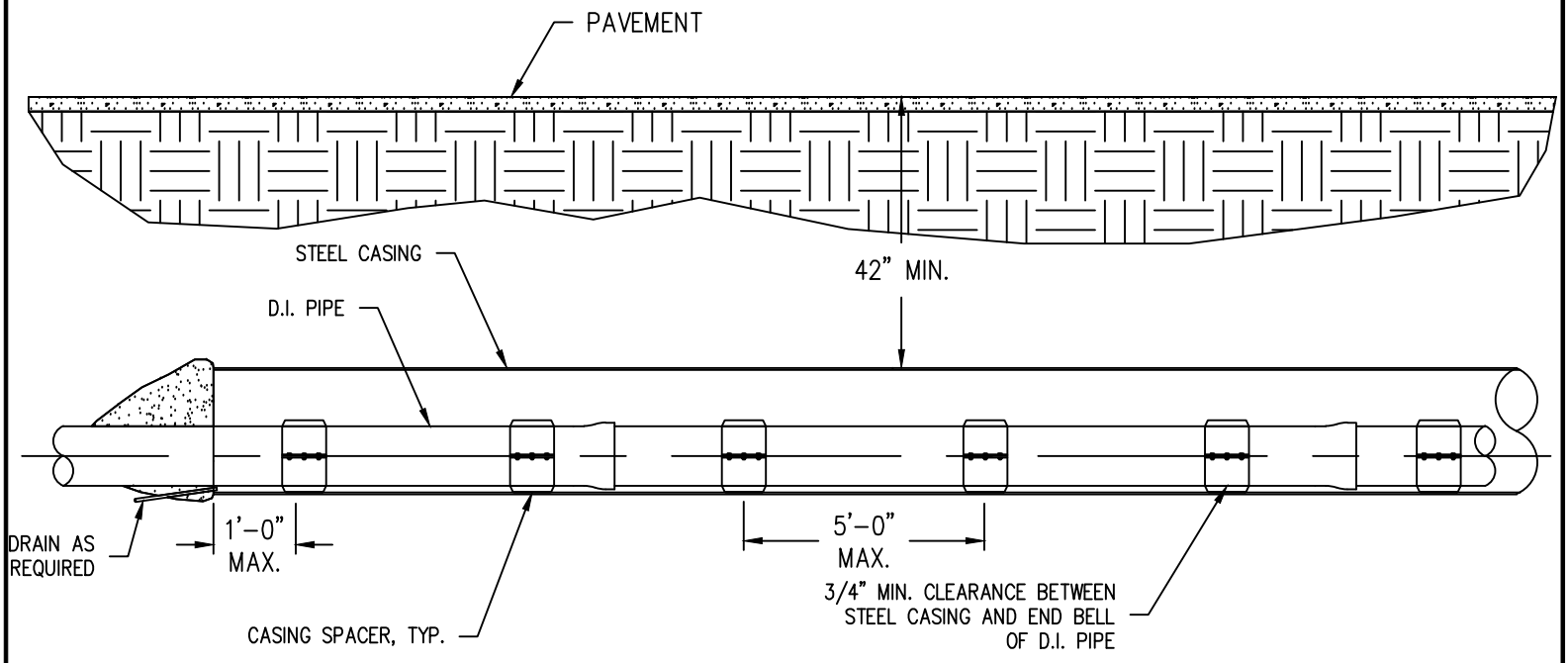
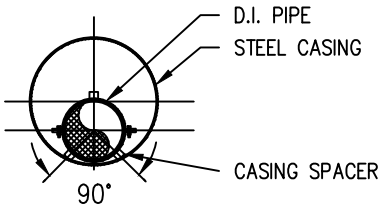


PROFILE



SECTION

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**PIPE CASING**	STANDARD DETAIL NO. **W-12**

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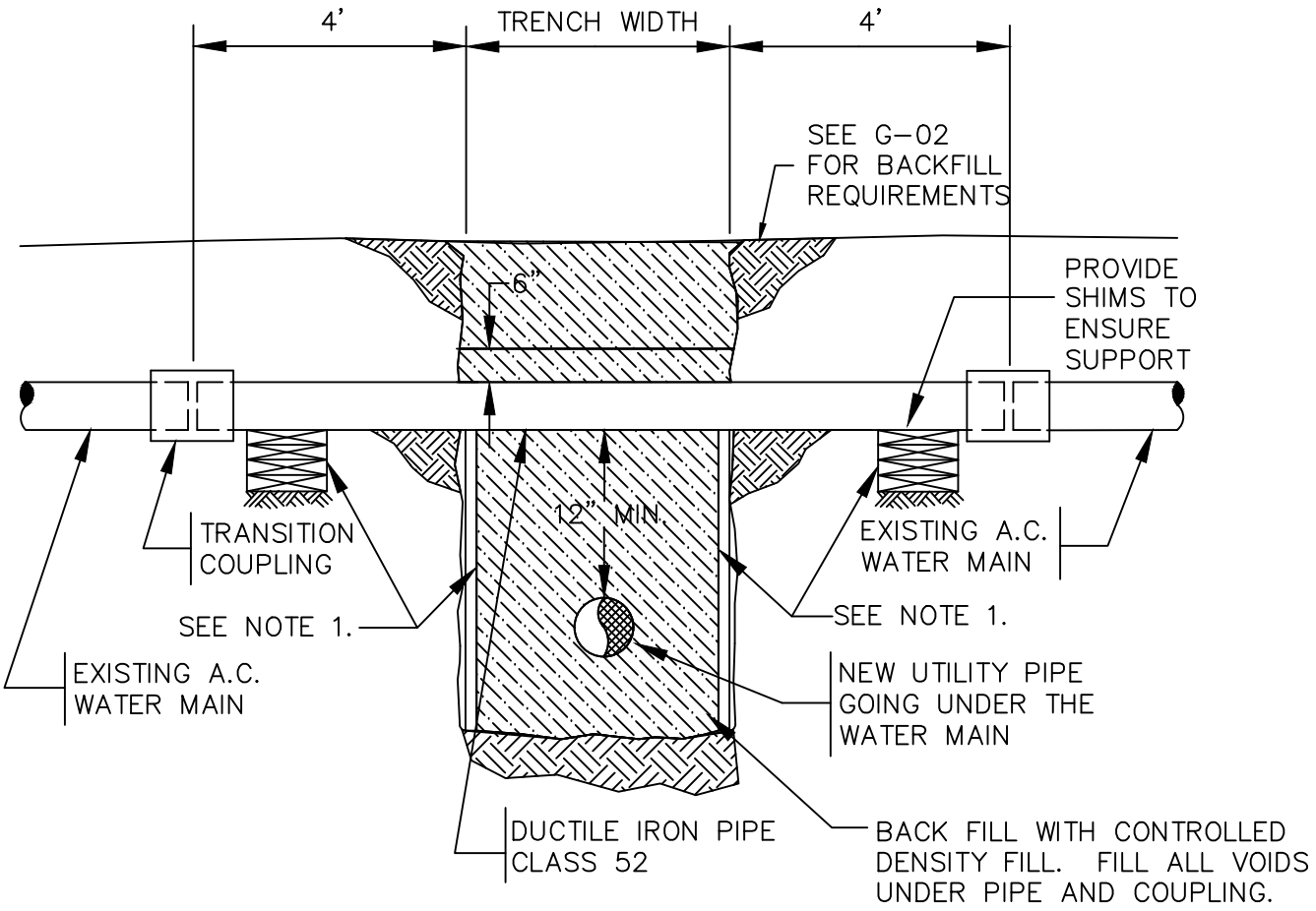

NOTES:

1. D.I. PIPE SHALL REST ON FIRM BEARING EARTH: SHORE TRENCH WALL UNDER WATER MAIN AS SHOWN. SUPPORT PIPE WITH PATIO BLOCKS (8"x16"X 2"). STACK BLOCKS AS REQUIRED TO REST ON FIRM BEARING SOIL.
2. WRAP DUCTILE IRON PIPE AND TRANSITION COUPLINGS WITH 8 MIL POLYETHYLENE CONFORMING TO AWWA C-105 AS REQUIRED BY PUBLIC WORKS.
3. THE CONTRACTOR IS REQUIRED TO FOLLOW ALL REQUIREMENTS FOR ASBESTOS WATER MAIN WORK PRESCRIBED IN WAC 296-62.
4. ALL A.C. PIPE AND CONTAMINATED MATERIALS AND CLOTHING SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH STATE REGULATIONS.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**TYPICAL A.C. WATER MAIN CROSSING REPLACEMENT DETAIL**	STANDARD DETAIL NO. **W-13**

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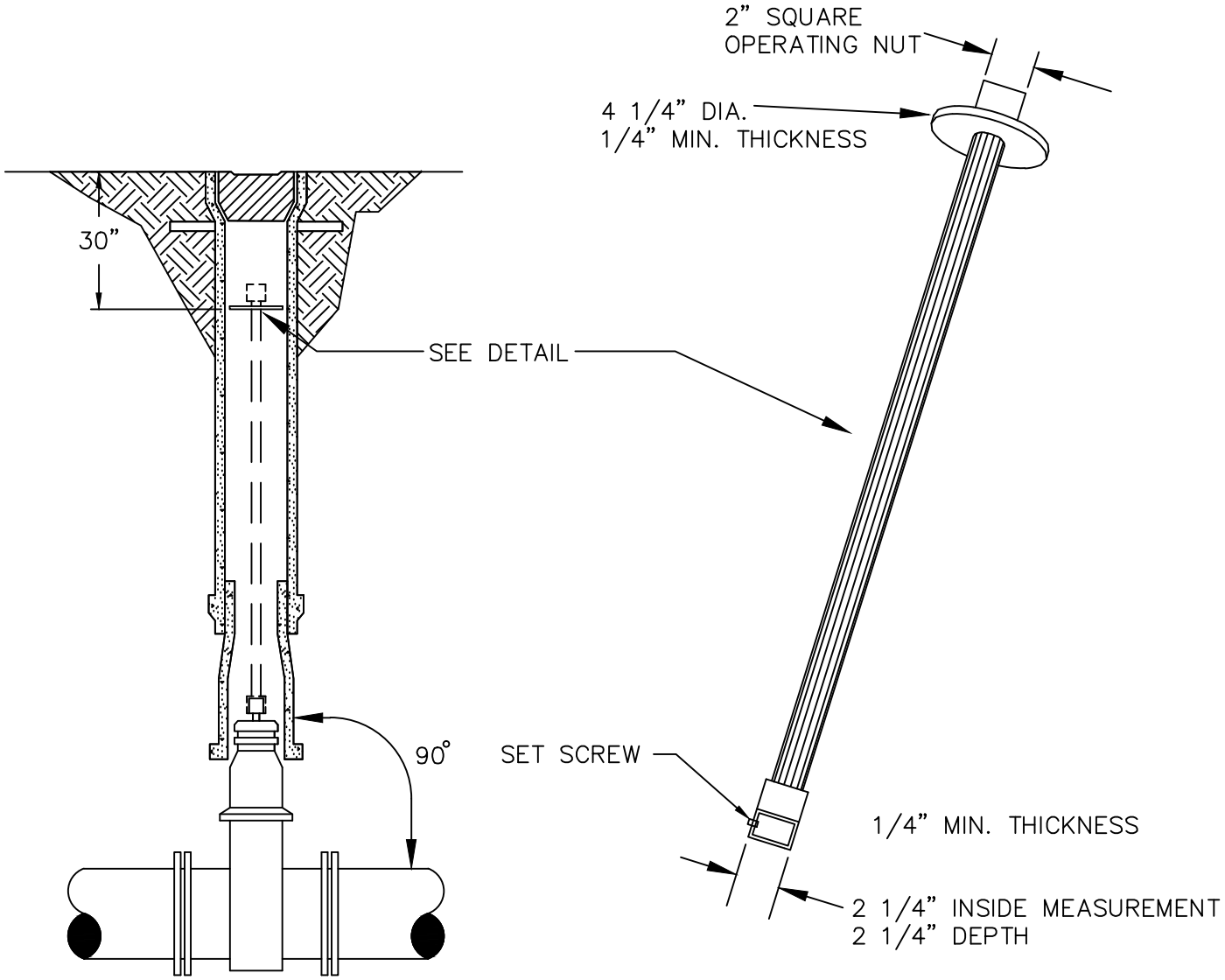

VALVE OPERATING NUT EXTENSION

EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN FOUR (4) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF TWO (2) FEET LONG. ONLY ONE EXTENSION TO BE USED PER VALVE.

NOTES:
1. ALL EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND HOT DIPPED GALVANIZED.
2. EXTENSION SHALL TURN FREELY WITHOUT BINDING.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**VALVE OPERATING EXTENSION**	STANDARD DETAIL NO. **W-14**

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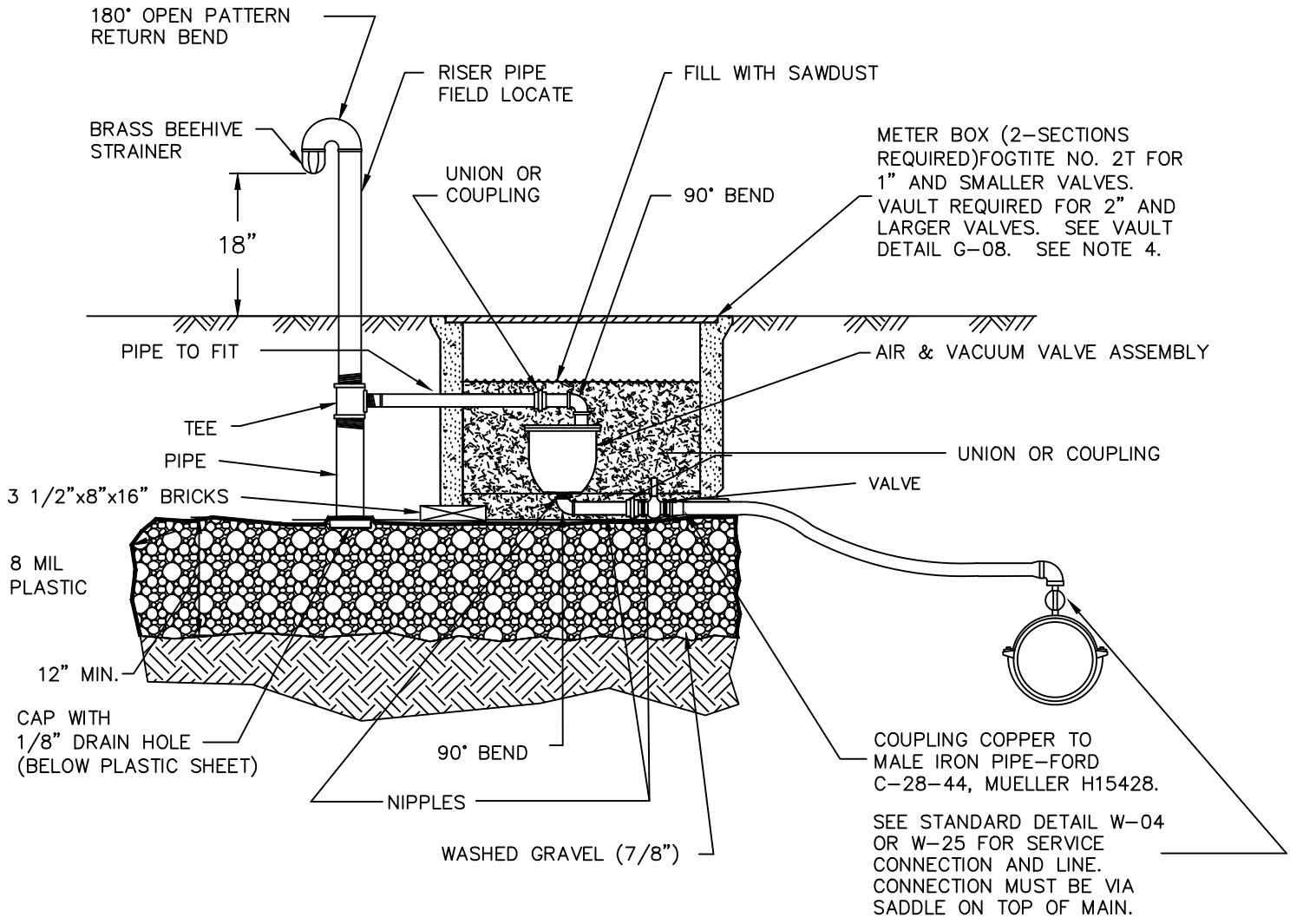

NOTES:

1. ALL PIPE AND FITTINGS TO BE BRASS, DUCTILE IRON OR COPPER. ALL JOINTS SHALL BE RESTRAINED.
2. PIPE ABOVE GRADE TO BE PAINTED WITH 2 COATS HAMMERITE HIGH GLOSS WHITE SMOOTH PAINT.
3. AIR & VACUUM RELEASE VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED.
4. LOCATE AIR & VACUUM METER BOX OUTSIDE OF TRAFFIC AREAS, BEHIND CURB OR SIDEWALK.
5. REQUIRED SIZE SHALL BE DESIGNED BY THE ENGINEER.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**AIR VACUUM RELEASE VALVE ASSEMBLY**	STANDARD DETAIL NO. **W-15**

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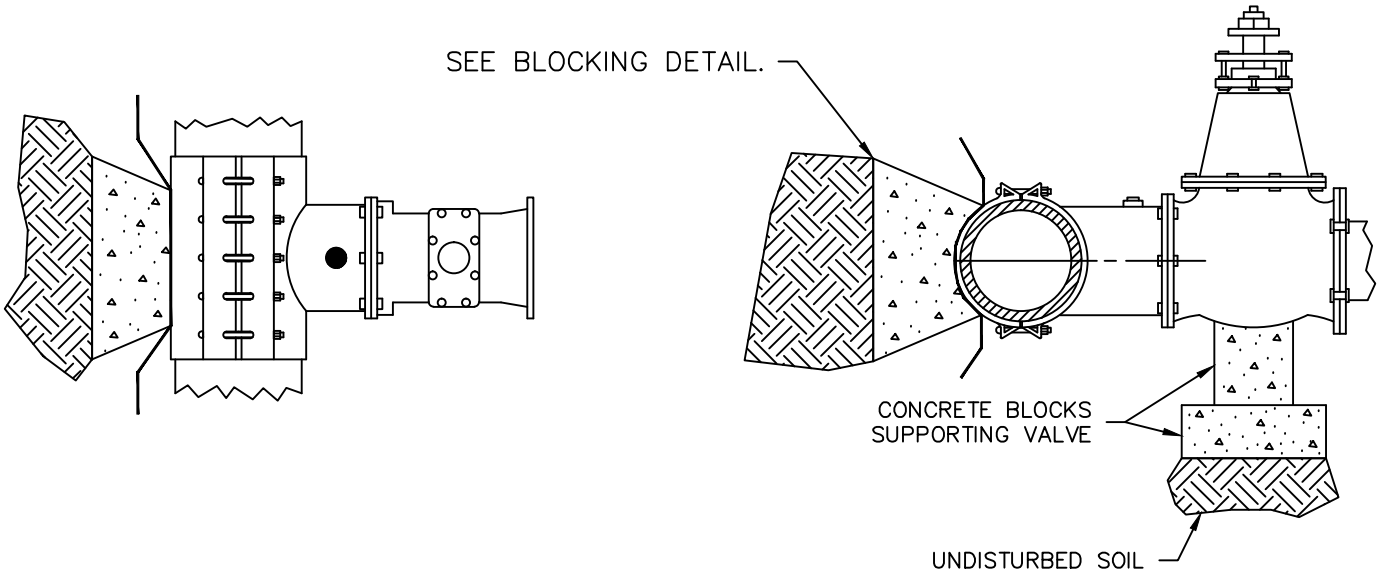

STAINLESS STEEL OR STEEL TAPPING TEE

STAINLESS STEEL TAPPING TEE

INSTALLED ON ASBESTOS CEMENT PIPE, CAST IRON PIPE AND DUCTILE IRON PIPE.

STEEL TAPPING TEE

INSTALLED ON DUCTILE IRON PIPE ONLY.

NOTES:

1. STAINLESS STEEL TAPPING TEES SHALL HAVE FULL CIRCLE SEAL. BOLTS AND NUTS SHALL BE STAINLESS STEEL.
2. STEEL TAPPING TEES SHALL BE EPOXY COATED, SEE APPROVED MATERIAL LIST. BOLTS AND NUTS SHALL BE COR–TEN, OR STAINLESS STEEL – SEE APPROVED MATERIAL LIST.
3. ALL TEES AND VALVES TO BE AIR TESTED BEFORE TAP AT 120 PSI FOR 5 MINUTES.
4. NO SIZE ON SIZE TAPS ON ASBESTOS OR CAST IRON. FULL SIZE TAPS ALLOWED ON DI ONLY.
5. VALVES SHALL BE FULL OPENING RESILIENT SEAT O–RING SEALED C 509, SEE APPROVED MATERIAL LIST.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**TAPPING TEES**	STANDARD DETAIL NO. **W-16**

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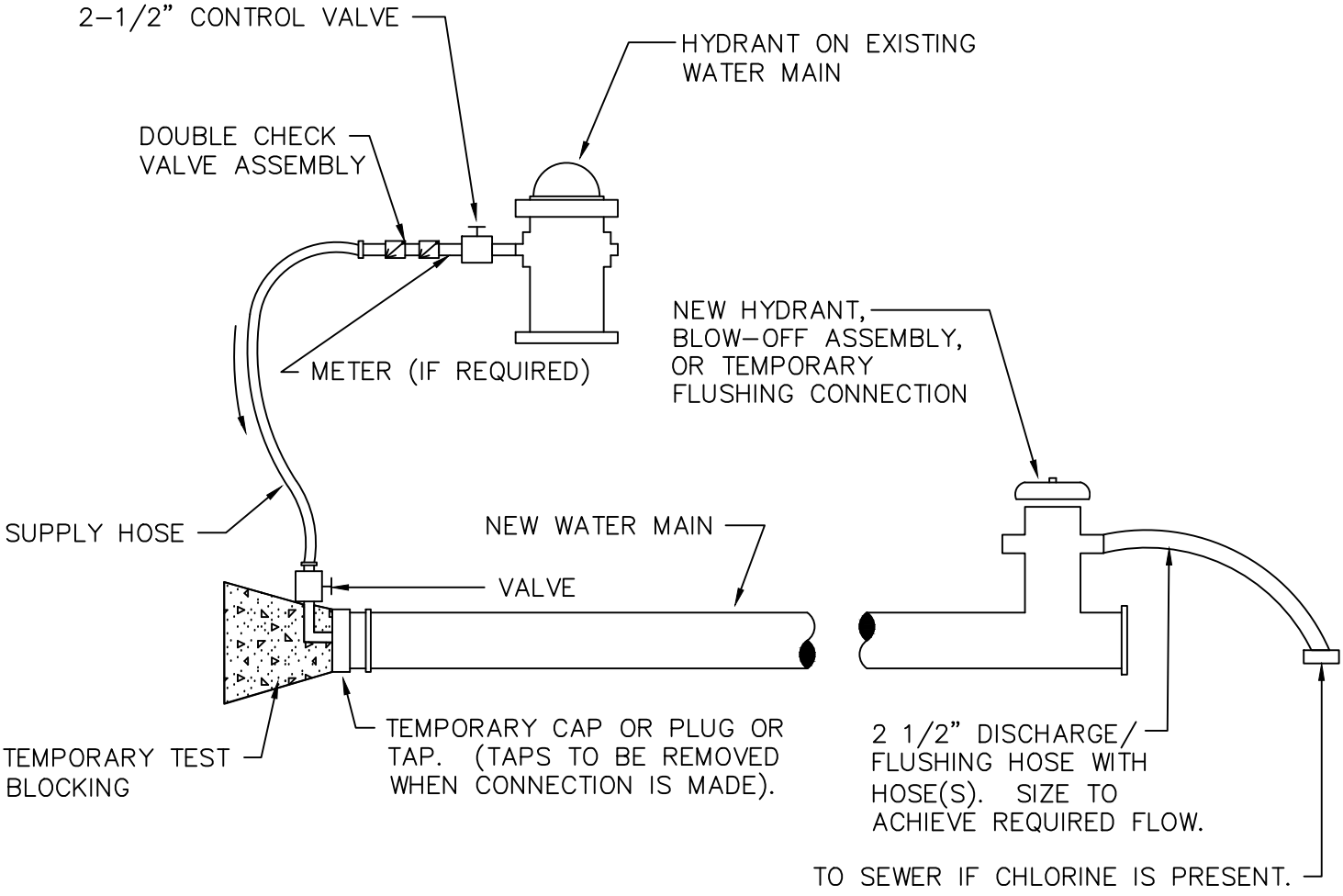

NOTES:

1. AN APPROVED BACK FLOW PREVENTION ASSEMBLY SHALL BE INSTALLED BETWEEN THE EXISTING AND NEW WATER LINES DURING DISINFECTION AND FLUSHING OF NEW WATERMAIN. (OBTAINED FROM ISSAQUAH PUBLIC WORKS).
2. THE BACK FLOW PREVENTION ASSEMBLY AND SUPPLY HOSE MUST BE DISCONNECTED DURING HYDROSTATIC PRESSURE TESTING OF THE NEW MAIN.
3. THE NEW WATER MAIN SHALL BE CONNECTED TO THE EXISTING SYSTEM ONLY AFTER NEW MAIN IS FLUSHED, DISINFECTED AND SATISFACTORY BACTERIOLOGICAL SAMPLE RESULTS ARE OBTAINED.
4. THE INTERIORS OF ALL PIPES AND FITTINGS TO BE USED IN FINAL CONNECTION MUST BE CLEANED AND SWABBED OR SPRAYED WITH A 1% AVAILABLE CHLORINE SOLUTION.
5. AFTER CHLORINE IS FLUSHED AND MAIN CONNECTION IS MADE, THE NEW LINE SHALL BE FLUSHED AT A VELOCITY OF 5 FPS. DISCHARGE SHALL BE SCREENED TO COLLECT ROCKS. FLUSHING DURATION SHALL ENSURE AT LEAST 5 CHANGES OF WATER IN THE PIPE.
6. IF FLOW OR DISCHARGE LIMITATIONS PREVENT ACHIEVING 5 FPS THEN THE PIPE SHALL BE PIGGED.
7. PROVIDE DECHLORINATION DURING FLUSHING WHERE NECESSARY.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**FILLING AND FLUSHING NEW WATER MAINS**	STANDARD DETAIL NO. **W-17**

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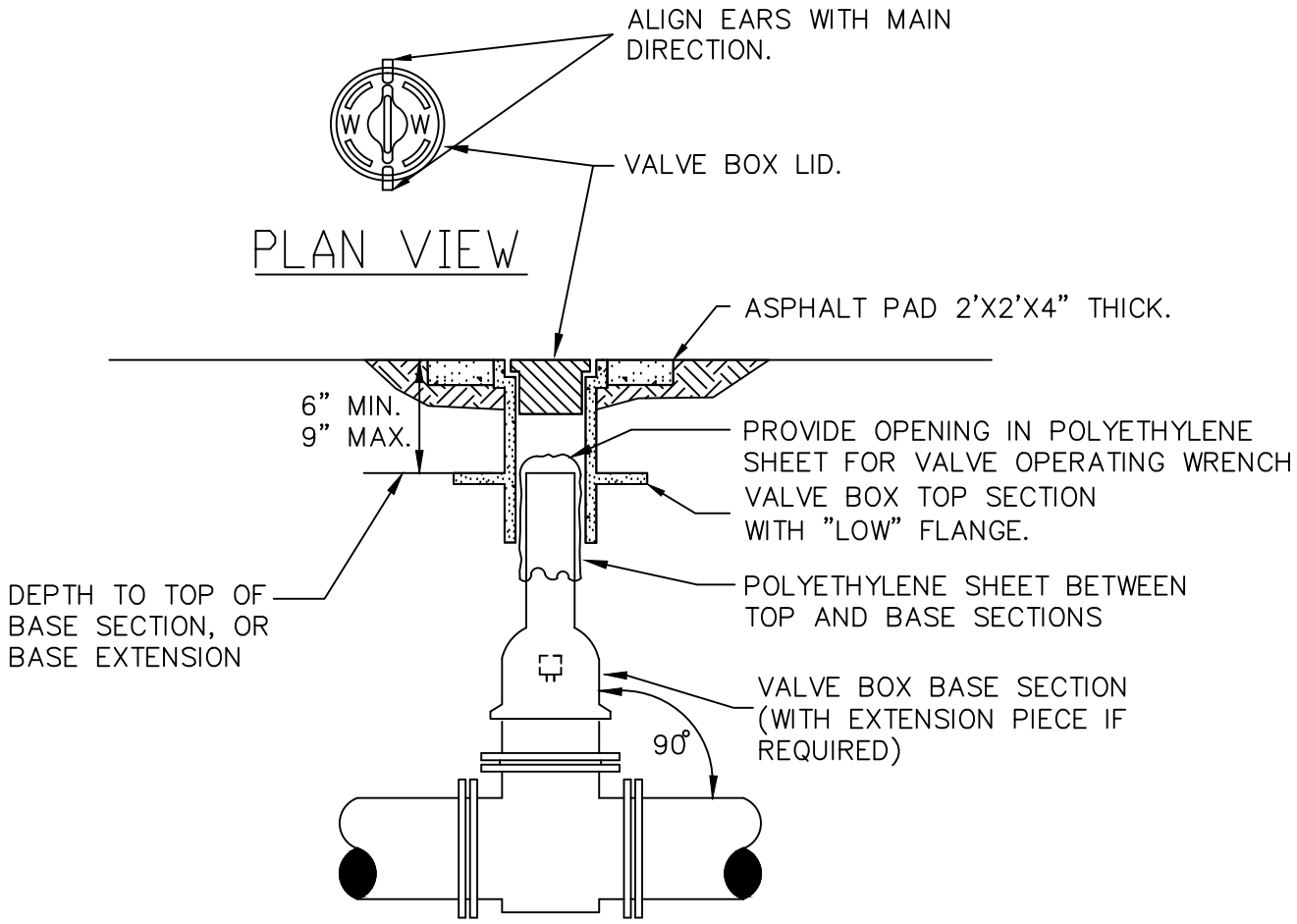

NOTES:
1. BOX SHALL BE PERPENDICULAR TO THE VALVE AND MAIN.
2. BOX SHALL BE CENTERED OVER VALVE NUT.
3. NO DEBRIS WILL BE ALLOWED AROUND THE VALVE NUT.
4. ALL PARTS SHALL BE CAST OR DUCTILE IRON AND COATED WITH ASPHALT VARNISH.
5. VALVE BOX SHALL BE RICH (VANRICH CASTING CORP.):
   TOP SECTION AND LID RICH #940 SEATTLE TYPE WITH LUGS (LID #0040).
   WITH RICH DEEP WELL BASE AND 12" TOP SECTION, SEE APPROVED MATERIALS

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**VALVE BOX INSTALLATION**	STANDARD DETAIL NO. **W-18**

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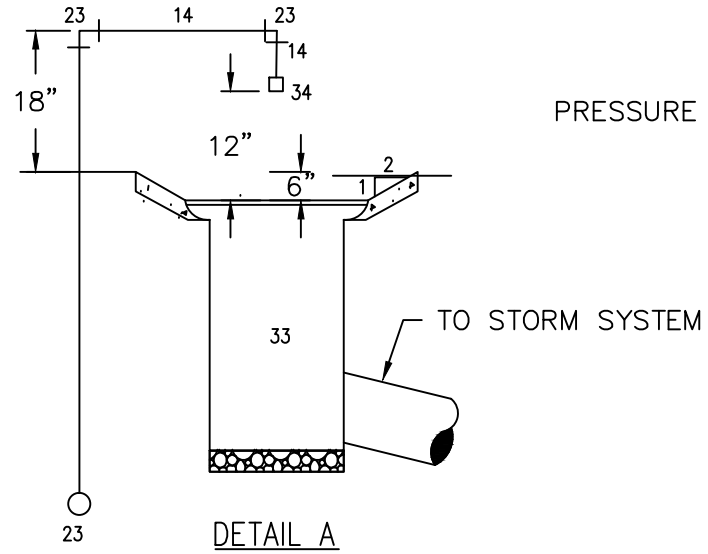
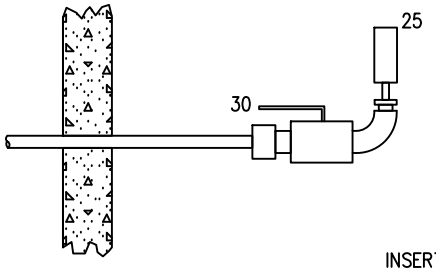
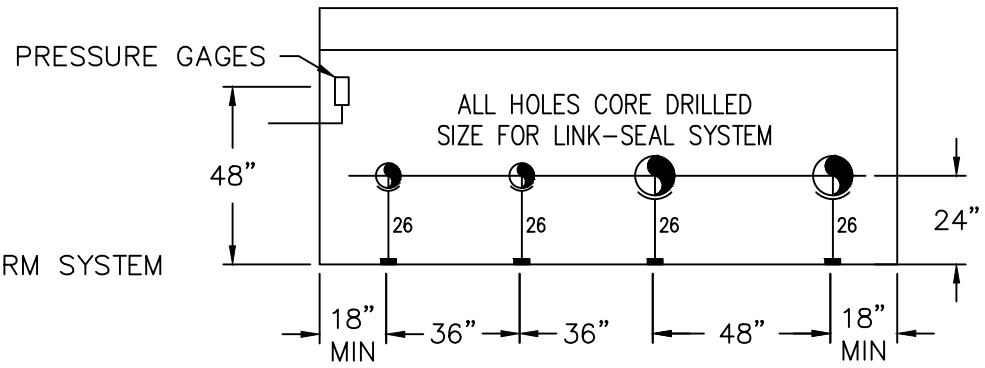


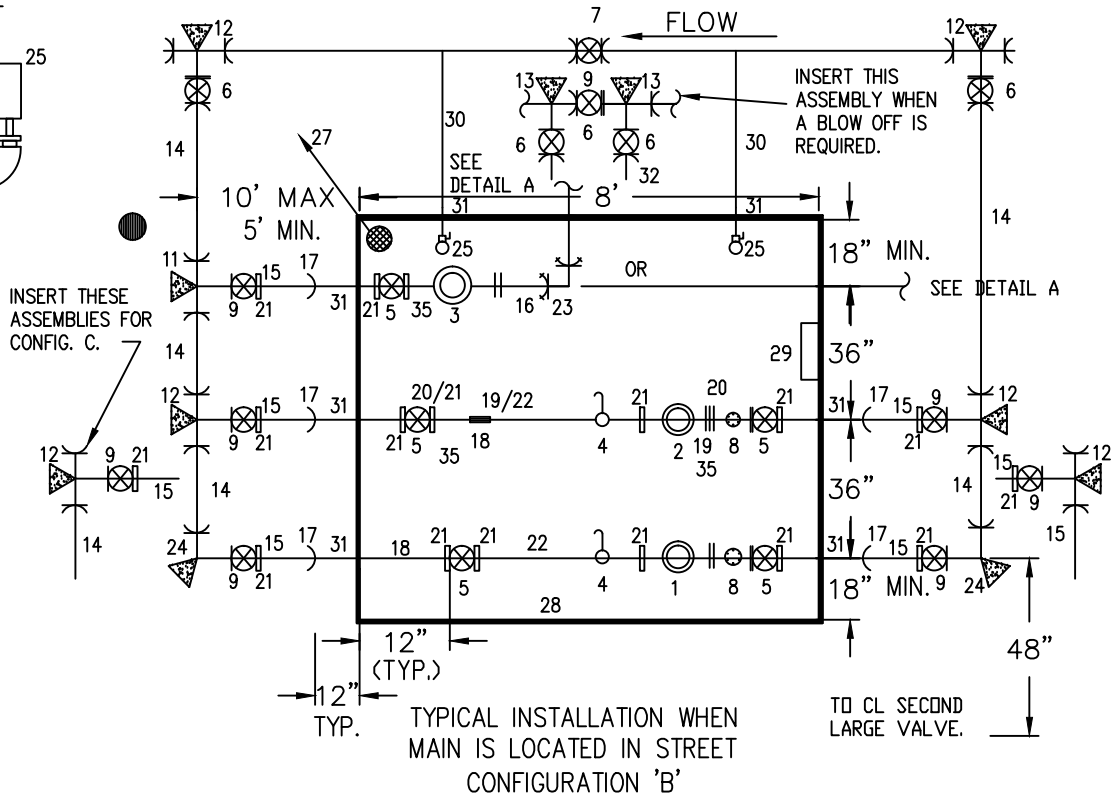
DETAIL A
PRESSURE RELIEF AND
BLOW-OFF DETAIL



DETAIL B
PRESSURE GAGE DETAIL



PROFILE DIMENSION DETAIL
CONFIGURATION 'C'



TYPICAL INSTALLATION WHEN
MAIN IS LOCATED IN STREET
CONFIGURATION 'B'

CONFIGURATION	DESCRIPTION	USE	VAULT SIZING FOR LARGE VALVES UP TO 8"
A	ONE LARGE VALVE AND ONE SMALL VALVE. INCLUDES TWO BLOW-OFF ASSEMBLIES.	1.) NORMALLY CLOSED CONNECTION BETWEEN A RESV OR PRV ZONE AND A RESV ZONE. 2.) SECONDARY PRV STATION.	8' X 6'
B	ONE LARGE VALVE, ONE SMALL VALVE AND ONE PRESSURE RELIEF VALVE.	1.) STANDARD CONFIGURATION OF A PRIMARY STATION.	8' X 10'
C	TWO LARGE VALVES, ONE SMALL VALVE AND ONE PRESSURE RELIEF VALVE.	1.) PARALLEL STATION. REQUIRED WHEN PRV STATION IS SOLE SUPPLY FOR ZONE.	8' X 14'
D	ONE LARGE VALVE, ONE SMALL VALVE, ONE PRESSURE RELIEF VALVE AND TWO BLOW-OFF ASSEMBLIES	1.) NORMALLY CLOSED CONNECTION BETWEEN A RESV OR PRV ZONE AND A PRV ZONE W/O A PRESSURE RELIEF ON THE PRIMARY STATION.	8' X 10'

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**STANDARD PRESSURE REDUCING STATION**	STANDARD DETAIL NO. **W-19A**

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ITEM#	DESCRIPTION	QUANTITIES			
		STANDARD		PARALLEL	
		≤ 2"	≥3"	≤ 2"	≥3"
1	LARGE PRESSURE REDUCING VALVE; CLA-VAL MODEL 92G-01 BCSKC W/BRONZE TRIM, X101 AND PRESSURE SUSTAINING CONTROLS.	1	1	2	2
2	SMALL PRESSURE REDUCING VALVE; CLA-VAL MODEL 90G-01 ABSKC W/SS TRIM, X101. THREADED ON 2" AND SMALLER. FLANGED ON 3" AND LARGER.	1	1	1	1
3	PRESSURE RELIEF VALVE; CLA-VAL MODEL 50A-01 BKC W/BRONZE TRIM. SIZE FOR 30% PRESSURE GAIN.	1	1	1	1
4	AIR RELEASE VALVE - APCO MODEL 50-28 - 3/32 - 175 PSI.	2	2	3	3
5	VALVE - FLANGE X FLANGE; C509 W/HAND WHEEL OPERATORS, 4" MINIMUM	5	5	7	7
6	VALVE - FLANGE X MJ; C509 W/2" OPERATING NUT. 4 REQUIRED W/ BLOW OFF.	2 (4)	2 (4)	2 (4)	2(4)
7	VALVE - MJ X MJ ; C509 W/2" OPERATING NUT. NONE REQUIRED W/ BLOW OFF.	1 (0)	1 (0)	1 (0)	1 (0)
8	STRAINER-BASKET STRAINER.	2	2	3	3
9	VALVE - FLANGE X FLANGE; C509 W/2" OPERATING NUT	5 (6)	5 (6)	7 (8)	7 (8)
10	LEFT BLANK.				
11	TEE MJ X FLANGE, SIZE X 4" MIN.	1	1	1	1
12	TEE MJ X FLANGE.	4	4	6	6
13	TEE MJ X FLANGE X FLANGE, SIZE X 4" - ONLY REQUIRED WITH BLOW OFF.	0 (2)	0 (2)	0 (2)	0 (2)
14	SPOOL PE X PE	5 (7)	5 (7)	7 (9)	7 (9)
15	SPOOL - VICTAULIC GROOVE X TR FLEX BEAD, CUT TO FIT.	3	3	5	5
16	SPOOL - FLANGE X PE.	1	1	1	1
17	TR FLEX JOINT - RESTRAINED	3	3	5	5
18	BRASS UNION - 2" AND SMALLER ONLY	1	0	1	0
19	BRASS PIPE - THREADED 2" AND SMALLER, CUT TO FIT.	3	0	3	0
20	BLIND FLANGE X SIZE TAP.	2	0	2	0
21	COUPLING - VICTAULIC #341, 4" AND LARGER.	0	12	0	18
22	DUCTILE IRON PIPE CL 53, GROOVED FOR VICTAULIC #341 BOTH ENDS.	0	2	0	3
23	90 MJ X MJ WITH APPROVED JOINT RESTRAINT SYSTEM.	4	4	4	4
24	90 FLANGE X MJ WITH APPROVED JOINT RESTRAINT SYSTEM.	2	2	2	2
25	GAGES - LIQUID FILLED 4 1/2" SPAN INSTRUMENTS, MODEL #LFS-410 0-200PSI - MOUNT VERTICALLY AT 48".	2	2	2	2
26	PIPE STANCHION - BOLTED TO FLOOR - GRINNEL #264, NUMBER AND PLACEMENT MAY VARY. PLACE AS DIRECTED.	1	1	2	2
27	4" DUCTILE IRON DRAIN. TO DAYLIGHT OR STORM DRAIN.	1	1	1	1
28	VAULT - SIZED TO MAINTAIN SPECIFIED CLEARANCES - SEE SIZING MATRIX. SEE STANDARD DETAIL G-08.	1	1	1	1
29	LADDER - PLACE AS DIRECTED. SEE STANDARD DETAIL G-08.	1	1	1	1
30	3/4" TYPE K COPPER LINE WITH 3/4" COMPRESSION BY MIP FITTING, 3/4" BRASS BALL VALVE, 3/4" BRASS STREET ELL, 3/4" X 1/4" BUSHING, SEE DETAIL B. SEE STANDARD DETAIL W-25A FOR CONNECTION TO MAIN.	2	2	2	2
31	SEAL PENETRATION SEALING SYSTEM - SEE APPROVED MATERIAL LIST.	8	8	10	10
32	BLOW OFF ASSEMBLY - STD DETAIL W-07.	0 (2)	0 (2)	0 (2)	0 (2)
33	18" CONCRETE PIPE CATCH BASIN W/BELL UP AND BOTTOM POURED WITH CONCRETE. OLYMPIC FOUNDRY GRATE #G20. DISCHARGE PIPE SHALL BE 12".	1	1	1	1
34	DIFFUSER.	1	1	1	1
35	3" X 4" REDUCER AS REQUIRED.				
NOTE:	1. ALL JOINTS SHALL BE RESTRAINED WITH APPROVED JOINT RESTRAINT SYSTEM. SEE APPROVED MATERIAL LIST. 2. VAULT SHALL ALWAYS BE LOCATED OUT OF TRAFFIC. IN SHOULDER, TYPICALLY BEHIND SIDEWALK. 3. QUANTITIES IN () INDICATE FOR BLOW OFF ASSEMBLY ONLY. 4. ALL PIPING AND FITTINGS SHALL BE COATED WITH 2 COATS OF TNEMEC MEDIUM BLUE EPOXY. 5. CONTRACTOR TO VERIFY ALL QUANTITIES. QUANTITIES PROVIDED AS A GUIDELINE ONLY.				

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**STANDARD PRESSURE REDUCING STATION NOTES**

STANDARD DETAIL NO. **W-19B**

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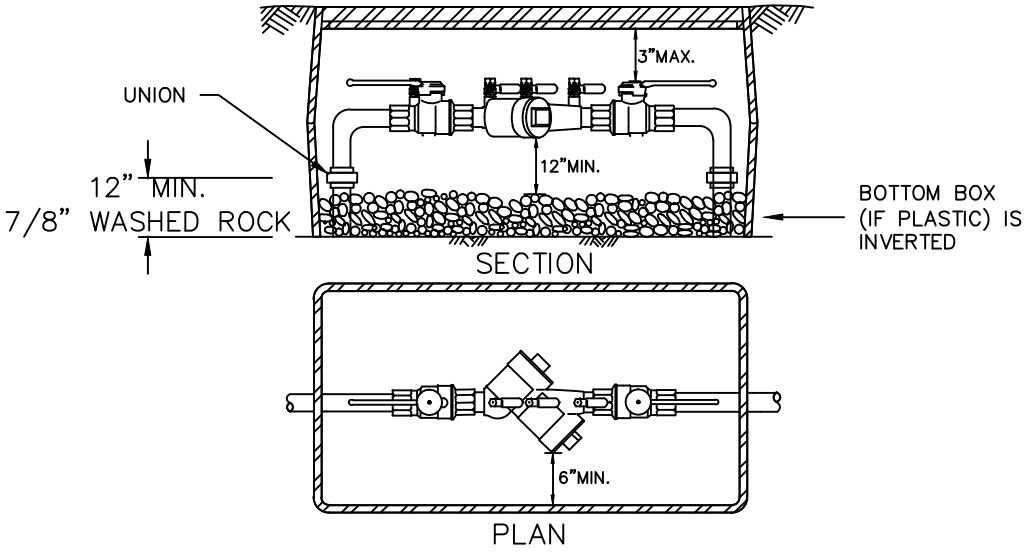
DRAWING APPLIES TO OUTSIDE UNDERGROUND ONLY



INSTALLATION PROCEDURES AND SPECIFICATIONS FOR DOUBLE CHECK VALVE ASSEMBLIES 2" AND SMALLER

THE DOUBLE CHECK VALVE ASSEMBLY (DCVA) CONSISTS OF TWO INTERNALLY LOADED CHECK VALVES, EITHER SPRING LOADED OR INTERNALLY WEIGHTED, TWO RESILIENT SEATED SHUTOFF VALVES, AND FOUR PROPERLY LOCATED RESILIENT SEATED TEST COCKS. THIS ASSEMBLY IS EFFECTIVE AGAINST BACKFLOW CAUSED BY BACKPRESSURE AND BACKSIPHONAGE, AND IS USED TO PROTECT THE WATER SYSTEM FROM OBJECTIONABLE SUBSTANCES, WHICH MAY CONSTITUTE A LOW HAZARD. THIS ASSEMBLY SHALL BE IN INSTALLED AS A UNIT AS FURNISHED BY THE MANUFACTURER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, MANUFACTURER'S SPECIFICATIONS, AND THE GUIDELINES LISTED BELOW.

1. OBTAIN PLUMBING PERMIT FROM THE PERMIT CENTER.
2. THE DCVA MUST BE A WASHINGTON STATE APPROVED DEVICE.*
3. PROVIDE ADEQUATE CLEARANCE FOR TESTING AND REPAIRS:
   A. THERE MUST BE AT LEAST 12" CLEARANCE FROM BOTTOM OF DEVICE TO GROUND, BUT NOT MORE THAN 60" IN HEIGHT.
   B. THERE MUST BE AT LEAST 6" CLEARANCE ON EITHER SIDE OF DEVICE.
   C. THERE MUST BE AT LEAST 12" CLEARANCE FROM END OF TEST COCKS TO WALL/STRUCTURE.
4. SIZE DCVA HYDRAULICALLY TO AVOID EXCESSIVE PRESSURE LOSS. (SEE MANUFACTURER'S SPECIFICATIONS).
5. INSTALL TWO UNIONS, ONE ON EITHER SIDE OF RESILIENT SEATED SHUTOFF VALVES.
6. INSTALL DCVA IN THE HORIZONTAL POSITION UNLESS PRIOR APPROVAL IS GAINED FROM BLACK DIAMOND PUBLIC WORKS OPERATIONS DEPARTMENT.
7. INSTALL PLUGS IN TEST COCKS.
8. THERE WILL BE NO DCVA INSTALLATIONS IN AREAS ACCESSIBLE TO VEHICLE TRAFFIC UNLESS PRIOR APPROVAL IS GAINED FROM BLACK DIAMOND PUBLIC WORKS OPERATIONS DEPARTMENT.
9. PROVED ADEQUATE FREEZE PROTECTION.
10. THE USE OF GALVANIZED WATER FITTINGS AND PIPING IS PROHIBITED. USE COPPER, BRASS OR PLASTIC FITTINGS AND/OR PIPING.
11. ONCE DEVICE IS INSTALLED:
    A. HAVE THE DEVICE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER OF YOUR CHOOSING.*
    B. HAVE THE DEVICE INSPECTED BY BLACK DIAMOND PUBLIC WORKS OPERATIONS DEPARTMENT.
12. THIS DEVICE WILL REQUIRE AN ANNUAL TEST TO ASSURE ITS PROPER FUNCTION IN PREVENTING WATER BACKFLOW. THE ANNUAL TEST IS TO BE PERFORMED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. THE CITY OF BLACK DIAMOND OPERATIONS DEPARTMENT, WATER QUALITY SECTION WILL SEND THE NECESSARY FORM(S) AS THE DEVICE COMES DUE.

DCVA'S INSTALLED BELOW GROUND LEVEL MUST ALSO COMPLY WITH THE FOLLOWING

13. PROVIDE ADEQUATE SIZED BOXES FOR TESTING AND REPAIRS:
    A. FOR 3/4" & 1" DEVICES, INSTALL TWO "JUMBO" SIZED IRRIGATION BOXES: (TOP = 12 3/4"X18 3/4"; BOTTOM = 24"X 18"X12" HIGH). LARGER BOXES MAY BE USED. INSTALL BOXES SUCH THAT THE BOTTOM BOX IS INVERTED (UPSIDE DOWN). IF DEVICE IS INSTALLED IN A CONCRETE OR PAVED AREA, THEY MUST BE REINFORCED CONCRETE BOXES OF SAME SIZE OR LARGER WITH INSPECTION LID.
    B. FOR 1 1/2" & 2" DEVICES, INSTALL TWO "FOG-TITE #2" REINFORCED CONCRETE BOXES WITH INSPECTION LID OR OTHER COMPARABLE CONCRETE BOX OF EQUAL OR GREATER SIZE.
14. INSTALL A MINIMUM OF 12" OF DRAIN ROCK (WASHED ROCK), 7/8" SIZE, BELOW DEVICE, STILL ALLOWING 12" CLEARANCE FROM DEVICE BOTTOM TO ROCK.
15. DRAIN TO DAYLIGHT ALSO IF STANDING WATER INSIDE BOXES IS EVIDENT.
16. TEST COCKS MUST FACE UPWARD AND WITHIN 6" FROM END OF TEST COCKS TO BOTTOM OF LID.
17. MAINTAIN ALL OTHER CLEARANCES AS STATED ABOVE.

* THIS ITEM/INFORMATION MAY BE OBTAINED FROM THE CITY OF BLACK DIAMOND PERMIT CENTER OR PUBLIC WORKS OPERATIONS DEPARTMENT, WATER QUALITY SECTION.

NOTES:

1. INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. ALL INSTALLATIONS MUST MEET MINIMUM STANDARDS OF THE UNIFORM PLUMBING CODE.
3. ASSEMBLY REQUIRES TESTING AND CERTIFICATION PRIOR TO USE, AND ANNUALLY THEREAFTER. FOR INFORMATION CONTACT WATER QUALITY SECTION.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**1/2" TO 2" DOUBLE CHECK VALVE ASSEMBLY(OUTSIDE INSTALLATION)**	STANDARD DETAIL NO. **W-20**

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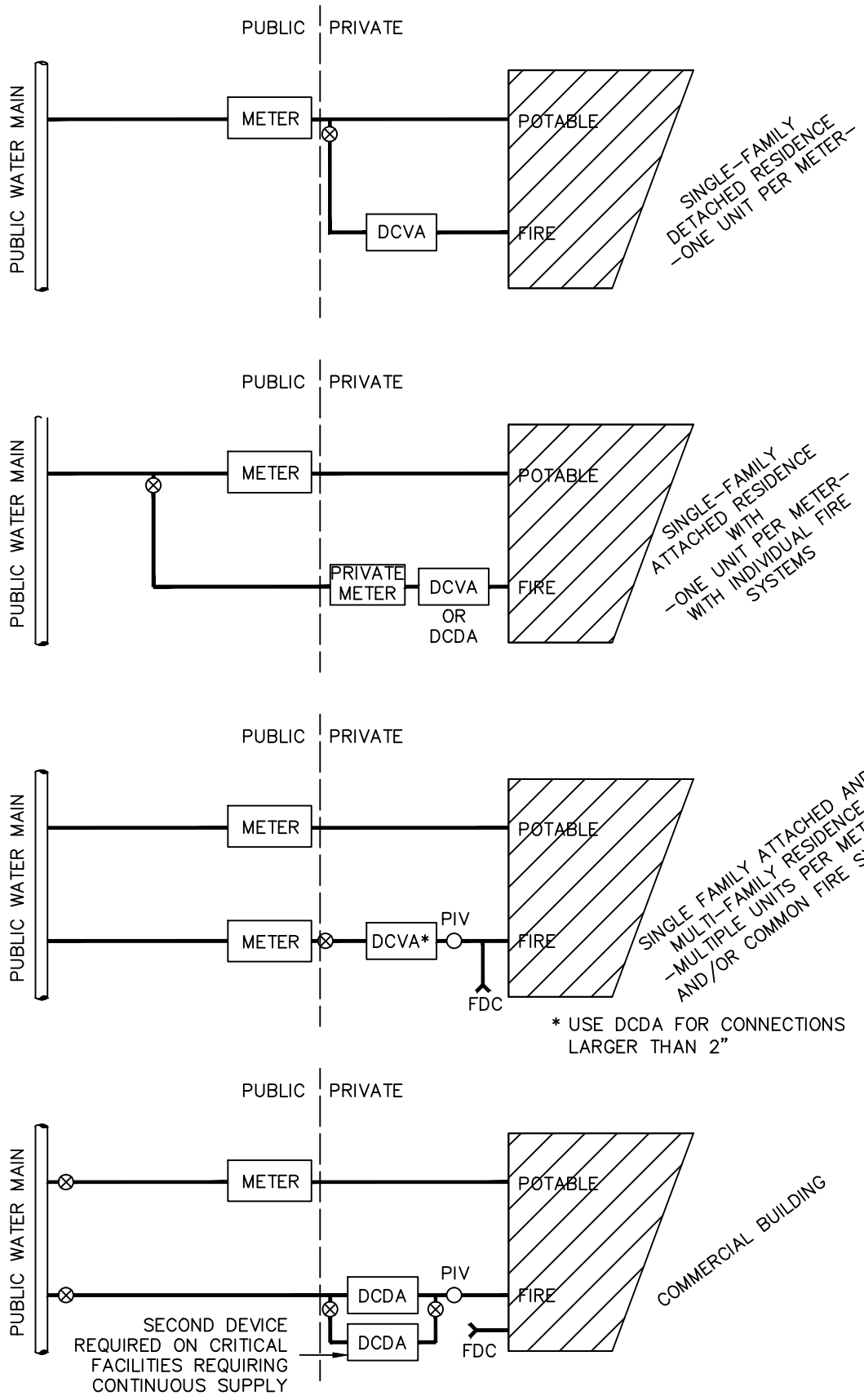

REVISION: OCT 22, 2010

ALLOWABLE CONNECTION OPTIONS

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**WATER SERVICE SCHEMATIC FOR DOMESTIC SERVICE AND FIRE PROTECTION SYSTEM**	STANDARD DETAIL NO. **W-21**

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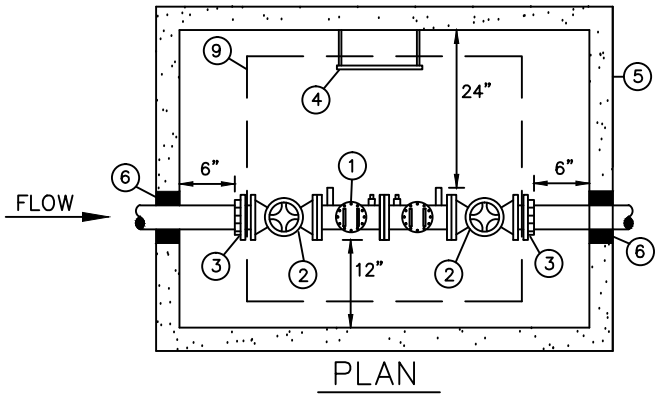

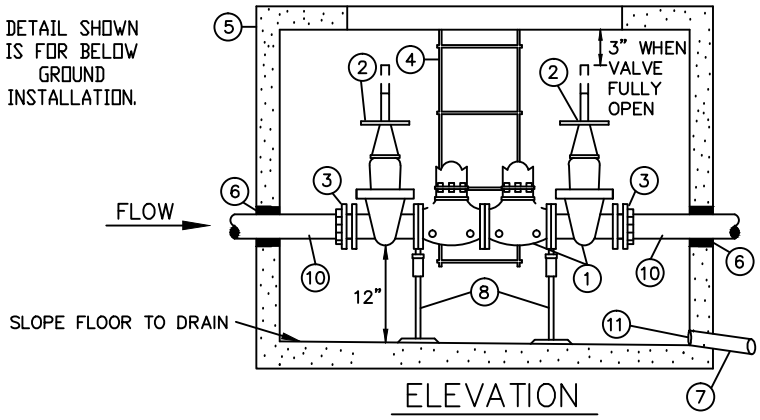

1. STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED O.S.&Y. VALVES AND (4) RESILIENT SEATED TEST COCKS.*
2. EACH VALVE SHALL BE MARKED WITH MODEL NUMBER WITH DESIGNATION OF RESILIENT SEAT: SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED WITH A MINIMUM OF 4MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
3. UNI-FLANGED WITH SETSCREWS.
4. ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
5. CONCRETE VAULT WITH A MINIMUM OF 2, 3'X3' DIAMOND PLATE DOORS RATED FOR H20 LOADING, MARKED "WATER". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
6. WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE WITH WELDED FLANGE OR ANCHOR BLOCKS.
7. DRAIN, SLOPE TO DAYLIGHT, 4" MINIMUM DIAMETER.
8. TWO ADJUSTABLE PIPE STANCHIONS, BOLTED TO FLOOR.
9. ACCESS TO BE CENTERED OVER ASSEMBLY.
10. CL 52, D.I., M.J. WITH RETAINER GLANDS.
11. INSTALL WIRE MESH RODENT SCREEN OVER DRAIN OUTLET.

SIZE	MIN. VAULT SIZE (INSIDE) W	L	H	UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
2 1/2", 3"	3'-8"	4'-8"	3'-3"	644-LA	64-2-332P
4"	3'-10"	5'-3"	3'-8"	575-LA	57TL-2-332P
6"	4'-0"	6'-6"	4'-5"	577-LA	57TL-20332P
8"	4'-5"	7'-8"	5'-3"	4484-LA	4484-TL2-332P
10"	4'-8"	8'-8"	6'-1"	5106-LA	5106-TL3-332

NOTES:

1. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION REQUIRED.
2. WATERLINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY THE CITY OF BLACK DIAMOND WATER QUALITY INSPECTOR
3. VALVE ASSEMBLY TO BE CENTERED IN VALUT.
4. TEE AND GATE VALVE REQUIRED ON MAIN.
5. ALL CLEARANCES SHOWN ARE MINIMUM.
6. VAULTS SHALL NOT BE INSTALLED IN AREAS WITH VEHICULAR TRAFFIC.
7. 2 1/2" THROUGH 6" ASSEMBLIES SHALL CONNECT TO WATER MAIN WITH 8" PIPE.
8. (SEE # 9).
9. (SEE # 10 A.).
10. THIS DEVICE/SPECIFICATION IS NOT INTENDED TO BE USED FOR A FIRE SUPPRESSION SYSTEM.

INSTALLATION PROCEDURES AND SPECIFICATIONS FOR DOUBLE CHECK VALVE ASSEMBLIES 2 1/2" AND LARGER

THE DOUBLE CHECK VALVE ASSEMBLY (DCVA) CONSISTS OF TWO INTERNALLY LOADED CHECK VALVES, EITHER SPRING LOADED OR INTERNALLY WEIGHTED, TWO RESILIENT SEATED GATE VALVES, AND FOUR PROPERLY LOCATED RESILIENT SEATED TEST COCKS. THIS ASSEMBLY IS EFFECTIVE AGAINST BACKFLOW CAUSED BY BACKPRESSURE AND BACKSIPHONAGE, AND IS USED TO PROTECT THE WATER SYSTEM FROM OBJECTIONABLE SUBSTANCES WHICH MAY CONSTITUTE A LOW HAZARD. THIS ASSEMBLY SHALL BE INSTALLED AS A UNIT AS FURNISHED BY THE MANUFACTURER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, MANUFACTURER'S SPECIFICATIONS, AND THE GUIDELINES LISTED BELOW.

1. OBTAIN PLUMBING PERMIT FROM PERMIT CENTER.
2. THE DCVA SHALL BE NO HIGHER THAN 60" FROM FLOOR OR GROUND TO HIGHEST POINT OF DEVICE.
3. SIZE DCVA HYDRAULICALLY TO AVOID EXCESSIVE PRESSURE LOSS. (SEE MANUFACTURER'S SPECIFICATION).
4. INSTALL DCVA IN THE HORIZONTAL POSITION.
5. INSTALL PLUGS IN TEST COCKS.
6. IF INSTALLED OUTDOORS AND ABOVE GROUND, ADEQUATE FREEZE PROTECTION MUST BE PROVIDED.
7. STANCHIONS SHALL BE INSTALLED TO PREVENT FLANGE DAMAGE.
8. THERE WILL BE NO DCVA INSTALLATIONS IN AREAS ACCESSIBLE TO VEHICLE TRAFFIC UNLESS PRIOR APPROVAL IS GAINED FROM BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
9. THE USE OF GALVANIZED WATER FITTINGS AND PIPING IS PROHIBITED.
10. ONCE DEVICE IS INSTALLED:
    A. HAVE THE DEVICE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TESTER.*
    B. HAVE THE DEVICE INSPECTED BY BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
11. ALL OUTSIDE, UNDERGROUND DCVA INSTALLATIONS MUST ALSO COMPLY WITH VAULT SPECIFICATIONS.
12. ALL DCVA'S INSTALLED FOR FIRE PROTECTION MUST HAVE FACTORY INSTALLED BYPASS FEATURE (TYPICALLY 3/4") TO INCLUDE AN APPROVED DCVA AND METER. (SEE FIRE SYSTEM DOUBLE CHECK DETECTOR ASSEMBLY SPECIFICATIONS).
13. THIS DEVICE WILL REQUIRE AN ANNUAL TEST TO ASSURE IT'S PROPER FUNCTION IN PREVENTING WATER BACKFLOW. THE ANNUAL TEST IS TO BE PERFORMED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. THE CITY OF BLACK DIAMOND O&M DEPARTMENT, WATER QUALITY SECTION WILL SEND THE NECESSARY FORM(S) AS THE DEVICE COMES DUE.

* THIS ITEM/INFORMATION MAY BE OBTAINED FROM THE CITY OF BLACK DIAMOND PERMIT CENTER OR PUBLIC WORKS O&M DEPARTMENT, WATER QUALITY SECTION.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**2 1/2" TO 10" DOUBLE CHECK VALVE ASSEMBLY**	STANDARD DETAIL NO. **W-22**

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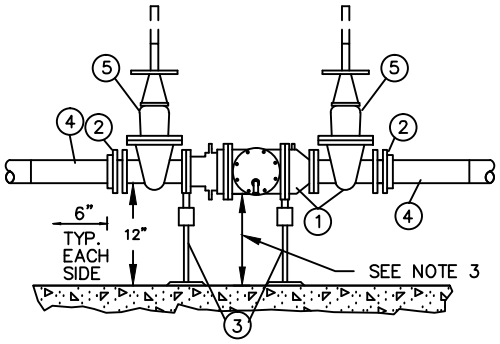

PROFILE

① STATE APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, COMPLETE WITH (2) RESILIENT SEATED O.S.&Y. GATE VALVES AND (4) RESILIENT SEATED TEST COCKS.* SEE NOTES.
② UNI-FLANGED WITH SETSCREWS.
③ TWO ADJUSTABLE PIPE STANCHIONS, BOLTED TO FLOOR.
④ CL. 52 D.I., M.J. WITH RETAINER GLANDS.
⑤ EACH VALVE SHALL BE MARKED WITH MODEL NUMBER WITH DESIGNATION OF RESILIENT SEAT: SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED WITH A MINIMUM OF 4MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.

NOTES:

1. IF INSTALLED OUTDOORS, DRAIN MUST BE INSTALLED ABOVE MAXIMUM FLOOD LEVEL, AND BE ABLE TO HANDLE THE VOLUME OF WATER THAT CAN BE DISCHARGED FROM THE RELIEF VALVE PORT.
2. WHEN THE REDUCED PRESSURE ASSEMBLY IS LOCATED INSIDE A BUILDING A SIZED DRAIN LINE SHALL BE PROVIDED FOR RELIEF PORT. THERE MUST BE AN APPROVED AIR GAP BETWEEN THE RELIEF PORT AND DRAIN.
3. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION REQUIRED.
4. WATERLINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY A CITY OF BLACK DIAMOND WATER QUALITY INSPECTOR.
5. MINIMUM CLEARANCE BETWEEN ASSEMBLY AND WALL IS 24". MAXIMUM HEIGHT SHALL BE 60" FROM FLOOR OR GROUND TO HIGHEST POINT OF DEVICE.
6. TEE AND GATE VALVE REQUIRED ON MAIN.
7. 2 1/2" THROUGH 6" ASSEMBLIES SHALL CONNECT TO WATER MAIN WITH 8" PIPE.

INSTALLATION PROCEDURES AND SPECIFICATIONS FOR REDUCED PRESSURE BACKFLOW ASSEMBLY (ALL SIZES)

THE REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) CONSISTS OF TWO INDEPENDENTLY ACTING, INTERNALLY SPRING LOADED CHECK VALVES SEPARATED BY A SPRING LOADED DIFFERENTIAL PRESSURE RELIEF VALVE, TWO RESILIENT SEATED SHUTOFF VALVES, AND FOUR PROPERLY LOCATED, RESILIENT SEATED TEST COCKS. THIS ASSEMBLY IS EFFECTIVE AGAINST BACKFLOW CAUSED BY BACKPRESSURE AND BACKSIPHONAGE, AND IS USED TO PROTECT THE POTABLE WATER SYSTEM FROM SUBSTANCES THAT CONSTITUTE A HIGH HAZARD. THIS ASSEMBLY SHALL BE INSTALLED AS A UNIT FURNISHED BY THE MANUFACTURER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, MANUFACTURER'S SPECIFICATIONS, AND THE GUIDELINES LISTED BELOW.

1. OBTAIN PLUMBING PERMIT FROM THE CITY OF BLACK DIAMOND PERMIT CENTER.
2. THE RPBA MUST BE A WASHINGTON STATE APPROVED DEVICE.*
3. THE RPBA MUST BE INSTALLED ABOVE GROUND LEVEL WHERE THERE IS NO CHANCE OF FLOODING.
4. PROVIDE ADEQUATE FREEZE PROTECTION FOR DEVICE.
5. PROVIDE ADEQUATE CLEARANCE FOR TESTING AND REPAIRS:
   A. RPBA MUST BE AT LEAST 12" FROM GROUND TO BOTTOM OF DEVICE, BUT NOT MORE THAN 60" IN HEIGHT FROM GROUND TO HIGHEST POINT OF DEVICE.
   B. RPBA MUST HAVE AT LEAST 12" CLEARANCE ON ALL SIDES.
   C. ADEQUATE SPACE MUST BE PROVIDED TO ALLOW IN-LINE REPAIRS TO CHECK VALVES OR RELIEF VALVE.
6. PROVIDE ADEQUATE DRAINAGE; DRAIN(S) MUST ALLOW FOR MAXIMUM DISCHARGE FROM RPBA RELIEF VALVE AT FULL MAIN PRESSURE. (SEE MANUFACTURER'S SPECIFICATIONS REGARDING DISCHARGE RATES).
7. THERE MUST BE AN APPROVED AIR GAP BETWEEN THE RELIEF PORT AND DRAIN.
8. WHENEVER POSSIBLE, DRAIN RPBA DISCHARGE INTO SEWER; DISCHARGE LINE MUST BE TRAPPED TO SEWER.
9. INSTALL RPBA IN THE HORIZONTAL POSITION ONLY.
10. SIZE THE RPBA HYDRAULICALLY TO AVOID EXCESSIVE PRESSURE LOSS.
11. INSTALL PLUGS IN ALL TEST COCKS.
12. ASSEMBLIES 2 1/2" AND LARGER MUST HAVE STANCHIONS INSTALLED TO PREVENT FLANGE DAMAGE. (SEE RPBA DETAIL_).
13. ASSEMBLIES 2" AND SMALLER MUST HAVE TWO UNIONS, ONE ON EITHER SIDE OF RESILIENT SEATED SHUTOFF VALVES.
14. THERE WILL BE NO RPBA INSTALLATIONS IN AREAS WHERE VEHICLE TRAFFIC IS ACCESSIBLE UNLESS PRIOR APPROVAL IS GAINED FROM BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
15. THE USE OF GALVANIZED WATER FITTINGS AND PIPING IS PROHIBITED. USE COPPER, BRASS OR PLASTIC FITTINGS AND/OR PIPING.
16. ONCE DEVICE IS INSTALLED.
   A. HAVE TESTED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TEST OF YOUR CHOOSING.*
   B. HAVE INSPECTED BY BLACK DIAMOND PUBLIC WORKS O&M DEPARTMENT.
17. ALL RPBA'S (2 1/2" AND LARGER) INSTALLED FOR FIRE PROTECTION MUST HAVE FACTORY INSTALLED BYPASS FEATURE (TYPICAL 3/4") TO INCLUDE AN APPROVED RPBA AND METER. (SEE FIRE SYSTEM RPDA INSTALLATION SPECIFICATIONS).
18. THIS DEVICE WILL REQUIRE AN ANNUAL TEST TO ASSURE IT'S PROPER FUNCTION IN PREVENTING WATER BACKFLOW. THE ANNUAL TEST IS TO BE PERFORMED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. THE CITY OF BLACK DIAMOND O&M DEPARTMENT, WATER QUALITY SECTION WILL SEND THE NECESSARY FORM(S) AS THE DEVICE COMES DUE.

* THIS ITEM/INFORMATION MAY BE OBTAINED FROM THE CITY OF BLACK DIAMOND PERMIT CENTER OR PUBLIC WORKS O&M DEPARTMENT, WATER QUALITY SECTION.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. TITLE CHKD. APPR. DATE	**2 1/2" TO 10" REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY**	STANDARD DETAIL NO. **W-23**

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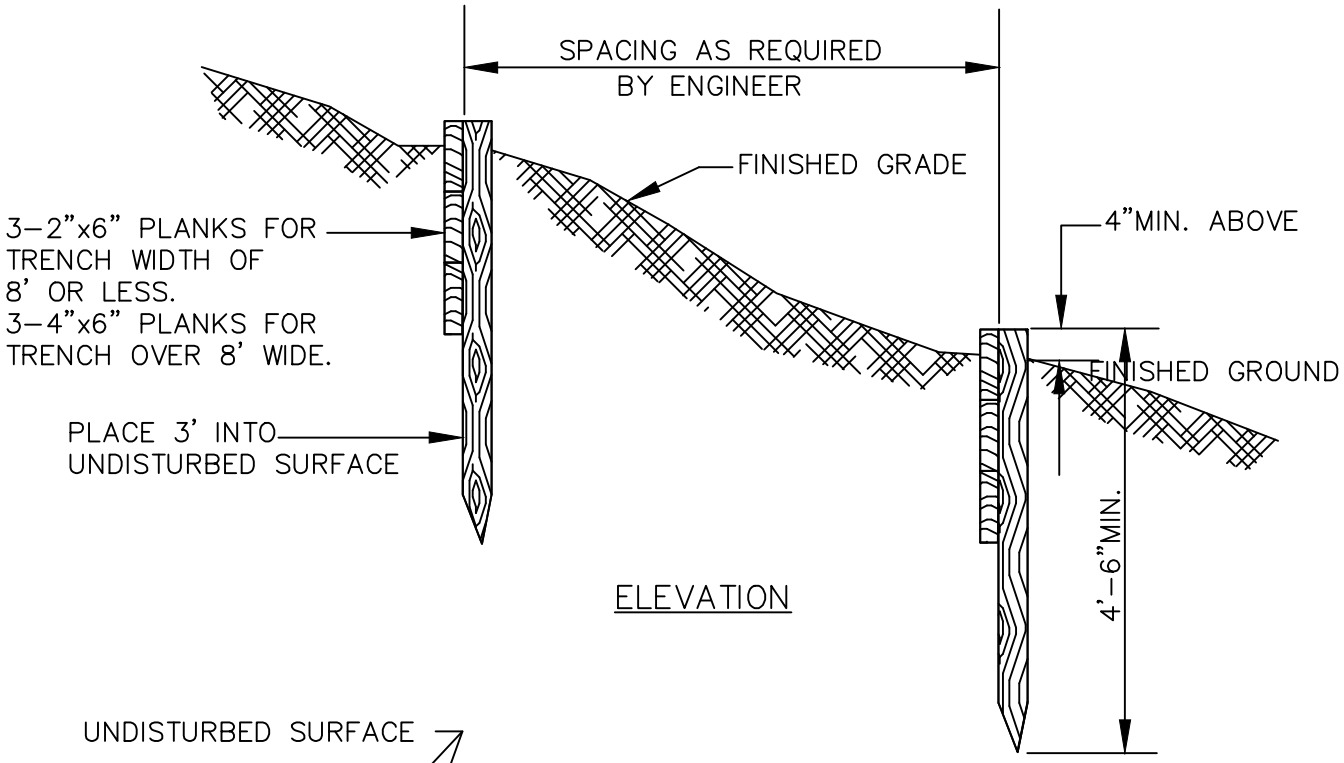
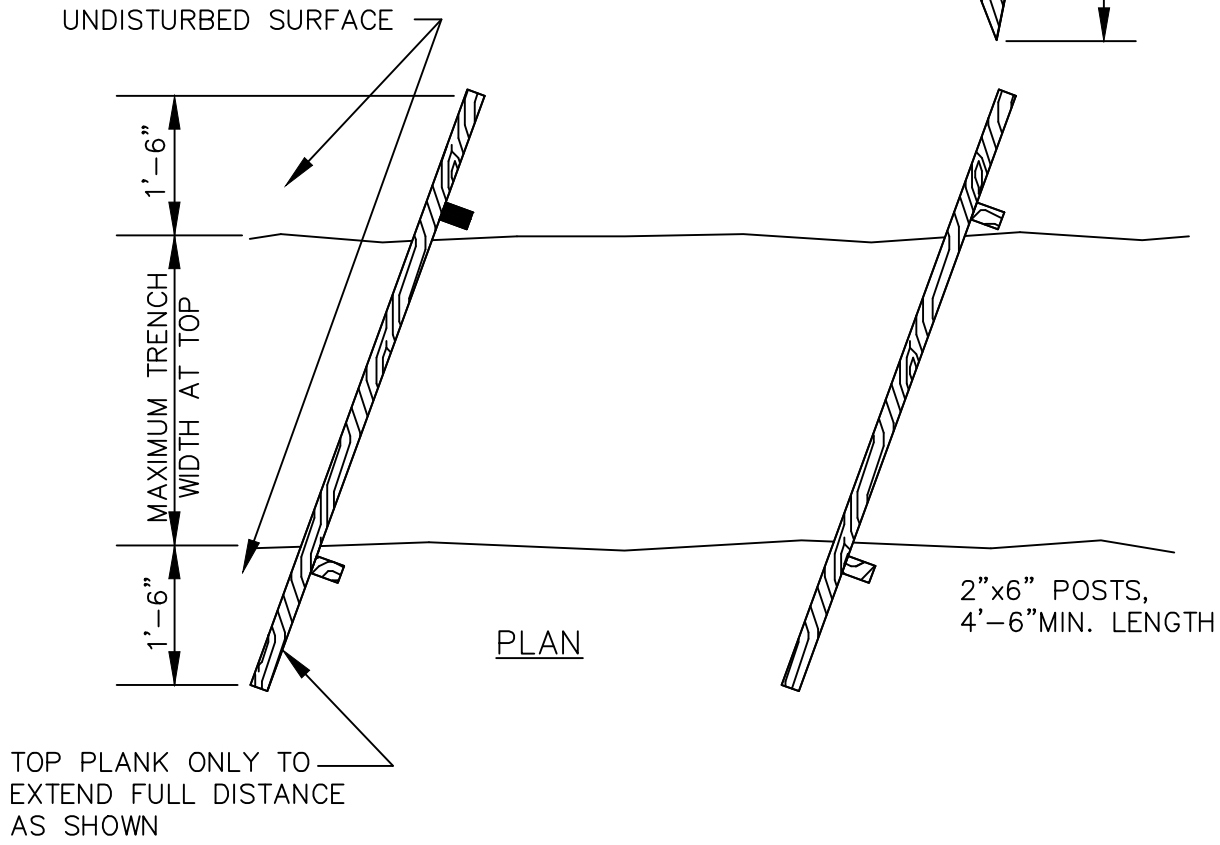


ELEVATION



PLAN

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**TIMBER BAFFLE HILL / HOLDER**	STANDARD DETAIL NO. **W-24**

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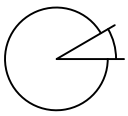
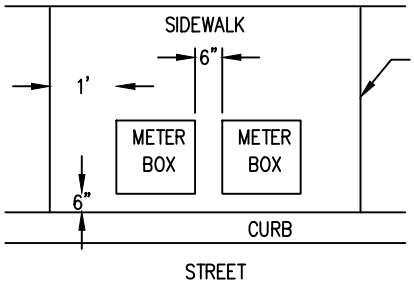


PIPE SIZE	8"	12"	16"	24"
30°ARC LENGTH	2.1"	3.1"	4.2"	6.3"



CONCRETE METER BOX W/ LIDS DRILLED FOR "TOUCH-READ" PIT LID ADAPTER (1-3/4" HOLE) APPROVED: 3/4" TRAVEL-AREAS-FOGTITE J-20S. 3/4" SIDEWALK & 1" METER-FOGTITE B-10T. 3/4"NON-TRAVELED AREAS-FOGTITE 1-D. 1" TRAVEL AREAS-FOGTITE 2 STEEL DIPPED.

"TOUCH-READ" TRANSMITTER INSTALLED IN LID

5/8"x3/4" OR 1" METER. APPROVED: SENSUS SRII-TRPL WITH "TOUCH-READ" AND PIT LID ADAPTER. (NO SUBSTITUTES)

ADJACENT METERS MAY SHARE AN R/F TRANSMITTER (MODEL 505) W/A 1" PVC CONDUIT CONNECTION BETWEEN BOXES, INSTALLED AT BOTTOM EDGE OF BOX.

9"

FILL TO TOP WITH SAWDUST UNCOMPACTED.

24" MIN.

CORPORATION STOP; TAPER (cc) INLET BY PACK JOINT FOR COPPER OUTLET. APPROVED: FORD F-1000 FORD FB1000 MUELLER H-15008

COMPACT SUBGRADE

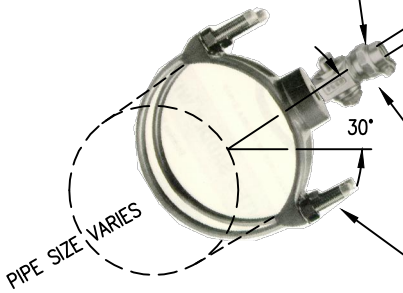
5/8"x3/4" OR 1" METER SETTER WITH ANGLE METER BALL VALVE & CHECK VALVE PADLOCK WINGS. PLUG BOTH YOKES. APPROVED:
FORD VBH92-15-15-H
FORD VBH94-15-15-H

TYPE K SOFT COPPER

15" MIN.

TO PRIVATE SERVICE-24" MINIMUM BURY.

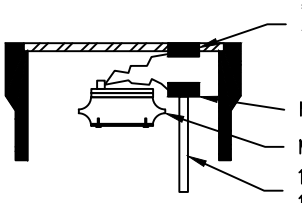
PACK JOINT COUPLING (COMPRESSION FITTING) FOR COPPER. USE A TEE OR "Y" FITTING (FORD YYY-243) W/ 1" SOFT COPPER FOR DOUBLE SERVICE



BACKFILL WITH 5/8" CRUSHED TO1' OVER PIPE.

HAND COMPACTED BEDDING UNDER CORP.

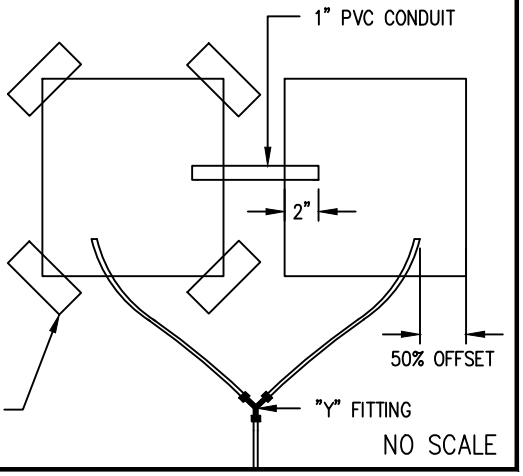
STAINLESS STEEL (SINGLE STRAP) SERVICE SADDLE WITH TAPER (CC) TAP. DOUBLE STRAP FOR 12" AND LARGER PIPES. APPROVED:
ROMAC 101 S, ROMAC 202 S, ROMAC SSI (for AC)



PIT EQUIPMENT SCHEMATIC 20" LONG W/ 12" SWEAT COUPLING ON TOP

INSTALL MXU IN UPPER CORNER SERVICE SIDE, PROPERTY LINE SIDE WITHIN 1" OF LID

1. SERVICE LINE MUST BE INSTALLED PERPENDICULAR TO THE WATER MAIN. COMPACT TRENCH TO 95% MAX. DRY DENSITY PER ASTM D-1557
2. SERVICE SADDLES ARE REQUIRED ON ALL PIPE EXCEPT, CLASS 52 OR THICKER DUCTILE IRON. THE CORP. STOP MAY BE TAPPED DIRECTLY INTO CLASS 52 OR THICKER DUCTILE IRON PIPE FOR 3/4" AND 1" TAPS.
3. DOH APPROVED BACK FLOW PREVENTION DEVICES MUST BE INSTALLED ON ALL IRRIGATION AND
4. OFFSET METER BOX TO LEFT OR RIGHT 50%. FIRE SERVICES AND SHALL BE TESTED AND APPROVED BY THE CITY PRIOR TO SERVICE ACTIVATION.
5. INSTALL DOUBLE SERVICES WITH SINGLE 2-PORT MXU (model 505) RADIO-READ WHERE POSSIBLE.
6. ON DOUBLE SERVICES PLACE THE MXU IN THE METER BOX WITH THE METER WIRED TO PORT NUMBER 1.
7. DOUBLE SET SERVICES MUST BE NO MORE THAN 2 FEET APART.
8. SINGLE SET SERVICE MUST BE A MINIMUM OF 20' APART.
9. SEE STANDARD DETAIL W3 AND W4 FOR FURTHER INFORMATION.
10. THE CITY SHALL MAKE ALL ELECTRICAL CONNECTIONS.
11. SERVICES SHALL BE INSTALLED BY THE CITY ON CITY OWNED MAINS.
12. METERS SHALL BE SET AT PROPERTY LINES OR IN SIDEWALK.
13. AVOID VEHICLE TRAVEL AREAS.
14. SERVICES SHALL NOT BE TAPPED OFF HYDRANT OR FIRE SPRINKLER SYSTEM BRANCHES.



REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**3/4" AND 1" WATER SERVICE OR IRRIGATION SERVICE (TOUCH-READ AND MXU R/F REQUIREMENT)**	STANDARD DETAIL NO. **W-25** FILE:

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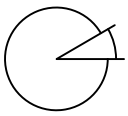
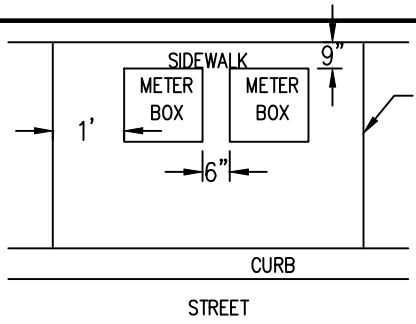


PIPE SIZE	8"	12"	16"	24"
30°ARC LENGTH	2.1"	3.1"	4.2"	6.3"



CONCRETE METER BOX W/ LIDS DRILLED FOR "TOUCH-READ" PIT LID ADAPTER (1-3/4" HOLE) APPROVED:
-3/4" TRAVEL-AREAS-FOGTITE J-20S.
-3/4" SIDEWALK & 1" METER-FOGTITE B-10T.
-3/4"NON-TRAVELED AREAS-FOGTITE 1-D.
-1" TRAVEL AREAS-FOGTITE 2 STEEL DIPPED.

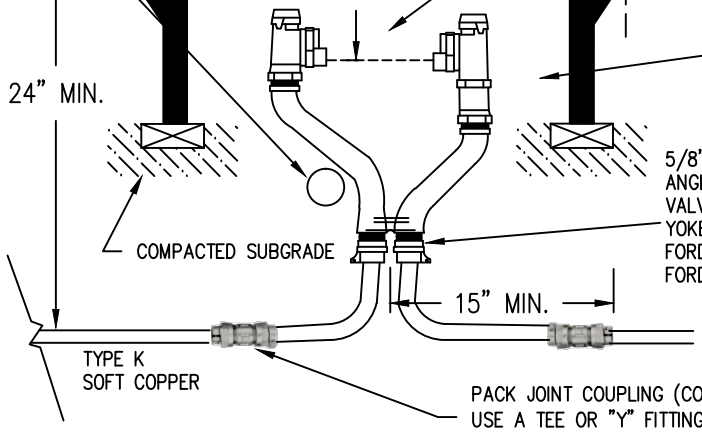
"TOUCH-READ" TRANSMITTER INSTALLED IN LID

5/8"x3/4" OR 1" METER. APPROVED: SENSUS SRII-TRPL WITH "TOUCH-READ" AND PIT LID ADAPTER. (NO SUBSTITUTES)

ADJACENT METERS MAY SHARE AN R/F TRANSMITTER (MODEL 505) W/A 1" PVC CONDUIT CONNECTION BETWEEN BOXES, INSTALLED AT BOTTOM EDGE OF BOX.

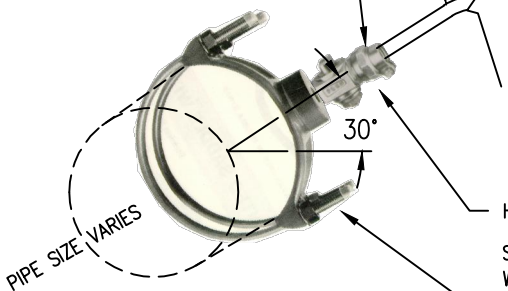
BACKFILL WITH 5/8" CRUSHED TO 1' OVER PIPE.

CORPORATION STOP; TAPER (CC) INLET BY PACK JOINT FOR COPPER OUTLET. APPROVED: FORD F-1000, FORD FB1000, AND MUELLER H-15008



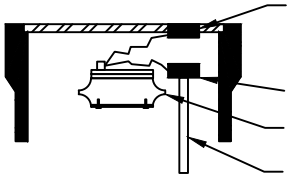
5/8"x3/4" OR 1" METER SETTER WITH ANGLE METER BALL VALVE & CHECK VALVE, PADLOCK WINGS. PLUG BOTH YOKES. APPROVED:
FORD VBH92-15-15-H
FORD VBH94-15-15-H

PACK JOINT COUPLING (COMPRESSION FITTING) FOR COPPER. USE A TEE OR "Y" FITTING (FORD YYY-243) W/ 1" SOFT COPPER FOR DOUBLE SERVICE



HAND COMPACTED BEDDING UNDER CORP.

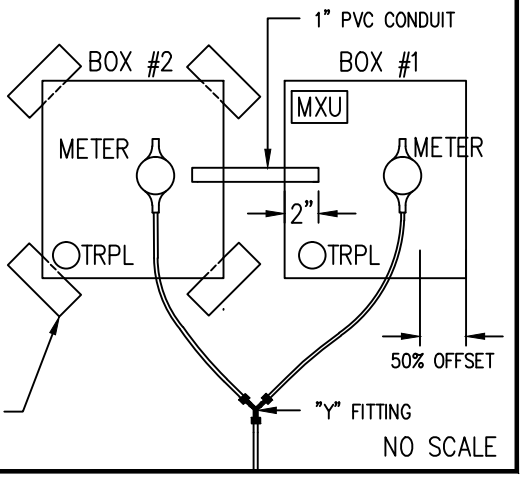
STAINLESS STEEL (SINGLE STRAP) SERVICE SADDLE WITH TAPER (CC) TAP. DOUBLE STRAP FOR 12" AND LARGER PIPES. APPROVED:
ROMAC 101 S, ROMAC 202 S, AND ROMAC SSI (for AC)



PIT EQUIPMENT SCHEMATIC

INSTALL MXU IN UPPER CORNER SERVICE SIDE, PROPERTY LINE SIDE WITHIN 1" OF LID

1. SERVICE LINE MUST BE INSTALLED PERPENDICULAR TO THE WATER MAIN. COMPACT TRENCH TO 95% MAX. DRY DENSITY PER ASTM D-1557
2. SERVICE SADDLES ARE REQUIRED ON ALL PIPE EXCEPT, CLASS 52 OR THICKER DUCTILE IRON. THE CORP. STOP MAY BE TAPPED DIRECTLY INTO CLASS 52 OR THICKER DUCTILE IRON PIPE FOR 3/4" AND 1" TAPS.
3. DOH APPROVED BACK FLOW PREVENTION DEVICES MUST BE INSTALLED ON ALL IRRIGATION AND FIRE SERVICES AND SHALL BE TESTED AND APPROVED BY THE CITY PRIOR TO SERVICE ACTIVATION.
4. OFFSET METER BOX TO LEFT OR RIGHT 50%. SET AT GRADE AND LEVEL WITH GRADE - PROVIDE POSITIVE DRAINAGE AWAY FROM BOX.
5. INSTALL DOUBLE SERVICES WITH SINGLE 2-PORT MXU (model 505) RADIO-READ WHERE POSSIBLE.
6. ON DOUBLE SERVICES PLACE THE MXU IN THE METER BOX WITH THE METER WIRED TO PORT NUMBER 1.
7. DOUBLE SET SERVICES MUST BE NO MORE THAN 2 FEET APART - 6" IN SIDEWALKS.
8. SINGLE SET SERVICE MUST BE A MINIMUM OF 20' APART.
9. THE CITY SHALL MAKE ALL ELECTRICAL CONNECTIONS.
10. SERVICES SHALL BE INSTALLED BY THE CITY ON CITY OWNED MAINS.
11. METERS SHALL BE SET AT PROPERTY LINES OR IN SIDEWALK.
12. AVOID VEHICLE TRAVEL AREAS.
13. SERVICES SHALL NOT BE TAPPED OFF HYDRANT OR FIRE SPRINKLER SYSTEM BRANCHES.



REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. / CHKD. / APPR. / DATE	**3/4" AND 1" WATER SERVICE**	STANDARD DETAIL NO. **W-25A**

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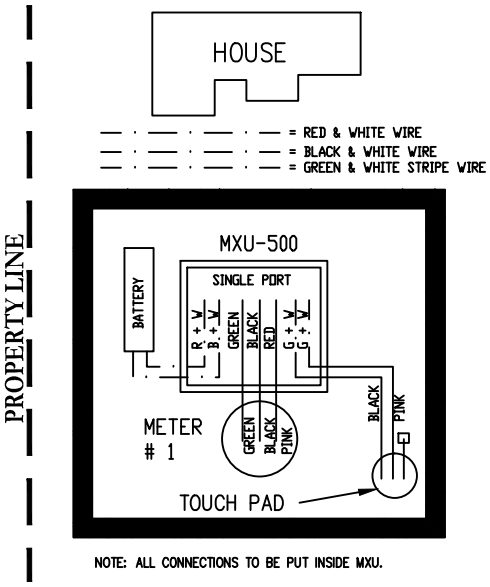
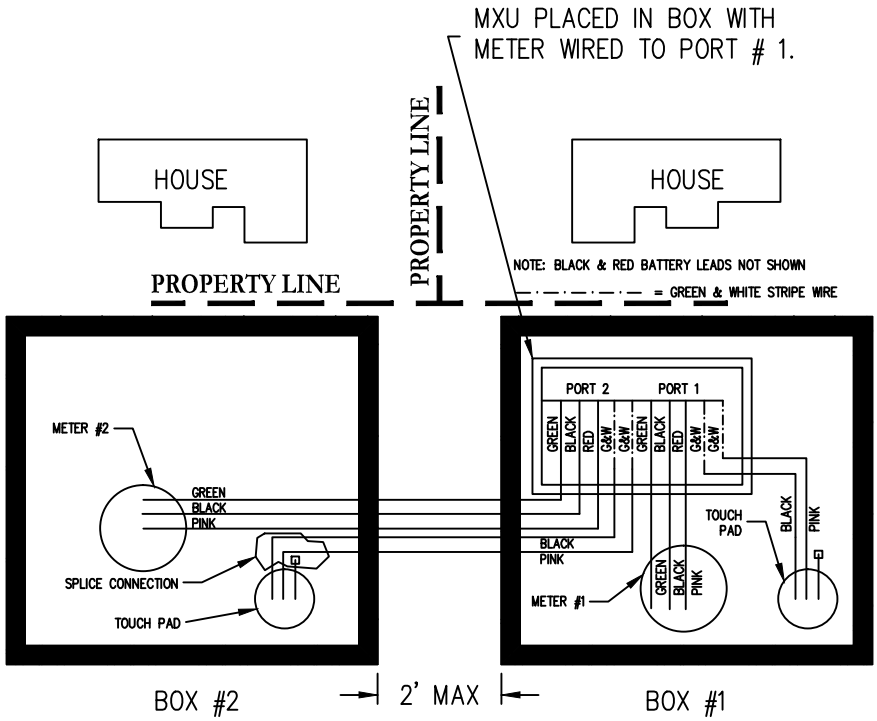


METER INSTALLATION FOR SINGLE PORT MXU



CONNECTION SCHEMATIC DOUBLE MXU (505 SERIES)

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**3/4" AND 1" WATER SERVICE "RADIO-READ" WIRING DETAILS**	STANDARD DETAIL NO. **W-25B**

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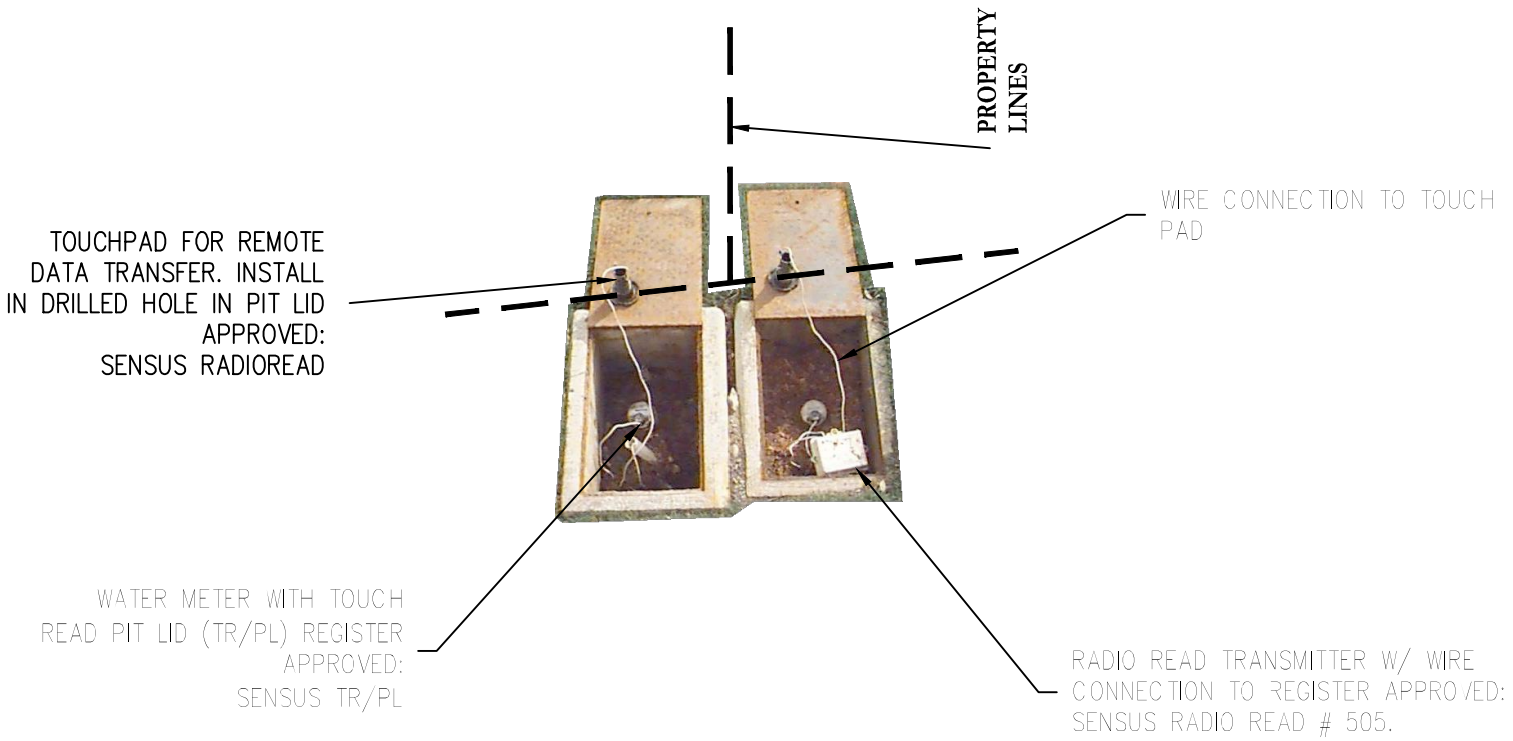
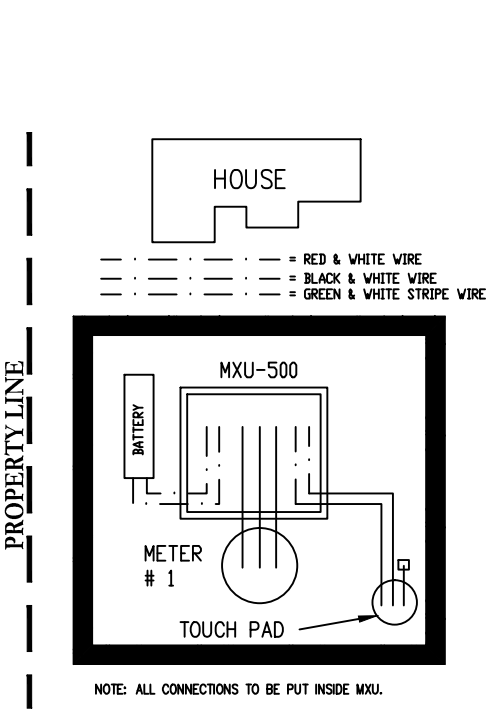
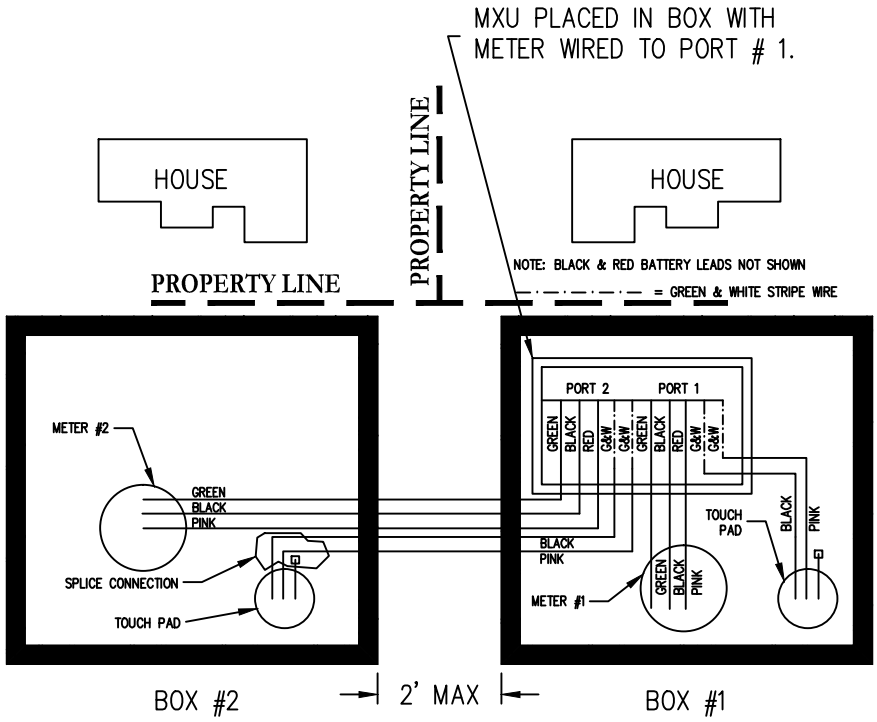


METER PIT WITH LID OPEN



METER INSTALLATION FOR SINGLE PORT MXU



CONNECTION SCHEMATIC DOUBLE MXU (505 SERIES)

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**3/4" AND 1" WATER SERVICE OR IRRIGATION SERVICE ("TOUCH-READ" AND " RADIO-READ" DETAILS)**	STANDARD DETAIL NO. **W-26** FILE:

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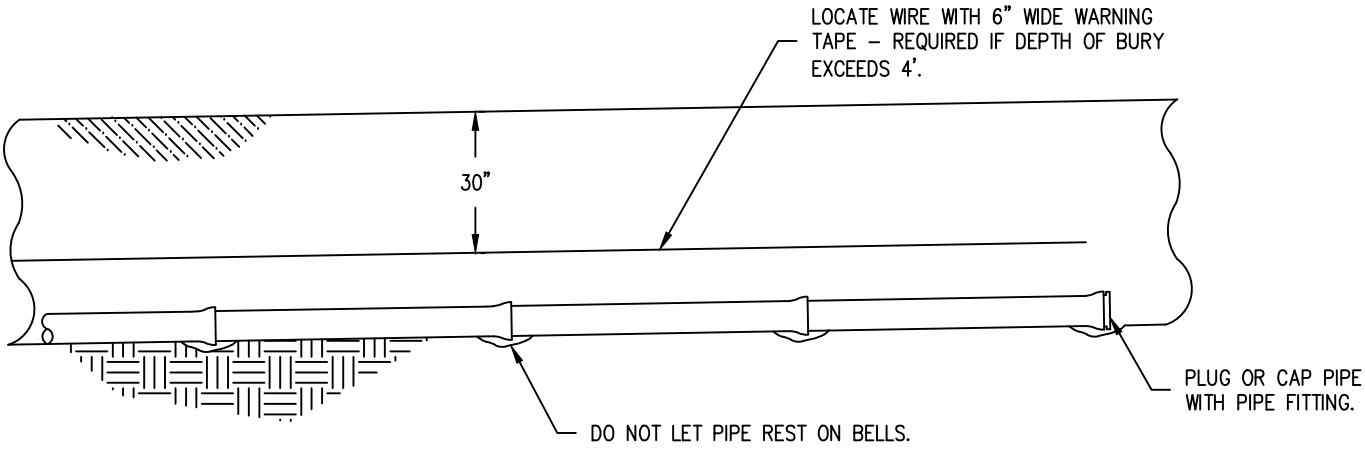

1. LAY PIPE WITH BELLS UPGRADE.

2. PREPARE TRENCH BOTTOM SO PIPE IS SUPPORTED FULL LENGTH.

3. PLUG OR CAP PIPE WHENEVER NOT ACTIVELY WORKING ON PIPE SECTION. USE MJ OR TYTON JOINT PLUG OR CAP. BOARDS, BUCKETS, ETC. ARE NOT ALLOWED.

4. EXTREME CARE SHALL BE TAKEN INSTALLING POLY ENCASEMENT TO PREVENT TEARS AND TO ENSURE PROPER SEAL.

5. PIPE THAT IS ROLLED OFF A TRUCK OR TRAILER OR IS DROPPED OR OTHERWISE MISHANDLED WILL BE REJECTED.

6. CUT ENDS SHALL BE BEVELED PER MANUFACTURER SPECS PRIOR TO ASSEMBLY.

7. GASKETS SHALL BE LUBRICATED WITH APPROVED GASKET LUBRICANT.

8. VALVES ON LIVE MAINS SHALL ONLY BE OPERATED BY CITY PERSONNEL.

9. NEW MAINS SHALL BE ISOLATED FROM LIVE MAINS WITH A DCVA UNTIL SATISFACTORY BACTERIOLOGICAL TESTS ARE OBTAINED.

10. NEW MAINS SHALL BE FLUSHED AT A MINIMUM VELOCITY OF 5 FPS. CONTRACTOR SHALL PAY $5.00 PER ROCK LARGER THAN 1/4" DISCHARGED FROM MAIN.

11. DISINFECTING SHALL BE ACCOMPLISHED BY PUMPING A CHLORINE SOLUTION INTO THE MAIN UNTIL 50 PPM IS ACHIEVED IN ALL SECTIONS OF THE PIPE. THIS CONCENTRATION SHALL REMAIN IN THE PIPE FOR 24 HOURS. CHLORINATED WATER SHALL NOT BE DISCHARGED TO STORM WATER SYSTEM OR SURFACE WATERS.

12. SHORT SECTIONS OF PIPE MAY BE SWABBED WITH A 500 PPM CHLORINE SOLUTION INSTEAD OF THE ABOVE. CARE SHALL BE TAKEN NOT TO GET CHLORINE ON THE OUTSIDE OF THE PIPE OR FITTINGS.

13. TRENCH WATER OR DEBRIS SHALL NOT BE ALLOWED TO ENTER THE PIPE.

14. A TORQUE WRENCH SHALL BE USED TO PROPERLY TORQUE BOLTS AND NUTS.

15. ISSAQUAH'S WATER SYSTEM IS NOT CHLORINATED. EXTREME CARE SHALL BE TAKEN TO AVOID CONTAMINATION.

16. TRAFFIC CONTROL PER THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SHALL BE MAINTAINED AT ALL TIMES.

17. RESTRAINED JOINTS SHALL BE FULLY EXTENDED WHEN SPECIFIED BY THE ENGINEER.

18. JOINT ASSEMBLY SHALL ALLOWED FOR THERMAL EXPANSION AND CONTRACTION WITHOUT BINDING THE PIPE.

NOTE:
PIPE LAYING OPERATIONS VIOLATING ANY SECTION OF THIS DETAIL SHALL BE IMMEDIATELY SUSPENDED UNTIL THE CITY HAS BEEN SATISFIED OF THE CONTRACTOR'S ABILITY TO MEET THESE REQUIREMENTS.

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**PIPE LAYING DETIAL**	STANDARD DETAIL NO. **W-27**

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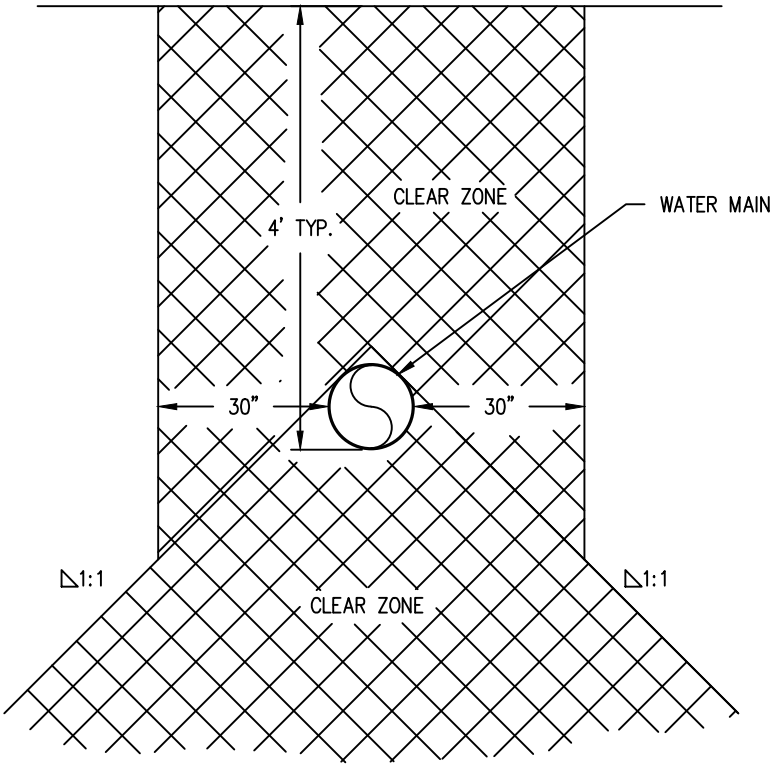

REVISION: OCT 22, 2010

NO SCALE

CITY OF BLACK DIAMOND STATE OF WASHINGTON	DRN. CHKD. APPR. DATE	**CLEAR ZONE DETAIL**	STANDARD DETAIL NO. **W-28**

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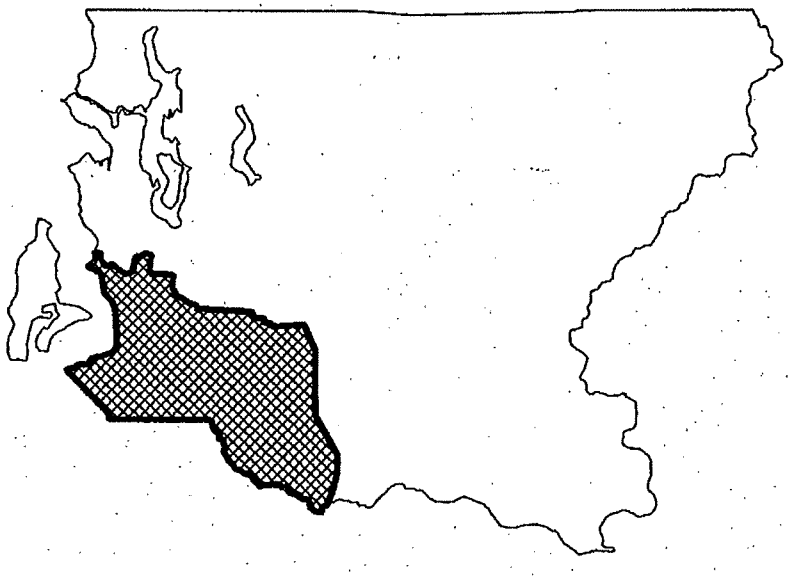
Appendix J

SKCCWSP Design Standards

SOUTH KING COUNTY

COORDINATED WATER SYSTEM PLAN



OCTOBER 1989

ECONOMIC AND ENGINEERING SERVICES, INC.

APPENDIX E

SOUTH KING COUNTY MINIMUM DESIGN STANDARDS

B. City Water Systems

The minimum design standards described herein do not apply to cities insofar as service within municipal boundaries is concerned. However, it is expected that cities will adopt, or have adopted, design standards at least equal to those herein. If cities extend new water service to customers outside of the city limits, the design standards adopted by the municipality for outside city service must at least meet the minimum design standards described in this document.

C. Water System Plans and Applicable Land Use Plans

New and expanding utilities shall meet water system planning requirements using land use designations for their service area as prescribed in the King County Comprehensive Plan, Community Plan, Zoning Code, and any related interlocal agreements. Approved land use activities in the service area shall be designated by the King County Parks, Planning, and Resources Department (County). Such designations shall be identified in the utility's Water System Plan, and shall be used to establish design requirements.

The utility shall prepare a water system plan and a program of capital improvements required to provide the anticipated level of service within their designated water service area, consistent with the land use plan. When the utility is requested to provide water service, it will identify that portion of planned capital facilities as well as other installations which are necessary to provide the service requested. As growth occurs, the full level of water service will eventually be provided throughout the service area of the utility in a planned, phased program which meets County requirements and minimizes overall cost to the customers.

In areas defined as Urban by the County, the utility shall install a distribution system with a minimum pipe size of 8 inches. The installation schedule for fire hydrants and storage will be based on the designated water utilities' water system plan and the fire flow requirements established by the County Fire Marshall.

For areas defined as Transitional and Rural, the minimum pipe size shall be 6 inches, except as provided in Section 5.B(2). The installation of hydrants and storage will be based on the requirements of the County Fire Marshall.

The designated water utilities, prior to their 5-year update of their Water System Plan, shall request the County to verify the current land use designation and planning projections. Based on the projections, the utility will establish the design criteria necessary to meet the land use and

fire flow requirements. This design criteria will be used to plan for hydrants and storage to meet anticipated fire flow requirements for future development. If the County does not respond in writing within 30 days, the utility shall use the then current County Comprehensive Plan and Community Plan.

D. Conditions to Exceed Minimum Design Standards

Minimum standards represent the lowest or least level of design allowed. Water service needs, as defined by a utility's approved water system plan and sound engineering and design practices, frequently require a higher level of service than can be achieved under the minimum standards. In the following instances, design standards will be allowed to exceed the minimums.

(1) When it is necessary to adequately serve Rural Activity Centers, Rural Neighborhood Centers, Urban Activity Centers, or Urban Areas;

(2) When it is necessary to provide transmission between a water source or storage facility to a distribution system of a utility and/or a Satellite System or an intertie with another utility;

(3) When it is necessary to address existing quantity or quality problems within any area currently authorized to receive water service;

(4) When it is necessary to meet health and safety guidelines of the County's applicable fire protection ordinances or another minimum design standard.

4. STANDARDS INCORPORATED BY REFERENCE

The existing standards listed below, or as may be modified by the appropriate authorities, are hereby incorporated by reference. Priority for application of these standards is in the order listed, but the most stringent applies. Except as otherwise superceded by the County standards described herein, these standards will apply to water system design, installation, modification, and operation.

- Rules and Regulations of the State Board of Health Regarding Public Water Systems.
- Applicable County rules, regulations, ordinances, and standards.
- Standard Specifications for Road, Bridge, and Municipal Construction, as published by the Washington State Department of Transportation/ American Public Works Association (DOT/APWA), latest edition.

- o Standards of the American Water Works Association.

5. MINIMUM STANDARDS

A. General Provisions

(1) Source Development

New sources must be designed to meet the Department of Ecology (Ecology), the Department of Social and Health Services (DSHS), and the Seattle-King County Department of Public Health (SKCDPH) regulations and design guideline. These include: Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Water Wells, as administered by Ecology; Chapter 248-54 WAC, "Rules and Regulations of the State Board of Health Regarding Public Water System", as administered by DSHS; and, "King County Board of Health, Title 12" as administered by the SKCDPH.

All test and production wells must be drilled in accordance with detailed drilling and testing specifications, which have either been prepared by, or received prior approval of the designated utility, if the well is to be used for a public water supply. These specifications may not be less stringent than those identified in the references cited in the above paragraph.

(2) Water Rights

Water rights must be obtained in accordance with Ecology regulations and procedures. Copies of water rights documents, correspondence, and other records are to be maintained on file with the purveyor and in the name of the purveyor.

(3) Water Quality

Water quality must be proven to conform with DSHS criteria specified in Chapter 248-54 WAC and/or any additional requirements contained in King County Board of Health Rules and Regulations No. 9, SKCDPH.

(4) Hydrostatic Pressure Test

A hydrostatic pressure leakage test will be conducted on all newly constructed water mains, fire lines, fire hydrant leads and stubouts

in accordance with DOT/APWA Section 7-11.3(11) or AWWA C-600 specifications unless otherwise specified by the designated utility.

(5) Disinfection and Bacteriological Testing

All pipe, reservoirs, and appurtenances shall be flushed and disinfected in accordance with the standards of the DSHS, AWWA C601 and D105, or DOT/APWA Section 7-11.3(12) unless otherwise specified by the designated utility.

(6) Auxiliary Power

All source and booster pumping facilities required for primary supply in an emergency shall be equipped with auxiliary power unless a redundant power supply source is provided. Where pumping is to a storage facility which is sized to permit down time for mobilization of a portable standby power unit, pigtail outlets and a manual transfer switching device are adequate. If the pigtail outlet approach is taken, the purveyor must provide a portable power unit. Where adequate gravity standby storage has been provided, no auxiliary power is required for pumping facilities. An adequately sized engine driven pumping device is an acceptable method to meet this requirement. Adequacy of facilities will be determined by the utility through its water comprehensive plan.

(7) Utility Interties

Planning for specific locations, size, and alignment of major water lines shall consider emergency interties with adjacent water utilities.

(8) Flow Measurement

All service lines shall be installed so that each residential, commercial, and industrial structure will have a separate metered service for domestic water received from the utility. This requirement may be waived by the utility, but, at a minimum, any new service will have a box for meter drop installation. If approved by the utility, domestic water consumption may be measured by a master meter for service to a complex, under single ownership, and where water utility line subdivision is impractical. Service lines providing fire flow may be required by the utility to be equipped with a fire detection check.

All new groundwater sources shall be provided with a device for measurement of depth to water and a meter for determining flow rate and total production. Installation of these devices is also recommended for existing groundwater sources. All new sources for which water treatment is included shall be provided with flow measurement.

(9) Cross Connection Control

Where the possibility of contamination of potable water exists, water services shall be equipped with appropriate cross connection control devices in accordance with Chapter 248-54 WAC. The utility and/or the County cross connection control program shall determine the need, size, kind, and location of the device.

B. Specific Provisions

(1) Pressure Requirement

Water systems shall be designed to provide an adequate quantity of water at a positive pressure of at least 30 psi under maximum instantaneous demand (MID) flow conditions measured at any customer's water meter or at the property line if no meter exists. If fire flow is to be provided, the distribution system shall be designed to provide the required fire flow at a pressure of at least 20 psi at the fire and positive pressure shall be maintained throughout the system during MID conditions (WAC 248-54-135).

(2) Pipe Sizing and Materials

With the exceptions noted within this document, the minimum pipe diameter shall correspond with the following land use designations: Urban Areas - 8 inch diameter; Transitional Areas - 6 inch diameter; Rural Areas - 6 inch diameter. In areas where fire flow is not required under current land use and where land use designations minimize the potential future requirement for fire flow, a smaller diameter pipe may be used if hydraulically justified.

Water main size shall be adequate to deliver required fire flow and to maintain the pressure requirement defined above. All water mains shall meet applicable engineering and health standards adopted by the State of Washington or the water purveyor, including Chapters 248-54 and 248-57 WAC.

All water mains subject to King County Code 17.08, which may serve fire hydrants, shall be a minimum of 8 inches nominal diameter for dead end mains and 6 inches nominal diameter for circulating mains. Hydrant leads less than 50 feet in length may be 6 inches in diameter. In a dead end cul-de-sac, mains sized for only domestic flow may be installed from the last hydrant to remaining residences.

All pipe material for new water systems shall be constructed with "lead-free" materials. The lead content for joint compound materials (solder and flux) used for pipe installation shall be less than 0.2 percent in order to be considered "lead-free." The lead content for all installed pipe shall be less than 8 percent in order to be considered "lead-free."

(3) Isolation Valving

Valving shall be installed in a configuration which permits isolation of lines. A valve is not required for short block lines of less than 100 feet. Valves should be installed at intersections with normal maximum spacing at 500 feet in commercial, industrial, and multiple- family districts, 800 feet in residential districts, and 1/4 mile in arterial mains.

(4) Air and Air-Vacuum Relief Valves

Air or combined air-vacuum relief valves shall be installed at appropriate points of high elevation in the system. All piping shall be sloped to permit escape of any entrained air. Combination air release/air vacuum valves shall have a rated operating pressure of 300 psi.

(5) Blow-off Assembly

A blow-off assembly or fire hydrant shall be installed on all dead end runs and at designated points of low elevation to provide a way for adequate flushing of the distribution system. The blow-off assembly shall be installed in the utility right-of-way, except where a written access and construction easement is provided for the water utility. In no case shall the location be such that there is a possibility of back-siphonage into the distribution system. The blow-off assembly shall be sized to achieve a flow velocity of 2-1/2 feet per second.

(6) Storage

Storage requirements are based upon three components:

- o Equalizing Storage, required to supplement production from water sources during high demand periods,
- o Standby Storage, required as backup supply in case the largest source is out of service, and
- o Fire Storage, required in order to deliver the level of fire flow service identified in the utility's approved plan (see "Fire Flow Requirements" below) for the required duration.

As a minimum, sizing of storage facilities shall be adequate to provide for equalizing storage, plus the larger of standby or fire storage requirements. Equalizing and standby storage volumes shall be determined using "Sizing Guidelines for Public Water Supplies", DSHS. Minimum fire storage volumes shall be determined using the fire flow and duration requirements of the County Fire Marshall, the respective municipal ordinance, or the minimum design standards prescribed herein. Siting of storage facilities should consider locations which provide gravity flow. In some cases, the system hydraulics may require additional storage.

(7) General Facility Placement

All piping, pumping, source, storage, and other facilities, shall be located on public rights-of-way or dedicated utility easements. Utility easements must be a minimum of 15 feet in width, and piping shall be installed no closer than 5 feet from the easement's edge. Exceptions to this minimum easement may be approved by the operating water utility. Unrestricted access shall be provided to all public water system lines and their appurtenances and public fire hydrants that are maintained by public agencies or utilities.

New Class 2, 3, and 4 utilities in undesignated service areas should consider future interties with Class 1 systems when determining the location of their distribution network.

The location of utilities shall be in accordance with the standards and guidelines established by King County or the appropriate City criteria. Where existing utilities or storm drains are in place, new utilities shall conform to these standards as nearly as practicable

and yet be compatible with the existing installations. Where practical, there shall be at least 3 feet horizontal separation from other utilities.

(8) Pipe Cover

The depth of trenching, installation of pipes, and backfill shall be such as to give a minimum cover of 30 inches over the top of the pipe from finished grade. This standard shall apply to all transmission and distribution piping and to service piping within the right-of-way unless specifically designed for an above ground installation.

(9) Water Line and Sewer Separation Distances

Transmission and distribution water piping shall be separated at least 10 feet horizontally from existing wastewater gravity or force mains. The bottom of the water main shall be 18 inches above the top of the sewer. Where local conditions prevent such horizontal and/or vertical separation, closer spacing is permissible where design and construction meet the special requirements of Section 2.4 of Ecology's Criteria for Sewage Works Design, as revised October 1985.

Separation distances between water piping and any portion of an on-site sewage system shall meet the requirements of the SKCBH Rules and Regulations.

(10) Fire Hydrants

Fire hydrants within cities shall adhere to the specific design criteria and standards utilized by the City Fire Department. Fire hydrants within the unincorporated areas of the County shall comply with the minimum design criteria set forth in King County Code 17.08. (King County is encouraged to address standardization of pipe threads in future revisions of this Code.)

(11) Fire Hydrant Location Installation Criteria

The location of fire hydrants within cities shall be located and/or installed as specified by the design standards of the city. Fire hydrants within the unincorporated areas of the County shall comply with the minimum location/installation criteria set forth in the King County Code 17.08. In all circumstances, these standards shall not be less stringent than the placement requirements prescribed by WAC 248-57-900.

(12) Fire Flow Requirements

New facilities installed by a water utility shall be designed to provide a level of service assigned to designated land uses within the County. The actual fire flow to be provided at a proposed development will be determined by the County Fire Marshall or City Fire Department Chief.

The minimum pipe size will be based on these standards. The location of hydrants and fire flow storage requirements will be based on the designated level of service identified during the water system planning process or the rated flow and duration for public water supply for fire protection, whichever is greater. The Fire Marshall shall consider the availability of water service based upon a phased improvement plan within the utility's water system plan and shall specify the fire flow requirements in conjunction with the utility, confirming the availability of water service. All water systems providing fire flow should be designed to deliver water supply to the services which require fire flow with a minimum rated flow of 1,000 gpm. The Fire Marshall will determine the duration required for fire protection.

(13) Maintenance of Fire Protection Facilities

A written operational agreement which identifies responsibilities for maintenance and testing of fire protection facilities shall be negotiated between the fire department or district and the water utility.

6. WAIVER PROCESS

A waiver process exists for circumstances where the minimum design standards create undue hardship. Outside designated service areas, a waiver may be obtained through the Appeals Process described in Section IX. In this instance, a waiver can only be granted to Class 4 systems located in rural land use areas where fire flows are not required.

Within designated service areas, the designated purveyor has the sole authority to allow the installation of facilities for remote systems which conform with DSHS standards but are less stringent than the South King County Minimum Design Standards. In this instance, lesser standards can only be granted to new systems with four or fewer service connections and where fire flow is not required. The acceptance of lesser standards should be noted on the Certificate of Water Availability by the designated utility and in its service area contract with the applicant. It is anticipated that this waiver will be utilized primarily

when the proximity of a smaller system will benefit from larger, nearby facilities planned for future installation by the designated utility.

7. STANDARDS REVIEW SUBCOMMITTEE

A Standards Review Subcommittee shall be established by the Water Utility Coordinating Committee (WUCC) and shall convene at least annually to review these standards and their implementation. The Subcommittee shall seek input from the King County Fire Marshall, the City fire departments, and King County fire protection districts in matters related to fire protection standards. Recommendations of the Standards Review Committee shall be submitted to the WUCC and, if revisions are approved, they shall be forwarded to the County Council for adoption.

8. SEVERABILITY

If any provision of these standards or their application is found to be invalid, the remainder of the standards and their implementation are not affected.

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Appendix K

Developer Extension Checklist and Agreement

CITY OF BLACK DIAMOND

DEVELOPER EXTENSION CHECKLIST

NAME OF PROJECT/PLAT _____

DEVELOPER/OWNER _____

CONTACT PERSON _____ PHONE _____

DEVELOPER'S ENGINEER _____ PHONE _____

CONTRACTOR _____ PHONE _____

JURISDICTION _____ COUNTY _____

RESIDENTIAL _____ MULTI-FAMILY _____ COMMERCIAL _____

INDUSTRIAL _____ MIXED _____

	Applies to Project Yes(Y)/No(N)	City Dept.*	Dept. Initial	Date
1. Plot Plan Received and Distributed to Staff (as applicable)	_____	P.D.	_____	_____
2. Master Plan Received (as applicable)	_____	P.D.	_____	_____
3. SEPA Checklist Received	_____	P.D.	_____	_____
4. D.N.S., M.D.N.S., or D.S. made	_____	P.D.	_____	_____
5. E.I.S. Required/Approved	_____	P.D.	_____	_____
6. Staff's Preliminary Approval	_____	C.A.	_____	_____
7. Public Meeting	_____	P.D.	_____	_____
8. Planning Commission Meeting	_____	P.D.	_____	_____
9. City Council Action Req'.d on Preliminary Project	_____	P.D.	_____	_____
10. Civil Plans Completed & Transmitted to City and Approved by City Engineer	_____	C.A.	_____	_____

	Applies to Project Yes(Y)/No(N)	City Dept.*	Dept. Initial	Date
11. Performance Bond Received, Reviewed and Approved by City Engineer	_____	C.A.	_____	_____
12. Contractor Insurance Certificate Approved by City Attorney	_____	C.A.	_____	_____
13. Preconstruction Conference	_____	C.A.	_____	_____
14. City, County, State Permits Acq'd.	_____	C.A.	_____	_____
15. Fire Department Review	_____	F.D.	_____	_____
16. City Building Permits Issued	_____	B.O.	_____	_____
17. Construction				
(a) Project officially begins	_____	C.E.	_____	_____
(b) Punchlist Items Completed	_____	C.E.	_____	_____
(c) Final Inspection	_____	C.E.	_____	_____
(d) Resident Inspector accepts construction as complete	_____	C.E.	_____	_____
18. City Staff Approval of Construction	_____	C.A.	_____	_____
19. Bill of Sale Received, Reviewed and Approved by City Engineer	_____	C.E.	_____	_____
20. Easements Received, Reviewed, Recorded and Approved by City Engineer	_____	C.E.	_____	_____
21. Maintenance/Guarantee Bond Received, Reviewed and Approved by City Attorney	_____	C.A.	_____	_____
22. Attorney's Review Memo	_____	C.A.	_____	_____
23. City Council Final Approval & Acceptance of Project	_____	C.A.	_____	_____
24. Council Minutes of City Approval Filed in Project File	_____	C.A.	_____	_____
25. Service Agreements/Interlocal Agreements Completed & Executed	_____	C.A.	_____	_____
26. "As-Builts" (Mylars) Completed, Submitted, Approved and in City's Possession	_____	C.A.	_____	_____

	Applies to Project Yes(Y)/No(N)	City Dept.*	Dept. Initial	Date
27. Capital Facility Charge/Hookup/ Outstanding Bills Paid in Full	_____	C.A.	_____	_____
28. Final Occupancy Approval	_____	B.O.	_____	_____
29. Two Year Warranty Period Expires	_____	C.E.	_____	_____
30. Other	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____
	_____	___	_____	_____

PROJECT CLOSE OUT

_____
City Administrator

* City Dept. Abbreviations:

P.D. - Planning Department
C.A. - City Administrator
B.O. - Building Official
F.D. - Fire Department
C.E. - City Engineer

SAMPLE COPY

CITY OF BLACK DIAMOND

DEVELOPER AGREEMENT

THIS AGREEMENT, by and between the City of Black Diamond, a municipal corporation, hereinafter referred to as "City", and _____, hereinafter referred to as "Developer":

WITNESSETH: That whereas the City of Black Diamond, a municipal corporation, provides water/sanitary/storm/gas or roadway service within this area, and the above-named Developer is preparing to construct an extension or modification or additions thereto, and said development requires the City's service;

WHEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. Developer agrees to construct the water/sanitary/storm/gas or roadway system, or additions thereto, to be connected to the City's infrastructure, and to maintain such additions until such time as the improvements are accepted by the City, with the agreements conditioned as set forth below. The improvements, extension, or additions thereto, shall be located within that area commonly referred to as _____, which property is described in Exhibit "A" attached hereto and referred to hereinafter as "Premises".

2. As a condition precedent to City obligations under this agreement, the Developer shall construct the proposed water/sanitary/storm/gas/or roadway system, or additions thereto, within said premises in conformance with the minimum standards as set forth in the City's currently adopted Construction Standards, as adopted together with any amendments thereto hereinafter made, and further to conform with the City's comprehensive planning documents, which agreement shall include oversizing of mains necessitated by the comprehensive plan.

3. The developer agrees that the construction of any infrastructure items, or additions thereto, shall not commence until the following conditions have been fulfilled:

    a. The developer shall furnish the City with four (4) sets of detailed plans for the proposed improvements, or additions thereto, at Developer's own expense, prepared by a qualified engineer currently licensed in the State of Washington.

    b. The above plans shall require the review and approval by the City and its Engineer, and the cost of such review shall be at the Developer's own expense.

    c. Minimum requirements for all plans, or additions thereto, submitted to the City for review are:

(1) Four (4) sets of all plans and documents shall be submitted, wherein two (2) sets will be retained by the City, and two (2) sets will be returned to the applicant.

(2) A preliminary plat of the area in which said improvement, or additions thereto, are to be constructed, which plat has been approved by the City.

(3) A map showing the location of the plat in relation to the surrounding area.

(4) A contour map of the plat with contour intervals of five feet or less extending fifty (50') feet beyond the plat/property lines.

(5) A map showing the location and depth of all proposed utilities and any connections and/or interconnections to existing facilities or future extensions and connections.

(6) A 1" = 50' plan and profile view of the proposed improvements showing streets, lot lines, dimensions, and location of bench marks (City datum) and monuments for the proposed plat, together with an indication of the development of the adjacent property, as may be applicable.

(7) A profile 1" = 50' horizontal and 1" = 5' vertical of the finished road grades with any proposed utility system improvements and other pertinent underground utilities located, with elevations noted thereon. The elevation datum shall be the same as used by the City. It shall be the responsibility of the Developer to confirm such datum with the City.

(8) Full-sized detail sheets shall be included as part of the construction drawings, as required to clearly indicate the details for all of the infrastructure improvements not otherwise provided for in this text, or additions thereto, to be constructed, consistent with City standards.

(9) Specifications sufficient to fully describe the work, consistent with the City's minimum and currently adopted Construction Standards.

(10) Approvals from all regulatory agencies.

d. Construction requirements in addition to the City standards and details for developer extensions, as adopted, are as follows:

(1) All streets and/or roadways shall be graded to within six inches of final grade before installation of utility improvements, unless otherwise approved by the City Engineer.

(2) All lots shall be fully staked to assist all parties involved in the proper location of utility services.

(3) All contractors and subcontractors shall have a current Washington State Contractors License on file with the City.

(4) The Developer's proposed improvements, or additions thereto, on Premises shall not be connected to the City system until authorized by the City, and such connection shall be performed only under the supervision and approval of the City.

e. For the purpose of applying RCW 4.24.115 to this Contract, the Developer and the City agree that the term "damages" applies only to the finding in a judicial proceeding and is exclusive of third party claims for damages preliminary thereto.

The Developer agrees to indemnify and hold harmless the City from all claims for damages by third parties, including costs and reasonable attorney's fees in the defense of claims for damages, arising from performance of the Developer's express or implied obligations under this Agreement. The Developer waives any right of contribution against the City.

It is agreed and mutually negotiated that in any and all claims against the City or any of its agents or employees by any employee of the Developer, any contractor or subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation hereunder shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Developer or any contractor or subcontractor under Workman's Compensation Acts, disability benefits acts or other employees' benefit acts. The City and the Developer agree that all third part claims for damages against the City for which the Developer's insurance carrier does not accept defense of the City may be tendered by the City by the Developer who shall, if so tendered by the City, accept and undertake to defend or settle with the Claimant. The City retains the right to approve claim investigation and counsel assigned to said claim and all investigation and legal work product regarding said claim shall be performed under a fiduciary relationship to the City. In the event that the City agrees or a court finds that the claim arises from the sole negligence of the City, this indemnification shall be void and the City shall be responsible for all damages payable to the third party claimant. In the event that the City and the Developer agree or a court finds that the claim arises from or includes negligence of both the Developer and the City, the Developer shall be responsible for all damages payable by the Developer to the third party claimant under the court findings, and, in addition thereto, the Developer shall hereunder indemnify the City for all damages paid or payable to the City under the court findings in an amount not to exceed the percentage of total fault attributable to the Developer. For example, where the Developer is 25% negligent, the Developer shall not be required to indemnify the City for any amount in excess of 25% of the claimant's total damages.

f. In the event the Developer in his operation damages or disrupts existing improvements, the repairs shall be made at the Developer's expense. In the event they are so damaged or the service disrupted and the Developer fails or

is unable to immediately restore the service, then the Owners of the improvements may cause the repairs to be made by others and all costs for the same shall be at the Developer's own expense.

Where the construction crosses or is adjacent to existing utilities, the Developer shall exercise extreme care to protect such utilities from damage.

If any damage is done to an existing utility, the Developer shall notify the utility company involved, who will dispatch a crew to repair the damage at the Developer's expense. All costs for the same shall be at the Developer's own expense.

The Developer shall be aware that some existing City owned facilities are known to contain asbestos cement pipe. The Developer shall conduct all work related to existing asbestos cement pipe in strict accordance with current WISHA safety regulations and provisions contained within WAC 296-62-077. All costs related to work in compliance with established rules and regulations shall be the responsibility of the Developer. Demolition of existing asbestos cement pipe, if required, will be permitted only after the proper permits are obtained from the Puget Sound Air Pollution Control Agency. The Developer shall be responsible for all associated fees and permits required for asbestos removal and disposal. Work crews shall be provided with proper protective clothing and equipment. Hand tools shall be used, and the asbestos cement pipe shall be scored and broken in lieu of the sawing or other methods which release fibers into the atmosphere. Waste asbestos pipe shall be buried in the trench. Asbestos pipe to be abandoned in place shall not be disturbed, except as noted herein, and shall remain in its original position.

The Developer is cautioned that all existing drainage systems, whether open ditch, buried pipe, or drainage structures, are not on record. It shall be the responsibility of the Developer to repair or replace all such systems found during construction, which are damaged by the Developer's construction in a manner which is satisfactory to the City.

Where the Developer is allowed to use private property adjacent to the work, the property so used shall be returned to its original or superior condition. The Developer shall make all arrangements in advance with such property owners, to insure that no conflicts will ensue after the property is restored as described above. The Developer will be required to furnish the City with a written release from said private property owners, if the City deems it to be necessary to obtain such document.

4. The construction of the Developer's proposed improvements, or additions thereto, on the Premises shall be supervised by the City in such a manner and at such times as the City deems reasonably necessary to assure that construction of the system will conform with the above-mentioned plans and specifications and minimum City Standards. The Developer herewith agrees to allow such inspections and agrees to cooperate providing reasonable advance notice on his construction schedule during the various construction phases as requested by the City. The Developer further

agrees to reimburse the City for all engineering fees and expenses incurred by the City for such supervision.

5. The Developer's proposed improvements, or additions thereto, on Premises shall not be accepted for service and use until the same have been fully inspected and approved, and the following requirements have been performed:

   a. Submit to the City in Auto-CADD format, latest revision, the computer file supplied on a three and one half (3-1/2) inch disc accompanied by the original "fixed line" mylars, with all changes from the original design clearly marked to reflect the as-built conditions. The Developer's Engineer shall certify the accuracy of the record drawings and shall affix his seal and signature.

   b. Payment of all permit fees and equivalent assessment charges and any other applicable City charges required for Premises.

   c. Payment of all plan check and inspection fees and related fees.

   d. Prepare and furnish the required easements in accordance with City's standard form, and furnish same to the City for approval by the City Attorney, along with the necessary recording fees.

   e. Furnish the City with an affidavit warranting there are no liens against the improvements constructed on Premises by the Developers, this affidavit shall be in the form prescribed by the City.

   f. Furnish the City with a Bill of Sale conveying the water/sanitary/storm or roadway system to the City, which shall include a two-year guarantee that the conveyed systems or improvements or additions thereto shall be free of defects in labor and materials. Form shall be as prescribed by the City.

   g. Payment of all applicable bills, invoices, fees, etc., have been paid in full.

6. In the event any warranty repairs are required, the City agrees, whenever feasible, to provide the Developer with reasonable notice before directly undertaking such repairs. The City reserves the right, however, to effect emergency repairs as deemed necessary by the City. The City shall be reimbursed by the Developer for all costs thereof.

7. Upon performing all requirements, including those as set forth in Paragraph 5 above, the City shall accept the water/sanitary/storm or roadway improvements, and agree therewith to operate and maintain said system.

SUBMITTED this ____ day of _____, 19__.

BY DEVELOPER: _____
Printed Name

_____
Signature

_____
Date

State of Washington)
) ss.
County of King)

On this _____ day of _____, 19__, before, me the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the person who executed the foregoing instrument, and acknowledged the said instrument to be his free and voluntary act and deed, for the uses and purposes therein mentioned, and acknowledged that he/she had the legal authority to execute said agreement on behalf of the "Developer".

WITNESS my hand and official seal affixed the day and year first above written.

_____
Notary Public in and for the State
of Washington, residing at _____

(INDIVIDUAL)

CITY OF BLACK DIAMOND

DEVELOPER AGREEMENT

EXHIBIT "A"

PLAT NAME: _____

DEVELOPER: _____

LEGAL DESCRIPTION: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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Appendix L

Water Right Documents

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: Primary Qi Maximum Rate Allowed	Existing Water Rights: Non-Additive Qi Maximum Rate Allowed	Existing Water Rights: Primary Qa Maximum Volume Allowed	Existing Water Rights: Non-Additive Qa Maximum Volume Allowed	Current Source Production – Most Recent Calendar Year: Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	10-Year Forecasted Source Production (determined from WSP): 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	20-Year Forecasted Source Production (determined from WSP): 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 S1-00506C	04 – Black Diamond Springfield including: 01 – Sofa Spring 02 – Mattress Spring 03 – Leaf Spring	8 cfs (3,590 gpm)	0 cfs	551 afy	0 afy	500 gpm	3,090 gpm	367 afy	184 afy	900 gpm	2,690 gpm	214 afy	337 afy	900 gpm	2,690 gpm	218 afy	333 afy
2																	
	TOTALS =	3,590 gpm		551 afy		500 gpm	3,090 gpm	367 afy	184 afy	900 gpm	2,690 gpm	214 afy	337 afy	900 gpm	2,690 gpm	218 afy	333 afy
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
None						

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: Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume	Expiration Date of Contract	Currently Purchased: Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	10-Year Forecasted Purchase: Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	20-Year Forecasted Purchase: Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1 Tacoma Water (2003)	2,675 gpm	1,918 afy	None	0 gpm	2,675 gpm	0 afy	1,918 afy	1,539 gpm	1,136 gpm	1,360 afy	558 afy	1,588 gpm	1,087 gpm	1,387 afy	531 afy
2 Tacoma Water (2007)	781 gpm	560 afy	None	0 gpm	781 gpm	0 afy	560 afy	0 gpm	781 gpm	0 afy	560 afy	0 gpm	781 gpm	0 afy	560 afy
TOTALS =	3,456 gpm	2,478 afy		0 gpm	3,456 gpm	0 afy	2,478 afy	1,539 gpm	1,917 gpm	1,360 afy	1,118 afy	1,588 gpm	1,868 gpm	1,387 afy	1,091 afy
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 None		
3		

ADDITIONAL COMMENTS:

- Existing Use from Calendar Year 2019. Combined 500 gpm and 367 afy from water rights and interties.
- 10-Year Forecast from Calendar Year 2029. Combined 2,439 gpm and 1,573 afy from water rights and interties.
- 20-Year Forecast from Calendar Year 2039. Combined 2,488 gpm and 1,605 afy from water rights and interties.
- 2003 Wholesale Agreement – Under C.2. of the Wholesale Water Agreement, the Maximum Qi was based on a peak day use of 3,852,000 gpd, while the Maximum Qa was based on an average day use of 1,712,000 gpd.
- 2007 Wholesale Agreement – Added under Section C of the Wholesale Water Agreement, the Maximum Qi was based on a peak day use of 1,125,000 gpd, while the Maximum Qa was based on an average day use of 500,000 gpd.
- The City also holds one water right for 2.93 cfs for power production from Black Diamond Springs. The water right number is SWC 3580 that was originally issued to King County Water District No. 66. This power water right is not included in the table since it is not used for potable municipal supply.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

MAR 09 2012

COMMUNITY DEVELOPMENT

MAR 14 2012

RECEIVED

Seth Boettcher
Public Works Director
City of Black Diamond
P.O. Box 599
Black Diamond, WA 98010

RE: Administrative Order No. 12WRNR – DE 9035 to Surface Water Reports of Examinations for CS1-00506C and CS1-00506C@1

Dear Mr. Boettcher:

Enclosed is Administrative Order No. 12WRNR – DE 9035 to change Surface Water Reports of Examinations for CS1-00506C and CS1-00506C@1.

If you have any questions, please contact Doug Wood at 425.649.7077 or at Doug.Wood@ecy.wa.gov.

Sincerely,

Jacqueline Klug
Section Manager
Water Resources Program

jl/dw/mc

Enclosure(s): Order No. 12WRNR – DE 9035
Your Right to be Heard

By certified mail: 7010 3090 0000 1910 1408

WASHINGTON STATE DEPARTMENT OF ECOLOGY

BEFORE THE
DEPARTMENT OF ECOLOGY
STATE OF WASHINGTON

IN THE MATTER OF REPORTS OF EXAMINATION FOR CHANGE NUMBERED CS1-00506C AND CS1-00506C@1 ISSUED ON APRIL 29, 1992 AND JUNE 30, 1992 RESPECTIVELY	)))))	REPORT OF INVESTIGATION, FINDINGS OF FACT, DETERMINATION, AND ORDER DOCKET NO 12WRNR – DE 9035

REPORT OF INVESTIGATION

The City of Black Diamond filed two applications for change to S1-00506C with the Department of Ecology on January 18, 1990 and August 13, 1990. The first application, CS1-00506C, sought to change the source from a spring collection system to a well. The second change application, CS1-00506C@1, sought to change the place of use to allow interties to be established between the City of Black Diamond and several municipal water purveyors located in Southwest King County.

FINDINGS OF FACT

The Report of Examination (ROE) for the first application (CS1-00596C), issued on April 29, 1990, recommended denial of the application to change the point of diversion and further recommended that an order be issued to reduce the rate of diversion (Qi) of S1-00506C from 8 cubic feet per second (cfs) to 550 gallons per minute (gpm). The ROE for the second application (CS1-00506C@1), issued on June 30, 1992, recommended partial approval of the change in place of use, and also recommended that an order be issued to reduce the Qi from 8 cfs to 550 gpm.

In the case of both ROE's, a cover letter accompanied the issuance of the report which stated that the letter constituted an order implementing the recommendations contained within the reports. However no further action was taken by Department of Ecology regarding issuance of an order to reduce the Qi of S1-00506C.

Ecology's rationale in recommending reduction of the Qi, as stated in its 1993 ROE's, was that an ministerial error had occurred when the certificate for S1-00506C was issued in 1974. The Proof of Appropriation (PA) in the file for S1-00506C has a notation on it, initialed by Ecology permitting staff, which indicates approval for a certificate to be issued for the same quantities as the permit, namely 8 cfs and 551 acre-feet per year (afy). These are the quantities for which the certificate was issued.

In 2003 the legislature passed and the Governor signed into law Second Engrossed Second Substitute House Bill 1338 (SESSB 1338), also known as the Municipal Water Law of 2003. Specifically SESSB 1338 added two new subsections to RCW 90.03.330, which address and restrict Ecology's authority to reduce quantities of existing water right certificates.

RCW 90.03.330(2) states that: *"Except as provided for the issuance of certificates under RCW 90.03.240 and for the issuance of certificates following the approval of a change, transfer, or amendment under RCW 90.03.380 or 90.44.100, the department shall not revoke or diminish a certificate for a surface or ground water right for municipal water supply purposes as defined in RCW 90.03.015 unless the certificate was issued with ministerial errors or was obtained through misrepresentation. The department may adjust such a certificate under this subsection if ministerial errors are discovered, but only to the extent necessary to correct the ministerial errors. The department may diminish the right represented by such a certificate if the certificate was obtained through a misrepresentation on the part of the applicant or permit holder, but only to the extent of the misrepresentation. The authority provided by this subsection does not include revoking, diminishing, or adjusting a certificate based on any change in policy regarding the issuance of such certificates that has occurred since the certificate was issued. This subsection may not be construed as providing any authority to the department to revoke, diminish, or adjust any other water right."*

RCW 90.03.330(3) states that: *"This subsection applies to the water right represented by a water right certificate issued prior to September 9, 2003, for municipal water supply purposes as defined in RCW 90.03.015 where the certificate was issued based on an administrative policy for issuing such certificates once works for diverting or withdrawing and distributing water for municipal supply purposes were constructed rather than after the water had been placed to actual beneficial use. Such a water right is a right in good standing."*

It is apparent that the reasoning for reducing the quantities was not the result of a ministerial error. The record reveals that Ecology permitting staff reviewed the quantities and approved issuance of the certificate at 8 cfs rather than for what was stated on the PA, which suggests more strongly that the certificate was issued based on an administrative policy as described in RCW 90.03.330(3).

The partial approval of changes proposed through application CS1-00506C@1, namely modifying the place of use to allow intertie flexibility, was made moot by another amendment to the Water Code enacted through SESSB 1338. Section 5 of SESSB 1338 amended RCW 90.03.386 by specifying that a municipal water purveyor's service area is established and modified through the water system planning process under the authority of the Department of Health.

The 2008 Water System Comprehensive Plan, the most recent plan in Ecology Files, reports that the City of Black Diamond two water rights, a 2.93 cfs surface water right (Certificate 3580) dedicated to hydro power and Certificate S1-000506C with 8 cfs and 551 afy serving municipal supply purposes.

In addition the plan shows that the City of Black Diamond has a wholesale contract and intertie with the City of Tacoma Second Supply Pipeline which can supply 3.4 cfs for average demand and 7.7 cfs for peak use (7.3 cfs averaged over 4 days).

DETERMINATION AND ORDER

The recommendation and order contained in the Reports of Examination for changes CS1-00506C and CS1-00506C@1 that an order be issued to reduce the quantities allocated through certificate S1-00506C

is hereby rescinded. The approval of the change in place of use for change application CS1-00506C@1 is deemed to be moot and also rescinded.

The effect of the above is to restore Certificate S1-00506C to its attributes as they existed when the certificate was issued in 1974, namely that the quantities are 8 cubic feet per second and 551 acre-feet per year, and that the authorized place of the use is the area served by the City of Black Diamond.

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk P.O. Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board Environmental Hearings Office 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board P.O. Box 40903 Olympia, WA 98504-0903

Dated at Bellevue, Washington this 9th day of March, 2012.

Jacqueline Klug
Section Manager
Water Resources – NW Region
Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

APPLICATION FOR CHANGE OF WATER RIGHT

[X] Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 15, 1968	20899	15556	S1-00506C

NAME
City of Black Diamond

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
25510 Lawson Street	Black Diamond	WA	98010

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Springs (3)

TRIBUTARY OF (IF SURFACE WATERS)
Green River

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
8 cfs*		551 acre-feet

QUANTITY, TYPE OF USE, PERIOD OF USE

Municipal supply, continuous

*This quantity will be reduced by Order of Recision to reflect perfected quantities under Permit No. 15556.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

Spring #1 325 feet east and 1250 feet north, Spring #2 200 feet west and 800 feet north, Spring #3 425 feet west and 600 feet north all from the south quarter corner of Section 19.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼ SW¼ SE¼ & E½ SE¼ SW¼	19	21	7 E	9	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Black Diamond, being within Section 11, SW¼ of Section 12, W½ of Section 13, Section 14 except the S½SW¼, NE¼ of Section 15, and NE½ of Section 23, T. 21 N., R. 6 E.W.M.

DESCRIPTION OF PROPOSED WORKS

System of interties not described

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
July 1, 1993	July 1, 1998	July 1, 1998

REPORT

BACKGROUND

The City of Black Diamond holds two water right certificates. Certificate of water right 3580 authorizes diversion of 2.93 cubic feet per second (cfs), continuously, for production of power to operate a hydro-turbine, with a priority date of August 22, 1949. The certificate has no annual quantity limit on water use; the water use is non-consumptive and the water is discharged to the Green River. The point of discharge is approximately 900 feet away from the point of diversion and 150 feet lower in elevation. The City also holds certificate of water right S1-00506C, priority date of April 15, 1971, which authorizes the diversion of 8.0 cfs, annual quantity limit of 551 acre-feet, for municipal water supply, with the place of use being the area served by the City of Black Diamond. The source of water for both certificates are the Black Diamond Springs.

A detailed description of the City's water system is contained in a report of examination written on a previous application for change of source from surface to ground water.

INVESTIGATION

An application for change of water right S1-00506C was received on August 13, 1990. Public notice was published in the Enumclaw Courier-Herald combined with the Buckley News-Banner on March 4 and 11, 1992. The applicant seeks to change the place of use from the area served by the Town of Black Diamond to include the City of Auburn, the City of Tacoma, the City of Kent, Covington Creek Water District # 105, Cedar Ridge Water District, Federal Way Water and Sewer District, King County Water District # 111, King County Water District # 56, and King County Water District # 75. A protest to the proposed change was received from the Muckleshoot Indian Tribe.

A field inspection was not conducted for this application, because a good understanding of the existing system and proposed change is known. In talking with Keith Olson, Director of Public Works for the City of Black Diamond, the change in place of use was requested for three reasons. The City wants to construct an intertie with Covington Water District (somewhere on the west side of Section 15, T. 21 N., R. 6 E.W.M.) to ensure an emergency supply for the east side of the City. The City envisions selling, wheeling, water to South King County utilities to meet future demand. This would be accomplished by an intertie on the north end of town, perhaps with Pipeline # 5. The intertie on the north end of town could also serve as an emergency backup source for the City of Black Diamond.

A review of the South King County Coordinated Water System Plan (CWSP), 1989, was conducted to determine if the proposed additions to Black Diamond's place of use under S1-00506C are consistent with the City's designated service area under the CWSP and if existing or proposed interties between Black Diamond and any neighboring purveyors were discussed.

The service area for the City of Black Diamond, as stated in the CWSP, includes the following: Sections 1 (except the N½N½), 2 (except the N½N½), 10 (except the NW¼), 11, 12, 13, 22, 23, 24, and those portions of 25, 26, and 27 north of the Green River, Township 21 N., Range 6 E.W.M. Also included in the service area are Sections 6, 7, 18, and 19, Township 21 N., Range 7 E.W.M. This service area is much larger than the place of use designated for S1-00506C. However, the City's service area does not include the water service areas for the purveyors listed above.

King County Building and Lands Management, is supposed to have a copy of an interlocal agreement for establishing water utility service area boundaries as identified by the South King County Coordination Water System Plan. I could not obtain a copy of this agreement.

The CWSP discusses several existing and proposed interties, however, it does not discuss any interties which involve the City of Black Diamond.

Recent legislation, Second Substitute Senate Bill 5358 (chapter 350, Laws of 1991) addressing interties is codified in RCW 90.03.383. That legislation recognized the value of interties for improving the reliability of public water systems, enhancing their management, and more efficiently utilizing water resources. For the purposes of RCW 90.03.383, the statute defines interties as interconnections between public water systems permitting the exchange or delivery of water between those systems for other than emergency supply purposes. Interties include interconnections between public water systems permitting exchange or delivery of water to serve as primary or secondary sources of supply, but do not include development of sources of supply to meet future demand. Based on the information at hand, it appears that the City wants to sell water that would constitute a source of water to meet future demand.

Pursuant to RCW 90.03.380 the right to use water which has been applied to a beneficial use can be transferred to another or others and become appurtenant to any other land or place of use without loss of priority of right, if such a change can be made without detriment or injury to existing rights. An assessment of a proposed change requires a determination of whether or not a right exists to be changed, would the change impair existing rights, and is the change in the public interest. A change made to the place of use cannot enlarge the right initially acquired.

In reviewing the instantaneous quantity of water diverted by the City, several pieces of information are necessary to determine the right perfected. The City of Black Diamond currently has the physical capacity to pump approximately 700 gallons per minute (gpm) to the reservoir if both the electrical pump and the hydro-turbine are used (personal communication, Keith Olson, March 1992). It is not standard practice to use both pumps, rather the electrical pump is a backup to the hydro-turbine. The electrical pump currently used by the City is not the same as the one used in 1974 when the proof of appropriation form was filed for S1-00506C. The proof of appropriation form filed by the City in February of 1974, for S1-00506C, indicated the ability to pump 550 gpm and 300 gpm as the amount of water applied to beneficial use. The Department of Ecology issued certificate of water right S1-00506C for 8.0 cfs (3600 gpm) instantaneous in 1974. In September of 1989 the City states in its supplement to its Comprehensive Water Plan that it currently uses 0.3 cfs or 135 gpm of water; the CWSP indicates the City has the ability to pump 500 gpm.

Black Diamond's population was 1,505 people on April 1, 1991. The projected population for the year 2020 is 4,000 people. The current per capita consumption of water is approximately 130 gallons per day. The projected population and the per capita consumption figures are from Keith Olson, March 1992. The annual water limit for certificate of water right S1-00506C of 551 acre-feet was calculated on a per capita consumption of 120 gpd for a projected population of 4100 in 1985. Although the projected 1985 population did not materialize, the City will have sufficient water to meet their projected demand until the year 2020.

The instantaneous diversion right perfected under S1-00506C is less than the certificated amount of 8.0 cfs. The limit on a water right is the amount of water beneficially used. Regardless of what a water right certificate states on its face, the right enjoyed is what has been perfected under the terms of the permit. The Department erred in 1974 in issuing certificate of water right S1-00506C for 8.0 cfs instantaneous, because that instantaneous amount was not perfected in accordance with the terms of the permit. The Department had no statutory authority to issue certificate S1-00506C for 8 cfs, when that amount was not perfected. The Department does have statutory authority to issue a certificate for the amount perfected.

The measure of a water right is the amount of water put to beneficial use. Generally, for municipal water systems, the Department will certificate a permitted water right when a diversion system has been constructed in agreement with a permit. It has been the Department's policy to certificate the annual quantity of water use even though the annual quantity of water has not been put to beneficial use. The reason annual quantities were certificated prior to full beneficial use for municipal systems is that the annual quantity is based on a projected population which is not present when a certificate issues. However, development of the water is constrained by the permit. In Black Diamond's case, the instantaneous quantity of water perfected is 550 gpm, the maximum capacity of the system to pump water to the City's reservoir. At this time it seems reasonable to leave the City's annual quantity authorization at 551 AF, because the Department expects that quantity to be fully used in the next 28 years.

The Muckleshoot Indian Tribe filed a protest letter to the proposed change on April 9, 1992. The Tribe is concerned that the City will increase their current diversion rate and that the increased diversion will negatively impact the Green River. The change filed for will not create additional diversion above the City's legal entitlement, therefore the Tribes protest is without merit. Should the City wish to withdraw more water, they would have to file a new water right application.

The City's requested change is not in agreement with the South King County Coordinated Water System Plan. In fact, the City should file an application for change in place of use if they wish to serve any area, excluding

emergency water for Covington # 105, outside the City of Black Diamond. An expansion of the City's service area to include Covington Water District would provide both Covington and Black Diamond with a source of water to use in emergency situations. Such a place of use expansion would not be an enhancement of the right. The water would only be used in emergency situations. Covington Water District should file an application of change to include the eastern portion of the City of Black Diamond as part of their service area, so that water may move through the proposed intertie in both directions. While this is not mentioned in the CWSP, it makes sense from a water management perspective and would be in the public interest as it would provide an emergency backup for the City.

That portion of the City of Black Diamond's requested change relating to an intertie with Pipeline # 5 for the purposes of Black Diamond selling water is not in the public interest. It is not in the public interest to have any water purveyor build a dependence on a non-firm source of water. While the City currently does not use all of their water entitlement, they will within the next 28 years.

I talked with Judy Nelson (General Manager, Covington Water District) on May 20, 1992. Prior to entering an agreement with the City of Black Diamond to construct an intertie, she indicated the District would need to determine the economic viability of constructing an intertie for emergency water sharing. It may not be economically viable. If the project is viable, then an intertie agreement would be executed and finally, construction of the intertie. Three years from the date of report of exam issuance was reasonable to Judy to complete the project, if it will happen at all.

Keith Olson indicated five years was a reasonable time for the City of Black Diamond to perfect the changes sought.

The actual location of any interties, construction plans, capacity of interties, and use agreements are yet to be determined.

CONCLUSION

I find the City of Black Diamond has a water right that can be changed pursuant to RCW 90.03.380 and that the proposed change herein recommended will not enlarge the existing water right or impact existing rights, and is in the public interest.

The City of Black Diamond's water right certificate S1-00506C is in error as to the instantaneous quantity authorization.

The City of Black Diamond does not have excess water to sell to other water purveyors in South King County.

RECOMMENDATION

I recommend authorizing a change in the service area for the City of Black Diamond. The City's water right place of use should be modified to include Covington Water District (as described in the CWSP), and approve an emergency intertie on the north end of town with Pipeline # 5.

I recommend denial of that portion of the requested change to include all of the rest of the purveyors listed above, because the City of Black Diamond does not have water in excess of their projected demand to sell.

I recommend the administrative error made by the Department in 1974 in regards to water right certificate S1-00506C be corrected. The City's certificate of water right S1-00506C should be superseded to reflect the actual water right perfected and to agree with the statutory authority of the Department.

Approval is subject to existing rights and the following provisos:

The City of Black Diamond shall demonstrate the two proposed interties, one for Covington # 105 and the other on the north end of town, will increase Black Diamond's overall system reliability, provide opportunities for conjunctive use and delay or avoid the need to develop new water sources for the Town of Black Diamond.

The City of Black Diamond shall file a copy of an agreement between the City and the water purveyor to the north on the emergency use of the intertie for Black Diamond's use of water from Pipeline # 5.

The City of Black Diamond file a copy of an agreement between the City of Black Diamond and Covington Water # 105 as to the use of the intertie.

Interties shall be metered and records of water exchanged will be maintained and made available to the Department upon request.

REPORT BY: Stephen J Hirschey DATE: June 30, 1993

I have examined this application as required by SEPA and find that it is: ☒ not an "action".

☐ categorically exempt.

RECEIVED
AUG 13 1990
DEPT OF ECOLOGY

SIGNATURE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Accepted By .....
Date .....
Is Field Exam. Required? ☐ YES ☐ NO
Determined By .....

APPLICATION FOR CHANGE OF WATER RIGHT

☐ PURPOSE ☐ DIVERSION OR WITHDRAWAL
☒ PLACE ☐ ADDITIONAL POINT OR POINTS

NAME: CITY OF BLACK DIAMOND
TELEPHONE NUMBER: (206)886-2560

ADDRESS: 25510 Lawson/P.O. Box 599 (CITY) Black Diamond (STATE) Wash. (ZIP CODE) 98010

APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
20890	15556	51-005066 G C

DECREED RIGHT (TITLE OF CASE)

APPROPRIATIONS MADE (GIVE DATE IF PRIOR TO JUNE 15, 1917 IF SURFACE WATER, OR JUNE 7, 1945 IF GROUND WATER)
Applicant claims vested rights by virture of continued use prior to 1917

IS THE WATER RIGHT RECORDED IN YOUR NAME? ☒ YES ☐ NO
IF NO, GIVE NAME RECORDED UNDER

RIGHT CONSISTS OF

WATERS USED FROM (STREAM, LAKE, WELL, OR TRENCH, ETC.): Springs
GALLONS PER MINUTE OR CUBIC FEET PER SECOND: 8.0 cubic feet per second-551 acre feet/year

WATER CURRENTLY USED FOR: Domestic Municipal purposes
TIME OF USE: continuous

LOCATION OF PRESENT POINT OF DIVERSION OR WITHDRAWAL

NUMBER OF FEET	☐ NORTH ☐ SOUTH	NUMBER OF FEET	☐ EAST ☐ WEST	FROM THE	☐ NORTHWEST ☐ SOUTHWEST	☐ NORTHEAST ☐ SOUTHEAST	CORNER OF:

SMALLEST LEGAL SUBDIVISION: E½ SE¼ SW¼ and NW¼ SW¼ SE¼

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	King

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF LANDS WATER IS USED ON

Area served by the City of Black Diamond

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY

(ATTACH SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS ☒ YES & ☒ NO
IF NO, EXPLAIN YOUR INTEREST: The City owns the site of the Springs and supplies water in the City of Black Diamond's "service area", which is privately owned.

REASONS FOR THE PROPOSED CHANGE

2/14

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

CONTINUE ON REVERSE SIDE

CY 040-1-87

CHANGE

CHANGE REQUESTED

CHANGE WATER USE TO	TIME OF USE	GALLONS PER MINUTE OR CUBIC FEET PER SECOND
Domestic Municipal use	continuous	3590 GPM/551 Acre Feet/year

LOCATION OF PROPOSED POINT OF DIVERSION OR WITHDRAWAL

NUMBER OF FEET	☐ NORTH ☐ SOUTH	NUMBER OF FEET	☐ EAST ☐ WEST	FROM THE	☐ NORTHWEST ☐ SOUTHWEST	☐ NORTHEAST ☐ SOUTHEAST	CORNER OF:

SMALLEST LEGAL SUBDIVISION
E½ SE¼ SW¼ and NW¼ SW¼ SE¼

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	King

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

ARE YOU THE OWNER OF THE LAND ON WHICH THE PROPOSED POINT OF DIVERSION OR WITHDRAWAL IS TO BE LOCATED?
☒ YES ☐ NO

LEGAL DESCRIPTION OF LANDS WATER IS TO BE USED ON

The "service areas" of: The City of Black Diamond, The City of Auburn, The City of Tacoma, The City of Kent, Covington Creek Water District #105, Cedar River Water District, Federal Way Water and Sewer District, King County Water District #111, King County Water District #56, King County Water District #75.

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	King

(ATTACH A SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS	IF NO, EXPLAIN YOUR INTEREST
☒ YES & ☒ NO	The City owns the site of the Springs, but the lands to which the municipality supplies water is privately owned and other Water Districts recognized by D.S.H.S., King and Pierce Counties.

Such change can be made without detriment or injury to existing rights or the state's interest in water, as provided in RCW 90.44.100 or RCW 90.03.380.

STATE OF WASHINGTON
County of King } *ss.*

I Howard Botts, *being first duly sworn, depose and say that I have read the above application for change of a water right, that I know the contents thereof; and that the facts therein stated are true.*

IN WITNESS WHEREOF, I have hereunto set my hand this 3RD *day of* AUGUST, *19* 90.

Howard Botts

Applicant(s)/Permitee

Subscribed and sworn to before me this 3rd *day of* August, *19* 90.

Cristine A. Sanders

Notary Public

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO CHANGE A WATER RIGHT CERTIFICATE

[X] **Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] **Ground Water** (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 15, 1968	20899	15556	S1-00506C

NAME
City of Black Diamond

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
25510 Lawson Street	Black Diamond	WA	98010

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Springs (3)

TRIBUTARY OF (IF SURFACE WATERS)
Green River

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
8 cfs		551 acre-feet

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply, continuous

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
Spring #1 325 feet east and 1250 feet north, Spring #2 200 feet west and 800 feet north, Spring #3 425 feet west and 600 feet north all from the south quarter corner of Section 19.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼SW¼SE¼ & E½SE¼SW¼	19	21	7 E	9	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the Town of Black Diamond, being within Section 11, SW¼ of Section 12, W½ of Section 13, Section 14 except the S½SW¼, NE¼ of Section 15, and NE½ of Section 23, T. 21 N., R. 6 E.W.M.

DESCRIPTION OF PROPOSED WORKS

See Investigation section below

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:

REPORT

BACKGROUND

The City of Black Diamond has two water right certificates. Certificate of water right 3580 authorizes diversion of 2.93 cubic feet per second (cfs), continuously, for production of power to operate a hydro-turbine, with a priority date of August 22, 1949. The certificate has no annual quantity limit on water use; the water use is non-consumptive and the water is discharged to the Green River. The point of discharge is approximately 900 feet away from the point of diversion and 150 feet lower in elevation. The City also holds certificate of water right S1-00506C, priority date of April 15, 1971, which authorizes the diversion of 8.0 cfs, and an annual quantity limit of 551 acre-feet, for municipal water supply, with the place of use being the area served by the City of Black Diamond. The source of water for both certificates are the Black Diamond Springs.

The Black Diamond Springs are located on 80 acres of City property about two miles southeast of the City and south of the Green River. There are four major springs and numerous small springs on the property; three of the springs have been developed as the City's water supply. Several small streams formed by spring run-off originate on the property and flow to the Green River. The largest spring in the area, discharge of approximately 15 cfs on October 10, 1990, commonly known as either Palmer Spring or spring # 4 has no historical or present day development.

The City's original water system was built in the late 1890's by the Pacific Coast Coal Company. The system has been modified numerous times over the years, with significant modifications in 1949, and 1987. The original system used two 10 inch iron pipes from springs # 1 and #3 to feed a surface reservoir formed by a small concrete dam just downhill of spring # 2. Water from spring # 2 was not conveyed to the reservoir in a pipe, but merely flowed downhill to the reservoir. The 10 inch iron pipes were laid horizontally or slightly downhill in the springs and concrete weep walls built to keep the pipes in place. Water in the reservoir flowed through the dam via a stepped keyway collection box. A six inch iron pipe conveyed water from the collection box to a pumphouse (pumphouse # 1) on the north side of the Green River. From the pumphouse, an electrical pump pumped the water uphill to the City's reservoir.

In 1949 the City built a pumphouse (pumphouse # 2) on the south side of the Green River and installed the hydro-turbine and 12 inch penstock. The collection box was modified to have three divisions with stepped key ways between each division. First, the 6 inch municipal water supply line is filled, then the water flows over a key way to supply the 12 inch penstock, and any additional water flows over a key way and down the hill as surface flow.

In 1979 the City changed the electric pump in pumphouse # 1. A 60 horse power (h.p.) electric pump (estimated capacity of 290 gallons per minute (gpm)) was replaced with a 75 h.p. pump (estimated capacity of 450 gpm).

In 1978 the collection system was modified to today's system and is described in the Investigation section.

INVESTIGATION

An application for change of water right was received on January 18, 1990. Public notice was published in the Enumclaw Courier-Herald combined with the Buckley News-Banner on January 24 and 31, 1990. No protests were received. The applicant seeks to change the source designation from surface to ground water to potentially avoid treatment of the water supply to meet the recently changed treatment standards for surface water. On October 10, 1990, I conducted an inspection of the City's water system with Keith Olson (Director of Public Works, City of Black Diamond), and Bill Lee (City's Consultant). The purpose of the trip was to document their water system as it exists today and obtain an understanding of the original development.

As stated above, the City obtains its water from three springs located in the NW¼SW¼SE¼ and E½SE¼SW¼ of Section 19, T. 21 N., R. 7 E.W.M. Brown and Caldwell, consulting engineers for the City, state in an April 22, 1989, report that the Black Diamond springs and other springs to the north and south occur at an elevation

of about 610 to 620 feet above sea level on the east side of the Green River gorge. Based on their investigation, ground water is present within glacial sand and gravel deposits which overlie the relatively impermeable Puget Group sandstone. The springs flow from zones where the downcutting of the Green River incised a channel into the Puget Group. The springs drain by gravity from the region where the water table intersects the ground surface. Most likely the springs discharge water which has been underground for some time.

Spring # 1, the southern most spring, is tapped by a 10 inch iron pipe going directly back into the hillside. The length of the pipe is unknown, perhaps 5 to 10 feet. It is unknown if the pipe is perforated. The 10 inch pipe conveys the water to a 24 inch corrugated aluminum pipe directly downhill of spring # 2. The land surface directly above the springs, approximately 150 square feet, is covered by a plastic tarp with a dirt overlay. The purpose of the plastic is to keep direct rainfall from entering the pipe. Spring # 1's collection system is the same as it was in the 1940's.

Spring # 2's collection system was modified in 1987. A 12 inch diameter, 3 foot long pipe of corrugated aluminum was laid into the hillside and a seepage wall built on the downhill end. The pipe trench was backfilled with large gravel, overlaid with a metal lid and plastic sheeting, and then buried with dirt to hold the plastic in place. The 12 inch infiltration pipe connects to a 24 inch corrugated aluminum pipe. The 24 inch pipe is about 40 feet long and is laid in the old retention pond. The 24 inch pipe serves the same function as the retention pond, to hold the water prior to it going downhill. There are also two additional 12 inch arms snubbed and plugged off the 24 inch pipe for future use.

I did not see spring # 3 but was told it has the same construction as spring # 1 and is connected to the 24 inch corrugated aluminum pipe. Spring # 3's construction is the same as it was in the 1940's, however, it has been covered with plastic to keep direct rainfall out of the system.

It does not appear the collection pipes in the springs penetrate vertically down into the ground, rather they are horizontal or slope down with the hill side. There is also no pumping system to lift the water to the land surface, rather the water flows at the land surface of its own accord. The water is collected at the land surface.

The 24 inch pipe connects to the collection box just below Spring # 2. The concrete collection box is part of the concrete dam with a spill-way constructed in the late 1890's. The concrete box has two pipes originating on the downhill side; A 6 inch municipal water line and a 12 inch penstock for the hydro-pump. The two water lines travel downhill a distance of approximately 900 feet, elevation drop of 150 feet, to pumphouse # 2 which is 30 feet above the Green River on the south side. In 1949 the six inch domestic line was modified so that water could be pumped to the reservoir by either the hydro-turbine or the electrical pump. Just above pumphouse # 2, the six inch line is split into a 6 inch line and a 4 inch line. Water in the 6 inch line is pumped by the hydro-turbine to the City's reservoir and the 4 inch line crosses the river to supply the electrical pump on the north bank. As the 6 inch line enters pumphouse # 2, it has about 60 pounds per square inch (psi) pressure due to the elevation drop. When the electric pump is not operating, the water in the 4 inch line stops at a control valve just before the electric pump (20 psi pressure at the valve).

The water in the 12 inch penstock enters a hydro-pump in pumphouse # 2. Following is a description of the system from the City's 1985 Comprehensive Water Plan. "The pumping unit consists of a De-Laval Steam Turbine with a nominal horse-power rating of 39.7 H.P. at 1450 rpm. This unit drives a De-Laval centrifugal pump through a Link Belt herringbone gear unit having a drive ratio of 1:2.03. Although the theoretical maximum pump speed was indicated to be 2960 rpm, the maximum speed measured on the drive unit was 1325 rpm with a resultant pump speed of 2700 rpm. At this speed, the pump produces approximately 195 gallons per minute (gpm) while the turbine drive uses approximately 1400 gpm." Keith Olson recently indicated that if the hydro-pump is running properly, it has the capacity to pump 250 gpm.

The 6 inch and 4 inch lines are supported across the Green River by a suspension bridge and enter pumphouse # 1. The 4 inch line is connected to the electric pump. There are flow meters on both lines in the pumphouse. If both pumps are running, the capacity exists to pump 700 gpm to the City's reservoir. Chlorination equipment is in pumphouse # 1, but it is currently not used. Once the two lines leave the electric pumphouse, they encounter an assortment of pressure valves and trees which split off some of the water. The majority of the water goes to the town's reservoir. The reservoir, built in the late 1980's, has a capacity of 500,000 gallons, and is at elevation 890 feet above sea level, about 450 feet higher in elevation than pumphouse # 1. The old reservoir, 250,000 gallon capacity, was of unreinforced concrete construction built into the side of a gently sloping hill. It was replaced for two reasons, structural problems and a need for increased capacity.

The City generally uses the hydro-pump to pump water to the reservoir. The electric pump is used as a backup. The electric pump is also used if excessive demand lowers the reservoir's water level below some critical point. Although both pumps can operate at the same time, it is not standard practice to do so.

While standing on the suspension bridge, it is possible to see stream flow entering the Green River about 300 yards downstream of the bridge (overflow from springs # 1 & # 3). About 400 yards upstream a stream created by spring # 4 enters the Green River.

The Proof of Appropriation form filed by the City in February of 1974, for S1-00506C, indicates the ability to pump 550 gpm and 300 gpm as the amount of water applied to beneficial use. The Department of Ecology issued certificate of water right S1-00506C for 8.0 cfs (3600 gpm) instantaneous in 1974. In September of 1989 the City states in its supplement to its Comprehensive Water Plan that it currently uses 0.3 cfs or 135 gpm of water. The City of Black Diamond has the physical capacity to pump approximately 700 gpm to the reservoir.

The 12 inch penstock under gravity flow has the theoretical maximum capacity to divert about 8 cfs, based on the size of the pipe, head, and elevation drop. This instantaneous volume is well in excess of the certificated right and the amount applied to beneficial use. In its initial application which resulted in certificate of water right 3850, the applicant requested 5.0 cfs. The 5.0 cfs amount requested was reduced and permitted for 2.93 cfs based on the amount of water, under 150 feet of head, needed to generate 50 horse power. The City's consultant states the hydro-pump uses about 1400 gpm (3.1 cfs).

Black Diamond's population was 1,505 people as of April 1, 1991. The projected population for the year 2020 is 4,000 people. The current per capita consumption of water is approximately 130 gallons per day (gpd). The projected population and the per capita consumption figures are from Keith Olson, March 1992.

The annual water limit for certificate of water right S1-00506C of 551 acre-feet was calculated on a per capita consumption of 120 gpd for a projected population of 4100 in 1985.

Ground water is defined in the Revised Code of Washington (RCW) 90.44.035(3) as water that exists beneath the land surface or beneath the bed of any stream, lake, or reservoir, or other body of surface water. Surface water is not explicitly defined in the Water Code, but is generally understood to be water at the land surface. It has been and is the policy of the Department to consider water at the land surface that flows or moves of its own accord not in the confines of a lake bed or stream channel, a spring.

RCW 90.03.380 allows changes to be made to the point of diversion for a perfected water right, when the change can be made without detriment to existing rights. Changes to the point of diversion generally relate to a physical change or move in the location of the point of diversion.

CONCLUSION

The applicant seeks to change the source designation for certificate of water right S1-00506C from surface to ground water. However, no changes have been made to the collection systems at springs # 1 and # 3. The collection system at spring # 2 was modified in 1987 and the entire system was enclosed to protect against contamination. The changes made at spring # 2 did not change the physical movement of water. No pumping system exists to lift the water to the land surface, rather the water flows at the land surface for all three springs because of the regional geology. The water is collected at the land surface.

The Black Diamond Springs are surface water. From my investigation, I conclude that neither the original development or changes made to the collection system over the years have altered the fact that the City obtains its water supply from the Black Diamond Springs.

The fact that the collection system is totally enclosed and the water does not see day light or is exposed to air is immaterial to defining the springs as surface or ground water. The City's consultant indicates, based on the physical and chemical characteristics of the water, that the Black Diamond Springs discharge ground water. This seems reasonable, and again is immaterial to the Department's designation of the source as ground or surface water.

The City has two paper water rights. Certificate of water right 3580 for 2.93 cfs for power to operate a hydro-turbine, non-consumptive, with the place of use SE¼SW¼ of Section 19, T. 21 N., R. 7 E.W.M. and certificate of water right S1-00506C, municipal water supply, consumptive, place of use is the area served by the Town of Black Diamond, being within Section 11, SW¼ of Section 12, W½ of Section 13, Section 14 except the S½SW¼, NE¼ of Section 15, and NE½ of Section 23, T. 21 N., R. 6 E.W.M., for 8.0 cfs instantaneous, 551 acre-feet annual limit, continuous use.

The instantaneous diversion right perfected under S1-00506C is less than the certificated amount of 8.0 cfs. The limit on a water right is the amount of water beneficially used. Regardless of what a water right certificate states on its face, the right enjoyed is what has been perfected under the terms of the permit. The Department erred in 1974 to issue certificate of water right S1-00506C for 8.0 cfs instantaneous because that instantaneous amount was not perfected in accordance with the terms of the permit. The annual water limit of 551 acre-feet was calculated on a per capita consumption of 120 gpd for a projected population of 4100 in 1985. Although

the projected 1985 population did not materialize, the City will have sufficient water to meet their projected demand until the year 2020.

RECOMMENDATION

I recommend denial of the requested change because the source of water for the City of Black Diamond has not changed through modifications made to the collection system.

I also recommend that the administrative error made by the Department in 1974 in regards to water right certificate S1-00506C be corrected. The City's certificate of water right S1-00506C should be corrected to reflect the actual water right perfected. Specifically, an order of recision should issue on the instantaneous diversion authorization on certificate of water right S1-00506C that was never perfected.

An order of compliance should also be issued requiring the City to limit diversion for the hydro-pump to 2.93 cfs.

REPORT BY: Stephen Hirschey DATE: 4/29/92

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Accepted By ....
Date January 18, 1990

Is Field Exam. Required?
☐ YES ☐ NO
Determined By.....

APPLICATION FOR CHANGE OF WATER RIGHT

☐ PURPOSE ☒ DIVERSION OR WITHDRAWAL
☐ PLACE ☐ ADDITIONAL POINT OR POINTS

NAME	TELEPHONE NUMBER
CITY OF BLACK DIAMOND Denied 5/28/93	(206) 886-2560

ADDRESS	(CITY)	(STATE)	(ZIP CODE)
25510 LAWSON ST./P.O. BOX 599	BLACK DIAMOND	WASHINGTON	98010

APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
20890	15556	51-005066

DECREED RIGHT (TITLE OF CASE)

APPROPRIATIONS MADE (GIVE DATE IF PRIOR TO JUNE 15, 1917 IF SURFACE WATER, OR JUNE 7, 1945 IF GROUND WATER)
APPLICANT CLAIMS VESTED RIGHTS BY VIRTUE OF CONTINUED USE PRIOR TO 1917

IS THE WATER RIGHT RECORDED IN YOUR NAME?	IF NO, GIVE NAME RECORDED UNDER
☒ YES ☐ NO	

1. **RIGHT CONSISTS OF**

WATERS USED FROM (STREAM, LAKE, WELL, OR TRENCH, ETC.)	GALLONS PER MINUTE OR CUBIC FEET PER SECOND
SPRINGS	8.0 CUBIC FEET PER SECOND-551 ACRE FEET/YEAR

WATER CURRENTLY USED FOR	TIME OF USE
DOMESTIC MUNICIPAL PURPOSES	CONTINUOUS

2. **LOCATION OF PRESENT POINT OF DIVERSION OR WITHDRAWAL**

NUMBER OF FEET	☐ NORTH ☐ SOUTH	NUMBER OF FEET	☐ EAST ☐ WEST	FROM THE	☐ NORTHWEST ☐ SOUTHWEST	☐ NORTHEAST ☐ SOUTHEAST	CORNER OF:

SMALLEST LEGAL SUBDIVISION
$E\frac{1}{2}$ $SE\frac{1}{4}$ $SW\frac{1}{4}$ AND $NW\frac{1}{4}$ $SW\frac{1}{4}$ $SE\frac{1}{4}$

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	KING

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

3. **LEGAL DESCRIPTION OF LANDS WATER IS USED ON**

AREA SERVED BY THE TOWN OF BLACK DIAMOND

RECEIVED
JAN 17 1990
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY

(ATTACH SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS	IF NO, EXPLAIN YOUR INTEREST
☒ YES & ☒ NO	THE CITY OWNES THE SITE OF THE SPRINGS AND SERVICES THE PRIVATE LAND OWNERS

REASONS FOR THE PROPOSED CHANGE

SEE ATTACHED LETTER

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

ECY 040-1-97

CONTINUE ON REVERSE SIDE

CHANGE

4. **CHANGE REQUESTED**

CHANGE WATER USE TO	TIME OF USE	GALLONS PER MINUTE OR CUBIC FEET PER SECOND
DOMESTIC MUNICIPAL USE	CONTINUOUS	3590 GPM/551 ACRE FEET/YEAR

5. **LOCATION OF PROPOSED POINT OF DIVERSION OR WITHDRAWAL**

NUMBER OF FEET	☐ NORTH ☐ SOUTH	NUMBER OF FEET	☐ EAST ☐ WEST	FROM THE	☐ NORTHWEST ☐ SOUTHWEST	☐ NORTHEAST ☐ SOUTHEAST	CORNER OF:

SMALLEST LEGAL SUBDIVISION

$E\frac{1}{2}$ $SE\frac{1}{4}$ $SW\frac{1}{4}$ AND $NW\frac{1}{4}$ $SW\frac{1}{4}$ $SE\frac{1}{4}$

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	KING

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

ARE YOU THE OWNER OF THE LAND ON WHICH THE PROPOSED POINT OF DIVERSION OR WITHDRAWAL IS TO BE LOCATED

☒ YES ☐ NO

6. **LEGAL DESCRIPTION OF LANDS WATER IS TO BE USED ON**

AREA SERVED BY THE TOWN OF BLACK DIAMOND

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY
19	21	7E	KING

(ATTACH A SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS	IF NO, EXPLAIN YOUR INTEREST
XX YES & XX NO	YES: THE CITY OWNS THE SITE OF THE SPRINGS.

NO: THE LANDS TO WHICH THE MUNICIPALITY SUPPLIES WATER IS PRIVATELY OWNED.

Such change can be made without detriment or injury to existing rights or the state's interest in water, as provided in RCW 90.44.100 or RCW 90.03.380.

STATE OF WASHINGTON
County of KING } *ss.*

I HOWARD BOTTS, *being first duly sworn, depose and say that I have read the above application for change of a water right, that I know the contents thereof; and that the facts therein stated are true.*

IN WITNESS WHEREOF, I have hereunto set my hand this 8TH *day of* JAN., *19* 90.

Howard Botts
Applicant(s)/Permitee

Subscribed and sworn to before me this 8TH *day of* January *19* 90.

Christine A. Sanderson
Notary Public

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

[X] *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
S1-00506C	15556	20899	April 15, 1968

NAME

TOWN OF BLACK DIAMOND

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
	Black Diamond	Washington	98010

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE

Three (3) unnamed springs

TRIBUTARY OF (IF SURFACE WATERS)

Green River

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
3.0		551.0

QUANTITY, TYPE OF USE, PERIOD OF USE

Municipal Supply - continuous use

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

#1 - 325 feet east and 1250 feet north #2 - 200 feet west and 800 feet north

#3 - 425 feet west and 600 feet north; ALL from south quarter corner of Section 19

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
E½SE¼SW¼ and NW¼SW¼SE¼	19	21	7E	09	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by the Town of Black Diamond.

Diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than 0.125 (1/8) inch.

Nothing in this certificate shall be construed as excusing the certificate holder from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 29th *day of* March, *19* 74.

JOHN A. BIGGS, *Director*
Department of Ecology

by R. Jerry Bollen

R. JERRY BOLLEN, Assistant Director

ENGINEERING DATA

OK Hall

FOR COUNTY USE ONLY

$5.00 payable to the Dept. of Ecology and $3.00 payable to the King County Auditor

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER		PERMIT NUMBER
		15556

NAME OF PERMITTEE
Town of Black Diamond

POST OFFICE ADDRESS	(CITY)	(STATE)	(ZIP CODE)
Town Hall	Black Diamond	Washington	98010

ACTUAL SOURCE OF APPROPRIATION
Spring water

PURPOSE OR PURPOSES WATER IS USED FOR
Municipal Water System

DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE	IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED
	None
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED ☐ YES ☒ NO	MONTHS DURING WHICH WATER IS USED 12

PUMP SIZE
350 GPM Electric Pump. 300 GPM Turbine Pump. Combined 550 GPM

ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM
300 GPM ☒ GPM ☐ CFS

HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED	IF NO, EXPLAIN
☒ YES ☐ NO	

7402200305

RECORDED

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

All area within Town Limits composed of Section 11, S.W. 1/4 of Section 12, West 1/2 Section 13, Section 14, N.E. 1/2 Section 23, and N.E. 1/4 of Section 15 Township 21N R6E WM.

STATE OF WASHINGTON,
County of King } ss.

I, Gomer Evans Jr., being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 2 day of February, 1974.

Gomer Evans Jr.

Subscribed and sworn to before me this 2nd day of February, 1974.

Norman Gumser
Notary Public

NORMAN GUMSER NOTARY PUBLIC COMMISSION EXPIRES JAN 16, 1974 STATE OF WASHINGTON

OK FOR CERT, ISSUE LIKE PERMIT 3/13/74 HWH

Form 10. S. F. No. 370—OS—6-67.

STATE OF WASHINGTON
DEPARTMENT OF WATER RESOURCES
Division of Water Management

Permit to Appropriate Public Waters of the State of Washington

Book No. 39 of Permits, on Page 15556 Under Application No. 20899

TOWN OF BLACK DIAMOND

of Black Diamond, Washington

is hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the following limitations and provisions: Permittee shall construct and maintain at his own expense a weir, or other suitable device, for measuring any water granted herein for irrigation purposes and such appropriation shall be subject to a reasonable rotation system if ordered by the Department of Water Resources.

Diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than .125 (1/8) inch.

The total annual diversion shall not exceed 551 acre-feet less any amount diverted under existing rights.

As provided under RCW 43.21.130 and 90.03.360, a master meter shall be installed in this system to measure the total amount of the diversion.

Priority date of this permit is April 15, 1968

Source of the proposed appropriation is three unnamed springs

tributary of Green River

The quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 8.0 cubic feet per second, or its equivalent in case of rotation, to be used for the following purposes: municipal supply

as more definitely set out below.

The approximate point of diversion is located #1: 325 feet east and 1250 feet north; #2: 200 feet west and 800 feet north; #3: 425 feet west and 600 feet north; ALL from south quarter corner of Sec. 19

being within E½SE¼SW¼ and NW¼SW¼SE¼ Sec. 19, Twp. 21 N., Rge. 7 E. W. M.,

county of King

The use, or uses, to which water is to be applied:

FOR DOMESTIC SUPPLY AND MISCELLANEOUS USES: 8.0 cubic feet per second/551 acre-feet per year during entire year for municipal supply continuously each year for the projected area population of 4100 as of 1985 to be used ~~to be used~~ within see below Sec. ..., Twp. ... N., Rge. ... W. M.,

FOR IRRIGATION: ... cubic feet per second, ... acre-feet per year, from ... to ... each year, for irrigation of ... acres, described as follows:

Area served by the Town of Black Diamond

FOR POWER: ..... cubic feet per second continuously each year. Total power to be developed ..... theoretical horse power. Total fall to be utilized ..... feet.

Nature of works by means of which power is to be developed .....

.....

Works to be located in ..... Sec. ....., Twp. ..... N., Rge. ..... W. M.

Water to be returned to .....

Point of return ..... Sec. ....., Twp. ..... N., Rge. ..... W. M.

Use to which power is to be applied .....

FOR MUNICIPAL SUPPLY: ..... cubic feet per second during entire year to supply .....

DIVERSION WORKS OBSERVED: collection gallery at spring #1, gravity pipeline to a pool formed by a 3 foot concrete dam at spring #2. Concrete collection tank at spring #3, gravity pipeline to con- ~~DESCRIPTION OF DIVERSION WORK~~ crete dam. Gravity pipeline from the diversion box.

Height of dam ..... ft.; Length on top ..... ft.; Length on bottom ..... ft.

Material to be used and character of construction .....

.....

Description of headgate .....

CANAL SYSTEM

AT HEADGATE: Width on top (at water line) ..... ft.; Width on bottom ..... ft.; Depth of water ..... ft.; Grade ..... ft. fall per one thousand feet.

AT ..... MILES FROM HEADGATE: Width on top (at water line) ..... ft.; Width on bottom ..... ft.; Depth of water ..... ft.; Grade ..... feet per one thousand feet.

(Please read carefully provisions below)

Construction work shall begin on or before Started

and shall thereafter be prosecuted with reasonable diligence and completed on or before March 1, ~~1970~~ ~~3-1-72~~ 3-1-74

and complete application of water to proposed uses shall be made on or before March 1, 1971

Given under my hand and the seal of this office at Olympia, Washington, this 6th day of March, 19 69

Glen H Fiedler

Assistant Director
Division of Water Management
Department of Water Resources

ENGINEERING DATA
O. K. E. E. L

REPORT OF EXAMINATION

Date of application April 15, 1968 Date of examination November 21, 1968 Application No. 20899

Name Town of Black Diamond Address Black Diamond, Washington 98010

Quantity applied for 8.0 c.f.s. Use municipal supply

Source of appropriation 3 unnamed springs Tributary of Green River

Legal sub. E½SE¼SW¼ and NW¼SW¼SE¼ Sec. 19 Twp. 21 N. Rge. 7 E. County King

~~Measured or~~ estimated quantity 12 c.f.s. Probable low flow 6 c.f.s.

Quantity previously appropriated: W.T. 2.93 c.f.s. CWT. 0 E.T. 2.93 c.f.s.

Other use made of water power

Diversion works ~~contemplated~~ or observed collection gallery at spring #1, gravity pipeline to a pool formed by a 3 foot concrete dam at spring #2. Concrete collection tank at spring #3, gravity pipeline to concrete diversion box adjacent to the concrete dam. Gravity pipeline from the diversion box.

Other equipment booster pumping

Irrigable acreage: Planned - Present Feasible

Other water rights appurtenant to this land claim of vested rights through use of water prior to June 6, 1917.

Progress of project to renovate existing system and completely box in the springs (project started)

Protests none

Quantity recommended (total) 8.0 c.f.s., 551 acre-feet per year Irrig. Dom.

Power Municipal 8.0 c.f.s., 551 acre-feet per year Other uses

Department of Fisheries and Game report see below

Special remarks and provisions:

In accordance with the recommendations of the Department of Fisheries and Game, the permit shall be issued subject to the following provisions: Diversion intake shall be tightly screened at all times with wire mesh having openings with dimensions not greater than .125 inch.

It is noted that the construction of the facilities for the appropriation of water under this application will require removal of material from or adjacent to a stream channel or watercourse. Applicant is therefore advised that a Hydraulic Approval should be obtained from the Departments of Fisheries and Game prior to commencing work (Fisheries Code 75.20.100).

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the State Director of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Department of Health, 304 Public Health Building, Olympia, with regard to the need for compliance.

The water requirement for this area is based on a per capita demand of 120 gallons per day, or 551 acre-feet annually for the projected area population of 4100 as of 1985.

Applicant claims vested rights for a portion of said waters by virtue of continued use prior to 1917. Therefore, permit will issue as follows: "The total annual diversion shall not exceed 551 acre-feet less any amount diverted under existing rights."

Applicants have Surface Water Certificate #3580 on the same source, said certificate issued for 2.93 cubic foot per second for power. This power was developed and used to operate pumps to transport water to the Town of Black Diamond. This power use will be abandoned in favor of commercial power.

As provided under RCW 43.21.130 and 90.03.360, a master meter shall be installed in this system to measure the total amount of the diversion.

In accordance with Section 90.03.290 RCW, I find that there is water available for appropriation from the source in question and that the diversion proposed in the application will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue as recommended above, subject to existing rights and indicated provisions.

Signed at Olympia, Washington
this 24 day of January, 1969

Dean Wood

DEAN WOOD
Water Resources Inspector
Division of Water Management

Form 10.
S. F. No. 370-A—OS—(Rev. 10-67)—10-67.

STATE OF WASHINGTON
DEPARTMENT OF WATER RESOURCES

Division of Water Management
OLYMPIA, WASHINGTON

Please send $10.00 minimum statutory examination fee with application.

PRIORITY
Date 4-15-68
Time 3 P.M.
Accepted E.L.

Application No. 20899

APPLICATION FOR A PERMIT

To Appropriate Public Surface Waters of the State of Washington

(Note: Gray boxes are for office use **only**)
(Read instruction sheet before filling out this form.)

asgd to: Town of Black Diamond 12-24-68

I, KING COUNTY WATER DISTRICT NO. 66, a Municipal Corporation,
(Name of applicant)

If the applicant is a corporation, give date and place of incorporation created by King County Commissioners Resolution No. 8812, July 6, 1943

asgd to:

of Black Diamond, Washington 98010
(Complete postoffice address)

do hereby make application for a permit to appropriate the following described public waters of the State of Washington subject to existing rights:

1. *The source of the proposed appropriation is* unnamed springs
(Name of source stream, lake, river, spring, etc.; if unnamed so state)
tributary of Green River

three unnamed springs, tributary of Green River

2. *The amount of water which the applicant intends to apply to beneficial use is* 8.0 *cubic feet per second;* ..... *acre-feet per year.*

3. *The use to which the water is to be applied is* Municipal supply
(Irrigation, power, mining, manufacturing, domestic supply, etc.)

4. *Time during which water will be required each year* continuously

5. *The approximate point of diversion is located* 2,200 ft East and 600 ft North; 2,400 ft East and 800 ft North; 3,000 ft East and 1,300 ft North of SW corner of Sec 19-21N-7E.WM
(Give measured distance and bearing, or north-south and east-west distances from nearest section or subsection corner)

#1 - 325'E & 1250'N; #2 - 200'W & 800'N; #3 - 425'W & 600'N; All from South quarter corner of Sec. 19

being within the SE¼ of the SW¼ & SW¼ of SE¼ *Sec.* 19, *Tp.* 21 *N., R.* 7 *(E. or W.) W.M.,*
(Give smallest legal subdivision)
in the county of King
(Accurately mark and identify each point of diversion on the maps or plats submitted with this application.)

E½ SE¼ SW¼ and NW¼ SW¼ SE¼ of Sec. 19, T. 21N., R. 7E. W.M.

Note S.W. Cert #3580.

E.

6. **WORK SCHEDULE:**

(a) *Construction work will begin on or before* existing

(b) *Construction work will be completed on or before* existing

(c) *Water will be put to complete beneficial use on or before* existing

7. *Is the source from which you wish to appropriate water on the tract of land on which the water is to be used?* No

8. **DESCRIPTION OF WORKS:**

(a) *Nature of works: (Reservoir, dam, ditch, flume, pumping plant, etc.)*

Collection gallery, cut-off wall and piping

(b) *Dimensions of works:*

Dam: Height.....feet; length at bottom.....feet; length at top.....feet; thickness at bottom.....feet; thickness at top.....feet; slope at front water face.....; slope at back face.....; material used in construction.....

Reservoir: Capacity when filled.....acre-feet. Surface area at highwater mark .....acres.

If 10 acre-feet or more of water is to be stored and/or if the water depth will be 10 feet or more at the deepest point, a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the Department of Water Resources, Olympia, Washington.

(c) *Description of Ditch or Pipeline System*.....

9. **IRRIGATION:** *Number of acres to be irrigated* --

If you are an S.C.S. cooperator, please include a tracing of your farm plan map with this application.

10. **MUNICIPAL WATER SUPPLY:**

To supply ~~the city of~~ King County Water District No. 66, *having a present population of* 1,000 *and an estimated population of.....in 19.....*

(a) *Estimated present requirement*.....

11. **MULTIPLE DOMESTIC WATER SUPPLY** *(Unincorporated Areas)*

Maximum number and type of family units to be supplied from this requested appropriation

12. **LEGAL DESCRIPTION OF PROPERTY** *on which water is to be used, for all purposes*

(Copy legal description from deed; or attach copy of deed. Tax statement descriptions are not acceptable. Also outline this property on the maps or plats submitted with this application.).....

King County Water District No. 66 within the Town of Black Diamond, Washington.

Area served by King County Water District No. 66 within Secs. 11, 13, 14 and 15 in T. 21 N., R. 6 E. W.M.

Area served by the Town of Black Diamond

WD #66 deleted on sheet in this file

(a) *What interest do you have in the property described under Item No. 12?* Water District Commissioners
(Owner, lessee, contract purchaser)

(b) *Are there any existing water rights appurtenant to the above described property?* yes

If so, from what source and under what authority Surface Water Certificate No. 3580 and vested rights established through use of water prior to June 6, 1917.. ← for power only

13. **POWER GENERATION:** See Certificate No. 3580.

(a) *Total amount of power to be developed* ..... *H.P.*
(Theoretical horsepower)

(b) *Total fall to be utilized* ..... *feet.*
(Head)

(c) *The nature of the works by means of which the power is to be developed* .....

(d) *Such works to be located in* ..... *of Sec.* ....., *Tp.* ..... *N., Rge.* ..... *W.M.*
(Legal subdivision) (E. or W.)

(e) *To what stream is the water to be returned?* .....

(f) *Locate point of return* ..... *Sec.* ....., *Tp.* ..... *N., Rge.* ..... *W.M.*
(E. or W.)

(g) *The use to which power is to be applied is* .....

14. **SIGNATURES:**

(SIGN HERE) Joe Dal Santo, Jr. *Address* Black Diamond, Wash
(Applicant)

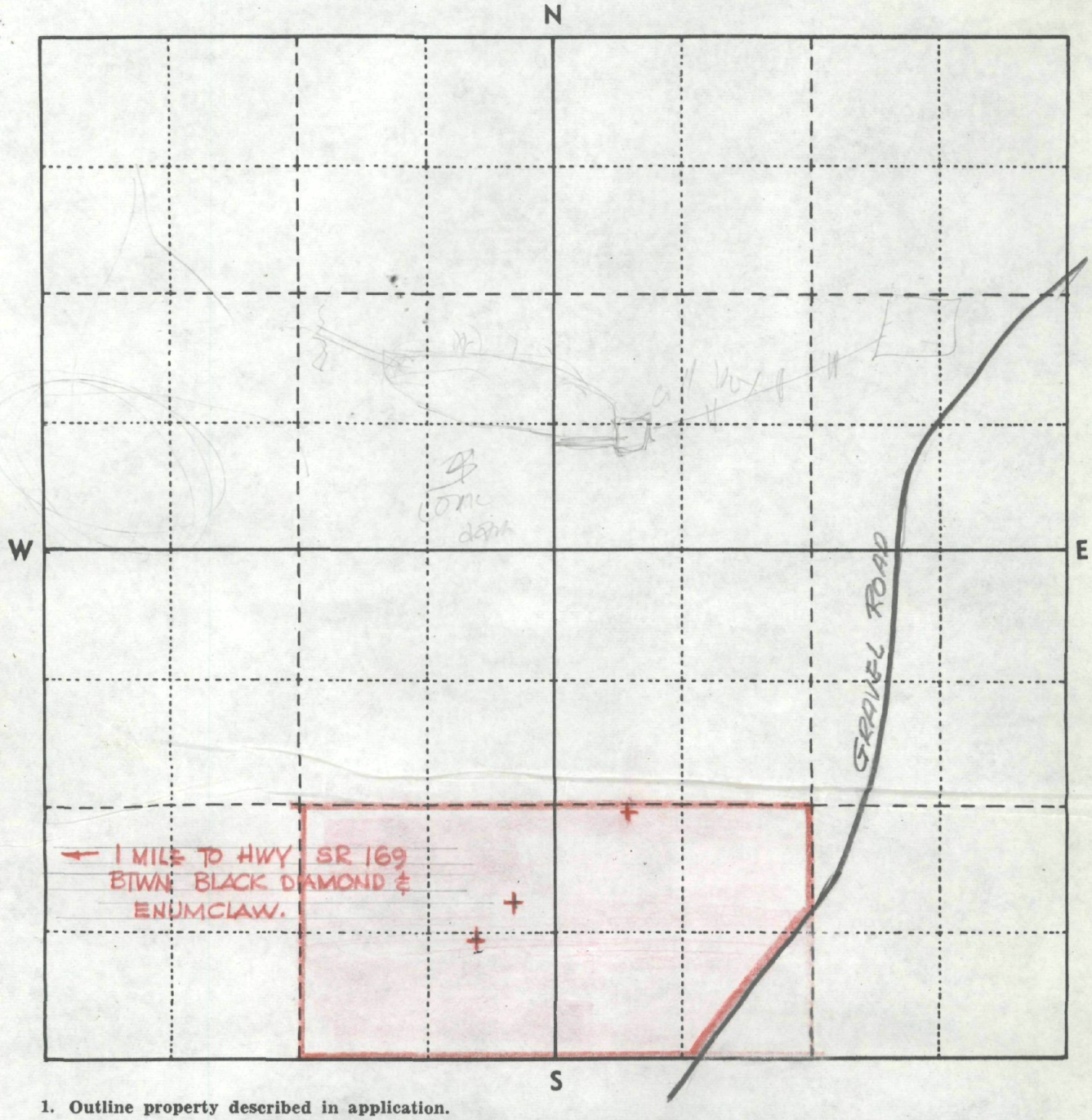
(SIGN HERE) Vic Weston *Address* Black Diamond Wash
(Owner of Land in item 12)

Remarks: .....

S. F. No. 1854-A—OS

SECTION PLAT

Sec. 19 Twp. 21 N. R. 7 E WM



1. Outline property described in application.
2. Show by a cross (X) the location of point of diversion (surface water source) or point of withdrawal (ground water source). For ground water applications, show by a circle (O) the locations of other wells or works within a quarter of a mile.
3. Indicate traveling directions from nearest town.

Scale: 1 inch = 800 feet (each small square = 10 acres)

OFFICE 2

20899

S. F. No. 369—8-49—1M. 22856.

CERTIFICATE RECORD NO. 8, PAGE NO. 3580

STATE OF WASHINGTON, COUNTY OF King

CERTIFICATE OF SURFACE WATER RIGHT

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the State Supervisor of Hydraulics thereunder.)

This is to certify that KING COUNTY WATER DISTRICT NO. 66 *of* Black Diamond, *State of* Washington, *has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the waters of* an unnamed spring, *a tributary of* Green River, *with point or points of diversion within the* SE¼ of SW¼ of *Sec.* 19, *Twp.* 21 *N., R.* 7 E. *W. M., under* Appropriation *Permit No.* 6232 *issued by the State Supervisor of Hydraulics, and that said right to the use of said waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Hydraulics of Washington and entered of record in Volume* 8, *at Page* 3580, *on the* 19th *day of* May, *19*50; *that the priority date of the right hereby confirmed is* August 22, 1949; *that the amount of water under the right hereby confirmed, for the following purposes is limited to an amount actually beneficially used and shall not exceed*

2.93 cubic feet per second

for the purpose of power

A description of the lands under such right to which the water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

SE¼ of SW¼ of Sec. 19, Twp. 21 N., Rge. 7 E.W.M.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Hydraulics affixed this 19th *day of* May, *19*50

Chas. H. Batchelor

State Supervisor of Hydraulics.

ENGINEERING DATA
O.K. MJW

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Appendix M

Sanitary Survey

CITY OF BLACK DIAMOND

24301 Roberts Drive
PO Box 599
Black Diamond, WA 98010

Phone: (360) 886-5700
Fax: (360) 886-2592
www.ci.blackdiamond.wa.us

April 26, 2023

Brietta Carter, P.E.
Department of Health, NW Drinking Water Operations,
PO Box 47800
ATTN: MS K17-12
Olympia, WA 98504-7800
Via email

Dear Brietta Carter,

RE: BLACK DIAMOND WATER (07220) 2023 SANITARY SURVEY

Thank you for the site visit for the sanitary survey and the follow up letter. This letter is in response to your letter dated February 21, 2023 and follows the outline in said letter to address potential issues.

Significant Deficiencies

1 – 0.5 MG storage tank air vent.

Response: The city will look for options to retrofit/replace the air vent to prevent rainwater and other windblown contaminants from entering the tank, increase security, and still providing adequate ventilation.

2 – Springs collection barrier.

Response: The city is underway on design to better enhance and protect the springs source of collection. With our engineering consultant, RH2, we are looking at how to best protect the springs source and will consider these options (screening, narrower opening, etc.) as we continue to move forward with design. We want to make sure the barrier(s) put in place will be a long-term protection for this groundwater source.

Observations & Recommendations

3 – Online chlorine monitoring

Response: We are looking to upgrade monitoring equipment and streamlining our processes so we are ensuring that data collected is accurate and that monitoring equipment is functioning properly.

4 – Daily residual reporting

The city is in the process of finding analyzing equipment that can track residuals every calendar day. As we work through this process, we are having staff come in on Saturdays and Sundays to collect those residual readings.

5 – Reporting

5a Response: We are actively working on finalizing the latest update to the water system plan update and hope to have it finalized and adopted later this year.

5b Response:

i: RH2 submitted the construction completion reports in for the Transmission Main Replacement and North Bank Pump Station projects following the sanitary survey meeting.

ii: The Springs to North Bank Pump Station (with Green River crossing) project is currently under design. We will submit the completion report for the Transmission Main project mentioned.

iii: Some Springs rehabilitation work has been completed. We will work on getting the necessary reports in.

6 – Monthly treatment plant reports

6a Response: We are working to make sure monitoring equipment is functioning properly as residuals should have had a higher reading from the Tacoma intertie.

6b Response: We will work on getting an updated CT6 calculation.

7 – Standard Operating Protocols for Tacoma interties

Response: We will work on developing these protocols for bringing these online and taking them offline.

8 – Sodium hypochlorite and sodium hydroxide usage

Response: We will work to monitor the volume used of sodium hypochlorite and sodium hydroxide. We are exploring options with work order vendors that will allow us to also keep track of our inventory, including materials used for the water system.

Thank you, once again, for your site visit and for the guidance to improve our monitoring. Please reach out if you have any questions on this response.

Sincerely,

Scott Hanis
Public Works Director

Cc: Jesse Stavano, City of Black Diamond
Harley Sandoval, P.E., RH2
Jared Ribail, P.E., RH2

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
PO BOX 47800 ATTN: MS K17-12 OLYMPIA, WA 98504-7800

February 21, 2023

Scott Hanis
Public Works Director
Black Diamond, City of
shanis@blackdiamondwa.gov

Subject: Black Diamond Water Department (ID #07220)
King County
2023 Routine Sanitary Survey

Dear Scott Hanis:

This letter is in follow up to our routine sanitary survey of the water system on January 4, 2023. The purpose of the sanitary survey is to inspect water system facilities, to review operations & maintenance programs, and to reinforce our long-term relationships. We covered the eight elements of a survey, with a focus on changes since the last survey. Thank you for a good day of conversation and field work.

The City has grown and made many improvements in planning and design. For example, the development and implementation of the cross-connection control program, additional routine coliform sample sites, submitting the 2020 water system plan update, and the North Bank pump station and transmission main improvements. Keep in mind the process for design review, approval, and construction acknowledgement.

2023 Survey issues
This letter reflects my understanding of your water system and highlights key issues we discussed during my visit. **Please, in the next 45 days, respond to this letter.** Note any inaccuracies and include them in your response. Send photos of things you can complete in the short term. If you are unable to take action within 45 days, please explain your intentions and provide a schedule for addressing the applicable issues.

Significant Deficiencies – *Potential significant public health risks.*

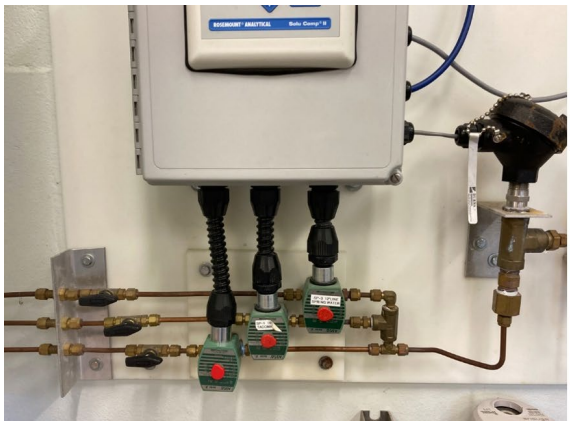
1. Thank you for having photos of the storage tank access hatches and air vents ready to view during the visit. The air vent on the 0.5MG storage tank does not appear to prevent rainwater or windblown contaminants from entering the tank. Please retrofit or replace the air vent to, a) better prevent rainwater and other windblown contaminants from entering the tank, b) increase security to prevent intentional contamination, and c) still provide adequate ventilation. It might be appropriate to schedule this work in conjunction with other planned work on the tank.

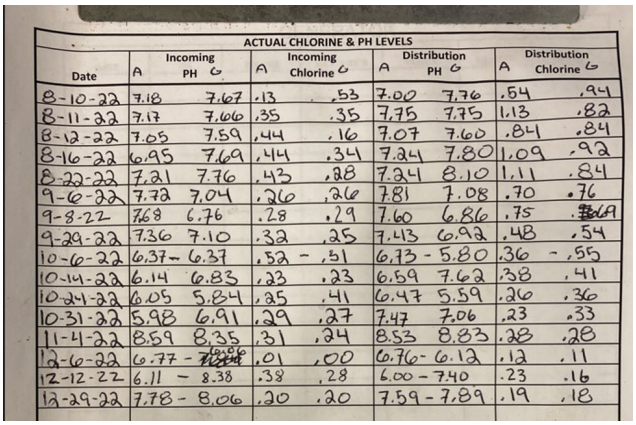
2. The springs collection combined overflow can use more work on a physical barrier. We noted the improvement to the top surface after the last survey. Thank you for that improvement. During the visit we discussed different options for screening or narrowing the opening of the overflow. Please come up with a better physical barrier at the opening, something to at least keep fish out.

Significant Findings – *Defects in your facilities or operations that need immediate attention.*
None.

Observations & Recommendations – *To notify you of other violations of drinking water rules.*

3. Online chlorine monitors used in compliance monitoring and reporting must be checked against another instrument at least every five calendar days (WAC 246-290-638). We recommend twice a week to simplify scheduling tasks. [photo: Continuous chlorine analyzer measures incoming Tacoma water, incoming springs water, and outgoing 4.3MG storage tank water – one at a time. Field sheet, A = analyzer, G = grab, Incoming refers to springs source.]





ACTUAL CHLORINE & PH LEVELS

Date	Incoming PH A	Incoming PH G	Incoming Chlorine A	Incoming Chlorine G	Distribution PH A	Distribution PH G	Distribution Chlorine A	Distribution Chlorine G
8-10-22	7.18	7.67	.13	.53	7.00	7.76	.54	.94
8-11-22	7.17	7.66	.35	.35	7.75	7.75	1.13	.82
8-12-22	7.05	7.59	.44	.16	7.07	7.60	.84	.84
8-16-22	6.95	7.69	.44	.34	7.24	7.80	1.09	.92
8-22-22	7.21	7.76	.43	.88	7.24	8.10	1.11	.84
9-6-22	7.72	7.04	.26	.26	781	7.08	.70	.76
9-8-22	768	6.76	.28	.29	7.60	6.86	.75	.69
9-29-22	7.36	7.10	.32	.25	7.43	6.92	.48	.54
10-6-22	6.37	6.37	.52	.51	6.13	5.80	.36	.55
10-14-22	6.14	6.83	.23	.23	6.59	7.62	.38	.41
10-24-22	6.05	5.84	.25	.41	6.47	5.59	.26	.36
10-31-22	5.98	6.91	.29	.27	7.47	7.06	.23	.33
11-4-22	8.59	8.35	.31	.24	8.53	8.83	.28	.28
12-6-22	6.77	7.86	.01	.00	6.76	6.12	.12	.11
12-12-22	6.11	8.38	.38	.28	6.00	7.40	.23	.16
12-29-22	7.78	8.06	.20	.20	7.59	7.89	.19	.18

4. As a system that purchases surface water, the City is required to report the distribution system disinfectant residuals every calendar day (to include weekends). The distribution system monthly summary report includes the chlorine residual collected at the same time and place as the routine coliform samples.

5. As we discussed, several of our system files are not available for me to review as we migrate to electronic records. This makes it difficult to verify the following information. Please help me understand the status to the best of your knowledge. Based on the records I have, it appears we have not received all of the construction documents, review response, and construction completion reports for the following submittals. During the site visit, it appears that some portions of the projects have been completed.

   a. 20-0308 Water System Plan Update – The water system plan is expired. We recognize the City is actively planning and working towards an approved plan. We received the update in 2020 and sent review comments. I understand a lot has changed since the 2020 plan submittal and it might make sense to add recent demand data and update the CIP for example. We talked about options, and I asked that you to follow up with Richard Rodriguez our planner to discuss further.

   b. 20-0807 Springs Rehabilitation, Transmission Main & North Bank Pump Station – Approval Design Summary: Plan to replace two 75Hp inline pumps with two more efficient 75Hp vertical turbine pumps (Differs from the 1,410gpm increase in capacity presented in the project report (reference submittal 17-0805). The City will use the springs to augment the Tacoma source, eliminating the need to maximize

instantaneous water right. Existing chlorination equipment to be reused. Chlorine injection is after the pumps. New transmission main is comprised of 12-inch HDPE materials. [for reference 17-0805 Springs Main & North Bank Pump Station Improvements – project report summary: Replace transmission main between the springs junction box and the North Bank pump station, to include a new Green River bridge crossing. Replace aging and undersized pumps at the North Bank pump station to help meet water right potential (two pumps capable of 1,410gpm with VFDs). Qa is the limiting factor. On-site sodium hypochlorite generator capacity increase from 12 lbs/day to 24 lbs/day.]

i. Please submit construction completion reports for the portions of the project that have been completed. Noted during the site visit that the chlorination equipment at the North Bank pump station was replaced. Please indicate any changes to the approved design in the letter of transmittal sent with the construction completion report(s).

ii. The following two portions of the project report (refer to submittal 17-0805) were not included in these construction documents. Please provide construction documents when available.

1. Springs to pump station transmission main Green River crossing.

2. Transmission main from the North Bank pump station to the City. Noted that construction of this part of the project appears to be complete.

iii. To the best of my knowledge, no documentation for the springs rehabilitation was included in the submittal (for springs 1 or 3). Reconstruction at Springs 3 looks great. I understand RH2 collected water quality data to demonstrate no impairment to source occurred because of reconstruction. Please provide this documentation.

6. Since our site visit, I reviewed recent monthly treatment plant reports. The review brings up a couple of issues worth following up on.

a. Investigate the chlorine residual monitoring on the Tacoma intertie. I would expect the residual to be much higher than 0.23 or 0.26mg/L as reported on the December 2022 report.

b. Our current documentation for CT6 calculation of the springs source is based on 8-inch contact pipe, 380gpm maximum flow rate, and the 0.5MG storage. Given the changes in the transmission main, please provide an updated CT6 calculation for the springs source. (This is something I should have asked for during the design review).

7. Develop standard operating protocols for bringing Tacoma intertie 1 and intertie 2 online.

8. Monitor the volume of sodium hypochlorite and sodium hydroxide used. Trending can help identify that the system is operating as expected.

System overview
Permanent source of supply comprised of two springs (S01 and S03) on the south bank of the Green River. GWI (groundwater under the direct influence of surface water) determination showed a hydraulic connection with surface water, but not directly influenced by surface water. CT6 disinfection and corrosion control treatment provided. Tacoma Water interties (S05) are used full-time in order to meet demand. A second Tacoma Water intertie was constructed and put to use since the last survey. The City operates two pump stations and two storage tanks.

The system holds a green operating permit with an "unspecified" number of approved connections. They serve a population of just over 2,400, with around 1,350 service connections. They meet the certified operator requirement (WDM2, CCS).

2017 sanitary survey issues completed (see previous survey notes and survey response for details)

- *Provide a plan / schedule to reconstruct the spring collection to better protect from contaminants or surface drainage. In the near term, please work on covering some of the larger openings in the plastic cover.* – Larger openings in the plastic cover were addressed by 2018. Rebuild of collection piping, replacement of drainage rock and plastic cover for Springs 3 was completed in 2020. Water quality data were collected to assess changes due to reconstruction. There have been no changes to Springs 1 collection.

- *Verify seals and screens with photos on the 0.5MG reservoir roof vent and access hatch are in excellent condition.*

- *Update coliform monitoring plan to include relevant components of the groundwater rule and the revised total coliform rule.* – Included in the 2020 water system plan update. Thank you. This is a working document that is updated as needed.

- *Develop cross-connection control program.* – The cross-connection control program and ordinance was submitted with the 2020 WSP update. Good work! I understand the City is working with a third party to send letters, schedule testing, etc..

- *Purchase portable pH meter for verification of the online monitor.* – I understand the City plans to begin pH monitoring in the distribution system as well. Excellent idea.

- *Recommend developing an* E.coli *Response Plan.*

The Drinking Water Regulations require that all Group A public water systems have a sanitary survey every 3-5 years. Regulations establishing a schedule of fees for sanitary surveys have been adopted (WAC 246-290-990). In order to receive credit for the survey, a sanitary survey fee must be paid. The total cost is **$765.00**, and an itemized invoice is enclosed.

Thank you for all that you do to provide safe and reliable drinking water. If you have any questions, please contact me at (564) 999-3355 or brietta.carter@doh.wa.gov.

Sincerely,

Brietta Carter

Brietta Carter, P.E.
Regional Engineer
NW Drinking Water Operations

Enclosure: Invoice

ecc: Carina Elsenboss, Public Health – Seattle & King County
Lynn Schneider, Public Health – Seattle & King County
Harley Sandoval, PE, RH2, hsandoval@rh2.com
Jason Pittam, O&M Superintendent, Black Diamond, jpittam@blackdiamondwa.gov
Carmen Tupas, Sanitary Survey Program, DOH, nwro.sanitarysurveys@doh.wa.gov
Richard Rodriguez, Planning, DOH, Richard.Rodriguez@DOH.WA.GOV

STATE OF WASHINGTON
Department of Health
OFFICE OF DRINKING WATER
SANITARY SURVEY INSPECTION

INVOICE

SCOTT HANIS, PUBLIC WORKS DIRECTOR
BLACK DIAMOND WATER DEPT
PO BOX 599
BLACK DIAMOND, WA 98010

WS ID: 07220
Invoice No: 51132
Invoice Date: 02/21/2023
Due Date: 04/07/2023

WS NAME: BLACK DIAMOND WATER DEPT SURVEY DATE: 01/04/2023

DESCRIPTION	QTY	COST	AMOUNT
Scheduling, Research, Prep	1.00	x $102.00	$102.00
Survey Documentation	3.00	x $102.00	$306.00
Survey Field Work	3.50	x $102.00	$357.00
		Total Amount Due	**$765.00**

1. ***Pay online*** with a credit card, debit card, or electronic check (ACH) using the Environmental Health Payment System at https://secureaccess.wa.gov/.
2. For billing questions, please contact Northwest Drinking Water Regional Operations at (253) 395-6750.
3. This invoice is issued in accordance with WAC 246-290-990(3)(c)(iii).
4. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 711 Washington Relay Service.
5. If paying by check:

   Make checks payable to Department of Health, Federal ID #91-1444603.

Please return the bottom portion of this invoice with your check.

Invoice Number: 51132
INVOICE AMOUNT: $765.00
Owner Number: 000513
WS Name: BLACK DIAMOND WATER DEPT

Invoice Date: 02/21/2023
Invoice Due Date: 04/07/2023
Region: NW
WS ID: 07220

Reference: SANITARY SURVEY INSPECTION PERFORMED ON 01/04/2023

Please remit to:
ACCOUNTS RECEIVABLE
DOH SANITARY SURVEY PROGRAM
PO BOX 1099
OLYMPIA, WA 98507-1099

1DWA10597240700 SS00007220X04072300076500

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Appendix N

Water Quality Testing

2022 WATER QUALITY *Report*

The **City of Black Diamond** Public Works staff is pleased to report another year of providing the community with SAFE and RELIABLE water

The United States Environmental Protection Agency (EPA) establishes national standards for public drinking water to ensure that tap water is safe to drink. The State Department of Health and EPA coordinate to establish maximum allowable levels for contaminants, as well as goals and action levels for contaminants.

Because contaminants are defined as *ANY* substance in water, it is important to note that some substances are of concern only if they are present above certain levels. In order to remain in compliance with State and Federal regulations, the City of Black Diamond's drinking water must be below the permitted level of these substances.

This report is intended to share information regarding the City's water quality with you and to explain any violations. Pursuant to Federal regulations, the City is required to provide all water customers of the City with a copy of an Annual Drinking Water Quality Report. Annual Drinking Water Quality Reports are provided to our customers in July of each year.

For more information you may contact Jess Stavano, Operations and Maintenance Superintendent at (360) 851-4817.

System ID # 072207

BLACK DIAMOND RESERVOIR TEST RESULTS

DEFINITIONS: The following definitions may be helpful in understanding the information included in the table below:

Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million is comparable to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter (µg/l) - one part per billion is comparable to one minute in 2,000 years, or a single penny in $10,000,000.

Action Level - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

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

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

Millions of Fibers per Liter (MFL) - Identifies the risk of developing benign intestinal polyps.

Inorganic Chemicals - Tested June 2023

Constituent	Level Detected	MCLG	MCL	Unit	Exceed MCL?	Date Analyzed
Arsenic	<0.0010	0.01	0.01	mg/L	No	19-Jun-23
Barium	<0.10	2	2	mg/L	No	19-Jun-23
Cadmium	<0.0010	0.005	0.005	mg/L	No	19-Jun-23
Chromium	<0.0070	0.1	0.1	mg/L	No	19-Jun-23
Mercury	<0.00020	0.002	0.002	mg/L	No	19-Jun-23
Selenium	<0.0020	0.05	0.05	mg/L	No	19-Jun-23
Beryllium	<0.00030	0.004	0.004	mg/L	No	19-Jun-23
Antimony	<0.0030	0.006	0.006	mg/L	No	19-Jun-23
Thallium	<0.0010	0.002	0.002	mg/L	No	19-Jun-23
Free Cyanide	<0.05	0.2	0.2	mg/L	No	14-Jun-23
Fluoride	<0.20	2	4	mg/L	No	12-Jun-23
Nitrite - N	<0.10	0.5	1	mg/L	No	12-Jun-23
Nitrate - N	0.62	5	10	mg/L	No	12-Jun-23
Iron	<0.10	No existing value	0.3	mg/L	No	23-Jun-23
Manganese	<0.010	No existing value	0.05	mg/L	No	19-Jun-23
Silver	<0.01	No existing value	0.1	mg/L	No	19-Jun-23
Chloride	2.4	No existing value	250	mg/L	No	12-Jun-23
Sulfate	2.5	No existing value	250	mg/L	No	12-Jun-23
Zinc	<0.20	No existing value	5	mg/L	No	19-Jun-23
Color	<5.0	No existing value	15	color units	No	14-Jun-23
Asbestos	0.151	7	7	MFL	No	23-Jun-23
Lead	<0.0010	0.001	No existing value	mg/L	No	19-Jun-23
Copper	<0.020	0.02	No existing value	mg/L	No	19-Jun-23

BLACK DIAMOND DISTRIBUTION TEST RESULTS

Drinking Water Disinfection: A public health success story - Public water systems play an essential role in protecting public health through treatment and disinfection processes. The most common method of disinfection is through the addition of chlorine to drinking water supplies. Chlorine effectively kills waterborne bacteria and viruses and continues to keep the water safe as it travels from the treatment plant to the consumer's tap.

Disinfection Byproducts - Although chlorine has been a literal lifesaver with regard to drinking water, it can react with organic materials in water to form disinfection byproducts (DBPs). Several types of DBPs have limits set by the United States Environmental Protection Agency (EPA): trihalomethanes (THMs) and haloacetic acids (HAAs). The EPA set these limits by balancing the health benefits of water disinfection with the risk of exposure to disinfection byproducts.

Testing and Action - All public water systems that disinfect must regularly test their treated water to determine if regulated DBPs are present and at what levels. If they are above the limits set by the EPA, the water system must take action to reduce the DBPs. Actions could include adjustments to organics removal processes, disinfection dose and location, and distribution system management.

Trihalomethane (THM) - Tested 25 May 2023

	Level Detected	Unit	State Reporting Level	MCL
Chloroform	8.4	µg/L	0.5	No existing value
Bromodicholoromethane	1.75	µg/L	0.5	No existing value
Dibromochloromethane	None detected	µg/L	0.5	No existing value
Bromoform	None detected	µg/L	0.5	No existing value
Total THM	**10.15**	**µg/L**	**No existing value**	**80**

Haloacetic Acid (HAA) - Tested 2 June 2023

	Level Detected	Unit	State Reporting Level	MCL
Monochloracetic Acid	None detected	µg/L	2.0	No existing value
Dichloroacetic Acid	3.69	µg/L	1.0	No existing value
Trichloroacetic Acid	2.72	µg/L	1.0	No existing value
Monobromoacetic Acid	None detected	µg/L	1.0	No existing value
Dibromoacetic Acid	None detected	µg/L	1.0	No existing value
Total HAA	**6.41**	**µg/L**	**No existing value**	**60**

BLACK DIAMOND RESIDENTIAL LEAD AND COPPER TEST RESULTS

How copper gets into water - Copper is a mineral and natural component of soils. It is an essential nutrient for humans and plants.

In Washington, most copper in drinking water comes from corrosion of household plumbing. Public water supplies are required to conduct treatment to reduce corrosion when more than 10 percent of the tap water samples exceed **1.3 mg/L** of copper.

Copper from plumbing corrosion can accumulate overnight. Flushing the water from the tap for 30 to 45 seconds can reduce the copper that can accumulate when the household plumbing is not in use.

How lead gets into water - Lead in drinking water usually comes from water distribution lines or household plumbing rather than lakes, wells, or streams. Lead may be present in your home drinking water if:

•There are lead pipes or brass fixtures.

•Lead solder was used on your home water pipes.

•You have soft water (low mineral content) or acidic water.

Public water supplies are required to conduct treatment to reduce corrosion when more than 10 percent of the tap water samples exceed the action level **(0.015 mg/L)** of lead.

Testing and Action - The Washington State Department of Health requires public water systems to:

•Collect samples from residential customers.

•Provide annual public education to all consumers when the water system exceeds the action level for lead and/or copper.

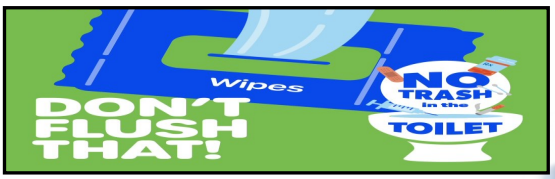
Lead and Copper - Tested 15 September 2022

Location	Lead	Copper	Unit
Site 1	<0.001	0.047	mg/L
Site 2	<0.001	<.020	mg/L
Site 3	<0.001	0.022	mg/L
Site 4	<0.001	<.020	mg/L
Site 5	0.0012	0.024	mg/L
Site 6	<0.001	0.037	mg/L
Site 7	0.005	0.538	mg/L
Site 8	0.002	<.020	mg/L
Site 9	<0.001	0.052	mg/L
Site 10	<0.001	0.036	mg/L

Easy Things You Can Do To Protect Drinking Water Sources

Dispose of harmful materials properly

Don't dump hazardous waste on the ground. It can contaminate the soil, which could also contaminate the groundwater or nearby surface water. A number of products used at home contain hazardous substances that can contaminate ground or surface waters, such as:



- Motor oil
- Paint
- Flea collars
- Household cleaners
- Medicines

Don't use toilets and sinks for trash

Don't let paint, oil, chemical cleaners, medicines or nondegradable products go down the drain. Even products advertised as flushable can throw a huge wrench into the sewage treatment process.

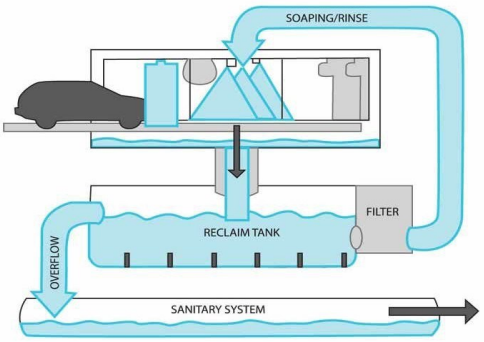
Pick up after pets

Scooping up pet waste keeps bacteria-laden material from running into storm drains and water supplies. The most practical disposal method is to double bag and tie it in a pet-waste bag and throw it in the trash.

To find out about hazardous waste disposal, contact Republic Services by scanning the QR code or visiting https://www.republicservices.com/municipality/black-diamond-wa.

Be a conscientious car owner

Keeping up on car maintenance can reduce the leaking of oil, coolant, antifreeze, and other harmful liquids that are carried by rainwater down driveways and then seep into groundwater supply. Choose a car wash over washing at home. A professional car wash is required to drain wastewater into the sewer, where it is treated before being discharged.



Provide porous surfaces to catch runoff

Stop pollution streams on your own property by using gravel, paver stones, wood or other porous materials whenever possible . If a hard surface is unavoidable, such as a driveway, dig a shallow trench along the border and add plants or gravel to catch the runoff.

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Appendix O

Source Water Protection

SOURCE WATER PROTECTION

WELLHEAD PROTECTION PROGRAM

OVERVIEW

This Wellhead Protection Program was prepared as a component of the City of Black Diamond's (City) previous water system planning efforts in order to meet requirements of the Department of Health (DOH) and the Environmental Protection Agency (EPA)[1]. The Black Diamond Spring Field is located on a 58-acre parcel that is owned by the City. The Black Diamond Spring Field is fed from the Cumberland Aquifer which is located southeast of the Green River. However, the recharge area to the southeast of the springs is not within the City's jurisdiction.

There are recent large lot developments created in the spring recharge area that have been created by Palmer Coking Coal Company in the Hyde Lake Area. The City has notified King County and DOH of the close proximity of these new developments to our source recharge area.

SUSCEPTIBILITY ASSESSMENT

A susceptibility assessment for the Black Diamond Spring Field was previously completed and submitted to the DOH.

WELLHEAD PROTECTION AREA INFORMATION

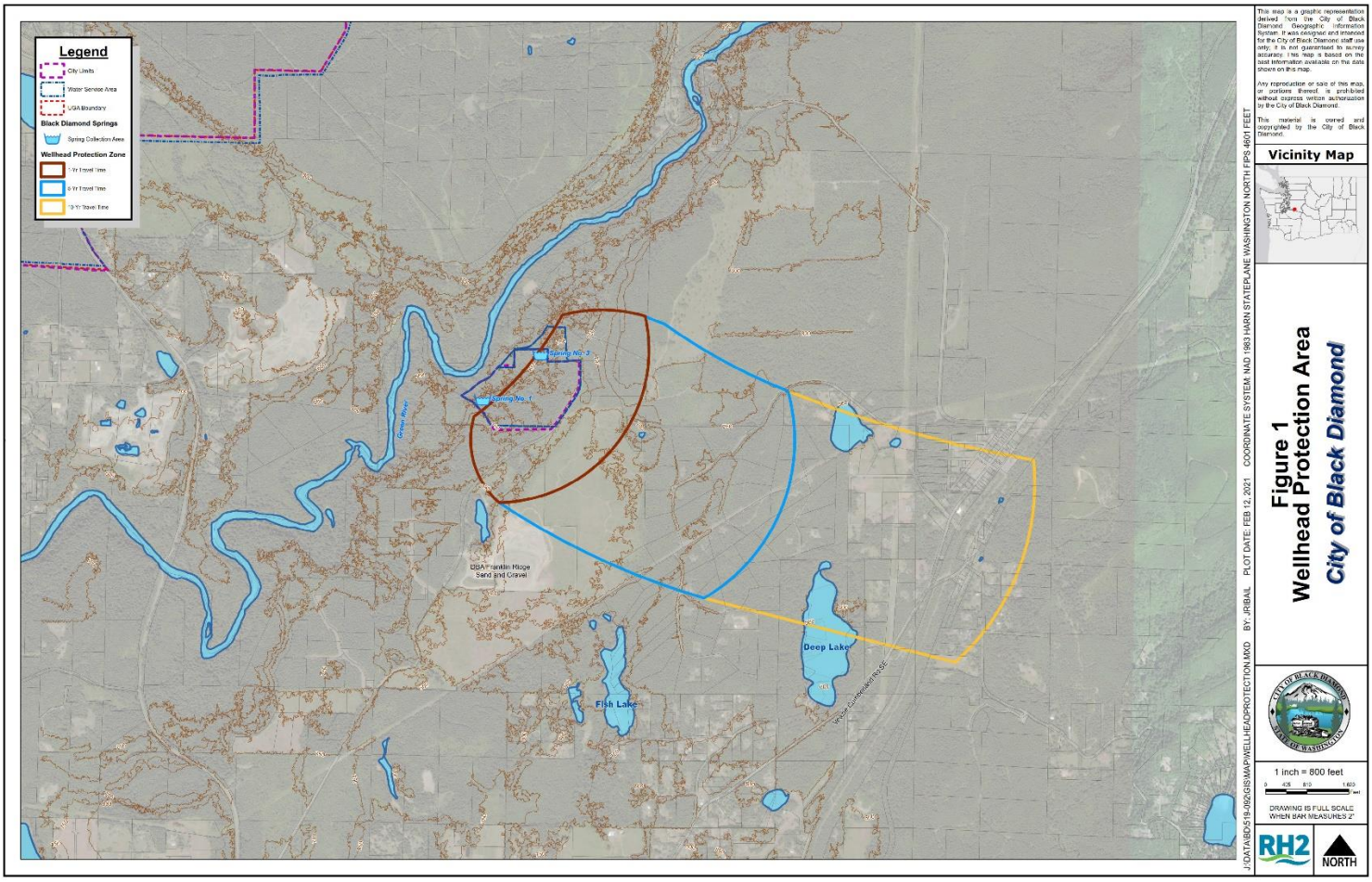
The City's wellhead protection areas are shown in **Figure 6.1, Wellhead Protection Zones**. The protection zones, also known as zones of contribution, are the areas that are most likely to contribute pollutants to the groundwater. It is important that land use is managed within zones of contribution in order to protect the City's spring source. The delineation of zones of contribution and the hydrogeological methods used to develop the zones are the Fixed Radius Method, the Analytical Method, and the Numeric Method.

Fixed Radius Method

The simplest method of modeling groundwater is the Fixed Radius Method. In this method, concentric areas around the wells delineate the zones of contribution by a set distance. Alternatively, the Calculated Fixed Radius Method delineates the zones of contribution based on known or assumed aquifer characteristics and pumping data.

[1] The analysis of the City of Black Diamond's Wellhead Protection Areas was completed in conjunction with the 2000 2016 Water System Plan update.

Figure 6.1
Wellhead Protection Zones



Analytical Method

The analytical method utilizes basic physical characteristics of the aquifer such as aquifer thickness and direction of groundwater flow. The analytical method makes assumptions and simplifies the hydrogeologic processes. However, by utilizing information regarding the physical characteristics of the aquifer, the analytical method is a more realistic representation of groundwater flow than the Fixed Radius Method.

Numeric Method

The numeric method is an even more complex and costlier delineation method than the analytical method. The numeric method models groundwater by superimposing a grid over the study area. Each of the squares in the grid is identified by its' physical characteristics which are collected from a variety of sources. These sources may include geologic and hydrogeologic maps, geophysical data, well logs, groundwater elevation data, meteorological data, and stream flow

discharge. The numeric method results in a more accurate representation of groundwater flow than the Analytical or Fixed Radius Methods.

Black Diamond Wellhead

The City's wellhead protection areas were delineated through the use of a computerized analytical model from the Wellhead Protection Area (WHPA) that was developed by EPA. It was determined that the Fixed Radius Method was inappropriate for the Black Diamond Spring Field as water does not flow to the discharge point from a 360-degree radius due to geographic constraints along the Green River embankment.

Table 6.1, Wellhead Delineation Factors includes data from a previously completed report that was inputted into the model in order to determine the one, five, and ten year zones of contribution.

Table 6.1
Wellhead Delineation Factors

Description	Value
Direction of groundwater flow within the Cumberland Aquifer	Generally to the northwest
Constant discharge rate form the Spring Field collection area	20 cfs
Porosity	0.22
Hydraulic Gradient (feet per foot)	0.02
Aquifer Thickness (feet)	100

If the City develops the North Bank supply options currently under consideration, then the wellhead protection area for that source will need to be assessed and included in the City's wellhead protection plan.

CONTAMINANT SOURCE INVENTORY

An inventory of all potential contaminants is necessary in order to identify past, present, and future activities which may potentially be a source of contamination to the City's spring field. The majority of the identified spring recharge area is undeveloped, forest lands. However, the Town of Cumberland is within the 10-year zone of contribution, as well as recent large-lot developments in the Hyde Lake Area.

In order to maintain an effective full inventory, all known and potential sources should be identified and mapped. There are many activities that may be a potential source of contamination, such as: landfills; underground storage tanks; septic tanks; land use and zoning practices; commercial and industrial operations; dry wells and catch basins; and known sites of contamination.

CONTINGENCY PLAN

Contingency planning plays an important role in the development of a wellhead protection program. Contingency planning addresses the long-term replacement of the City's spring source. A contingency plan allows for the City to be prepared to respond to emergency situations. For

the City, a worst case scenario would be if the Black Diamond Spring Field experienced groundwater contamination. Contamination could occur due to illegal discharges, leaks, or spills in and around the Spring Protection area.

Previously, the Black Diamond Spring Field was the City's only source of supply. Within recent years, the City has negotiated with the City of Tacoma and an intertie has been completed between the City's water system and the City of Tacoma's Second Supply Pipeline. This intertie connection has resulted in an alternate source of supply for the City in the event of contamination of the Black Diamond Spring Field.

RECOMMENDATIONS AND NOTIFICATION OF FINDINGS

The City will take the following actions in order to minimize the risk of contamination to the Black Diamond Spring Field. The City will notify commercial businesses, hazardous waste generators, and septic system owners of their presence within the City's wellhead protection area. The City will also assertively notify King County of the potential impact that developments approved by their jurisdiction may have on the water quality of the City. The City will utilize management strategies provided by the King County Groundwater Protection Program.

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Appendix P

Coliform Monitoring Plan

Coliform Monitoring Plan for: City of Black Diamond

A. System Information

Plan Date: 02-03-2020

Water System Name Black Diamond Water Dept.	**County** King	**System I.D. Number** 072207
Name of Plan Preparer Dan Dal Santo	**Position** Utility Superintendent	**Daytime Phone** **360-851-4522**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	000513 S04 Black Diamond Springs 500GPM	
Storage: List and Describe	.5 mg and 4.3 mg above ground steel reservoirs	
Treatment: Source Number & Process	S04 Liquid Hypochlorite Chlorination system and Sodium Hydroxide 25%	
Pressure Zones: Number and name	3 pressure zones 965, 850, 750	
Population by Pressure Zone	421 / 965 zone, 995 / 850 zone, 1520 / 750 zone	
Number of Routine Samples Required Monthly by Regulation:	2	
Number of Sample Sites Needed to Represent the Distribution System:	7	
***Request DOH Approval of Triggered Source Monitoring Plan?**	**Yes** ☐ **No** ☒	

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name Water Management Labs	**Office Phone 253-531-3121** **After Hours Phone 253-841-0732**
Address 1515 80th St. E, Tacoma, WA 98404	**Cell Phone - -** **Email** Customerservice@watermanagmentlabs.com
Hours of Operation Monday-Friday 8:00am-5:00pm Saturday 9:00am-Noon	
Contact Name _____	
Emergency Laboratory Name Lab / Cor Inc.	**Office Phone 206 - 418 - 5486** **After Hours Phone - - arranged**

Address 7619 6th Ave. NW, Seattle, WA 98117	**Cell Phone - -** **Email** staff@labcor.net
Hours of Operation Monday-Friday 8:00am-5:00pm	
Contact Name	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☐
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
We sell groundwater to other public water systems.	☐	☐
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		

If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -	

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X1. Dal Santo Residents	**1-1.** 30614 3rd	**S_04__** Black Diamond Springs
30614 3rd Bathroom Sink	**1-2.** 30418 3rd	**S___**
	1-3. 30624 3rd	**S___**
		S___
		S___
X2. City Shop	**2-1.** 32820 3rd	**S_04__** Black Diamond Springs
32820 3rd Bathroom Sink	**2-2.** 32814 3rd	**S___**
	2-3. 32828 3rd	**S___**
		S___
		S___
X3. Sample Station	**3-1.** 25560 Olympic Lane	**S_04__** Black Diamond Springs
25560 Olympic Lane	**3-2.** 25530 Olympic Lane	**S___**
	3-3. 25610 Olympic Lane	**S___**
		S___
		S___

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X4. Sample Station 32225 Bruckners Way	**1-1.** 32225 Bruckners Way **1-2.** 32225 Bruckners Way **1-3.** 23903 Roberts Dr.	**S_04__** Black Diamond Springs **S___** **S___** **S___** **S___**
X5. 25600 Baker St Outside Faucet	**2-1.** 25600 Baker St **2-2.** 25591 Baker St **2-3.** 32406 6th Ave	**S_04__** Black Diamond Springs **S___** **S___** **S___** **S___**
X6. 33211 Glacier Ave SE Sampling Station	**3-1.** 33211 Glacier Ave SE **3-2.** 33209 Glacier Ave SE **3-3.** 33213 Glacier Ave SE	**S_04__** Black Diamond Springs **S___** **S___**
X7. 32774 Ash Ave SE Sampling Station	**4-1.** **32774 Ash Ave SE** **4-2.** **32764 Ash Ave SE** **4-3.** **32782 Ash Ave SE**	**S04 ___** **Black Diamond Springs**

E. *NOTE: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

F. ** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.

G.

H. Important Notes for Sample Collector:

I. See attached page for additional routine sites.

J. Reduced Triggered Source Monitoring Justification (add sheets as needed):

Will not apply for reduced triggered source monitoring.

K. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	25560 Olympic Lane 30614 3rd	**July**	25600 Baker St 32774 Ash Ave SE
February	32225 Bruckners Way 33211 Glacier Ave SE	**August**	25560 Olympic Lane 30614 3rd
March	32820 3rd 25600 Baker ST	**September**	32225 Bruckners Way 33211 Glacier Ave SE
April	32774 Ash Ave SE 25560 Olympic Lane	**October**	32820 3rd 25600 Baker ST
May	30614 3rd 32225 Bruckners Way	**November**	32774 Ash Ave SE 25560 Olympic Lane
June	33211 Glacier Ave SE 32820 3rd	**December**	30614 3rd 32225 Bruckners Way

L. Level 1 and Level 2 Assessment Contact Information

Name Justin Ross	**Office Phone (253)736-4478** **After Hours Phone (218)324-2942**
Address 434 North Sergeant St Buckley, WA 98321	**Email** jross@blackdiamondwa.gov
Name Dan Dal Santo	**Office Phone 360-886-5712** **After Hours Phone 253-261-1860**
Address 30614 3rd Ave, Black Diamond, WA 98010	**Email** ddalsanto@blackdiamondwa.gov

M. *E. coli*-Present Sample Response

Distribution System *E. coli* Response Checklist				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	☒	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☒	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☒	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☒	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☒	☐	☐	☐
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☐	☒	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☒	☐	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☒	☐	☐	☐
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☒	☐	☐
We have the capacity to print and distribute the required number of notices in a short time period.	☒	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of *E. coli*-present sample results with our policy makers.	☒	☐	☐	☐
If we find *E. coli* in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☒	☐	☐	☐
(Cont.)				

Distribution System *E. coli* Response Checklist

Potential Public Notice Delivery Methods	Yes	No	N/A	To Do List
It is feasible to deliver a notice going door-to-door.	☒	☐	☐	☐
We have a list of all of our customers' addresses.	☒	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☐	☒	☐	☐
We have a list of customer email addresses.	☐	☒	☐	☐
We encourage our customers to remain in contact with us using social media.	☐	☒	☐	☐
We have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☒	☐	☐
We need a news release to supplement our public notification process.	☐	☒	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered samples per Part D. Collect additional investigative samples as necessary.
3. Check chlorine residual where there the E.coli indicating test was taken, at the discharge side and source side of the 4.3 mg tank and at the supply pump station. If the chlorine level is unusually low at any point take additional follow up coliform samples for testing as appropriate.
4. Concurrently with step 3 review if anything unusual happened during the collection of the sample at the E.coli indicating sample site. Review any public or private activity that is occurring in the nearby area.
5. If the follow up tests indicate E.coli contamination in the distribution system, isolate the area where the e-coli indicating sample was taken if possible and flush fire hydrants in the area and the sample port site as well.
6. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 2-5
7. If the follow up tests indicate E.coli contamination at the springs, follow the response checklist titled **E. coli Present Triggered Source Sample Response Plan - Source**
8. If the triggered sample tests indicate that there is E.coli contamination in one or both of the reservoirs proceed with the following actions: 1) Discuss with DOH whether to issue a Health Advisory based on the findings of steps 2-5 2) Initiate discussions regarding activating the intertie with Tacoma 3) Isolate the reservoirs 4) Issue the health advisory as recommended by the Department of Health
9. The PW Director, Utilities Operator and Water System Engineer shall meet to determine a plan of action for disinfection and flushing and review the action plan with the Department of Health
10. Once follow up tests show that the drinking water supply is clean and safe to drink and the

Department of Health has approved reconnection of the reservoirs to the distribution system, open the valves to the reservoir and turn off the intertie with Tacoma

E. coli-Present Triggered Source Sample Response Checklist – All Sources

Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	☒ ☐	☐ ☒	☐ ☐	☐ ☐
We routinely inspect our well site(s).	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☐
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☒	☐	☐	☐
We discussed the requirement for immediate public notice of an *E. coli*-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☒	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S__*				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☐	☒	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? __.2-2.0___ mg/L	☒	☐	☐	☐
We can quickly increase chlorine into the water system and take advantage of the existing contact time to provide increased disinfection to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☐	☒	☐	☐

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

E. coli-Present Triggered Source Sample Response Plan – Source ___

Source sampling will typically be done in response to a coliform test in the distribution system that indicates e-coli present or routine tests that show unusually low chlorine residual in the storage tanks or at the pump house.

If we have *E. coli* in the city Spring Source water, we will immediately:

1. Call DOH.
2. Isolate the spring source water from the storage and distribution system. In the fall, winter and spring the City has a week of stand by storage. Notify the Gun Club of a health advisory.
3. Conduct a detailed contamination inspection at the springs. Make sure that the issue is not a chlorination problem, respond to any issues discovered and report to DOH

4. Add chlorine to the 4.3 mg tank to raise the chlorine residual.
5. Remove any suspected source of contamination that might be affecting the springs, flush the springs with several surcharges, drain the spring to the environment for one hour after the turbidity has returned to normal.
6. Take follow up bacteria T tests at the discharge and intake side of the storage reservoirs, the combined spring source water at the pump house and the individual source water from spring 1 and spring 3
7. If follow up tests indicate e-coli in the storage tanks, call DOH, take steps to open the intertie with the City of Tacoma, and notify the public by distributing door hangers with the boil water notice.
8. If follow up tests only show e-coli in one or both of the spring's sources but not in the transmission main or in the storage reservoirs, eliminate the source of contamination, flush the appropriate portions of the source piping, Repeat step 5 above.
9. Once the follow up tests show clean groundwater, reconnect the supply upon approval from DOH.
10. If the source test in step 5 indicates a contamination at only one spring, isolate the contaminated spring, flush affected lines with water from the clean spring, and retest. Once a clean test is received at the pump station and at the intake to the 4.3 mg tank reconnect the spring source to the water system upon DOH approval.

N. System Map

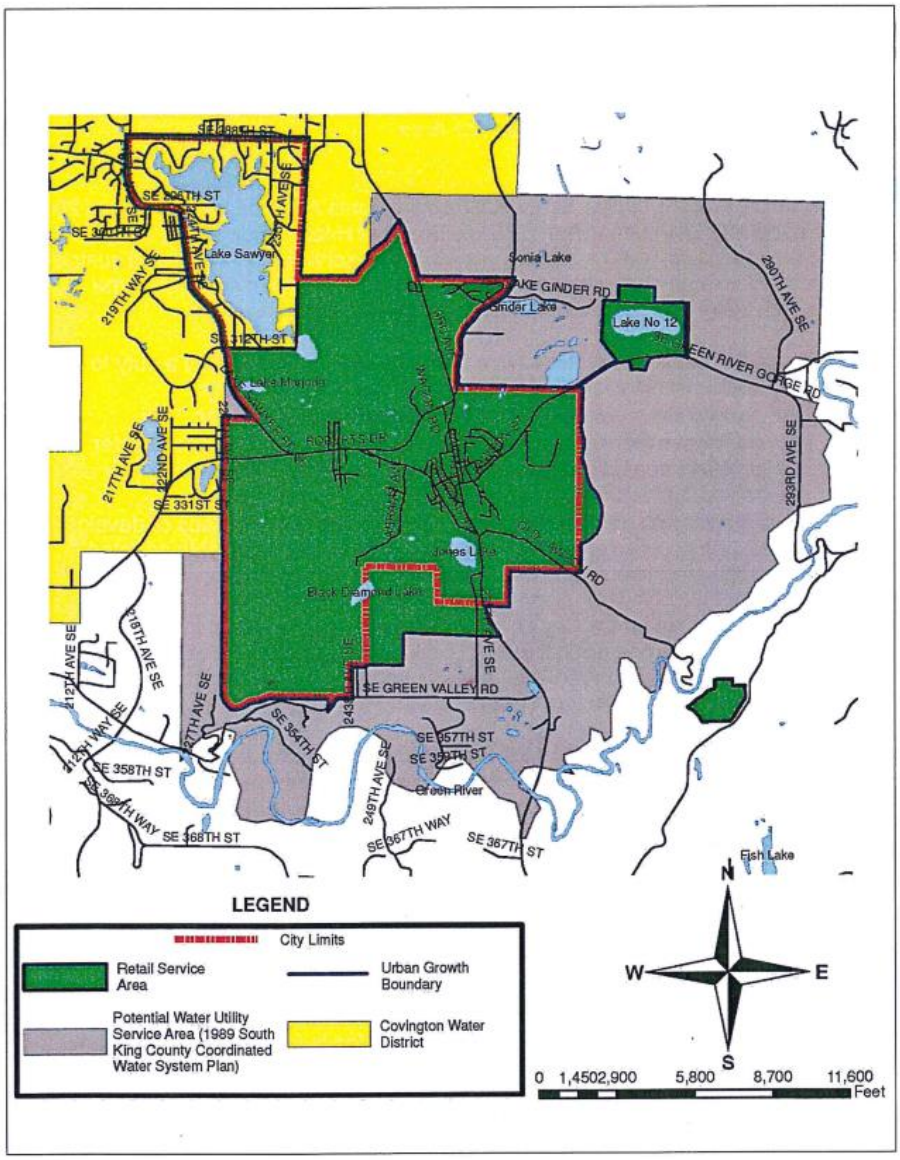

Figure 2.6, Water Service Area

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Appendix Q

Disinfection Byproducts Monitoring Plan

CITY OF BLACK DIAMOND

Water utility

DISINFECTION BYPRODUCTS MONITORING PLAN

YEAR 2020

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

DBP Monitoring Plan
(Annual Schedule)

This template should be used by:

* Surface water systems who serve less than 500 population
* Surface water systems who serve between 500-3,300 population on reduced monitoring
* Groundwater systems who serve less than 10,000 population
* Groundwater systems who serve 500-99,999 population on reduced monitoring

For more information, refer to the Reference Sheets on the separate tabs

System Name:	Black Diamond Water Department
PWSID#:	072207
Population:	2700
Type of Source Water:	Springs
Completed by:	Dan Dal Santo
Date:	

Monitoring Requirments

Monitoring Frequency:	Annual
Number of TTHM Samples Required:	1
Number of HAA5 Samples Required:	1

Monitoring Locations and Month Assigned

Monitoring Location (Name of Site)	Month Assigned
33211 Glacier Ave.	August

Determining Compliance for TTHM and HAA5

Our system is required to monitor annually. Compliance will be achieved if the TTHM and the HAA5 at each monitoring location is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/l for HAA5. If these levels are exceeded the monitoring frequency will be increased to quarterly.

To qualify for reduced monitoring:

The TTHM LRAA must be less than or equal to 0.040 mg/l AND the HAA LRAA must be less than or equal to 0.030 mg/l at each monitoring location.

If your system is on reduced annual monitoring, to remain on reduced monitoring:

The TTHM LRAA must be less than or equal to 0.060 mg/l AND the HAA LRAA must be less than or equal to 0.045 mg/l at each monitoring location. If these levels are exceeded, but the MCL is not exceeded, the monitoring frequency will be returned to quarterly.

Disinfectant Residual Monitoring

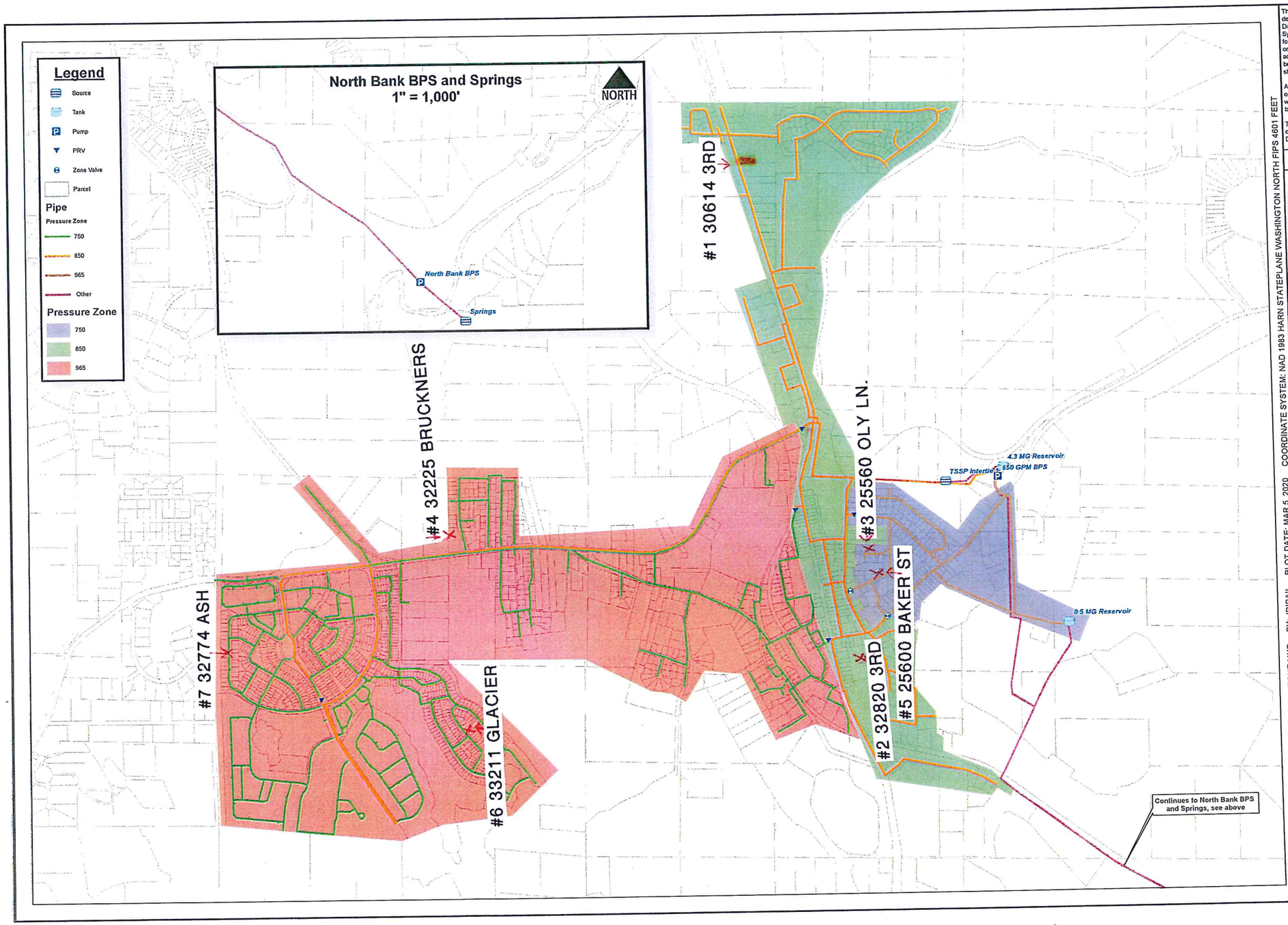
Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl_2

Determining Compliance for disinfectant residuals

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X1. Dal Santo Residents	**1-1.** 30614 3rd	**S_04_** Black Diamond Springs
30614 3rd Bathroom Sink	**1-2.** 30418 3rd	**S___**
	1-3. 30624 3rd	**S___**
		S___
		S___
X2. City Shop	**2-1.** 32820 3rd	**S_04_** Black Diamond Springs
32820 3rd Bathroom Sink	**2-2.** 32814 3rd	**S___**
	2-3. 32828 3rd	**S___**
		S___
		S___
X3. Sample Station	**3-1.** 25560 Olympic Lane	**S_04_** Black Diamond Springs
25560 Olympic Lane	**3-2.** 25530 Olympic Lane	**S___**
	3-3. 25610 Olympic Lane	**S___**
		S___
		S___

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X4. Sample Station 32225 Bruckners Way	**1-1.** 32225 Bruckners Way	**S_04__** Black Diamond Springs
	1-2. 32225 Bruckners Way	**S___**
	1-3. 23903 Roberts Dr.	**S___**
		S___
		S___
X5. 25600 Baker St Outside Faucet	**2-1.** 25600 Baker St	**S_04__** Black Diamond Springs
	2-2. 25591 Baker St	**S___**
	2-3. 32406 6th Ave	**S___**
		S___
		S___
X6. 33211 Glacier Ave SE Sampling Station	**3-1.** 33211 Glacier Ave SE	**S_04__** Black Diamond Springs
	3-2. 33209 Glacier Ave SE	**S___**
	3-3. 33213 Glacier Ave SE	**S___**
X7. 32774 Ash Ave SE Sampling Station	**4-1.** **32774 Ash Ave SE**	**S04 ___** **Black Diamond Springs**
	4-2. **32764 Ash Ave SE**	
	4-3. **32782 Ash Ave SE**	



This map is a graphic representation derived from the City of Black Diamond Geographic Information System. It was designed and intended for City of Black Diamond staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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This material is owned and copyrighted by the City of Black Diamond.

Vicinity Map

PRELIMINARY

J:\DATA\BD\519-092\GIS\MAP\FIGURE 2-6 PRESSURE ZONE.MXD BY: JRIBAIL PLOT DATE: MAR 5, 2020 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Figure 2-6
Pipe Network by Pressure Zone

City of Black Diamond
Comprehensive Water System Plan

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

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Appendix R

Lead and Copper Bilateral Compliance Agreement

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
1511 Third Ave., Suite 719 • Seattle, Washington 98101-1632

June 30, 1998

MR. DAN DAL SANTO
CITY OF BLACK DIAMOND
PO BOX 599
BLACK DIAMOND WA 98010

Subject: Black Diamond Water System - ID# 072207
King County
Lead and Copper Rule Compliance
Signed Bilateral Compliance Agreement

Dear Mr. Dal Santo:

Enclosed is your signed copy of our Bilateral Compliance Agreement regarding the implementation of the federal Lead and Copper Rule (LCR). I would like to thank you and the City of Black Diamond for your cooperation in the implementation of the LCR. If you should have any questions please contact this office in Seattle at (206) 464-7671.

Sincerely,

Robert E. James

Robert E. James, P.E.
Regional Engineer
N.W. Drinking Water Operations

enclosure

cc: Seattle-King County Department of Public Health
Dan Bruce, DOH
Karen Heneghan, DOH

BILATERAL COMPLIANCE AGREEMENT

Water System Name: Black Diamond Water System
King County - ID# 072207

Subject: Compliance with the Lead and Copper Rule
Chapter 246-290 WAC

The following compliance agreement is hereby established between the Department of Health (hereafter, department), and the City of Black Diamond (hereafter, purveyor).

The City of Black Diamond agrees to perform the following:

1. Data collection to determine risk from surface water influence. Monitor on at least a weekly basis for a period of twelve months beginning on January 1, 1998 the air temperature, water temperature, water conductivity, and precipitation at the Black Diamond Springs and record the information on the attached form.

2. Prepare and submit a GWI Water Quality Monitoring Report. On or before January 1, 1999 prepare and submit a GWI Water Quality Monitoring Report to DOH for review which includes the monitoring data specified above, background information regarding the development of the Black Diamond Springs, a site map identifying pertinent features, and an elevation profile of the Springs.

3. Prepare and submit a complete Corrosion Control Recommendation Report. Prepare and submit in accordance with WAC 246-290-115 a Corrosion Control Recommendation Report prior to July 1, 1999.

4. Submit project report and construction documents. In accordance with WAC 246-290-110 & 120 submit for review and approval a project report and construction documents for the installation of the department designated corrosion control treatment equipment required to treat water from the Black Diamond Springs.

5. Construct corrosion control treatment facilities. Complete the installation of corrosion control treatment facilities to treat the water from the Black Diamond Springs in accordance with department approved construction documents prior to January 1, 2001.

6. Monitor tap water quality. Monitor tap water quality in accordance with Title 40 CFR Chapter 1 Parts 141.86 and 141.87 and complete two six-month monitoring compliance periods prior to January 1, 2002.

7. Monitor water quality parameters. Monitor water quality parameters where treated water from the Black Diamond Springs enters the distribution system in accordance with Title 40 CFR Chapter 1 Part 141.87(c), (d), and (e) beginning on January 1, 2001.

8. Prepare optimization report. By April 1, 2002, prepare and submit an optimization report that discusses the monitoring conducted under paragraphs 6, & 7 above. The report shall propose the operational ranges for optimal water quality control parameters.

9. Renegotiate agreement. Renegotiate this agreement if the drinking regulations change significantly.

The Department of Health agrees to:

1. Defer enforcement. Defer any enforcement actions for violations of the Lead and Copper Rule as long as the conditions of this agreement are being met.

2. Mediation. Intercede on behalf of the purveyor with the U.S. Environmental Protection Agency for the violations addressed in this agreement as long as the conditions of the agreement are being met.

3. Review GWI Water Quality Monitoring Reports. Review the GWI Water Quality Monitoring Reports utilizing the statistical software known as WQHYDRO and determine whether a hydraulic connection with surface water exists for the spring within 60 days. Should a hydraulic connection to surface water exist for the spring the department will recommend to the purveyor that this agreement be renegotiated to provide sufficient time to determine whether the source water is susceptible to surface water contamination.

4. Designate optimal corrosion control treatment. Designate optimal corrosion control treatment for the spring within 30 days following the receipt of a complete Corrosion Control Recommendation Report in accordance with Title 40 CFR Chapter 1 Part 141.82(d).

5. Establish water quality control parameters. Establish the water quality control parameters for the spring in accordance with Title 40 CFR Chapter 1 Part 181.82(f) prior to July 1, 2002.

6. Renegotiate agreement. Renegotiate the level of activity or the schedules identified in this agreement if requested by the purveyor.

7. Terminate agreement. Terminate this agreement if requested by the purveyor.

It is understood that failure to comply with this agreement without reasons acceptable to the department may result in the termination of this agreement and the issuance of a departmental order or referral to the Environmental Protection Agency (EPA) for enforcement. Failure to comply with a departmental order may result in the imposition of penalties of up to $5000 per day per violation.

All documents or reports required by this agreement, questions about compliance and request to modify this agreement shall be directed to Robert E. James, P.E., at DOH - Northwest Drinking Water Operations, 1511 3rd Avenue, Suite 719, Seattle, Washington 98101.

WASHINGTON STATE DEPARTMENT OF HEALTH		WATER SYSTEM REPRESENTATIVE	
Robert E James (Signature)		Dan Dal Santo (Signature)	
Regional Engineer (Title)		Utility Supervisor (Title)	
6/30/98 (Date)	206 464-7671 (Phone)	6-24-98 (Date)	360-886-2560 (Phone)

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Appendix S

Cross Connection Control Program

CITY OF BLACK DIAMOND
CROSS CONNECTION CONTROL

CODE AUTHORITY AND ENFORCEMENT

The City of Black Diamond has an ordinance (Ord. 156 § 15, 1973) addressing backflow prevention. Cross connection control is covered briefly in the City Municipal Code (Chapter 13) and states the following:

> 13.04.140 Check Valves
>
> The water department shall have the right to order the installation of check valves on services where this is found necessary to protect the city's meter from hot water or in cases where contaminated or stagnant water may back into the city's mains. The number, location and type of check valves to be used shall be fixed and approved respectively by the water department. The water department shall discontinue water service if the installation of a check valve has not been made within ten days after written notice has been served.

It is recommended that the City review its Cross Connection Control program to verify that it is in accordance with the Accepted Procedures and Practices for Cross Connection Control Manual, 6th Edition, published by the Pacific Northwest Section of the American Water Works Association in 1995, as required by WAC 246-290-490.

The following section sets forth suggestions for needed cross connection control program elements. The City is currently compiling a list of services with backflow prevention devices. Although the City does not test the devices, a City utility worker, Mr. Ken Blakely, does have testing certification.

- ❑ **Priority Service List and Surveillance Program**

  The City should begin the program with a priority list of services considered potentially hazardous to the water system in the event of a backsiphonage within the distribution system. Three categories of hazards need development. Category one services pose the highest degree of hazard and include printing facilities, medical laboratories, chemical companies, radiator establishments, battery, plant nursery, fertilizer, pest control and paint manufacturers and janitorial establishments. Category two services are considered less hazardous than category one and include doctor, dentist, and veterinarians' offices, blood banks, drug rehabilitation centers, car wash establishments, photo labs, commercial laundries, nursing homes and hospitals. The least hazardous services include food processing facilities, dairy establishments, beverage and candy manufacturers, massage parlors, health spas, motels, and schools with pools and/or spa and sauna facilities.

An inspection of the premises should be conducted by City personnel to evaluate the existing hazard. The inspection would also establish the level of protection required. Recommendations would then be prepared by the City as to what type of cross connection devices, if any, are required. A copy of the letter, together with a time-frame for compliance, will be sent to the customer.

The report will establish a time limit for compliance. A City representative will resurvey at the end of the allotted time-frame to verify compliance. If a reinspection shows non-compliance, the customer will be given 30 days for compliance. The City will meet with the customer to discuss the reasons for non-compliance.

After all reasonable avenues of approach fail to bring about compliance, the City will send a letter requesting the customer to show why the water service should not be shut off. After seven (7) days from the date of the letter, if hearing and additional follow-up attempts fail to secure compliance, the customer will be called to a meeting with the City. If the hearing is unsuccessful, the City will shut off the water service to the customer until compliance is obtained.

- **New and Existing Cross Connection Devices**

  New and existing cross connection devices will be catalogued and checked initially by City personnel or a representative of the City. A brass identification tag will be attached to the device. It is the responsibility of the customer to ensure proper testing of the devices on the annual basis thereafter. A condition for new service should be an evaluation by the operations staff of the need for a backflow device.

- **Cross Connection Control Program: Record Keeping**

  A critical program element is the maintenance of accurate records in support of an aggressive cross connection control program. It is suggested the City develop a card filing tracking system for each service with a cross connection device. Annual testing results for the devices can then be recorded on each respective card.

- **Program Scheduling and Personnel Requirements**

  The priority list of inspections will be handled by a person certified as a cross connection control specialist. It is anticipated the testing of both existing and new devices will be performed concurrently in accordance with current standards. It is important one or more operations personnel obtain state certification in both cross connection control and backflow testing.

SUGGESTED CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM

The following program suggestions are in accordance with the aforementioned manual.

- **Purpose**

  The purpose of a cross connection and backflow prevention program is to protect the health of water consumers and potability of the water system. It is also intended to define and establish the policies and procedures necessary to properly implement a cross connection control program as required by ordinance and established in the Washington Administrative Code (WAC).

- **General**

  Except where specifically designated herein, all words used in this procedure shall carry their customary meanings. Words used in the present tense include the future and plural includes the singular. The word "shall" is always mandatory and the word "may" denoted a use of discretion in making a decision.

- **Definitions**

  - The City of Black Diamond is also referred to as the Water Department.

  - Superintendent: Shall mean the Public Works Superintendent of the City of Black Diamond.

    Any act in this procedure required or authorized by the Superintendent may be done on his/her behalf by an authorized representative of the Water Department.

  - Public Health Officer: Shall be the duly appointed Public Health Officer of the King County Health Department.

    Any act in this procedure required or authorized to be done by the "Public Health Officer" may be done on his/her behalf by an authorized representative of the Health Department.

  - Building Inspector: Shall be the Building Inspector for the City of Black Diamond. It shall also include the Building Inspector for the King County Building Department.

  - Inspector: Shall be that person or persons employed by the Water Department that have been trained and qualified to perform the designated inspection work.

- Cross Connection: The term "cross connection" shall mean any physical arrangement whereby a potable water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture or other assembly which contains, or may contain, contaminated water, sewage or other waste liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply as a result of backflow (reversed flow).

- Public Water Supply: The system operated and maintained by the Water Department which is a water supply intended or used for human consumption or other domestic use, including source, treatment, storage, transmission and distribution facilities where water is furnished by the Water Department to the customers of the City of Black Diamond and the immediate surrounding area in which it serves.

- Auxiliary Supply: Shall mean any water supply on or available to the premises other than the public water supply.

- Customer: Any person, persons, firm or corporation that is furnished potable water from the public water supply through a legal service connection to the public water supply distribution system.

- Service Connection: A connection between the public water supply distribution system and the customer's system

- Industrial Fluids: Shall mean fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration that would constitute a health or plumbing hazard if introduced into the potable water supply. This may included but is not limited to:
  - all types of processed waters originating from the public water or auxiliary supply which may deteriorate in sanitary quality
  - chemicals in fluid form
  - planting acids and alkalies
  - circulated cooling waters that are chemically or biologically stabilized with toxic substances
  - contaminated natural waters such as water from wells, springs, streams or ponds.
- Liquids: The term "liquid" shall mean any substance that flows readily but does not expand indefinitely, such as water and industrial fluids.

- Air Gap Separation (AG): Shall mean the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other assembly and the maximum flood level rim of the receptacle, and shall be at least double the diameter of the supply pipe measured vertically above the flood level rim of the vessel. In no case shall this gap be less than one (1") inch.

- Backflow: Shall mean the flow, other than in the intended direction of flow, of any foreign liquids, gasses or other substances (including water) into the distribution system of the public water supply.

- Back Pressure: Shall mean any induced pressure caused by a pump, elevated tank or plumbing, boiler, or other means that could create pressure within the customer's system greater than the operating pressure of the public water supply.

- Approved Backflow Prevention Device: Shall mean any assembly to prevent backflow that has been approved for use by the Superintendent, Washington State Division of Health.

- Atmospheric Vacuum Breaker (AVB): Shall mean a backflow prevention assembly which is operated by atmospheric pressure in combination with the force of gravity. The unit is so designed to work on a vertical plane only. The moving part consists of a poppet valve which must be carefully sized to slide in a guided chamber and effectively shut off the reverse flow from water when a negative pressure exists in the supply system. They are designed to protect against back siphonage events only.

- Pressure Vacuum Breaker (PVBA): Pressure vacuum breaker assemblies consist of a spring loaded check valve (3-inch and larger consist of two), an independently operating air inlet valve, inlet and discharge shut-off valves and properly installed test cocks. The air inlet valve is internally loaded to the open position, normally by means of a spring. This internal loading allows the device to be installed on the pressure side of a shut-off valve. They are designed to protect against back siphonage events only.

- Double Check Valve Assembly (DCVA): Shall mean an assembly composed of two (2) single, independently acting, approved check valves, including tightly closing shut-off valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. Double check

valve assemblies protect the water system from both back siphonage and back pressure events. They are not suitable for use in protecting the water system from health threatening substances.

- Double Check Detector Assembly (DCDA): Shall mean an assembly composed of two (2) single, independently acting, approved check valves, including tightly closing shut-off valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve. It shall also provide a factory installed bypass feature, designated to monitor low flows on low hazard fire systems. It is used to detect unauthorized use of the water allocated for fire protection and/or to detect leaks in the fire system. Double check detector assemblies protect the water system from both back siphonage and back pressure events. They are not suitable for use in protecting the water system from health threatening substances.

- Reduced Pressure Principal Backflow Prevention Assembly (RPBA): Shall mean an assembly containing a minimum of two (2) independently acting, approved check valves, together with an automatically operated pressure differential relief valve located between the two check valves. During normal flow, the pressure between these two check valves shall be less than the upstream (supply) pressure. The unit must include tightly closing shut-off valves located at each end of the assembly, and each assembly shall be fitted with properly locked tests cocks.

- Degree of Hazard: Shall express the results of an evaluation of a health, system or plumbing hazard.

- Health Hazard: Shall mean any condition, assembly or practice in a water supply system and/or its operation that creates or may create a danger to the health and well-being of a customer.

- Back Siphonage: Backflow of water due to a negative or reduced pressure within the water system.

- Plumbing Hazard: Shall mean a potential or existing cross connection in a customer's potable water system that may permit back siphonage in the event of a reduced pressure in the supply line.

- Non-health Hazard: A hazard which could cause aesthetic problems or have an adverse effect on the quality of water in the system.

GENERAL POLICY

The intention of this program is to provide for the payment of abatement or control of all cross connections. Where physically and economically unfeasible to find or to permanently eliminate all cross connections of the customer's water system, and when it is deemed necessary by the appropriate inspector, a suitable backflow prevention assembly commensurate with the degree of hazard to the public water supply be installed at the service connection.

The following methods of cross connection control are considered minimum protection at the service connection:

- ❑ The public water supply to a premises having an auxiliary water supply from an additional public supply with no known cross connections shall require an approved double check valve assembly at the service connection.

- ❑ The public water supply to a premises on which is handled a substance that is objectionable (not a health hazard) in a manner constituting a potential cross connection shall require a double check valve assembly at the service connection.

- ❑ The public water supply to a premises on which there is an auxiliary water supply and having internal cross connections that are not correctable or intricate plumbing arrangements which make it impractical to ascertain where or not cross connections exist, shall require a reduced pressure type backflow prevention assembly at the service connection.

- ❑ The public water supply to a premises on which material dangerous to health or toxic substances are handled shall have installed a reduced pressure backflow prevention assembly at the service connection.

- ❑ The public water supply to a premises where entry is restricted so that inspection fro cross connections can not be made at a sufficient frequency or at sufficient short notice to assure that cross connections do not exist shall have installed a reduced pressure backflow prevention assembly at the service connection.

- ❑ The public water supply to a premises on which any substance is handled under pressure so as to permit entry into the public water supply, or where a cross connection could reasonably be expected to occur, shall have installed a RPBA or a DCVA according to health hazard at the service connection.

- ☐ The public water supply to a premises having a repeated history of cross connections being established or re-established, shall have installed a RPBA at the service connection.

CORRECTIVE MEASURES

Follow guidelines in the most recently published edition of the Accepted Procedure and Practice in Cross Connection Control Manual previously mentioned.

CODE

The following are the abbreviation for the assemblies or methods used to prevent or eliminate cross connection.

Air Gap	AG
Reduced Pressure Backflow Assembly	RPBA
Double Check Valve Assembly	DCVA
Double Check Detector Assembly	DCDA
Pressure Vacuum Breaker	PVB
Atmospheric Vacuum Breaker	AVB
Not Allowed	NA

Backflow prevention assemblies may be required at the meter where, in the opinion of the Water Department, it should be isolated due to a potential or existing cross connection in the customer's system.

PROCEDURE FOR INSTALLATION, INSPECTION AND MAINTENANCE OF BACKFLOW PREVENTION DEVICES

☐ **Atmospheric Vacuum Breaker Assemblies**

1. Initial Installation

   a. The installation of vacuum breakers as required shall be by a licensed plumber.

   b. Installation of vacuum breakers shall be installed as specified in the most recent edition of the Uniform Building Code, 1995, and/or the PSWS - AWWA Cross Connection Control Manual, whichever is the more restrictive.

2. Testing and Maintenance

   a. Since the number of atmospheric backflow prevention assemblies (vacuum breakers) can be assumed to be large, a continuous program of inspection would not be economically feasible. Field inspection will, however, be carried on by

the inspector by periodic spot checking or various premises in which they have been installed.

b. When a defective atmospheric backflow prevention assembly (vacuum breaker) is reported and/or discovered, the owner shall take immediate action to have the subject assembly repaired or replaced at his/her expense by a qualified and licensed plumber.

❑ **Pressure Vacuum Breaker Assemblies, Double Check Valve Assemblies, Double Check Detector Assemblies, and Reduced Pressure Backflow Prevention Devices**

1. Initial Installation

a. When it has been determined that a pressure vacuum breaker assembly, double check valve assembly, double check detector assembly, or a reduced pressure backflow prevention assembly is required, the water purveyor shall inform the Superintendent of the need for a device.

b. At the discretion of the Water Department, the purchase and installation of the approved backflow prevention assembly may be performed by either a licensed and qualified plumber or a state certified backflow tester.

c. Installation of the above stated devices shall be installed as specified in the most recent edition of the Uniform Building Code, 1995, and/or the PSWS-AWWA Cross Connection Control Manual whichever is the more restrictive.

d. Upon completion of the installation of the backflow prevention assembly, a qualified tester will make such tests as required to insure proper operation of the assembly. If the assembly fails any part of the test, the assembly will be rejected until repaired or replaced in order to meet all elements of the test. The test results will then be supplied to the Water Department.

2. Inspection and Maintenance

a. All backflow prevention assemblies (except atmospheric vacuum breakers) will be tested not less often than once annually, or more often as necessary, depending on use and history of the failure. The testing shall be made by a certified backflow prevention assembly tester, and results forwarded to the Water Department.

b. Maintenance

i. When a backflow prevention assembly is determined to be defective, the tester shall immediately notify the water purveyor.

ii. Upon receipt of notification of the defective assembly, the purveyor shall take necessary steps to have the defective assembly repaired or replaced. The defective assembly shall be repaired or replaced by a qualified and specifically trained backflow assembly repairman.

iii. Upon completion of repair, the backflow prevention assembly shall be tested by a certified Backflow Assembly Tester.

RECORDS AND REPORTS

❑ **Cross Connection Control Inspections**

1. Each individual customer will be tracked by the City.

2. The following information will be available through the Department's record keeping program:

   a. Information about installation

   b. Test results for installation

   c. Information about testers

   d. Tester's certification histories

   e. Mailing addresses of installation owners

   f. Device manufacturer and models and approved status

ORDINANCE NO. 18-1102

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF BLACK DIAMOND, KING COUNTY, WASHINGTON ESTABLISHING THE AUTHORITY TO ADOPT A CROSS CONNECTION CONTROL PROGRAM; ADOPTING BLACK DIAMOND MUNICIPAL CODE SECTIONS 13.04.025, 13.04.085 AND 13.04.095; AMENDING SECTION 13.04.090; REPEALING SECTION 13.040.070; PROVIDING FOR SEVERABILITY; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, it is the responsibility of a water purveyor to provide water to the customer at the meter that meets Washington state water quality standards; and

WHEREAS, it is the water purveyor's responsibility to prevent the contamination of the public water system from the source of supply (i.e., to the customer's connection to the service pipe or meter); and

WHEREAS, it is a requirement of the Washington State Department of Health ("DOH") for the Purveyor to establish a cross connection-control program satisfactory to DOH; and

WHEREAS, cross-connections within the customer's plumbing system pose a potential source for the contamination of the public water supply system; and

WHEREAS, the Council now desires to establish the authority to adopt and implement a cross-connection control program to protect the City-owned water system from the risk of contamination, to apply equally to all new and existing customers for public health and safety;

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF BLACK DIAMOND DO ORDAIN AS FOLLOWS:

Section 1. A new Section 13.04.025 of the Black Diamond Municipal Code ("BDMC") is hereby adopted to read as follows:

13.04.025 Authority to Adopt and Implement a Cross-Connection Control Program.

The City will engage the services of a DOH-certified Cross-Connection Control Specialist ("CCS") to develop, implement and be in charge of the Black Diamond Water System's cross-connection control program.

The City, under the direction of the aforementioned CCS, will prepare a written cross-connection control program plan to implement the requirements of this ordinance. The

written program shall be consistent with this ordinance and shall comply with the requirements of Chapter 246-290 WAC (Group A Drinking Water Regulations). The Public Works Director shall be responsible for the adoption and implementation of the cross-connection control program. A copy of the program shall be on file in the City Clerk's office and the Public Works Department.

The City will use the most recently published editions of the following publications as references and technical aids:

(1) *Cross-Connection Control Manual, Accepted Procedures and Practice,* published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof.

(2) *Manual of Cross-Connection Control,* published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, or latest edition thereof.

(3) *Cross-Connection Control Guidance Manual for Small Water Systems,* published by the DOH Office of Drinking Water.

(4) *[Optional addition: add additional references here, if applicable].*

The City will incorporate the written program plan into the Water System Plan and will submit the plan to DOH for approval when requested.

The Public Works Director or his/her designee, in consultation with the aforementioned CCS, shall have the authority to make reasonable decisions related to cross connections in cases and situations not provided for in the BDMC or written program.

If any provision in the BDMC, or in the written cross-connection control program is found to be less stringent than or inconsistent with the Drinking Water Regulations (Chapter 246-290 WAC), or other Washington state statutes or rules, the more stringent state statute, rule, or regulation shall apply.

Section 2. A new Section 13.04.085 of the Black Diamond Municipal Code is hereby adopted to read as follows:

13.04.085 Cross-connection restrictions and fees

A. No water service connection from the city water system to any premises shall be installed or maintained unless the city water supply is protected by backflow prevention devices as required by the director or his/her designee, the rules and regulations of the State Board of Health, the county department of health, this code, and the city's cross-connection control program. The installation or maintenance of a cross-connection which will endanger the water quality of the city water supply is unlawful. Any such cross-connection is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the city systems shall be in accordance with

WAC 246-290-490, the rules and regulations of the state and county, and the city's cross-connection control program, as amended.

B. Service to any property, landowner, or water user receiving its water supply from the city water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the state and county boards of health, the city, and this code pertaining to cross-connections. Service shall be discontinued to any premises, water user, or property owner for failure to comply with such regulations of the State Board of Health, the city, and this code pertaining to cross-connections, and any discontinued service will not be re-established until the public works department has approved compliance with such requirement of the rules and regulations of the State Board of Health, the city, and this code pertaining to cross-connections.

C. Costs and Fees. The property owner or developer shall be responsible for paying all utility costs and fees associated with the installation, inspection, testing, certification, repair, replacement or upgrade of backflow prevention assemblies in accordance with the City's adopted Fee Schedule, as applicable.

Section 3. A new Section 13.04.095 of the Black Diamond Municipal Code is hereby adopted to read as follows:

13.04.095 Cross-Connections and Backflow Prevention Assemblies – Enforcement

A. Unlawful cross-connections and installation of backflow prevention assemblies. Cross-connections declared in BDMC Chapter 13.04 and/or the City's cross-connection control program to be unlawful, whether presently existing or hereinafter installed, and/or services requiring backflow prevention assemblies and/or unlawful use or operation of a private water supply system served by the City public water supply system are public nuisances, and in addition to any other provisions of this code or the ordinances of the City where abatement of public nuisances shall be subject to abatement in accordance with the following procedure:

(1) In the event that the Public Works Director determines that a nuisance as herein provided does exist, written notice shall be sent to the person in whose name the water service is established under the records of the City water department, or alternatively, a copy of such written notice shall be posted on the premises served.

(2) The notice shall provide that the nuisance described herein shall be corrected within 30 days of the date said notice is mailed or posted on the premises.

(3) In the event said nuisance is not abated within the prescribed time, water service to said premises shall be discontinued.

(4) In the event that the nuisance, in the opinion of the Public Works Director, or his or her designee, presents an immediate danger of contamination to the public water supply, service from the City water supply system to the premises may be terminated

without prior notice, provided, however, notice will be posted on the premises in the manner heretofore provided at the time said service is terminated.

B. Failure to complete inspections/test reports. When a customer fails to send in backflow preventer inspection/test reports required by the cross-connection control program within 15 days after the due date specified and the City has not approved an extension, the City will take the following enforcement action:

(1) The City will send a second notice giving the customer an additional 15 days to comply.

(2) If the customer has not complied within 10 days of the due date given in the second notice, the City will send a third notice, by certified mail or by hand delivery, giving an additional 15 days to send in the inspection/test report. The notice will inform the customer that failure to satisfactorily respond to the notice will result in water service shut-off.

(3) The purveyor will send copies of the third notice to the occupants of the premises (if different from the customer) and to the local administrative authority.

(4) If the customer has not responded satisfactorily within 10 days of the due date specified in the third notice, the purveyor will implement service shut-off procedures.

(5) Prior to shut-off, the City will offer to arrange for the inspection and/or testing of the customer-owned backflow preventers by a certified BAT and will bill the customer the actual cost of inspection and/or testing in the service area plus associated costs for staff time as determined in the City's adopted Fee Schedule. Collection and enforcement procedures for such charges will be the same as for other water utility charges.

Section 4. Section 13.04.090 of the Black Diamond Municipal Code is hereby amended to read as follows:

13.04.090 Connection with other water supply.

No service connection shall be allowed from the city mains to any premises supplied by water from any other source

Section 5. Section 13.04.070 of the Black Diamond Municipal Code is hereby repealed in its entirety.

Section 6. Each and every provision of this Ordinance is severable. If any provision of this Ordinance is found to be unconstitutional or otherwise unenforceable or contrary to law by a court of competent jurisdiction, that finding shall not affect the validity of the remaining provisions, which shall remain in force and effect.

Section 7. This Ordinance shall be published in the official newspaper of the City, and shall take effect and be in full force five (5) days after the date of publication.

PASSED BY A MAJORITY OF THE CITY COUNCIL AT A MEETING HELD ON THE 15TH DAY OF MARCH 2018.

CITY OF BLACK DIAMOND:

Carol Benson

Carol Benson, Mayor

Attest:

Brenda L Martinez

Brenda L. Martinez, City Clerk

APPROVED AS TO FORM:

David Linehan, City Attorney

Published: 3/20/2018

Posted: 3/16/2018

Effective Date: 3/25/2018

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Appendix T

Hydraulic Analysis

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Diameter

- 3" or less
- 4"
- 6"
- 8"
- 12"
- 16"
- 20"

Junction

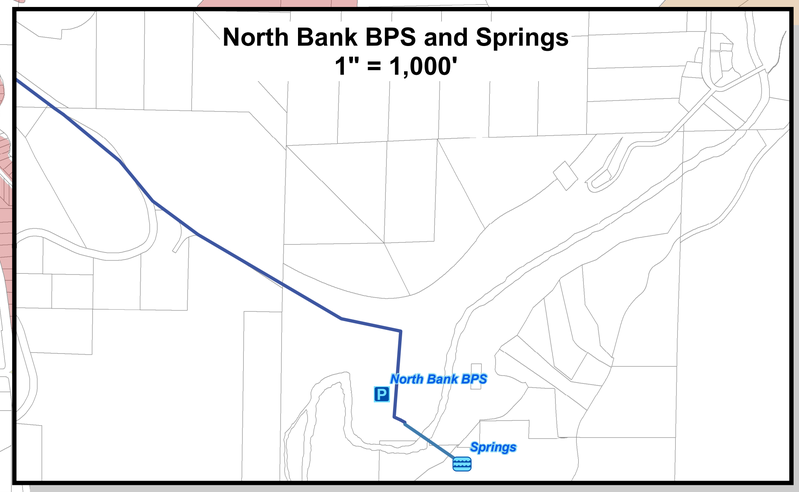
Available Fire Flow

- 0 - 1,000 GPM
- 1,000 - 2,500 GPM
- 2,500 - 3,000 GPM
- 3,000 - 3,500 GPM
- > 3,500 GPM

Land Use

- Business Park & Light Industrial
- Community Commercial
- Industrial
- Low Density Residential
- Medium Density Residential
- Neighborhood Commercial
- Public
- Town Center

North Bank BPS and Springs
1" = 1,000'



TSSP Intertie 2

TSSP Intertie 1

4.3 MG Reservoir
650 GPM BPS

0.5 MG Reservoir

Continues to North Bank BPS and Springs, see above

This map is a graphic representation derived from the City of Black Diamond Geographic Information System. It was designed and intended for the City of Black Diamond staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Vicinity Map

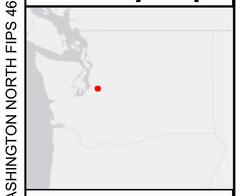

Figure A
Existing Water System MDD

City of Black Diamond Water System Plan

CITY OF BLACK DIAMOND STATE OF WASHINGTON

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE A JUNCTIONSMDD.MXD BY: JRIBAIL PLOT DATE: MAY 9, 2024 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

Legend

- Source
- Reservoir
- Pump
- PRV
- Parcel

Pipe

Diameter

- 3" or less
- 4"
- 6"
- 8"
- 12"
- 16"
- 20"

Junction

Pressure

- 0 - 30 psi
- 30 - 100 psi
- > 100 psi

North Bank BPS and Springs
1" = 1,000'

NORTH

North Bank BPS

Springs

TSSP Intertie 2

4.3 MG Reservoir

TSSP Intertie 1 2,050 GPM BPS

0.5 MG Reservoir

Continues to North Bank BPS and Springs, see above

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Vicinity Map

Figure B
Existing Water System PHD

City of Black Diamond
Water System Plan

1 inch = 600 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE
WHEN BAR MEASURES 2"

NORTH

J:\DATA\BD\519-092\GIS\MAP\FIGURE B JUNCTIONSPHD.MXD BY: JRIBAIL PLOT DATE: MAY 9, 2024 COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

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Appendix U

Springs Vulnerability and Feasibility Study

BLACK DIAMOND SPRINGS

Preliminary Alternatives Analysis

Prepared for the City of Black Diamond

This report has been prepared by RH2 Engineering, Inc., to develop planning-level costs based on conceptual improvements required to improve reliability, better utilize the existing water rights, improve efficiency, reduce operating costs, and improve source quality protection of the City's existing water supply.

RH2 Engineering, Inc.
February 2014
BD 1113.105

Black Diamond Springs
Preliminary Alternatives Analysis

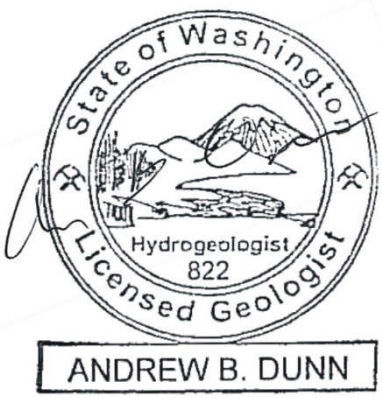
February 2014

This report summarizes the findings of an alternatives analysis for the Black Diamond Springs in Black Diamond, Washington. This report describes the existing system and evaluates potential options for improving the Black Diamond Springs water source to provide municipal supply to the City of Black Diamond.

Sincerely,

RH2 ENGINEERING, INC.

Geoff Dillard, P.E.
Project Manager and Principal-in-Charge



Andrew Dunn, L.G., LH.G.
Hydrogeologist

CITY OF BLACK DIAMOND
BLACK DIAMOND SPRINGS
PRELIMINARY ALTERNATIVES ANALYSIS

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CITY OF BLACK DIAMOND
BLACK DIAMOND SPRINGS
PRELIMINARY ALTERNATIVES ANALYSIS

FEBRUARY 2014

Introduction

The City of Black Diamond (City) currently relies on a series of natural springs on the south side of the Green River for all of its municipal water supply. The infrastructure used to capture and transport the spring water into the Municipal water system is nearing the end of its useful service life and has several potential deficiencies that need to be addressed to ensure the long-term reliability of this asset. The City has, for several years, anticipated that the springs would be rebuilt or rehabilitated in conjunction with growth in the City. The City made funding arrangements with the major property owners (now Palmer Coking Coal and Yarrow Bay) for the reconstruction of the springs in addition to other water system improvements through the Water Supply and Facilities Funding Agreement (WSFFA). In a meeting to discuss the springs rehabilitation project the funding partners requested that the City investigate further the viability of drilling a well on the north side of the Green River and compare the cost with the spring rehabilitation project including an assessment of risks and operation/maintenance costs.

This report, prepared by RH2 Engineering, Inc., (RH2), provides an evaluation of the spring rehabilitation and well supply alternatives as two cost effective and reasonable solutions for the City to consider in its effort to utilize its water rights and maintain a City-owned source of water. The two alternatives analyzed in this report will be referenced as: Alternative 1 – Existing Springs Rehabilitation; and Alternative 2 - North Bank Well.

Existing Water System

The City's potable water source, known as Black Diamond Springs, actually consists of four separate and proximate natural springs all located within the Black Diamond owned property. Two of the springs (Spring Nos. 1 and 3) are currently fitted with equipment and piping and used for municipal water supply. Another spring (Spring No. 2) has been developed with collection facilities and piping but is not currently on-line for use because of surface water influence. The fourth spring (Palmer Spring) has never been developed for use by the City and is in its natural condition. The spring sources include capture and impoundment facilities, collection boxes, transmission mains crossing sensitive areas and running down steep slopes, pipes crossing the Green River on an early 1900s suspension bridge, a pump station, a disinfection (chlorination) facility, and several miles of transmission main to deliver water to the City's distribution system.

The City has a valid and certificated water right for Black Diamond Springs.

System Deficiency

The existing springs and capture/impoundment facilities are equipped with simple surface-type collection facilities (impoundment boxes, weirs, piping) and the Washington State Department of Health (DOH) has expressed a concern that the impoundment and collection area should be more robustly protected from both natural and intentional contamination. Historical water quality testing has shown that the spring's groundwater sources are not under the direct influence of surface water (GWI). However, if changes in the area occur that adversely affect the springs then DOH could require that additional treatment facilities be constructed by the City to address surface water contamination concerns. Both the springs and the gravity transmission mains are in areas that are difficult to access for maintenance and repair and some are on or below a steep slope with known instability. The suspension bridge that is used to convey the collected water from the south side to the north side of the river is 100 years old, not constructed to current codes, and could potentially be damaged during large flood events.

Damage to the suspension bridge would likely compromise the ability to supply the City's water system from the springs.

Background Data

A number of studies and reports evaluating water rights, site conditions, and improvement alternatives have been completed in the past, and to the extent possible are used in this evaluation. Flow measurement equipment was installed in March 2013, to estimate individual spring flow rates and help refine spring capacity evaluations. This spring flow data, along with demand and growth factors from the City's current *Water System Plan* (WSP), are used for developing design criteria and demand projections for the proposed spring improvement alternatives.

Water Rights

The City holds Water Right Certificate S1-00506C for the diversion of up to 8 cubic feet per second (cfs) of instantaneous withdrawal (Qi). However, the volume of water that can be annually withdrawn cannot exceed 551 acre-feet per year (Qa). Therefore, the annual withdrawal amount is the limiting factor in how the City's existing water right can be used. Typically, Qi water rights would equal a water system's maximum day demand (MDD) and the Qa water right would equal a system's average day demand (ADD) totaled for the full year. The ratio of these factors (MDD/ADD) is typically less than 2.5. In the case of the City's water right the ratio is in excess of 10.0. Stated differently, the City could divert water continuously from the spring at the water right Qi for less than 35 days before the water right Qa would be exhausted. The implication is that the City should not spend a lot of money trying to get more capacity at the springs to reach the Qi of 8 cfs because the period of time for which it could be withdrawn before the annual volume limitation is reached is too short to be cost-effective.

Growth and Demand Projections

Data from the City indicates that the current number of water system customers is approximately 1,310 equivalent residential units (ERUs). The current WSP states that by 2027 the number of customers will be approximately 6,907 ERUs. This equates to a growth rate of approximately 15 percent per year. Using this growth rate through the year 2029 (15-years) and a 3 percent growth rate for each additional year would result in approximately 14,200 ERUs by 2044 (30 years).

Current: Based on customer demand factors from the City's current WSP, this year's annualized ADD would be approximately **77 million gallons (MG)** or **237 acre-feet per year**, with a MDD of approximately 293 gallons per minute (gpm) or 0.65 cfs.

Future Long-Term: In 2044, annualized ADD would be approximately **970 MG** or **2,978 acre-feet per year**, with a MDD of approximately 923 gpm or 2.06 cfs.

Additional growth and demand data can be found in **Appendix A**.

Existing Spring Source Production Capacity

RH2 completed a flow measurement study of the Black Diamond Springs in November of 2013. The flow measurement study was conducted to analyze the production of the four existing springs at seasonal high and low flows. The study, found in **Appendix B**, was used to determine how much water could be diverted from each spring to achieve full use of the City's water rights.

Minimum production from the springs occurred during the month of October with a combined estimated flow from all four springs of 6.1 cfs. Currently, only water from Spring Nos. 1 and 3 are easily captured and routed to the City's water system. The minimum combined flow from these two springs is 4.30 cfs. Palmer Springs is located in an undeveloped area and it may not be practical to construct capture and impoundment facilities and transmission piping to divert water from this spring. In addition, the amount of work necessary to capture water from Spring No. 2 does not justify further evaluation at this time due to the Qa limitations of the water right discussed earlier in this report.

Unit Cost of Production

Data provided by the City regarding the recent costs to operate and maintain the spring sources was used to estimate the per unit cost for the City to produce water. This is the cost to produce the water and deliver it to the City's system. This unit cost does not include other costs associated with repair and maintenance of the distribution system, meter reading, administrative, and other costs necessary to operate the overall water utility. The per unit costs included labor, electricity, chemical, fuel, insurance, repair parts, and vehicle maintenance. Electricity and chemical costs are directly dependent on the amount of water produced, while the other costs are relatively less dependent on the total volume produced. Therefore, electricity and chemical costs were adjusted to reflect how much would be needed to produce the full water right Qa of 551 acre-feet per year. Based on this approach it is estimated that it costs approximately $0.55 to produce 100 cubic feet (ccf) of water. This unit cost of

production is based on the same elements as the of Tacoma Water's wholesale supply. Therefore, these costs can be compared side by side to calculate supply cost differences.

Currently, the City's only other option for water is wholesale water from Tacoma Water (Tacoma). Tacoma charges water on a seasonal basis ($2.048 per ccf in the winter and $2.560 per ccf in the summer) and also has a meter availability charge of $1,880 per month.

Cost of Other Options

As a point of comparison, the City would spend an additional $178,800 this year to buy all of its water from Tacoma, not including the meter availability charge of $22,560 per year. These numbers are based on an estimated annual usage of 77 MG and 2014 rates.

Once the City reaches the point where annual demand equals 551 acre-feet per year the additional cost to buy that amount of water from Tacoma would be $438,800 per year, including the availability charge.

As the City's demand grows, supply from Tacoma will be needed to augment the City's springs sources. Ideally, the City could use its less expensive water in the summer when Tacoma rates are the highest. Assuming that the City used all of its annual water right of 551 acre-feet per year (180 MG) during the period of June through September, it would save $483,000 per year compared to only buying wholesale water from Tacoma.

Source of Supply Capacity Criteria

Several factors were considered in evaluating how the spring sources could be used effectively, including water rights annual withdrawal limitations, low flow production capacity for Springs Nos. 1 and 3, existing facility capacity (pumps and pipe sizes), and the cost of source alternatives (Tacoma Water).

Based on growth projections, the City could rely on the springs as its only source until approximately 2020. At this point, ADD would equal 551 acre-feet per year and MDD would be 1.52 cfs (683 gpm). These projections are based on 2,630 ERU and the WSP demand factors of 187 gallons per day per ERU and a MDD/ADD ratio of 2.0. Currently the City has excess storage relative to a system of its size. This means that MDD does not need to be supplied solely by the springs as some volume of the excess storage can be used to meet peak demands.

As growth continues, the City could rely on the springs as its only source for summer demand (June through September) which would occur at about 2025. At this point, summer usage would equal 551 acre-feet per year and MDD would be 3.14 cfs (1,410 gpm).

Therefore, for pumping and pipe sizing a maximum flow rate of 1,410 gpm was selected for this analysis. Booster pumps, well pumps, and treatment equipment sizing and cost estimations are based on this flow rate.

Typically, a maximum pipe line velocity of 5 feet per second (fps) is used for design during non-emergency demand conditions. Using this parameter a transmission main size of 12-inches was selected based on a flow rate of 1,410 gpm and a velocity of 4.0 feet per second (fps) (note that the velocity for a 10-inch pipe would be 5.8 fps).

Alternative 1 – Existing Springs Rehabilitation

Overview

The existing springs produce varying amounts of water year round that is collected in an open air impoundment area and a series of collection boxes and pipes. The spring water flows via gravity across the top of an embankment area and down a steep slope. From here it crosses the Green River on a small suspension bridge and is pumped to the City's water system via the North Bank Pump Station (capacity 450 gpm) and approximately 10,000 linear feet (lf) of 8-inch diameter asbestos cement (AC) pipe (illustrated in **Table 2 – Planning-level Cost Estimates Alternative 1,** presented later in this report).

Alternative 1 includes rehabilitating the existing springs on the south side of the Green River and replacing associated infrastructure to improve its reliability for water supply and increase its production capacity to meet the target flow rate of 1,410 gpm. Recent site survey drawings can be found in **Appendix C**.

Proposed Improvements

Springs

DOH is concerned that change in the watershed could result in the springs becoming under the influence of surface water and other surface contaminants. This would mean that the springs could be reclassified Ground Water Influenced (GWI). If the springs are to be reconstructed, improvements should be implemented that would help further protect the springs from insects, macroorganisms, algae, and large diameter pathogens. The improved capture and impoundment facilities would also need to limit changes in the water characteristics such as turbidity, pH, and temperature. Security fencing and other security improvements should be implemented to reduce the possible influence of external influences such as animals and persons. One proposed solution is to cap the immediate collection area (approximately 1,000 square feet (sf) for Spring No. 1 and 1,500 sf for Spring No. 3) with wash rock and a membrane cover. The cover would be protected with a layer of crushed rock and diversion pipe to intercept potential upstream surface waters. Construction for Spring No. 1would require a rudimentary construction access road to be constructed from the property boundary road above the spring. During periods of high overflow, water discharges from the collection box and down a relatively steep slope towards the river. Continued erosion of this area will eventually undermine Spring No. 1. . Improvements to Spring No. 1 should also be made to provide protection from erosion. This may require installation of a larger main to the spring collection box that will carry the entire peak flow from spring 1

Spring Collection Box

The captured water from Spring Nos. 1 and 3 is conveyed to a concrete collection box and then diverted into a 6-inch thin wall steel potable pipeline and a 10-inch thin wall steel pipeline for power generation. Improvements to weirs, valves, and covers should be made to better secure the facilities and to provide better flow control and monitoring

Upper Pipeline

The existing 6-inch pipeline from the main collection box to the top of the steep slope is aging and does not have adequate capacity for 1,410 gpm. There is another existing 10-inch pipeline that was used for hydroelectric needs that could help increase the domestic water capacity of the facility. However, this line is also aging and would only offer a short-term solution. Both of these lines cross a small creek. Crossing this area would require additional permitting, regardless if the construction method was directional drilling underneath, open trench cutting across, or crossing over via small pipe bridge.

Steep Slope Pipeline

Both the existing 6-inch and 10-inch pipelines are installed down a very steep slope (greater than 1 horizontal to 1 vertical) with a change in elevation of approximately 120 vertical feet (540 feet elevation to 420 feet). The slope has been there since the pipes were installed but concerns exists regarding the age of the pipes, the condition of the pipe anchoring system, and slope erosion. Proposed improvement would include a dead-man concrete block anchoring system and high-density polyethylene (HDPE) pipe secured along the surface of the slope.

Bridge

The existing bridge is over 100 years old. Visual inspection of the bridge raised concerns about damage from flooding and the condition of the concrete embankments in particular. Additional investigation and analysis of the condition and remaining life of the bridge would be costly and may not be helpful. It is certain that at least minor improvements would be recommended and that the cost of gaining access to both sides of the bridge for even minor levels of repair would be expensive enough to indicate that the full replacement of the bridge would be a better option.

North Bank Pump Station

The pump capacity at the existing pump station would need to be upsized to 1,410 gpm to make full use of the City's water right for summer seasonal supply. If the City were to use the springs source year round then the existing pumping capacity of 450 gpm would be adequate. The chlorine disinfection system also needs to be replaced with a larger capacity system as it currently is running at near capacity. Emergency power would also need to be provided. It is assumed that the existing building would be retrofitted in lieu of a full replacement.

Transmission Main

The transmission main from the pump station to the distribution system is deficient in capacity. In addition, this is a high pressure system and the age and material of the

transmission main are also a concern. Replacing this line with 12-inch high pressure class ductile iron (DI) is recommended.

Permitting

Permitting for Alternative 1 would be more complicated than Alternative 2. Permitting at a minimum would include DOH, the Washington State Department of Fish and Wildlife (WDFW), King County, the Washington State Parks Department, and the Washington State Department of Ecology (Ecology).

Key differences between this alternative and Alternative No. 2 include the creek crossing, the work near and across the Green River, and additional improvements to avoid a GWI determination.

Construction Issues

Construction access to the springs sites would require site improvements and will be difficult. The existing road provides access to Spring Nos. 2 and 3 and the top of the steep slope area. Vehicle access to Spring No. 1 does not exist. The only access to the bottom of the transmission main and the hydropower station is from the pedestrian suspension bridge. Significant work would be required to establish construction access to Spring No. 1 and the south bank of the Green River. In addition, a culvert for access road should be installed where it crosses the springs overflow.

RH2 conducted a geological investigation in September and October of 2013 to evaluate the geological risks of the existing springs and the option to rehabilitate the existing springs. The full *Engineering Geology Report* is found in **Appendix D.** Based upon the results of that investigation, it was concluded that the proposed improvements are feasible for construction. However, due to slope instability, the transmission main cannot be buried in the ground via open cut or directional drilling. The proposed transmission main should be installed on the slope above grade with concrete anchors at the top and bottom of the slope.

If the springs rehabilitation alternative were to be implemented, the springs production would be offline for a significant amount of time. The City would need to supply their municipal water demand using water from storage and the Tacoma intertie. The construction sequence should be timed is such a way as to minimize the amount of time the springs are offline and should, if practical, avoid the peak summer season when Tacoma water rates are higher.

Risks

GWI

A GWI determination by DOH would require the City to provide a higher level of water quality treatment. Surface water treatment typically includes additional chlorine contact time and filtration facilities. Although substantial chlorine contact time can be provided in the long transmission main to the City's distribution system, additional monitoring and chlorination system improvements would be required. Filtration facilities are expensive to construct and maintain and typically require a higher level of operator certification.

Steep Slope

Rehabilitating the existing springs poses geological risks. As concluded in RH2's *Engineering Geology Report*, risks from landslides and soil creep are moderate to high, and the risk of earthquakes of M5 to M6 is high to moderate. These risks pose the greatest threat to Spring No. 1 and the gravity transmission main that travels down the slope between Spring No. 2 and the Green River crossing.

Pipeline construction methods can help alleviate some of these risks. The landslide and slope creep risk will remain moderate to high, but that the pipeline and anchors will mitigate some of these risks. The slope will creep despite the pipe and anchors, and the slope could experience small slides, but the anchoring method should hold the pipe in place and reduce the risk of pipeline failure to low to moderate.

As stated above, part of the proposed transmission main should be installed above grade due to soil instability. This puts the above-grade portion of the main at risk to tree fall. The current transmission main is installed above grade and the alignment has been secure from tree fall since installation. However the risk of broken limbs or falling trees damaging the above-grade pipe during wind or ice storms remains a possibility.

Bridge Failure

In the short term, the proposed transmission main could cross the Green River using the existing pedestrian suspension bridge similar to the existing transmission main. However, the existing bridge is low hanging with a minimum clearance above the Green River of approximately 12.5-feet. It is at risk of being damaged by large floating debris (e.g., trees) and the concrete embankment are subjected to ongoing erosion during high flow events. The cable anchoring on the south side is unknown and is not exposed for inspection. The concrete headwall that starts just below the hydropower turbine protects the south bank and needs maintenance work.

Capital Cost

The planning-level costs for the improvement proposed to rehabilitate the springs sources has been estimated at approximately $4.0 million. A description of each cost comparison is listed in **Table 1**. Construction cost of rehabilitating the springs and associated infrastructure can be found in **Table 2.** Each component of the proposed improvements is shown on **Figure 1**.

Table 1 – Alternative 1 Improvements

ID	Description	Notes and Assumptions
R	Spring Access Road Stabilization	Stabilize and restore access road from Enumclaw Franklin Road SE to Spring Box No. 3 and collection box area to facilitate access of construction vehicles and protect existing pipes.
S1	Spring No. 1 - Collection Area GWI Protection	Cap 1,000 sf of spring collection area with wash rock, membrane, and crushed rock. Install interceptor pipe around the uphill side of spring area to divert surface flows around spring area. Vehicle access to spring area is limited and a premium in labor is included for hand labor or use of a high lead system.
S1A	Spring Box No. 1 - Erosion Stabilization	Stabilize overflow from Spring Box No. 1 with rip rap to help minimize potential erosion during high flow periods.
S3	Spring No. 3 - Collection Area GWI Protection	Cap 1,500 sf of spring collection area with wash rock, membrane, and crushed rock. Install interceptor pipe around the uphill side of spring area to divert surface flows around spring area.
SB1	Spring Box No. 1 - Rehabilitation	Make minor improvements to concrete collection box, weir, and valve system.
SB3	Spring Box No. 3 - Rehabilitation	Make minor improvements to concrete collection box, weir, and valve system.
CB	Collection Box - Rehabilitation	Make minor improvements to concrete collection box, weir, and valve system.
P1	Pipeline - Collection Box to Top of Steep Slope	Replace existing pipeline with 12-inch HDPE from collection box to the proposed anchor block at the top of the steep slope.
P1A	Pipeline - Pipeline Stream Crossing	Construction premium for either open cutting or directional drilling the existing "springs overflow" creek.
P2	Pipeline - Down Steep Slope to River	Install deadman concrete anchor block to secure steep slope pipeline. Pipeline down steep slope will be 12-inch HDPE installed along ground surface and secured with cabling.
P3	Pipeline - Across River	Install and secure 12-inch HDPE pipeline across existing bridge.
B	Bridge Rehabilitation	Fortify existing concrete bridge abutments. It is assumed work on south side will be by high lead system.
HW	Head Wall Repairs	Repair concrete headwall that protects bridge abutments and existing pump station housing from river ersosion.
P4	Pipeline - Bridge to North Pump Station	Replace existing pipeline with 12-inch HDPE from north side of bridge to North Pump Station. It is assumed that pipeline will be installed via conventional open-cut trenching.
TM	Transmission Main - North Pump Station to System	Replace existing 8-inch AC pipeline with 12-inch DI from North Pump Station to existing 12-inch DI transmission main on slope (Botts Drive) between 0.5 MG reservoir and Old Lawson Road. It is assumed that pipeline will be installed via conventional open-cut trenching with minimal road restoration.
PS	Improvements to Existing North Pump Station	Upsize existing pumps and chlorination system, and provide emergency power.

Table 2 – Planning-level Cost Estimates Alternative 1

ID	Description	Size	Unit Price	Cost	Alternative 1		
					South Side - Existing Springs Rehabilitation		
					Construction Cost	35% Indirect Costs	Total Cost
R	Spring Access Road Stabilization	2,200 LF	$ 50	$ 110,000	$ 110,000	$ 38,500	**$ 148,500**
S1	Spring No. 1 - Collection Area GWI Protection	1,000 SF	$ 140	$ 140,000	$ 140,000	$ 49,000	**$ 189,000**
S1A	Spring Box No. 1 - Erosion Stabilization	1 each	$ 25,000	$ 25,000	$ 25,000	$ 8,750	**$ 33,750**
S3	Spring No. 3 - Collection Area GWI Protection	1,500 SF	$ 80	$ 120,000	$ 120,000	$ 42,000	**$ 162,000**
SB1	Spring Box No. 1 - Rehabilitation	1 each	$ 35,000	$ 35,000	$ 35,000	$ 12,250	**$ 47,250**
SB3	Spring Box No. 3 - Rehabilitation	1 each	$ 25,000	$ 25,000	$ 25,000	$ 8,750	**$ 33,750**
CB	Collection Box - Rehabilitation	1 each	$ 25,000	$ 25,000	$ 25,000	$ 8,750	**$ 33,750**
P1	Pipeline - Collection Box to Top of Steep Slope	300 LF	$ 200	$ 60,000	$ 60,000	$ 21,000	**$ 81,000**
P1A	Pipeline - Pipeline Stream Crossing	30 LF	$ 1,000	$ 30,000	$ 30,000	$ 10,500	**$ 40,500**
P2	Pipeline - Down Steep Slope to River	200 LF	$ 200	$ 40,000	$ 40,000	$ 14,000	**$ 54,000**
P3	Pipeline - Across River	200 LF	$ 200	$ 40,000	$ 40,000	$ 14,000	**$ 54,000**
B	Bridge Rehabilitation	1 each	$ 550,000	$ 550,000	$ 550,000	$ 192,500	**$ 742,500**
HW	Head Wall Repairs	1 each	$ 50,000	$ 50,000	$ 50,000	$ 17,500	**$ 67,500**
P4	Pipeline - Bridge to North Pump Station	600 LF	$ 200	$ 120,000	$ 120,000	$ 42,000	**$ 162,000**
TM	Transmission Main - North Pump Station to system	10,000 LF	$ 120	$ 1,200,000	$ 1,200,000	$ 420,000	**$ 1,620,000**
PS	Improvements to existing North Pump Station	1 each	$ 400,000	$ 400,000	$ 400,000	$ 140,000	**$ 540,000**

Total Cost Estimate	$ 2,970,000	$ 1,039,500	$ 4,009,500

Alternative 2 – North Bank Well

Overview

The North Bank Well alternative proposes to acquire water from a new well drilled on the north side of the Green River as opposed to diverting water from the Black Diamond Springs. There are several mine shafts in this area that are full of groundwater in artesian conditions as evidenced by the Gem Seam Air Shaft which comes to the surface at a location just southeast of the North Bank Pump Station. Tapping into this groundwater aquifer would access water similar to the existing springs source.

This alternative would require a change in the point of withdrawal of the City's existing water right. In addition, the City's existing easement with the Washington State Parks Department for the water system on the north side of the river only includes water transmission. Drilling a new well may require a modification of that easement. The easement can be found in **Appendix E.**

The new well would be sized for a capacity of 1,410 gpm and would pump directly to the distribution system. This means pump replacements at the existing North Bank Pump Station would not be required. However, other improvements would be necessary, including upsizing the chlorination system, providing emergency power, and replacing of the 10,000 lf transmission main to the City.

Proposed Improvements

Well

A mine shaft has been identified very close to the existing North Bank Pump Station. A proposed well would be drilled approximately 375 feet deep at this location and would ideally tap into the existing mine shaft. The well would be equipped with a 1,410 gpm high head vertical turbine pump and pump directly to the City's distribution system. The well facility would be equipped with a chlorination system and emergency power. **Appendix E** contains the existing easement, mine shaft site map, and recent price quote for drilling the new well.

Transmission Main

The transmission main from the pump station to the distribution system is deficient in capacity. In addition, this is a high pressure system and the age and material of the main are also a concern. Replacing this line with 12-inch high pressure class DI is recommended.

Permitting

Ecology will require a change in point of withdrawal of the City's existing water right. Since the spring water and the mine shaft water both discharge to approximately the same point of the Green River this transfer should be relatively straightforward. See **Appendix F** for more information regarding this issue.

Permitting for this alternative at a minimum would include DOH, WDFW, King County, DNR, the Muckleshoot Tribe (Tribe), and Ecology.

Construction Issues

Construction access is much easier on the north side of the river than for Alternative No. 1. However, providing for the pump discharge overboard process may require an outfall near the Green River. Water during the starting and stopping of the well is typically discharged to the environment and can be detained in a pond and slowly discharge to the Green River.

An advantage of this alternative is that the existing springs system could stay online until this facility was constructed and in service. This would alleviate the City from having to purchase water from Tacoma during construction.

Risks

Drilling

Tapping into the mine shaft on the first drilling attempt is not guaranteed. The City would need to be prepared for a second well drilling attempt if the first attempt did not tap the targeted mine shaft.

Water Quality

There may be some concern about the water quality of this aquifer since it is not spring water. However, water quality testing was conducted on the artesian water in the Gem Seam Air Shaft and no issues where identified. See **Appendix G** for results. An updated wellhead protection plan would need to be prepared but the risk to either the springs or the well water would be similar. Capping of the existing Gem Seam air shaft will also be installed to further protect the mineshaft water.

Administrative

There are always risks in negotiating easement modifications and water right transfers. However, given the unique circumstances involved the risks should be relatively small. An easement for water facilities already exists; therefore, a slight modification to the facilities included and a relatively small additional land allocation for the well would be involved. The impacts to the Green River should be identical regardless of which side the water is taken from.

Capital Cost

The planning-level cost for the improvements proposed to construct a new well facility has been estimated at $2.9 million. A description of each cost component is listed in **Table 3**. Construction cost of rehabilitating the springs and associated infrastructure can be found in **Table 4.** Each component of the proposed improvements is shown on **Figure 1.**

Table 3 – Alternative 2 Improvements

ID	Description	Notes and Assumptions
TM	Pipeline - North Pump Station to System	Replace existing 8-inch AC pipeline with 12-inch DI from North Pump Station to existing 12-inch DI transmission main on slope (Botts Drive) between 0.5 MG reservoir and Old Lawson Road. It is assumed that pipeline will be installed via conventional open-cut trenching with minimal road restoration.
WD	Well Drilling	Drill and install a 16-inch casing near existing North Pump Station approximately 375 feet below ground surface. Goal is to tap existing mine shaft.
WE	Well Equipment (Pump, Motor, and Disinfection)	Install high-head vertical turbine pump with 1,800 gpm capacity. Also provide chlorination system and emergency power.
WR	Water Rights Transfer Process	It is assumed that only a water right change to point of withdrawal will be needed. No mitigation required other than possible voluntary Qi reduction.
L	Acquisition of Easements or Land Swap	It is assumed that the new well can be drilled within the City's existing easement with the Park. However, the easement will need to be renegotiated to include the new well area.

Table 4 – Planning-level Cost Estimate for Alternative 2

		Alternative 2					
		North Side - New Well					
ID	Description	Size	Unit Price	Cost	Construction Cost	35% Indirect Costs	Total Cost
TM	Transmission Main - North Pump Station to System	10,000 LF	$ 120	$ 1,200,000	$ 1,200,000	$ 420,000	**$ 1,620,000**
WD	Well Drilling	380 VF	$ 500	$ 190,000	$ 190,000	$ 66,500	**$ 256,500**
WE	Well Equipment (Pump, Motor, and Disinfection)	1 each	$ 650,000	$ 650,000	$ 650,000	$ 227,500	**$ 877,500**
WR	Water Rights Transfer Process	1 each	$ 60,000	$ 60,000	$ 60,000	$ 21,000	**$ 81,000**
L	Acquisition of Easements or Land Swap	1 each	$ 60,000	$ 60,000	$ 60,000	$ 21,000	**$ 81,000**
Total Cost Estimate					$ 2,160,000	$ 756,000	**$ 2,916,000**

Conclusions

Capital Cost

The capital cost difference between the two alternatives is over $1 million with Alternative 1 being approximately 25 percent less than Alternative 2. This is mainly because of the infrastructure and difficult construction access associated with Alternative 1.

Operation and Maintenance Costs

There are only two main differences between the two alternatives; after a brief cost analysis it was shown that the differences cancelled each other out and were not helpful in distinguishing between the two options. Alternative 1 would require more maintenance due to more infrastructure and the difficult site access. Alternative 2 would require more electricity to pump water from the well instead of getting the water via gravity at the springs. Both of these differences were small (on the order of $10,000 per year) and offset each other.

Risks

Both alternatives involve risk. However, the risks are similar and the differences are not helpful in distinguishing between the two options. Alternative 1 has more long-term risks due to geology, flooding, and the greater number of facilities at risk. The risks associated with Alternative 2 are mostly up-front, or short-term, risks that will be addressed and eliminated early in the design process (e.g., water rights, easements, and drilling).

Recommendation

Based on our analysis of the potential value to the City, RH2 believes that both of options are cost effective and reasonable solutions. This means that relative to purchasing all of its water from Tacoma, spending the money on either options makes economic sense. However, RH2 recommends the City pursue Alternative 2, North Bank Well, at this time for several reasons.

1. The capital costs for the North Bank Well alternative is estimated to be approximately $1.1 million less than the Springs Rehabilitation alternative.
2. Although both alternatives have risks associated with them, most of the North Bank Well risks occur, and possibly can be alleviated, early in the design process. In addition, the risks can be addressed one at a time and if the outcome of any one risk makes the project unviable then the project can be stopped before additional money is spent on capital facilities.
3. A well facility is a common and standardized asset and can be operated and maintained with conventional tools by many local contractors and by the City's operations staff. A surface collection system is less common and requires specialized equipment and processes that may not be readily available from local contractors and may require expertise that is not readily available in the waterworks industry.

With regards to implementation and schedule, RH2 recommends that the following steps be pursued by the City for the North Bank Well alternative.

1. Share the proposal with the Tribe and see if they would support the idea and identify if they have concerns.
2. Work with the Tribe to address any concerns.
3. Secure a right-of-entry to drill a well on the Park property.
4. Have a pre-application meeting with Ecology to discuss the proposed change, further refine the feasibility of success from a water right transfer standpoint, and identify the processing pathway that will best meet the City's and Ecology's needs.
5. Submit a water right change application and request that Ecology issue a preliminary permit to drill and test a well or wells.
6. Design, bid, and complete the drilling of a well near the existing North Bank Pump Station.
7. Conduct additional water quality and aquifer capacity testing.
8. Complete the water right transfer process.
9. Acquire the necessary property or easement for the new well.
10. Obtain source approval from DOH.
11. Design, bid, and complete the construction of the well and treatment facility.

Figure 1

Black Diamond Springs Rehabilitation Evaluation

Black Diamond Springs Rehabilitation Evaluation

Diversion Point
Mine Shaft (water flow)
Combined Hydropower & PS
Spring
Proposed Well
Water Main
Spring Pipe
Transmission Pipe
Hydropower Collection Pipe
Penstock
Overflow Stream
Waterbodies
City Property
Access Road

N
1 inch = 150 feet
0 75 150 300
Feet

RH2

Water Main
P5
PS
WD
WE
WR
L
P4
HW
P3
B
Bridge
P2
P1A
P1 Hydropower Collection System
Potable Collection System
S3
SB3
Spring No. 3
Palmer Coking Coal Co. Diversion
Palmer Spring
R
S1A
Spring No. 1
CB
S1
SB1

Key	Description
R	Spring Access Road Stabilization
S1	Spring No. 1 - Collection Area GWI Protection
S1A	Spring Box No. 1 - Erosion Stabilization
S3	Spring No. 3 - Collection Area GWI Protection
SB1	Spring Box No. 1 - Rehabilitation
SB3	Spring Box No. 3 - Rehabilitation
CB	Collection Box - Rehabilitation
P1	Pipeline - collection box to top of steep slope
P1A	Pipeline - Pipeline stream crossing
P2	Pipeline - down steep slope to river
P3	Pipeline - across river
B	Bridge Rehabilitation
HW	Head Wall Repairs
P4	Pipeline - bridge to North Pump Station
P5	Pipeline - North Pump Station to system
PS	Improvements to existing North Pump Station
WD	Well Drilling
WE	Well Equipment (pump, motor, and disinfection)
WR	Water Rights - transfer process
L	Acquisition of easements or land swap

Appendix A
Demand Data

City of Black Diamond
Springs Source Evaluation
Background Data

Water Rights

Instantaneous ($Q_{i)}$	8.00 cfs	
Annual Withdrawal ($Q_{a)}$	551 acre*ft	or 0.76 cfs is used continuously

Demand Factors

Average Day Demand (ADD)	187 gpd/ERU	Table 3.5 WSP
MDD/ADD Factor	2.0	Table 3.11 WSP

Current and Future Demand

	$Current_{WSP}$	**Annual Demand = Q_a**	**Summer Demand = Q_a**	**2027_{WSP}**
Customers	1,130 ERU	2,630 ERU	5,428 ERU	6,907 ERU
ADD/ERU	187 gpd/ERU	187 gpd/ERU	187 gpd/ERU	187 gpd/ERU
MDD/ADD	2.0	2.0	2.0	2.0
ADD	0.33 cfs	0.76 cfs	1.57 cfs	2.00 cfs
MDD	0.65 cfs	1.52 cfs	3.14 cfs	4.00 cfs
		683 gpm	1,410 gpm	

Source Capacity Available (during low flow periods)

Q_i (min) Existing
4.30 cfs
Spring 1+3

Pipe Flow Data

Diameter (in)	**5.00 fps Q_{max}**	**8.00 fps Q_{max}**
6	0.98 cfs	1.57 cfs
8	1.75 cfs	2.79 cfs
12	3.93 cfs	6.28 cfs

Commodity Costs	**Unit Price**	**Volume**	**Cost/yr**	**Annual Difference**
Springs Source*	$0.548/ccf	551 acre*ft	$131,434	
Tacoma - Summer*	$2.560/ccf	551 acre*ft	$614,440	**$483,005**
Tacoma - Winter*	$2.048/ccf	551 acre*ft	$491,552	**$360,117**

*estimated using operational costs from City data

**not including monthly meter availability charges from Tacoma Water

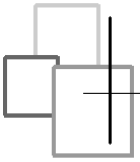
City of Black Diamond
Springs Source Evaluation
Cost Projections

Year		Current	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Date		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Growth Rate	115%		15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Customers (ERU)		1,130	1,299	1,493	1,716	1,972	2,267	2,606	2,995	3,443	3,957	4,548	5,228	6,009	6,907	7,939	9,125
ADD (annual volume)	187 gpd/ERU	77 MG	89 MG	102 MG	117 MG	135 MG	155 MG	178 MG	204 MG	235 MG	270 MG	310 MG	357 MG	410 MG	471 MG	542 MG	623 MG
Summer Usage	46%	35 MG	41 MG	47 MG	54 MG	62 MG	71 MG	81 MG	93 MG	107 MG	123 MG	142 MG	163 MG	187 MG	215 MG	248 MG	285 MG
Winter Usage	54%	42 MG	48 MG	55 MG	64 MG	73 MG	84 MG	97 MG	111 MG	128 MG	147 MG	169 MG	194 MG	223 MG	256 MG	294 MG	338 MG
commodity escalation rate	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Springs Volume (up to Qa)	180 MG	77 MG	89 MG	102 MG	117 MG	135 MG	155 MG	178 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG
Tacoma Summer Volume		0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	8 MG	36 MG	68 MG	105 MG
Tacoma Winter Volume		0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	0 MG	25 MG	55 MG	91 MG	131 MG	177 MG	223 MG	256 MG	294 MG	338 MG
Springs Production Unit Cost	$0.548/ccf	$ 0.56	$ 0.58	$ 0.60	$ 0.62	$ 0.63	$ 0.65	$ 0.67	$ 0.69	$ 0.71	$ 0.74	$ 0.76	$ 0.78	$ 0.80	$ 0.83	$ 0.85	$ 0.88
Tacoma - Summer Rate	$2.560/ccf	$ 2.64	$ 2.72	$ 2.80	$ 2.88	$ 2.97	$ 3.06	$ 3.15	$ 3.24	$ 3.34	$ 3.44	$ 3.54	$ 3.65	$ 3.76	$ 3.87	$ 3.99	$ 4.11
Tacoma - Winter Rate	$2.048/ccf	$ 2.11	$ 2.17	$ 2.24	$ 2.31	$ 2.37	$ 2.45	$ 2.52	$ 2.59	$ 2.67	$ 2.75	$ 2.83	$ 2.92	$ 3.01	$ 3.10	$ 3.19	$ 3.29
Tacoma Availability Charge	$1,880/month	$ 1,936	$ 1,994	$ 2,054	$ 2,116	$ 2,179	$ 2,245	$ 2,312	$ 2,382	$ 2,453	$ 2,527	$ 2,602	$ 2,680	$ 2,761	$ 2,844	$ 2,929	$ 3,017
Springs Cost		$ 58,159	$ 68,855	$ 81,517	$ 96,508	$ 114,256	$ 135,267	$ 160,143	$ 166,508	$ 171,504	$ 176,649	$ 181,948	$ 187,407	$ 193,029	$ 198,820	$ 204,784	$ 210,928
Tacoma Cost		$ -	$ -	$ -	$ -	$ -	$ -	$ 2,312	$ 91,099	$ 205,409	$ 345,817	$ 514,347	$ 716,217	$ 962,780	$ 1,277,308	$ 1,653,363	$ 2,099,342
Total Cost		**$ 58,159**	**$ 68,855**	**$ 81,517**	**$ 96,508**	**$ 114,256**	**$ 135,267**	**$ 164,768**	**$ 262,372**	**$ 384,275**	**$ 535,104**	**$ 714,519**	**$ 927,756**	**$ 1,183,428**	**$ 1,507,419**	**$ 1,893,307**	**$ 2,346,484**
Springs Cost Share		100%	100%	100%	100%	100%	100%	97%	63%	45%	33%	25%	20%	16%	13%	11%	9%
100% Tacoma																	
Total Cost		$ 265,597	$ 310,864	$ 364,348	$ 427,558	$ 502,278	$ 590,622	$ 695,092	$ 818,649	$ 964,801	$ 1,137,697	$ 1,342,254	$ 1,584,288	$ 1,870,688	$ 2,209,609	$ 2,610,704	$ 3,085,403
Difference		$ 207,438	$ 242,009	$ 282,831	$ 331,050	$ 388,023	$ 455,355	$ 530,324	$ 556,277	$ 580,526	$ 602,594	$ 627,735	$ 656,532	$ 687,260	$ 702,190	$ 717,397	$ 738,920

City of Black Diamond
Springs Source Evaluation
Cost Projections

Year		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Date		2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Growth Rate	115%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Customers (ERU)		9,399	9,681	9,971	10,271	10,579	10,896	11,223	11,560	11,906	12,264	12,631	13,010	13,401	13,803	14,217
ADD (annual volume)	187 gpd/ERU	642 MG	661 MG	681 MG	701 MG	722 MG	744 MG	766 MG	789 MG	813 MG	837 MG	862 MG	888 MG	915 MG	942 MG	970 MG
Summer Usage	46%	293 MG	302 MG	311 MG	320 MG	330 MG	340 MG	350 MG	361 MG	371 MG	383 MG	394 MG	406 MG	418 MG	431 MG	443 MG
Winter Usage	54%	348 MG	359 MG	370 MG	381 MG	392 MG	404 MG	416 MG	428 MG	441 MG	455 MG	468 MG	482 MG	497 MG	512 MG	527 MG
commodity escalation rate	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Springs Volume (up to Qa)	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG	180 MG
Tacoma Summer Volume		114 MG	122 MG	131 MG	141 MG	150 MG	160 MG	171 MG	181 MG	192 MG	203 MG	214 MG	226 MG	238 MG	251 MG	264 MG
Tacoma Winter Volume		348 MG	359 MG	370 MG	381 MG	392 MG	404 MG	416 MG	428 MG	441 MG	455 MG	468 MG	482 MG	497 MG	512 MG	527 MG
Springs Production Unit Cost	$0.548/ccf	$ 0.91	$ 0.93	$ 0.96	$ 0.99	$ 1.02	$ 1.05	$ 1.08	$ 1.11	$ 1.15	$ 1.18	$ 1.22	$ 1.25	$ 1.29	$ 1.33	$ 1.37
Tacoma - Summer Rate	$2.560/ccf	$ 4.23	$ 4.36	$ 4.49	$ 4.62	$ 4.76	$ 4.91	$ 5.05	$ 5.20	$ 5.36	$ 5.52	$ 5.69	$ 5.86	$ 6.03	$ 6.21	$ 6.40
Tacoma - Winter Rate	$2.048/ccf	$ 3.39	$ 3.49	$ 3.59	$ 3.70	$ 3.81	$ 3.92	$ 4.04	$ 4.16	$ 4.29	$ 4.42	$ 4.55	$ 4.69	$ 4.83	$ 4.97	$ 5.12
Tacoma Availability Charge	$1,880/month	$ 3,107	$ 3,201	$ 3,297	$ 3,395	$ 3,497	$ 3,602	$ 3,710	$ 3,822	$ 3,936	$ 4,054	$ 4,176	$ 4,301	$ 4,430	$ 4,563	$ 4,700
Springs Cost		$ 217,256	$ 223,773	$ 230,487	$ 237,401	$ 244,523	$ 251,859	$ 259,415	$ 267,197	$ 275,213	$ 283,469	$ 291,974	$ 300,733	$ 309,755	$ 319,047	$ 328,619
Tacoma Cost		$ 2,256,542	$ 2,424,197	$ 2,602,968	$ 2,793,561	$ 2,996,724	$ 3,213,250	$ 3,443,983	$ 3,689,819	$ 3,951,710	$ 4,230,665	$ 4,527,757	$ 4,844,125	$ 5,180,980	$ 5,544,167	$ 5,930,761
Total Cost		**$ 2,511,098**	**$ 2,686,389**	**$ 2,873,026**	**$ 3,071,721**	**$ 3,283,227**	**$ 3,508,348**	**$ 3,747,934**	**$ 4,002,888**	**$ 4,274,170**	**$ 4,562,799**	**$ 4,869,855**	**$ 5,196,486**	**$ 5,543,911**	**$ 5,922,550**	**$ 6,325,196**
Springs Cost Share		9%	8%	8%	8%	7%	7%	7%	7%	6%	6%	6%	6%	6%	5%	5%
100% Tacoma																
Total Cost		$ 3,272,186	$ 3,470,310	$ 3,680,465	$ 3,903,383	$ 4,139,839	$ 4,390,659	$ 4,656,714	$ 4,938,932	$ 5,238,296	$ 5,555,849	$ 5,892,697	$ 6,250,014	$ 6,629,044	$ 7,031,110	$ 7,457,613
Difference		$ 761,088	$ 783,921	$ 807,438	$ 831,662	$ 856,612	$ 882,311	$ 908,781	$ 936,044	$ 964,126	$ 993,050	$ 1,022,842	$ 1,053,528	$ 1,085,134	$ 1,108,561	$ 1,132,417

Usage Report



Sample Data Page

Usage Report

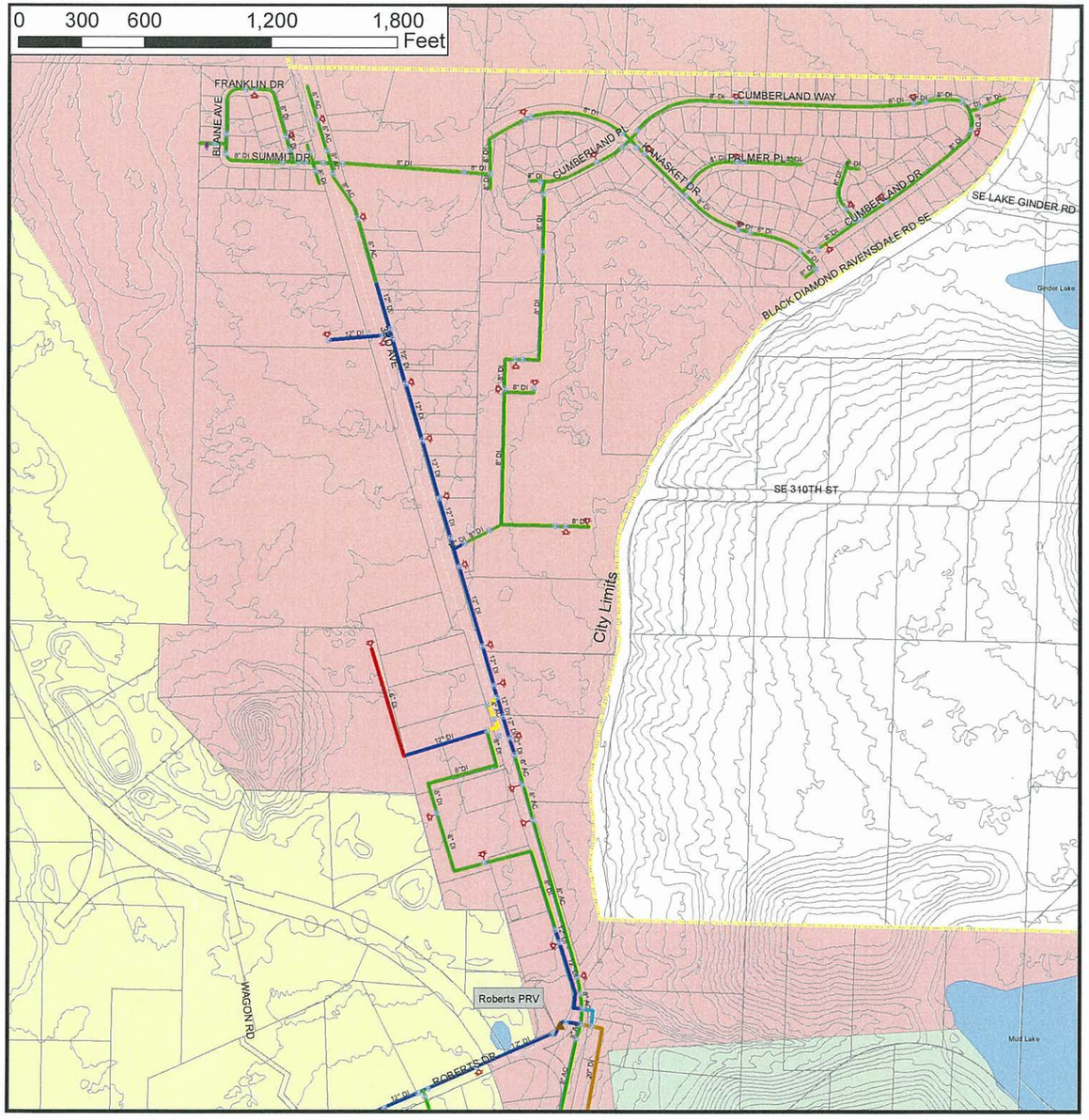
The data totals are presented on the following page.

Account	Name	Service Address	Date	Usage
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	10/29/2012	785
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	11/28/2012	828
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	12/26/2012	519
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	1/29/2013	941
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	2/26/2013	709
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	3/27/2013	684
100300.3	Graf Sr, Jesse & Jolee	MT View Drive 32280	4/29/2013	780
				5,246
100600.0	Ruppert, John F.	Botts Drive 32401	10/29/2012	1,067
100600.0	Ruppert, John F.	Botts Drive 32401	11/28/2012	856
100600.0	Ruppert, John F.	Botts Drive 32401	12/26/2012	767
100600.0	Ruppert, John F.	Botts Drive 32401	1/29/2013	977
100600.0	Ruppert, John F.	Botts Drive 32401	2/26/2013	778
100600.0	Ruppert, John F.	Botts Drive 32401	3/27/2013	772
100600.0	Ruppert, John F.	Botts Drive 32401	4/29/2013	847
				6,064
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	10/29/2012	290
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	11/28/2012	289
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	12/26/2012	248
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	1/29/2013	297
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	2/26/2013	277
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	3/27/2013	324
100800.5	Kuzaro, Anthony & Dene	Botts Drive 32229	4/29/2013	327
				2,052
100805.0	North, Dennis & Julie	MT View Drive 32318	10/29/2012	807
100805.0	North, Dennis & Julie	MT View Drive 32318	11/28/2012	748
100805.0	North, Dennis & Julie	MT View Drive 32318	12/26/2012	695
100805.0	North, Dennis & Julie	MT View Drive 32318	1/29/2013	884
100805.0	North, Dennis & Julie	MT View Drive 32318	2/26/2013	589
100805.0	North, Dennis & Julie	MT View Drive 32318	3/27/2013	609
100805.0	North, Dennis & Julie	MT View Drive 32318	4/29/2013	718
				5,050
100806.0	Kuzaro, James	MT View Drive 32212	10/29/2012	2,023
100806.0	Kuzaro, James	MT View Drive 32212	11/28/2012	503
100806.0	Kuzaro, James	MT View Drive 32212	12/26/2012	541
100806.0	Kuzaro, James	MT View Drive 32212	1/29/2013	665
100806.0	Kuzaro, James	MT View Drive 32212	2/26/2013	739
100806.0	Kuzaro, James	MT View Drive 32212	3/27/2013	716
100806.0	Kuzaro, James	MT View Drive 32212	4/29/2013	788
				5,975
100810.0	Luthi, Kirk	MT View Drive 32201	10/29/2012	1,675
100810.0	Luthi, Kirk	MT View Drive 32201	11/28/2012	137
100810.0	Luthi, Kirk	MT View Drive 32201	12/26/2012	177

Usage Report

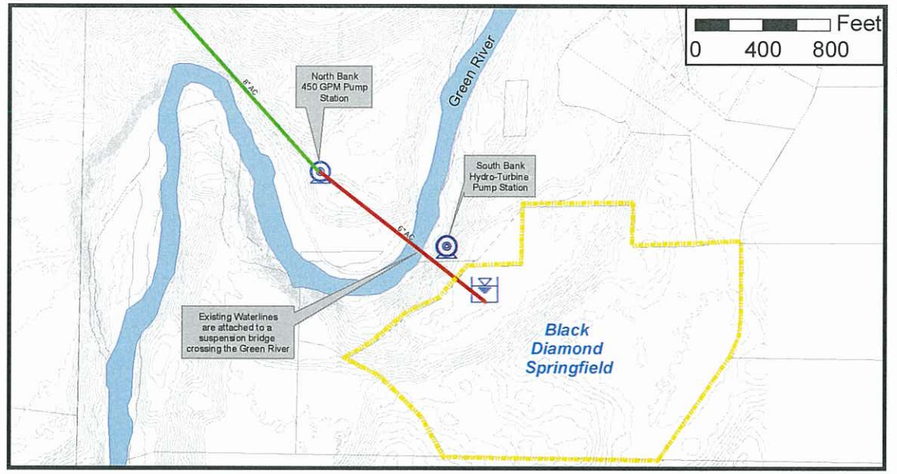
Grand Totals:		3,037,445	
	#/Meters active the entire period	732	
	#/Meters with 0 reading	26	
	Total Meters	758	
	Average/Active Meter	4,150	
		16,689	total usage divided by 182 days, avg. daily
		23	average daily cubic feet/active meter
		171	average daily gallons/active meter
		124,844	Ave gpd

NORTH BLACK DIAMOND



Matchline "SOUTH BLACK DIAMOND" (See Sheet 2)

BLACK DIAMOND SPRINGFIELD



Sheet 1

PacWest Engineering, LLC
5009 Pacific Highway East, Unit 9-0
Fife, WA 98424
Phone (253) 926-3400
Fax (253) 926-3402

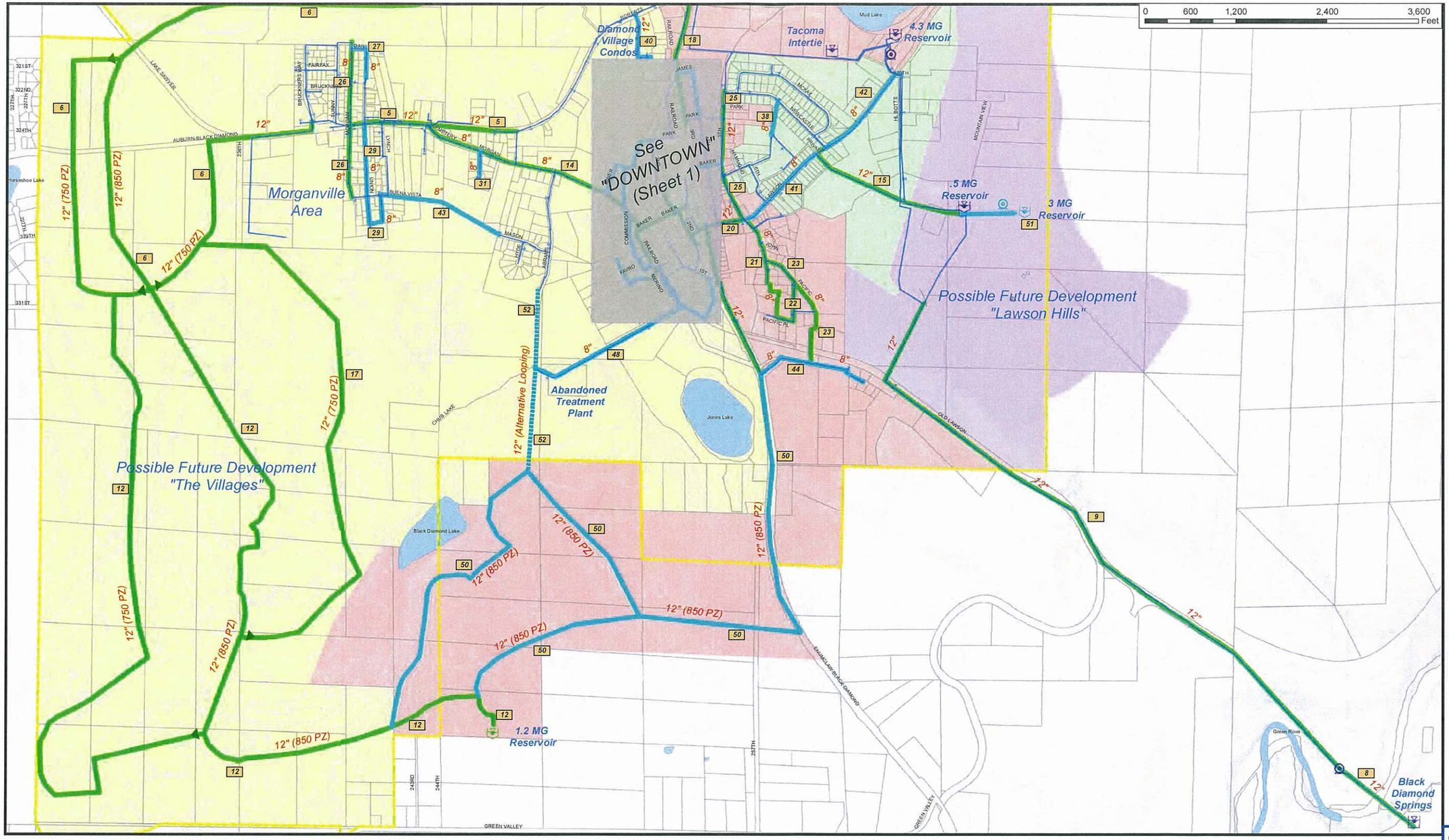
FIGURE 2.3a
CITY OF BLACK DIAMOND
COMPREHENSIVE WATER SYSTEM MAP

LEGEND

- Tank
- Hydrant
- Pressure Reducing Valve
- Valve
- Pump Station
- 750 Pressure Zone
- 850 Pressure Zone
- 965 Pressure Zone
- City Limits
- 2" or Smaller Waterline
- 4" Waterline
- 6" Waterline
- 8" Waterline
- 12" Waterline
- 16" Waterline
- 20" Waterline

SOUTH BLACK DIAMOND

Matchline "NORTH BLACK DIAMOND" (See Sheet 1)



Sheet 2

FIGURE 9.1b

CITY OF BLACK DIAMOND

PROPOSED WATER SYSTEM IMPROVEMENTS

PacWest Engineering, LLC
5009 Pacific Highway East, Unit 9-0
Fife, WA 98424
Phone (253) 926-3400
Fax (253) 926-3402

LEGEND

- Hydrant
- Tank
- Pump Station
- 750 Pressure Zone
- 850 Pressure Zone
- 965 Pressure Zone
- 1175 Pressure Zone
- City Limits
- Existing Waterlines
- Proposed Improvement Projects (2008-2013)
- Proposed Improvement Projects (2014-2027)

An average per capita use 230 gpd per ERU was utilized in calculating projected water needs for all future growth. This value consists of both residential and non-residential uses as well as unaccounted-for water. This value of 230 gpd is the documented value that has been utilized in numerous agreements between the City of Black Diamond and developers. Copies of these agreements are included in ***Appendix M – Water Supply and Facilities Funding Agreement, Appendix N – Plum Creek Land Co. Water Funding Agreement***, and ***Appendix O – Palmer Coking Coal Co. Water Funding Agreement***. These agreements also acknowledge that attempts will be made to maintain actual usage at 220 gpd or less. However, the higher value of 230 gpd has been used throughout this plan in order to provide for a more conservative evaluation of the City's water system.

A default peaking factor of 2.0 was applied to the average day demand to calculate the peak day demand due to the lack of accurate consumption data. ***Table 3.11, Projected Water Demands*** summarizes the projected water demands for future years.

Table 3.11, Projected Water Demands

YEAR	PROJECTED ERU's	PROJECTED AVERAGE DAY DEMAND (GPD)	PROJECTED PEAK DAY DEMAND (GPD)	PROJECTED PEAK HOUR DEMAND (GAL PER HR)
2008 (Yr 1)	1151	216,140	432,280	18,012
2009 (Yr 2)	1172	220,970	441,940	18,414
2010 (Yr 3)	1454	285,830	571,660	23,819
2011 (Yr 4)	1736	350,690	701,380	29,224
2012 (Yr 5)	2413	506,400	1,012,800	42,200
2013 (Yr 6)	3090	662,110	1,324,220	55,176
2027 (Yr 20)	6907	1,540,020	3,080,040	128,335

The City of Black Diamond's lack of accurate consumption and production data does not allow for a measure of the historical effects of conservation efforts on water usage. ***Table 3.12, Projected Water Demands (including Conservation)*** includes projected water demands assuming an annual one percent reduction in water consumption over the first six years covered within this plan, and a total reduction of ten percent by year 2027. This is consistent with the conservation goals included in the South King County Coordinated Water System Plan.

Figure 3.2, Consumption (2006)

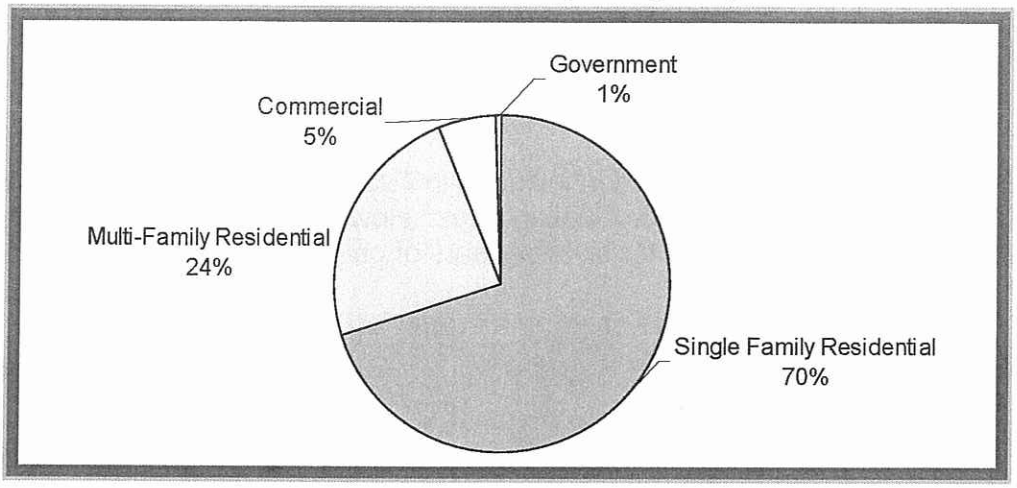


Table 3.4, Historical Consumption – M-Gal per Year

2004	2005	2006	2007
74.8124	77.9468	80.0269	75.8544

Table 3.5, Historical Consumption - Gallons per Day per ERU

2004	2005	2006	2007	AVERAGE
181	189	194	184	187

Water Supply

Water supply, or production, is the total amount of water supplied to the system, as measured by the meters at each supply source. Water supply is different than water consumption in that water supply is essentially the recorded amount of water put into the system and water consumption is the recorded amount of water taken out of the system. The measured amount of water supply of any system is typically larger than the measured amount of water consumption, due to non-metered water use and water loss (i.e. unaccounted-for water).

The Black Diamond Water System has two sources of supply – the Black Diamond Spring Field and the City of Tacoma Intertie. Supply meters are monitored and read daily by City personnel.

Recent production information has been included in ***Table 3.6, Production (2006)***. In comparing production records to consumption records for the same time period, it appears that consumption was greater than production. City staff is aware that there are discrepancies with their historical production meter readings. The City replaced the source meter in August of 2007. The new meter is being monitored at least twice a week and records are now showing that the City is producing more water than is being consumed.

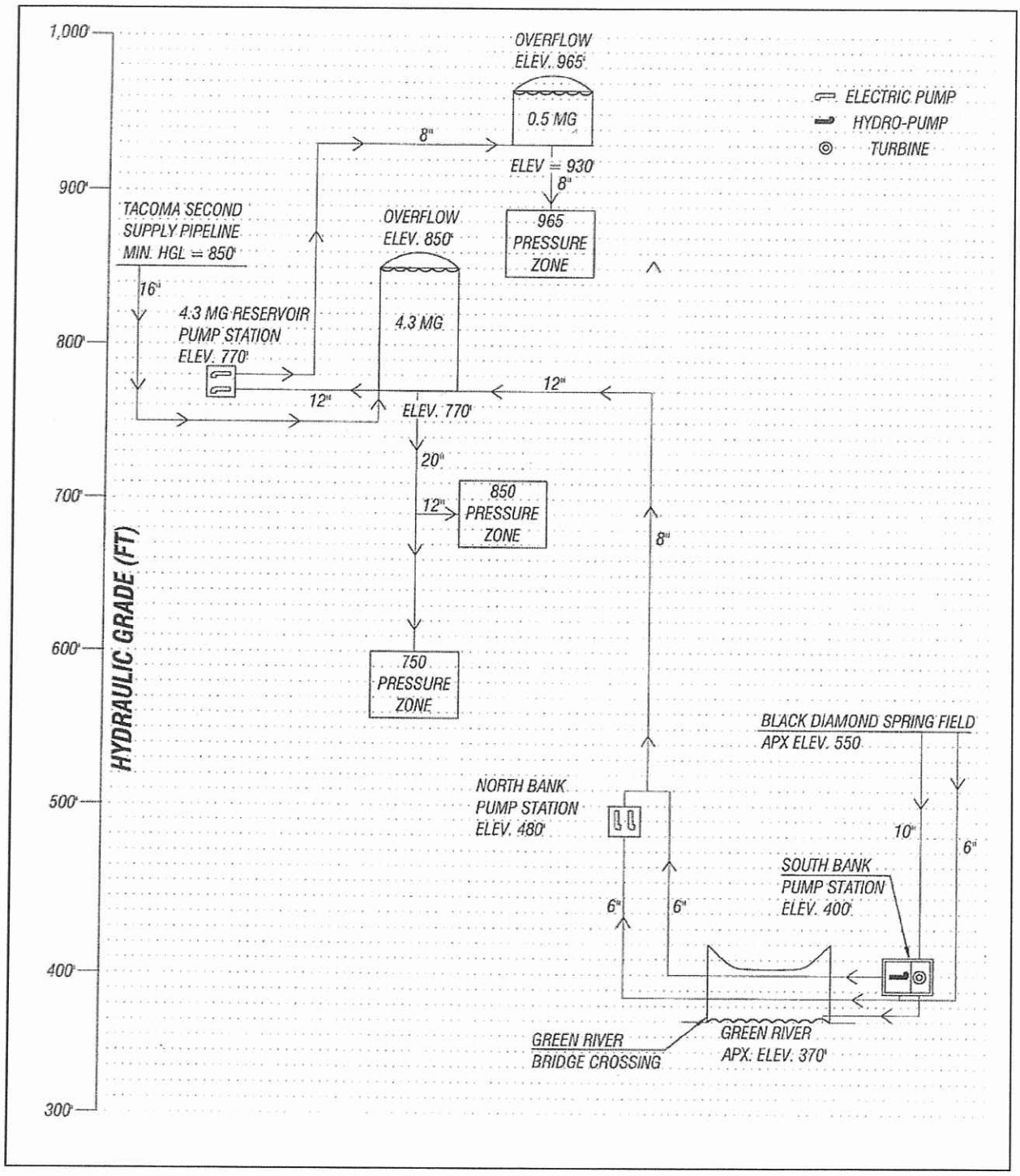


Figure 2.5, Existing Hydraulic Profile

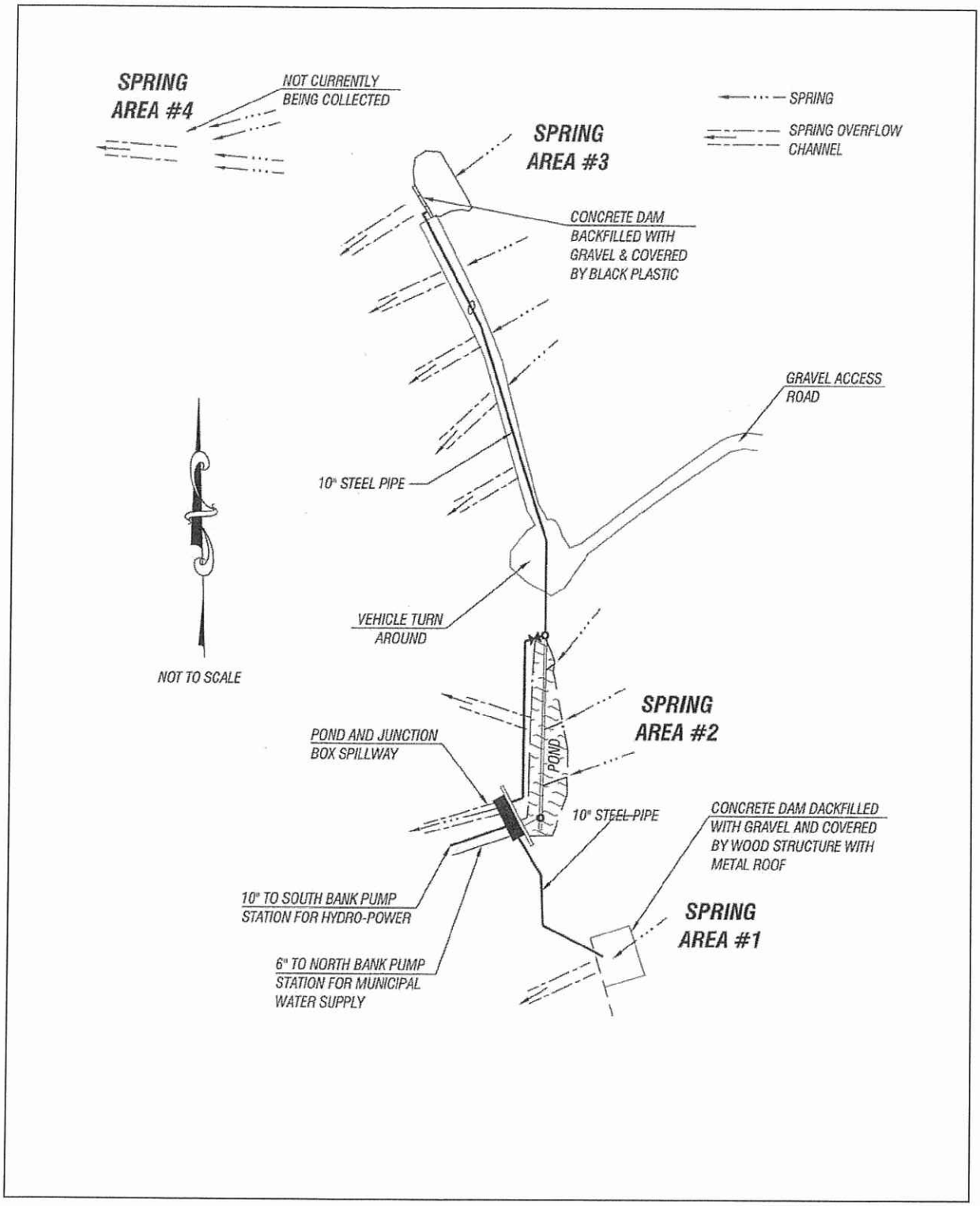


Figure 2.4, Black Diamond Spring Field Collection System

Appendix B

Flow Measurement Study

RH2 ENGINEERS PLANNERS SCIENTISTS

RH2 TECHNICAL

Memorandum

Client: City of Black Diamond

Project: Black Diamond Springs Flow Measurement

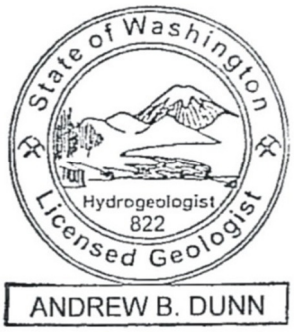
Project File: BD 1113-044.01.101 **Project Manager:** Dan Ervin, P.E.

Composed by: Andrew B. Dunn, L.G., L.H.G.

Reviewed by: Dan Ervin, P.E.

Subject: Black Diamond Springs Flow Measurements

Date: November 18, 2013



PRELIMINARY

Purpose of Study

The City of Black Diamond (City) holds two surface water certificates (S1-00506C and Surface Water Certificate 3580) to divert water from Black Diamond Springs for municipal and hydropower use. In order to prepare for future growth, the City has been considering various options with respect to its water supply and wanted to collect data to better understand the individual discharge from each spring, the amount of water that can be captured through the existing system, the combined discharge from all springs, and the seasonal variability in discharge. To capture this information, RH2 Engineering, Inc., (RH2), measured the discharge of the Black Diamond Springs over the period of March 1, 2013 through October 31, 2013 (**Table 1**). The findings of this study will be used by the City to facilitate decision making with respect to the ongoing use and potential improvement of infrastructure associated with Black Diamond Springs.

General Description of Area Hydrology and Piping

The Black Diamond Springs are located south of the Green River in the South ½, Section 19, Township 21 North, Range 7 East, W.M. The springline is formed at the contact between the permeable overlying ice-contact recessional outwash deposits and the underlying glacial till. For purposes of this memorandum, there are four primary springs

labeled from southwest to northeast as Spring 1, Spring 2, Spring 3, and Palmer Spring (also known as Spring 4). Currently, Springs 1 and 3 are developed and utilized by the City for municipal and hydropower supply. Concrete headwalls have been constructed across the spring and the area behind the headwall presumably contains perforated pipe that has been buried in a bed of gravel and ultimately leads to the junction box. Notches exist in the concrete headwalls to allow excess water to discharge from the structure at a single location. The structures are referred to as a springbox in the remainder of this memorandum. Spring 2 has been developed, but is not currently utilized by the City. Palmer Spring has never been developed by the City.

Water is routed from a buried collection system contained within Springbox 1 and Springbox 3 in 8-inch-diameter pipe that flows into a junction box. From that junction box, water either flows into the municipal system, into the hydropower penstock, or it overflows. Water also overflows both of the springboxes if more water is available than can be transported via the pipelines to the junction box. Water overflowing Springbox 1 does not contribute to the cumulative stream discussed later. Overflow from Spring 3 (except for a minor amount), Spring 2, the junction box, and any other undeveloped springs (excluding Palmer Spring) join together to form what is referred to as the cumulative stream before flowing down the slope and into the Green River. (**Figure 1**).

All water from Palmer Spring flows off of City-owned property shortly after emanating from the ground and proceeds to flow directly to the Green River. This spring does not contribute to the cumulative stream measured as part of this study.

Equipment Utilized and Setup

Monitoring the discharge from the Black Diamond Springs occurred at six locations in order to accurately determine the relative contribution from each developed spring and also the cumulative discharge from all springs and seeps that could potentially be captured. For all weir locations, the discharge was calculated using the United States Bureau of Reclamation (USBR) Weir spreadsheet, which uses the Kindsvater-Carter equation.

Daily precipitation data was obtained from King County's hydrologic information center[1]. The closest precipitation gage is identified as site BDIA and is located near downtown Black Diamond, approximately 2.5 miles northwest from the springs (**Table 2**).[1]

For the manually measured stream discharge locations, a Swoffer™ pygmy flow meter and Model 3000 recorder were used, and the standard velocity measured at 0.6 depth method was utilized (**Table 3**).

Spring 1:

RH2 utilized the existing concrete springbox structure and added some additional equipment to allow for more accurate overflow measurement. A sharp-crested weir constructed from $^{3}/_{8}$-inch acrylic sheet was used as the flow control structure to allow for accurate discharge measurements. The inside-edge of the weir was beveled at a 45 degree angle. The weir

[1] http://green.kingcounty.gov/WLR/Waterres/hydrology/DataDownload.aspx?G_ID=664&Parameter=Precipitation

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opening measures 33 inches wide by 12 inches high. The height of the weir crest above the gravel contained within the springbox is approximately 0.6 feet. This weir is categorized as a partially-contracted rectangular sharp-crested weir. A staff gage was placed in the pool 3.1 feet back from the weir crest. The staff gage was placed so that the zero reading correlates with the crest of the weir. A perforated open-top PVC pipe was attached to the staff gage for placement of a pressure transducer data logger to record water levels. The accuracy of flow measured at this site is considered very high (plus or minus 5 percent).

Spring 2:

The overflow from Spring 2 near the junction box was blocked to force all water to exit the spring through a single overflow channel. All flow from Spring 2 leaves the spring through a culvert and overflow channel near the middle of the spring. A staff gage and perforated ABS pipe were installed in the overflow channel near the location where manual discharge measurements are performed. The staff gage is not correlated to any particular vertical datum or reference. The channel is straight upstream and downstream of the measurement location. The accuracy of flow measured at this location is considered very high (plus or minus 5 percent).

Spring 3:

RH2 utilized the existing concrete springbox structure and added some additional equipment to allow for more accurate flow measurement. A sharp-crested weir constructed from $^{3}/_{8}$-inch acrylic sheet was used as the flow control structure to allow for accurate discharge measurements. The inside-edge of the weir was beveled at a 45 degree angle. The weir opening measures 26 inches wide by 12 inches high. The height of the weir crest above the gravel contained within the springbox is approximately 0.75 feet. This weir is categorized as a partially-contracted sharp-crested weir. A staff gage was attached to the front concrete wall 2 feet from the edge of the weir. The staff gage was placed so that the zero reading correlates with the crest of the weir. A perforated open-top PVC pipe was attached to the staff gage for placement of a pressure transducer data logger to record water levels. The accuracy of flow measured at this location is considered high (plus or minus 10 percent).

Junction Box:

The junction box collects flow from Springs 1 and 3 so that it may be directed into the municipal or hydropower penstocks. Water that is not diverted to these uses overflows the box. The overflow structure was fitted with two 2x6 cedar stoplogs. The top stoplog had a $^{1}/_{16}$-inch" piece of aluminum angle metal affixed to the top of it with the portion sticking up aligned with the upstream face of the board. Installation of these boards created two suppressed sharp-crested rectangular weirs. One weir is 3.5 feet wide while the second weir is 2 feet wide. A staff gage was placed in the junction box 1.5 feet back from the weir crest. The staff gage height that is equal to the weir crest height is 1.20 feet. So, 1.20 feet needs to be subtracted from staff gage readings to determine the head of water flowing over the weirs. Angle aluminum metal was placed into the nappe to provide air beneath the nappe and improve accuracy of the measurements. Given the non-flat pool conditions behind the weir and the location of the staff gage too close to the weir crest, accuracy of flow measured at this location is considered medium (plus or minus 20 percent).

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Palmer Spring:

Due to the steep gradient of the hillside at Palmer Spring, it was impractical to be able to establish a weir or flume at a point lower on the slope where all of the discharge would have been measured. Instead, a rough rectangular weir was established toward the top of the springs to measure that discharge and see how the flow responded during declining seasonal discharge.

Water was routed toward a natural pool using sand bags and boulders. A 4-foot-wide by 1-foot-tall piece of plywood reinforced with a 2x4 was wedged into the constriction to approximate a suppressed sharp crested rectangular weir. A staff gage was established in a calmer portion of the pool. Due to site constraints, flow through the pool, lack of a true sharp crest, and only partial capture of spring flow, the accuracy of flow measurement at this location is considered poor (plus or minus 30 percent). Also, it should be noted that the flow recorded is much less than the total spring discharge. The weir eventually failed and the existing staff gage was used and traditional stream gaging was performed at the old weir location to create a rating curve, similar to the other streamflow sites. Unfortunately, under low-flow conditions (less than a staff gage reading of approximately 0.1 feet, the staff gage does not record the level of the pool surface, but instead the level of a side pool.

Cumulative Stream:

All overflow from Spring 2, Spring 3, smaller unnamed Springs, and the junction box enters a stream channel that eventually flows past this site. A staff gage and perforated ABS pipe were installed in the channel near the location where manual measurements of flow were performed. The staff gage is not correlated to any particular vertical datum or reference. The channel is straight upstream of the measurement location. The accuracy of flow measured at this location is considered medium (plus or minus 20 percent) due to the high velocity of water in the channel (greater than 5 feet per second in places at higher flows).

Discharge Summary

Figures 2 through **8** contain the calculated discharge as measured at the Spring 1 overflow, Spring 2 discharge, Spring 3 overflow, Upper Palmer Spring, the junction box, the cumulative stream, and all together, respectively. **Table 1** contains a summary of the minimum, average, and maximum monthly discharge for each measurement site and for the springs currently developed for municipal and hydropower supply. Rating tables for each measurement site are contained as **Appendices A-1** through **A-5**.

Under normal operating conditions (valve fully open) overflow from Spring 1 ceased on July 1st and did not flow again through the end of the study period (October 31, 2013). For the period when there was no overflow, all water from the spring was routed through the junction box. The concrete headwall for Spring 1 appears to be effectively capturing all of the spring discharge during low-flow conditions and there does not appear to be any seepage under the concrete headwall. However, during high-discharge periods, water does overtop the concrete headwall when there is insufficient capacity to spill water over the weir or route it to the junction box.

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The flow from Spring 2 is supplemented from water exiting the junction box below the ground surface on the uphill side of the structure, possibly through the old, partially blocked intake pipe from Spring 2. This water ultimately comingles with the Spring 2 discharge and makes its way to the Spring 2 outflow channel. So, the natural discharge from Spring 2 is likely less than measured in this study. Overall, discharge from Spring 2 was fairly constant over the study period and contained fewer fluctuations due to precipitation events than observed at Springs 1 and 3.

Under normal operating conditions (valve fully open) overflow from Spring 3 basically ceased in mid-September and did not flow again through the end of the study period (October 31, 2013). For the period when there was no overflow, all water from the spring was routed through the junction box. The footings for the Spring 3 headwall are believed to be shallow since groundwater seepage, that is believed to originate from under the wall, was observed emanating from the ground at multiple locations shortly downhill from the spring. A deeper foundation for the headwall might be able to capture additional discharge from this spring.

The junction box overflow remained relatively constant at approximately 8 cubic feet per second (cfs) until the middle of July. After this the junction box overflow dropped to a minimum of 4.3 cfs in mid-September and early October. This suggests that the contribution from the existing works at Spring 1 and 3 in this particular year was sufficient to allow for a continuous municipal diversion of at least 4.0 cfs year round. The valves at Springs 1 and 3 were closed on September 12, 2013, and November 1, 2013, during the low-flow period to determine the contribution to the junction box from each spring. The total discharge from the junction box during these closures on September 12 and November 1 was 4.26 and 4.61 cfs, respectively, while the contribution from Spring 1 was 1.69 and 1.54 cfs respectively (approximately 35 percent of total) and the contribution from Spring 3 was consistently 2.83 cfs (approximately 65 percent of total). So, Spring 3 provides approximately two thirds of the water available at the junction box during the low-flow period.

All Springs Available for Potential Capture

Peak cumulative discharge measured/estimated during the study period, for all Spring discharge except for the lower portion of Palmer Spring, occurred in April and May and was approximately 41 cfs (**Table 1**). Minimum discharge measured/estimated during the study period occurred in October and was approximately 6 cfs (**Table 1**). It should be noted that the City diverts approximately 1 cfs when it pumps municipal water and the low flows likely represent when the City is pumping, so the actual low flow from the springs is actually closer to 7 cfs.

Reaction of Spring Discharge to Precipitation

Early in the study period there were periods of substantial precipitation that appear to correlate well with increases in spring discharge (**Table 2**). Comparing the larger event with increased spring discharge suggests that there is a 1-to 2-week lag between precipitation and response at the springs.

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Attachments

Table 1 – Black Diamond Springs 2013 Flow Summary
Table 2 – Daily Precipitation Measured at King County Precipitation Station BDIA
Table 3 – Discharge Measurements with the Swoffer Flow Meter

Figure 1 – Schematic Diagram of Springs, Infrastructure, and Measurement Points
Figure 2 – Springbox 1 Overflow
Figure 3 – Spring 2 Discharge
Figure 4 – Springbox 3 Overflow
Figure 5 – Upper Palmer Spring Discharge
Figure 6 – Junction Box Overflow
Figure 7 – Cumulative Stream Discharge
Figure 8 – All Black Diamond Springs Discharge Measurements

Appendices

Rating Table A-1 – Black Diamond Springbox 1 Overflow
Rating Table A-2 – Black Diamond Spring 2 Discharge
Rating Table A-3 – Black Diamond Springbox 3 Overflow
Rating Table A-4 – Black Diamond Junction Box Overflow
Rating Table A-5 – Black Diamond Cumulative Stream Discharge

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TABLES

Table 1. Black Diamond Springs 2013 Flow Summary

Minimum Calculated Discharge (cfs)

	Spring 1 Overflow	Spring 2	Spring 3 Overflow	Junction Box Overflow	Cumulative Stream	Upper Palmer Spring	Spring 1 and 3 Total	Total
March	2.58	2.66	2.83	7.67	17.12	4.09	13.07	23.78
April	2.35	2.69	3.73	7.67	16.98	3.04	13.75	22.37
May	1.48	2.38	2.70	7.67	14.91	6.03	11.85	22.42
June	0.00	2.22	2.73	7.06	13.55	4.58	9.80	18.13
July	0.00	2.07	0.83	5.72	10.21	3.53	6.55	13.74
August	0.00	1.99	0.00	5.00	6.88	2.10	5.00	8.98
September	0.00	1.91	0.00	4.30	4.90	1.27	4.30	6.17
October	0.00	1.90	0.00	4.30	4.76	1.34	4.30	6.10

Mean Calculated Discharge (cfs)

	Spring 1 Overflow	Spring 2	Spring 3 Overflow	Junction Box Overflow	Cumulative Stream	Upper Palmer Spring	Spring 1 and 3 Total	Total
March	3.00	2.76	3.14	8.33	18.89	4.47	14.48	26.36
April	4.60	2.92	5.14	8.42	20.81	3.04	18.16	28.46
May	4.01	2.73	4.23	8.39	18.91	7.63	16.63	30.55
June	1.23	2.35	3.23	8.24	15.71	5.55	12.70	22.49
July	0.00	2.19	1.89	7.52	12.69	4.98	9.41	17.67
August	0.00	2.06	0.42	5.23	9.04	2.58	5.65	11.63
September	0.00	1.97	0.00	4.65	6.67	1.40	4.65	8.07
October	0.00	1.96	0.00	4.73	6.88	1.37	4.73	8.25

Maximum Calculated Discharge (cfs)

	Spring 1 Overflow	Spring 2	Spring 3 Overflow	Junction Box Overflow	Cumulative Stream	Upper Palmer Spring	Spring 1 and 3 Total	Total
March	3.87	2.89	3.54	9.35	21.01	5.23	16.77	30.11
April	7.16	3.40	5.79	8.92	25.47	3.04	21.87	35.68
May	6.99	3.43	5.67	8.92	24.81	9.29	21.58	41.09
June	1.96	2.43	3.80	8.92	17.21	6.03	14.68	25.20
July	0.00	2.28	2.88	8.50	14.87	5.56	11.38	20.43
August	0.00	2.14	0.88	5.35	11.44	3.18	6.23	14.62
September	0.00	2.06	0.00	5.00	8.45	1.74	5.00	10.20
October	0.00	2.00	0.00	5.00	7.95	1.40	5.00	9.35

Table 2. Daily Precipitation Measured at King County Precipitation Station BDIA (inches)

Day	March	April	May	June	July	August	September	October
1	0.15	0	0	0	0	0.01	0	0.82
2	0.06	0.02	0	0.01	0	0.04	0	0.28
3	0	0	0	0	0	0	0.14	0
4	0	0.37	0	0	0	0	0	0.01
5	0	1.03	0	0	0	0	0.75	0
6	0.55	0.84	0	0	0	0	0.8	0
7	0.34	1.31	0	0	0	0	0	0.23
8	0	0.16	0	0	0	0	0.01	0.34
9	0.01	0	0.01	0	0	0	0	0
10	0.15	0.26	0	0	0	0.13	0	0.14
11	0.1	0.04	0	0.07	0	0	0	0
12	0.13	0.46	0.17	0.22	0	0	0	0.25
13	0.25	0.39	0.38	0.06	0	0	0.02	0
14	0.07	0.19	0.01	0.03	0	0.02	0	0
15	0.05	0.12	0.06	0	0	0.13	0.21	0
16	0.27	0.02	0.05	0.01	0.02	0	0.5	0
17	0.04	0	0.23	0.08	0.08	0	0.05	0
18	0.02	0.33	0.04	0.12	0	0	0	0.01
19	0.25	1.44	0.04	0.09	0	0	0	0
20	0.41	0.01	0	0.36	0	0	0.09	0.01
21	0.02	0.19	0.35	0.04	0	0	0.07	0.01
22	0.48	0	0.49	0	0.03	0	0.75	0
23	0	0	0.19	0.11	0	0	0.81	0.01
24	0	0	0.14	0.41	0	0.02	0.07	0
25	0	0	0.06	0.34	0	0.01	0.03	0.02
26	0	0	0.23	0.16	0	0.02	0	0
27	0.02	0.15	0.52	0.1	0	0.07	0.1	0.12
28	0.1	0.07	0.13	0	0	0.28	1.72	0
29	0	0.04	0.43	0	0	0.98	0.67	0
30	0	0.02	0.14	0	0	0.11	1.43	0.02
31	0	--	0.01	--	0.09	0	--	0.18
Total	3.47	7.46	3.68	2.21	0.22	1.82	8.22	2.45

BDIA = King County Site Identifier (Black Diamond I&I Rain Gauge)

Table 3. Discharge Measured with the Swoffer Flow Meter

Location	Date					
	3/1/2013	4/2/2013	5/7/2013	7/8/2013	9/12/2013	11/1/2013
Spring 2 Overflow	2.93	2.57	3.20	2.29	2.00	2.14
Upper Palmer Spring	NM	NM	9.29	4.58	1.27	1.41
Cumulative Stream	21.14	17.52	22.96	11.93	7.40	7.79

Discharge measured in cubic feet per second.
NM = Not Measured

FIGURES

Figure 1. Schematic Diagram Showing Springs, Existing Infrastructure, and Measurement Points

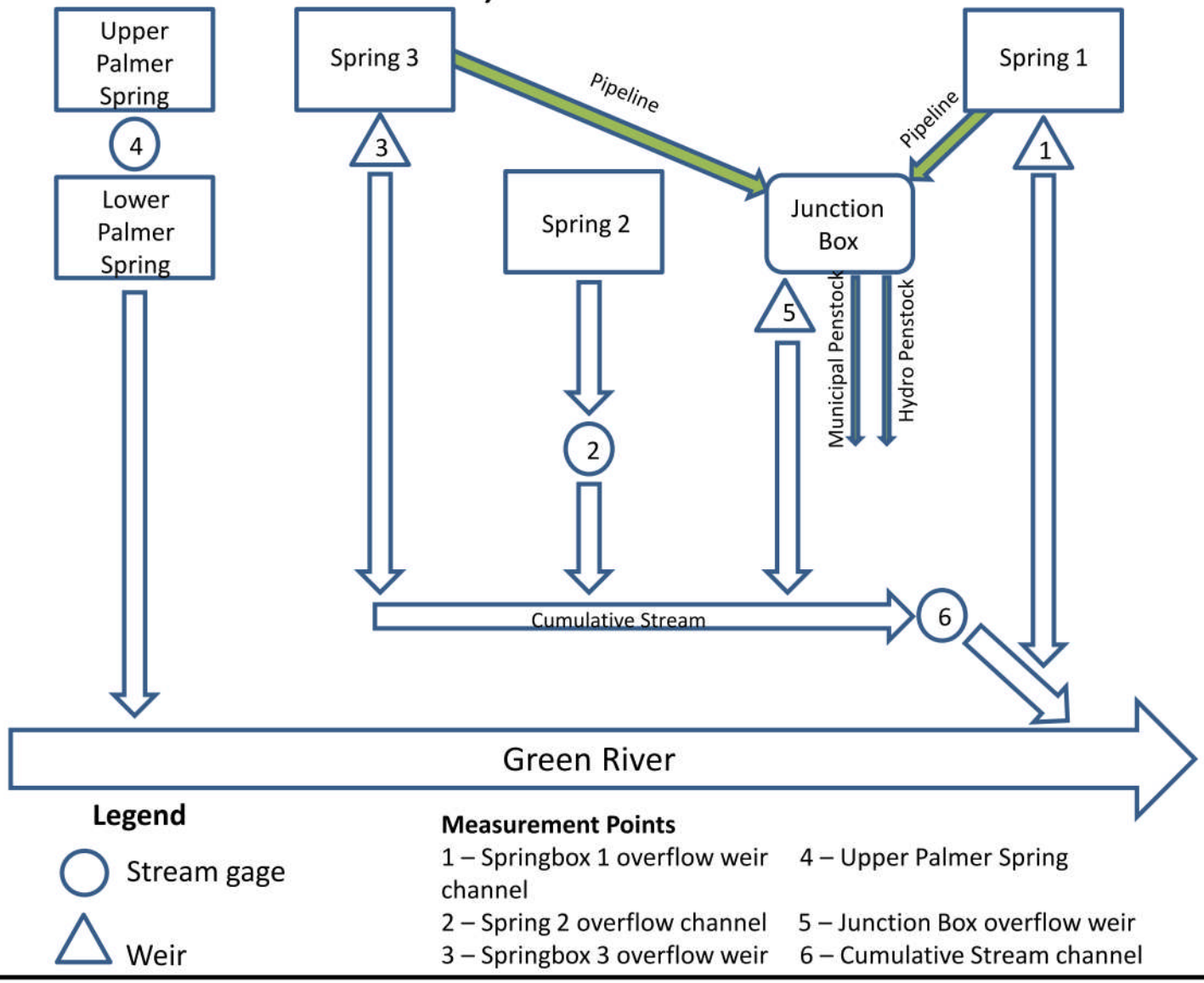


Figure 2. Springbox 1 Overflow

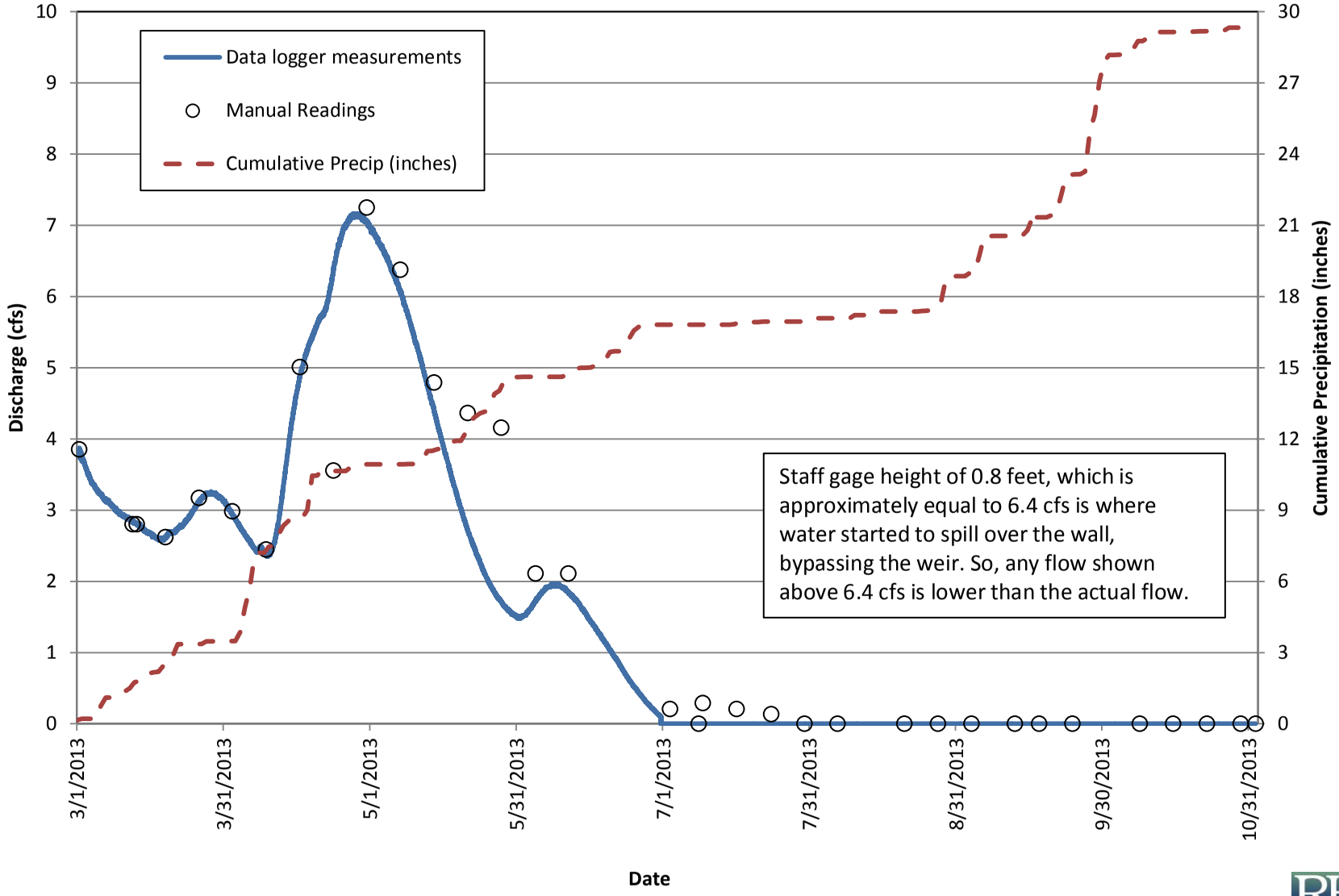


Figure 3. Spring 2 Discharge

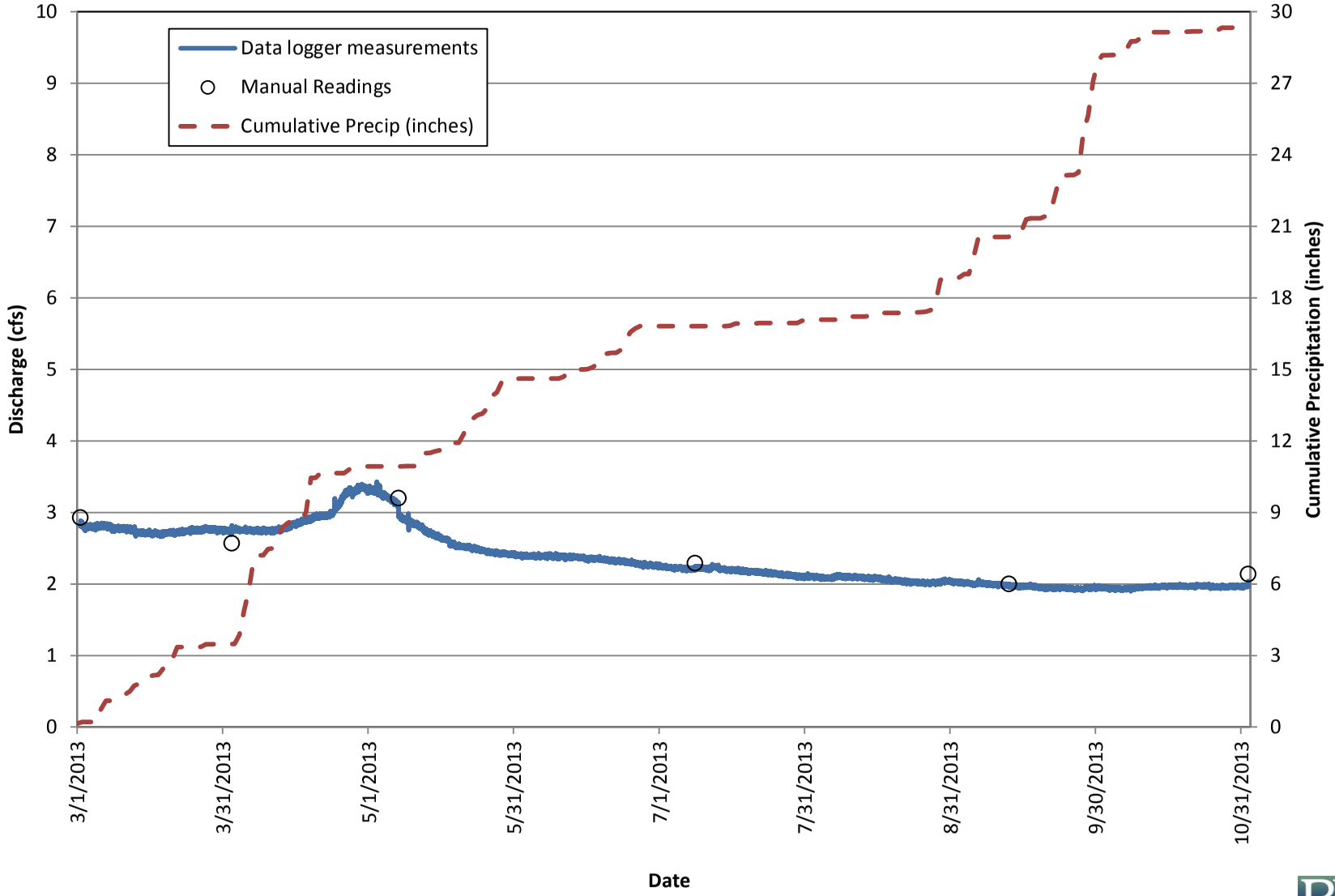


Figure 4. Springbox 3 Overflow

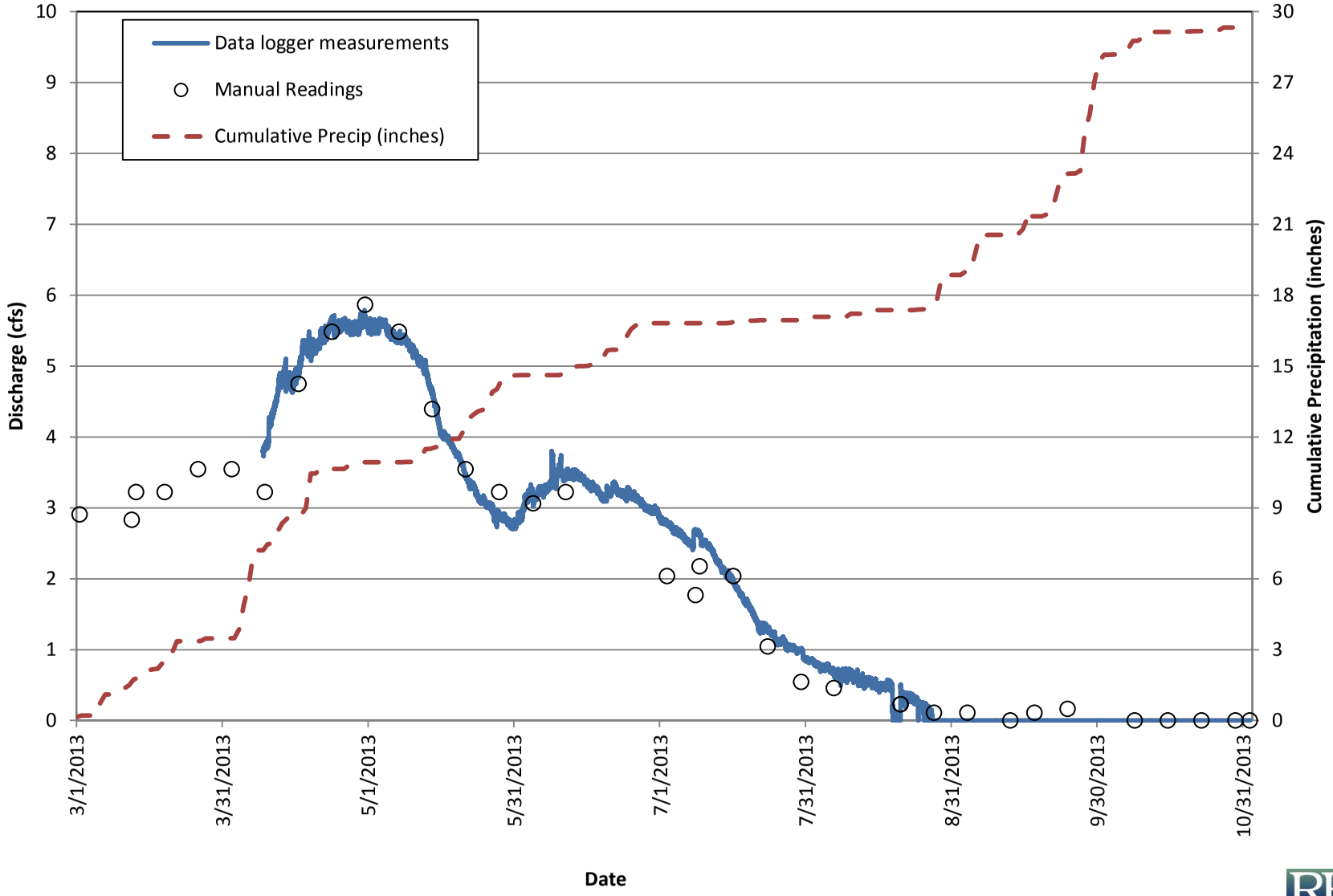


Figure 5. Upper Palmer Spring Discharge

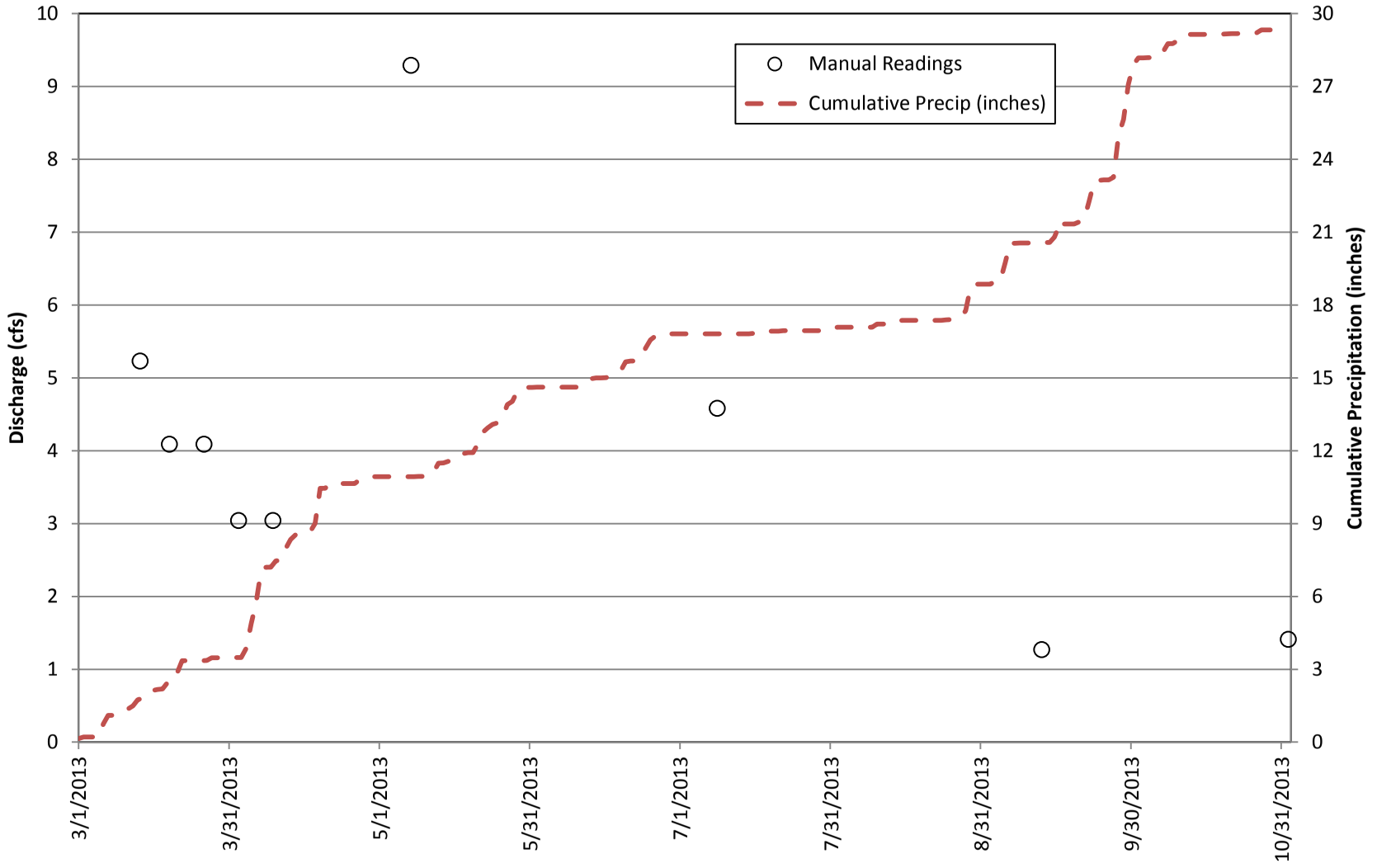


Figure 6. Junction Box Overflow

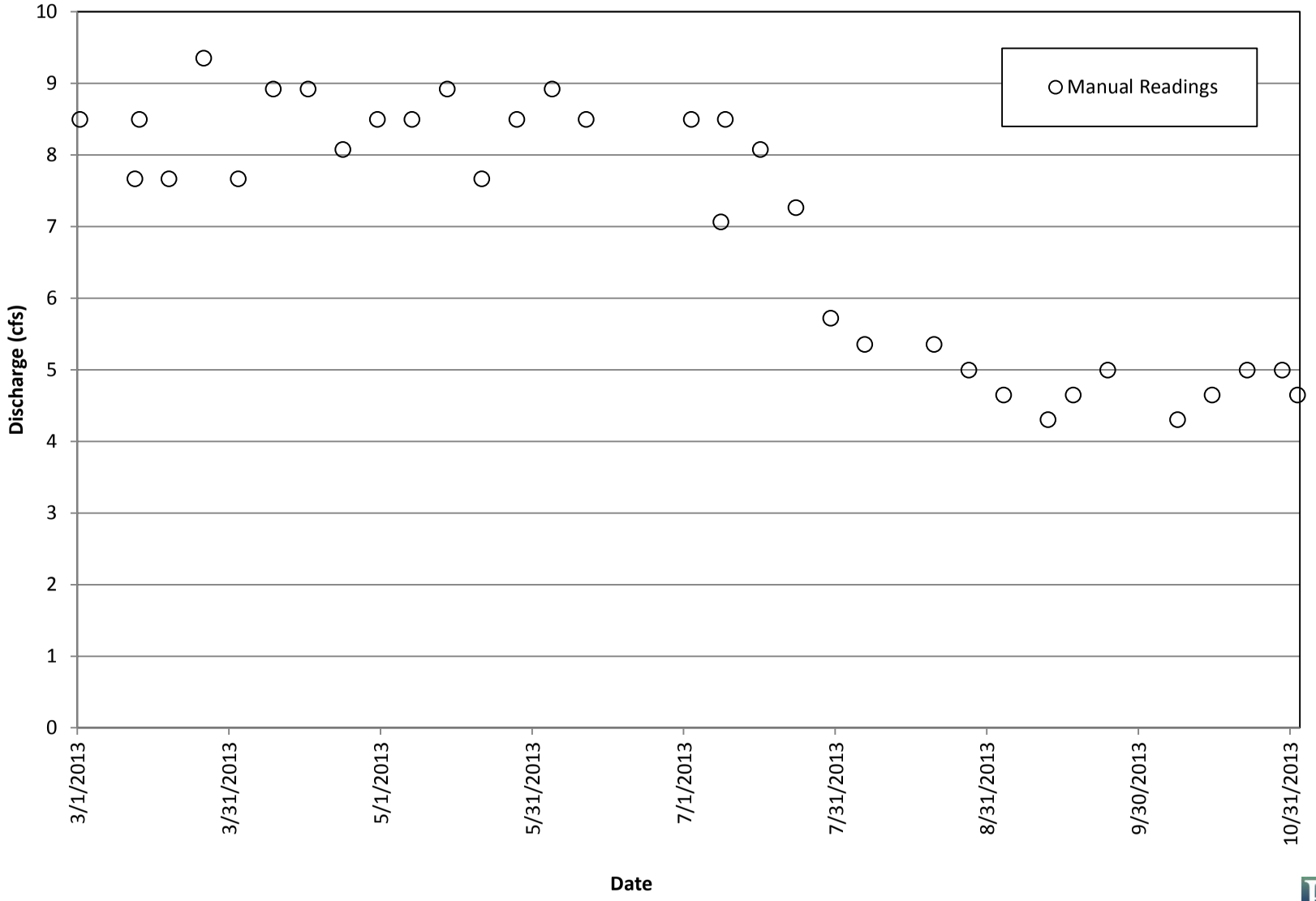


Figure 7. Cumulative Stream Discharge

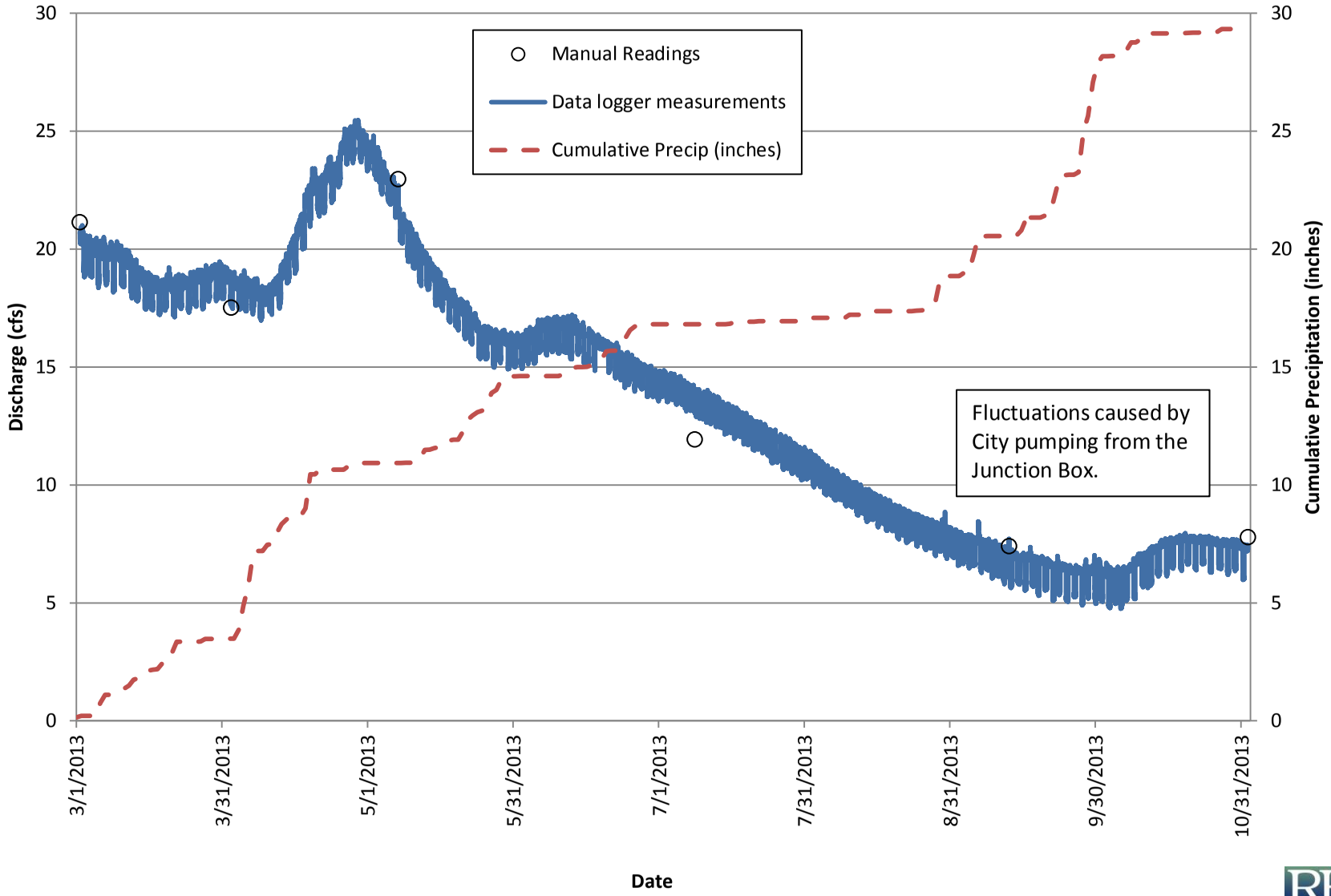
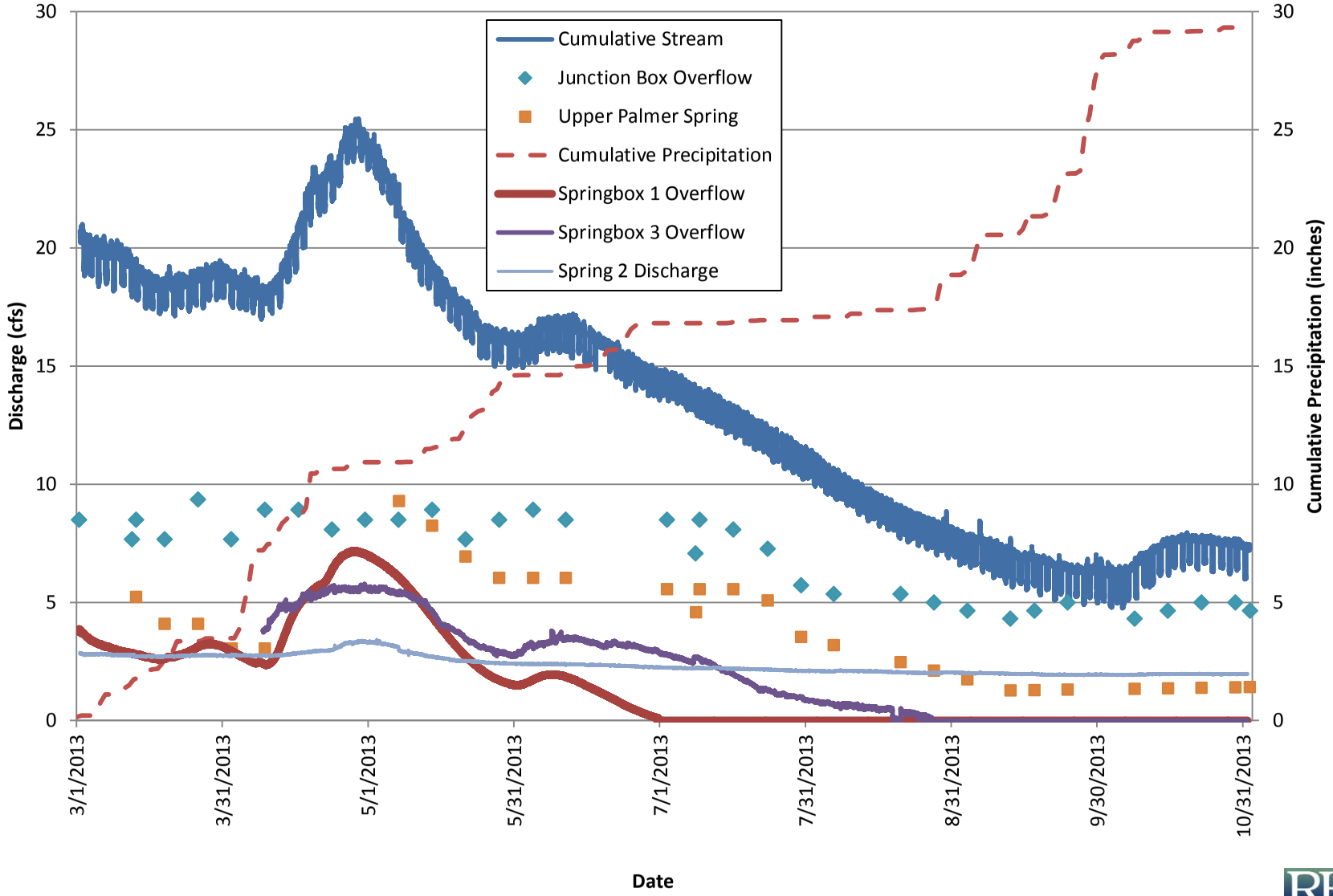


Figure 8. All Black Diamond Springs Discharge Measurements



RATING TABLES

Rating Table A-1 - Black Diamond Springbox 1 Overflow

Staff Gage Height (ft)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.00	0.01	0.03	0.05	0.07	0.10	0.14	0.17	0.21	0.25
0.1	0.29	0.33	0.38	0.43	0.48	0.53	0.58	0.64	0.69	0.75
0.2	0.81	0.87	0.94	1.00	1.06	1.13	1.20	1.27	1.34	1.41
0.3	1.48	1.56	1.63	1.71	1.79	1.87	1.95	2.03	2.11	2.19
0.4	2.28	2.36	2.45	2.53	2.62	2.71	2.80	2.89	2.98	3.08
0.5	3.17	3.27	3.36	3.46	3.55	3.65	3.75	3.85	3.95	4.05
0.6	4.16	4.26	4.37	4.47	4.58	4.68	4.79	4.90	5.01	5.12
0.7	5.23	5.34	5.45	5.56	5.68	5.79	5.91	6.02	6.14	6.26
0.8	6.38	*6.50*	*6.61*	*6.73*	*6.86*	*6.98*	*7.10*	*7.22*	*7.35*	*7.47*
0.9	*7.60*	*7.72*	*7.85*	*7.98*	*8.10*	*8.23*	*8.36*	*8.49*	*8.62*	*8.75*
1.0	*8.88*	*9.02*	*9.15*	*9.28*	*9.42*	*9.55*	*9.69*	*9.82*	*9.96*	*10.10*

Discharge in cubic feet per second
Weir crest is equal to a staff gage reading of 0.00 feet
Water overtops the concrete wall at a staff gage height of 0.80 feet. Any discharge above this height should be considered approximate.
Rectangular Sharp-crested Partially Contracted Weir
Weir width: 2.75 feet
Weir height: 0.6 feet
Approach channel width: 6 feet
Equation: Q = 8.8845*h^1.4866 Where Q = discharge in cubic feet per second and h = staff gage height in feet
Rating table developed using the USBR Kindsvater-Carter Weir Calculator Spreadsheet, Version 1.1, March 10, 2011

Rating Table A-2 - Black Diamond Spring 2 Discharge

Staff Gage Height (ft)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*
0.1	*0.01*	*0.02*	*0.02*	*0.02*	*0.03*	*0.03*	*0.04*	*0.05*	*0.05*	*0.06*
0.2	*0.07*	*0.08*	*0.08*	*0.09*	*0.10*	*0.11*	*0.13*	*0.14*	*0.15*	*0.16*
0.3	*0.17*	*0.19*	*0.20*	*0.22*	*0.23*	*0.25*	*0.27*	*0.29*	*0.30*	*0.32*
0.4	*0.34*	*0.36*	*0.38*	*0.41*	*0.43*	*0.45*	*0.47*	*0.50*	*0.52*	*0.55*
0.5	*0.58*	*0.60*	*0.63*	*0.66*	*0.69*	*0.72*	*0.75*	*0.78*	*0.82*	*0.85*
0.6	*0.88*	*0.92*	*0.95*	*0.99*	*1.03*	*1.06*	*1.10*	*1.14*	*1.18*	*1.22*
0.7	*1.27*	*1.31*	*1.35*	*1.40*	*1.44*	*1.49*	*1.53*	*1.58*	*1.63*	*1.68*
0.8	*1.73*	*1.78*	*1.83*	*1.89*	*1.94*	*1.99*	2.05	2.10	2.16	2.22
0.9	2.28	2.34	2.40	2.46	2.52	2.58	2.65	2.71	2.78	2.85
1.0	2.91	2.98	3.05	*3.12*	*3.19*	*3.27*	*3.34*	*3.41*	*3.49*	*3.56*
1.1	*3.64*	*3.72*	*3.80*	*3.88*	*3.96*	*4.04*	*4.12*	*4.21*	*4.29*	*4.37*
1.2	*4.46*	*4.55*	*4.64*	*4.73*	*4.82*	*4.91*	*5.00*	*5.09*	*5.19*	*5.28*

Discharge in cubic feet per second

Flow between a staff gage height of 0.86 and 1.02 feet is considered calibrated. Outside this range should be considered approximate.

Equation: Q = 2.9136*h^2.3368 Where Q = discharge in cubic feet per second and h = staff gage height in feet

Rating Table A-3 - Black Diamond Springbox 3 Overflow

Staff Gage Height (ft)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.00	0.01	0.02	0.04	0.06	0.08	0.11	0.13	0.16	0.19
0.1	0.23	0.26	0.30	0.34	0.37	0.41	0.46	0.50	0.54	0.59
0.2	0.63	0.68	0.73	0.78	0.83	0.88	0.93	0.99	1.04	1.10
0.3	1.16	1.21	1.27	1.33	1.39	1.45	1.51	1.58	1.64	1.70
0.4	1.77	1.83	1.90	1.97	2.04	2.10	2.17	2.24	2.32	2.39
0.5	2.46	2.53	2.61	2.68	2.76	2.83	2.91	2.99	3.06	3.14
0.6	3.22	3.30	3.38	3.46	3.54	3.63	3.71	3.79	3.88	3.96
0.7	4.04	4.13	4.22	4.30	4.39	4.48	4.57	4.66	4.75	4.84
0.8	4.93	5.02	5.11	5.20	5.30	5.39	5.48	*5.58*	*5.67*	*5.77*
0.9	*5.87*	*5.96*	*6.06*	*6.16*	*6.26*	*6.35*	*6.45*	*6.55*	*6.65*	*6.75*
1.0	*6.85*	*6.96*	*7.06*	*7.16*	*7.26*	*7.37*	*7.47*	*7.58*	*7.68*	*7.79*

Discharge in cubic feet per second
Weir crest is equal to a staff gage reading of 0.00 feet
Water overtops the concrete wall at a staff gage height of 0.86 feet. Any discharge above this height should be considered approximate.
Rectangular Sharp-crested Partially Contracted Weir
Weir width: 2.166 feet
Weir height: 0.75 feet
Approach channel width: 8 feet
Equation: Q = 6.8548*h^1.4789 Where Q = discharge in cubic feet per second and h = staff gage height in feet
Rating table developed using the USBR Kindsvater-Carter Weir Calculator Spreadsheet, Version 1.1, March 10, 2011

Rating Table A-4 - Black Diamond Junction Box Overflow

Staff Gage Height (ft)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
1.2	0.00	0.02	0.05	0.10	0.15	0.21	0.28	0.35	0.42	0.50
1.3	0.59	0.68	0.77	0.87	0.97	1.08	1.19	1.30	1.42	1.53
1.4	1.66	1.78	1.91	2.04	2.17	2.31	2.45	2.59	2.73	2.88
1.5	3.03	3.18	3.33	3.49	3.65	3.81	3.97	4.14	4.30	4.47
1.6	4.65	4.82	5.00	5.17	5.35	5.54	5.72	5.91	6.09	6.28
1.7	6.48	6.67	6.87	7.06	7.26	7.46	7.67	7.87	8.08	8.29
1.8	8.50	8.71	8.92	9.14	9.35	9.57	9.79	10.01	10.24	10.46
1.9	10.69	10.91	11.14	11.38	11.61	11.84	12.08	12.32	12.55	12.79

Discharge in cubic feet per second
Weir crest is equal to a staff gage reading of 1.2 feet
Water overtops the concrete wall at a staff gage height of approximately 2.00 feet
Two Rectangular Sharp-crested Suppressed Weirs
Weir width: 2 feet and 3.5 feet
Weir height: 4 feet for both
Equation: Q = (11.554*(h - 1.2)^1.4887) + (6.6193*(h - 1.2)^1.4887)
Where Q = discharge in cubic feet per second and h = staff gage height in feet
Rating table developed using the USBR Kindsvater-Carter Weir Calculator Spreadsheet, Version 1.1, March 10, 2011

Rating Table A-5 - Black Diamond Cumulative Stream Discharge

Staff Gage Height (ft)	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	*2.11*	*2.19*	*2.28*	*2.38*	*2.47*	*2.57*	*2.68*	*2.79*	*2.90*	*3.02*
0.1	*3.14*	*3.27*	*3.40*	*3.54*	*3.68*	*3.83*	*3.98*	*4.15*	*4.31*	*4.49*
0.2	*4.67*	*4.86*	*5.06*	*5.26*	*5.48*	*5.70*	*5.93*	*6.17*	*6.42*	*6.68*
0.3	*6.95*	7.24	7.53	7.83	8.15	8.48	8.83	9.18	9.56	9.95
0.4	10.35	10.77	11.21	11.66	12.13	12.63	13.14	13.67	14.22	14.80
0.5	15.40	16.03	16.68	17.35	18.06	18.79	19.55	20.35	21.17	22.03
0.6	22.92	23.85	*24.82*	*25.83*	*26.88*	*27.97*	*29.10*	*30.28*	*31.51*	*32.79*
0.7	*34.12*	*35.50*	*36.94*	*38.44*	*40.00*	*41.62*	*43.31*	*45.07*	*46.90*	*48.80*
0.8	*50.78*	*52.84*	*54.98*	*57.21*	*59.53*	*61.95*	*64.46*	*67.08*	*69.80*	*72.63*

Discharge in cubic feet per second

Flow between a staff gage height of 0.31 and 0.61 feet is considered calibrated. Outside this range should be considered approximate.

Equation: Q = 2.109*exp(h*3.9766) Where Q = discharge in cubic feet per second and h = staff gage height in feet

Appendix C

Springs Sites Topographical Survey

By Parametrix, December 2013

TOPOGRAPHIC MAP

SHEET 6 OF 6

SHEET 5 OF 6

SHEET 4 OF 6

SHEET 3 OF 6

SHEET 2 OF 6

NOTE:
TOPO INFORMATION SHOWN FOR THE PUMP STATION WAS PROVIDED FROM PACE ENGINEERING DRAWING AND NOT MAPPED BY PARAMETRIX INC.

OLD MINE AIR SHAFT

GREEN RIVER

CONCRETE TURBIN BUILDING

PEDESTRIAN BRIDGE WITH 2-WATER LINES AND 1-POWER CONDUIT SEE DETAIL OF BRIDGE PROFILE AND CROSS SECTION

PALMER SPRINGS

SPRING No. 3

SPRING No. 2

SPRING No. 1

GATE POST

GATE POST

FRANKLIN-HOWARD ROAD NO. 1018

LEGEND

- WATER GAUGE
- WATER VALVE
- STEEL CABLE ANCHOR
- CONIFER TREE
- DECIDUOUS TREE
- EDGE OF GRAVEL
- WATER LINE
- STREAM
- CHAINLINK FENCE
- EDGE OF PAVEMENT

N

SCALE IN FEET
0 100' 200

SURVEY NOTES:
HORIZONTAL DATUM: NAD 83-91, WASHINGTON COORDINATE SYSTEM NORTH ZONE, BASED ON GPS MEASUREMENTS TO WSDOT CONTROL POINTS.
VERTICAL DATUM: NAVD 88
WSDOT MONUMENTS
1) KC GP 16, FOUND 3 1/4" BRASS DISK IN CONCRETE STAMPED "KING COUNTY SURVEY MONUMENT, STA GP-16, 1974"
N. 96123.020
E. 1353903.854
EL.=716.95
2) LONDON, FOUND CASED MONUMENT WITH 3 1/4" ALUMINUM DISK IN CONCRETE STAMPED "WSDOT SURVEY MONUMENT, LONDON 2008"
N. 103865.150
E. 1353112.756
EL.=489.86
THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT AND DOES NOT PURPORT TO SHOW ALL EASEMENTS.

THE LOCATION OF THE WATER LINE ARE FROM PHYSICAL EVIDENCE WHERE FOUND, THE EXACT LOCATION MAY VARY.

TREE TABLE	
TREE #	TREE DIA.
1	FIR 36
2	FIR 36
3	FIR 30
4	FIR 24
5	FIR 24
6	FIR 20
7	CED 24
8	MAP 50
9	CED 40
10	CED 40
11	CED 40
12	CED 50
13	ALD 16
14	MAP 36
15	MAP 2-36
16	CED 36
17	MAP 14
18	ALD 16
19	COT 36
20	CED 10
21	ALD 14
22	CED 42
23	FIR 48
24	CED 38
25	CED 28
26	FIR 36
27	FIR 36
28	CED 2_8
29	MAP 12
30	HEM 6
31	CED 40
32	CED 30
33	MAP 10
34	FIR 24
35	CED 12
36	FIR 24
37	FIR 24
38	CED 2_28
39	CED 48
40	CED 36
41	HEM 5
42	HEM 5
43	HEM 4
44	CED 2_36
45	MAP 8
46	MAP 3-18
47	CED 18
48	HEM 6
49	ALD 12
50	CED 7
51	ALD 12
52	ALD 10
53	CED 36
54	ALD 14
55	ALD 14
56	ALD 12
57	ALD 16
58	ALD 2-9
59	HEM 9
60	HEM 9
61	ALD 10
62	CED 7
63	CED 30
64	CED 48
65	ALD 8
66	CED 12
67	ALD 10
68	ALD 10
69	ALD 10
70	ALD 15

TREE TABLE	
TREE #	TREE DIA.
71	HEM 12
72	HEM 10
73	CED 10
74	CED 30
75	FIR 18
76	ALD 9
77	FIR 20
78	FIR 18
79	HEM 10
80	FIR 18
81	FIR 10
82	FIR 10
83	FIR 18
84	CED 24
85	CED 24
86	FIR 15
87	FIR 8
88	CED 24
89	FIR 14
90	FIR 8
91	CED 15
92	CED 8
93	FIR 18
94	CED 36
95	FIR 10
96	CED 14
97	CED 6
98	CED 6
99	CED 6
100	CED 8
101	FIR 6
102	FIR 18
103	CED 24
104	FIR 20
105	CED 4
106	ALD 8
107	FIR 22
108	CED 48
109	CED 48
110	CED 36
111	FIR 28
112	FIR 36
113	CED 2_16_28
114	FIR 36
115	CED 36
116	CED 36
117	FIR 2_30
118	CED 24
119	CED 24
120	CED 30
121	CED 36
122	CED 30
123	ALD 12
124	CED 28
125	ALD 18
126	MAP 36
127	CED 24
128	CED 20
129	CED 10
130	CED 24
131	FIR 24
132	CED 24
133	CED 15
134	CED 18
135	CED 36
136	CED 36
137	CED 15
138	CED 12
139	CED 18
140	CED 16

TREE TABLE	
TREE #	TREE DIA.
141	CED 24
142	CED 12
143	CED 24
144	CED 24
145	HEM 36
146	CED 12
147	MAP 12
148	CED 16
149	FIR 24
150	CED 8
151	FIR 20
152	CED 16
153	MAP 12
154	CED 18
155	MAP 12
156	MAP 18
157	FIR 10
158	CED 10
159	CED 18
160	ALD 12
161	CED 20
162	ALD 16
163	ALD 18
164	CED 8
165	COT 18
166	CED 18
167	CED 12
168	COT 30
169	ALD 2-10
170	ALD 10
171	ALD 10
172	COT 18
173	COT 16
174	ALD 12
175	MAP 2-10
176	MAP 8
177	CED 12
178	MAP 10
179	ALD 18
180	MAP 24
181	MAP 16
182	COT 24
183	ALD 12
184	ALD 15
185	ALD 18
186	ALD 20
187	ALD 15
188	ALD 15
189	ALD 20
190	MAP 12
191	MAP 12
192	MAP 16
193	ALD 24
194	ALD 20
195	ALD 20
196	ALD 20
197	ALD 20
198	MAP 2-20
199	MAP 5-15
200	ALD 10
201	ALD 10

11-20-13
DAVID A. IRONMONGER
STATE OF WASHINGTON
33133
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REVISIONS	DATE	BY

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TOPOGRAPHIC MAP FOR CITY OF BLACK DIAMOND

SPRING SITES EXISTING CONDITIONS

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SV1

LAYOUT: SHEET 1 PATH: U:\Puyu\Projects\Clients\3043-City of Black Diamond\247-3043-013 2012 Survey On-call\995ca1\Survey\00Current\Dwg\Black Diamond Springs\ PLOTTED BY: murrayjay DATE: Wednesday, November 20, 2013 2:12:03 PM

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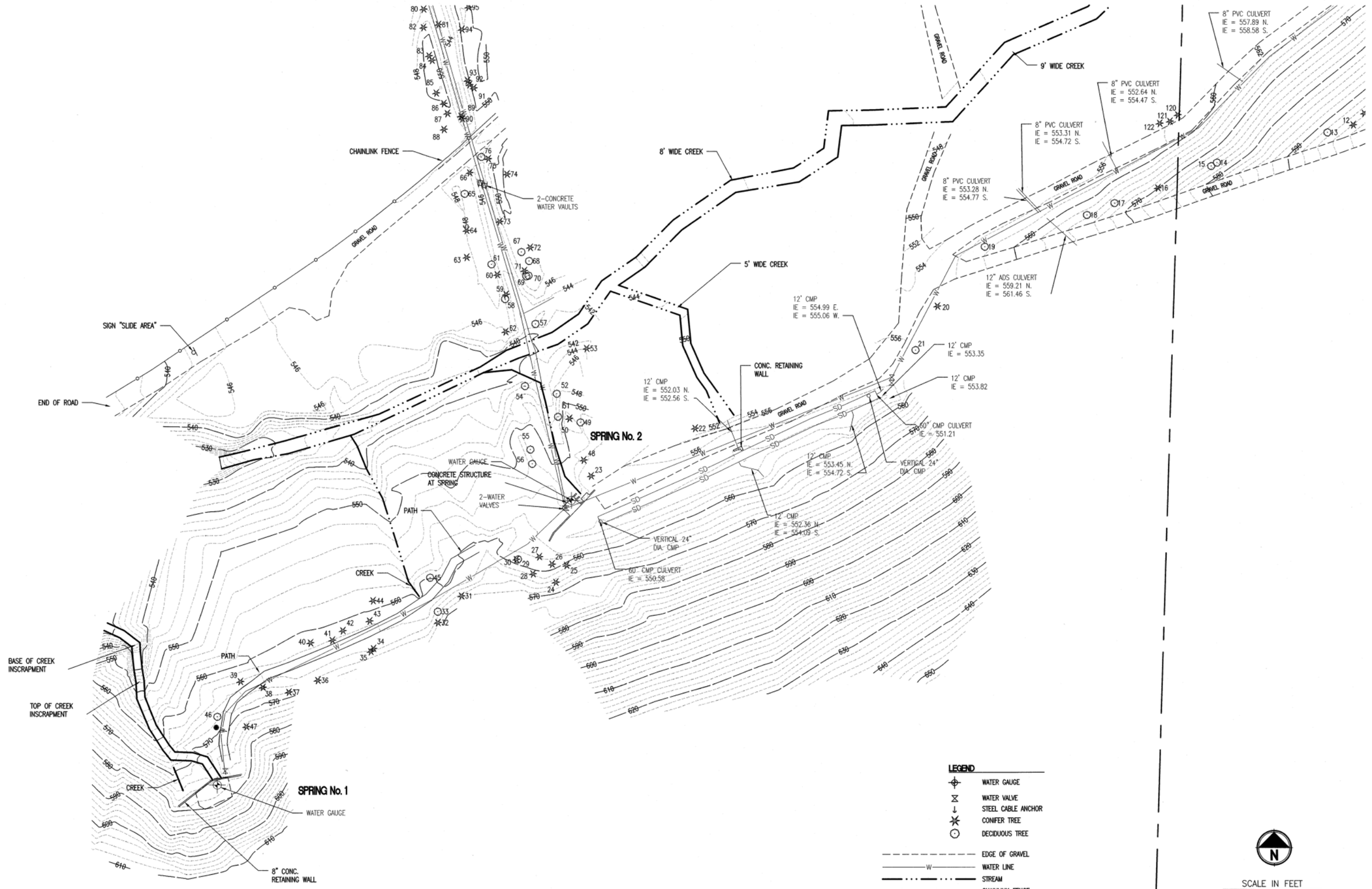

LEGEND

- WATER GAUGE
- WATER VALVE
- STEEL CABLE ANCHOR
- CONIFER TREE
- DECIDUOUS TREE
- EDGE OF GRAVEL
- WATER LINE
- STREAM
- CHAINLINK FENCE

N

SCALE IN FEET
0 30' 60'

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SV1

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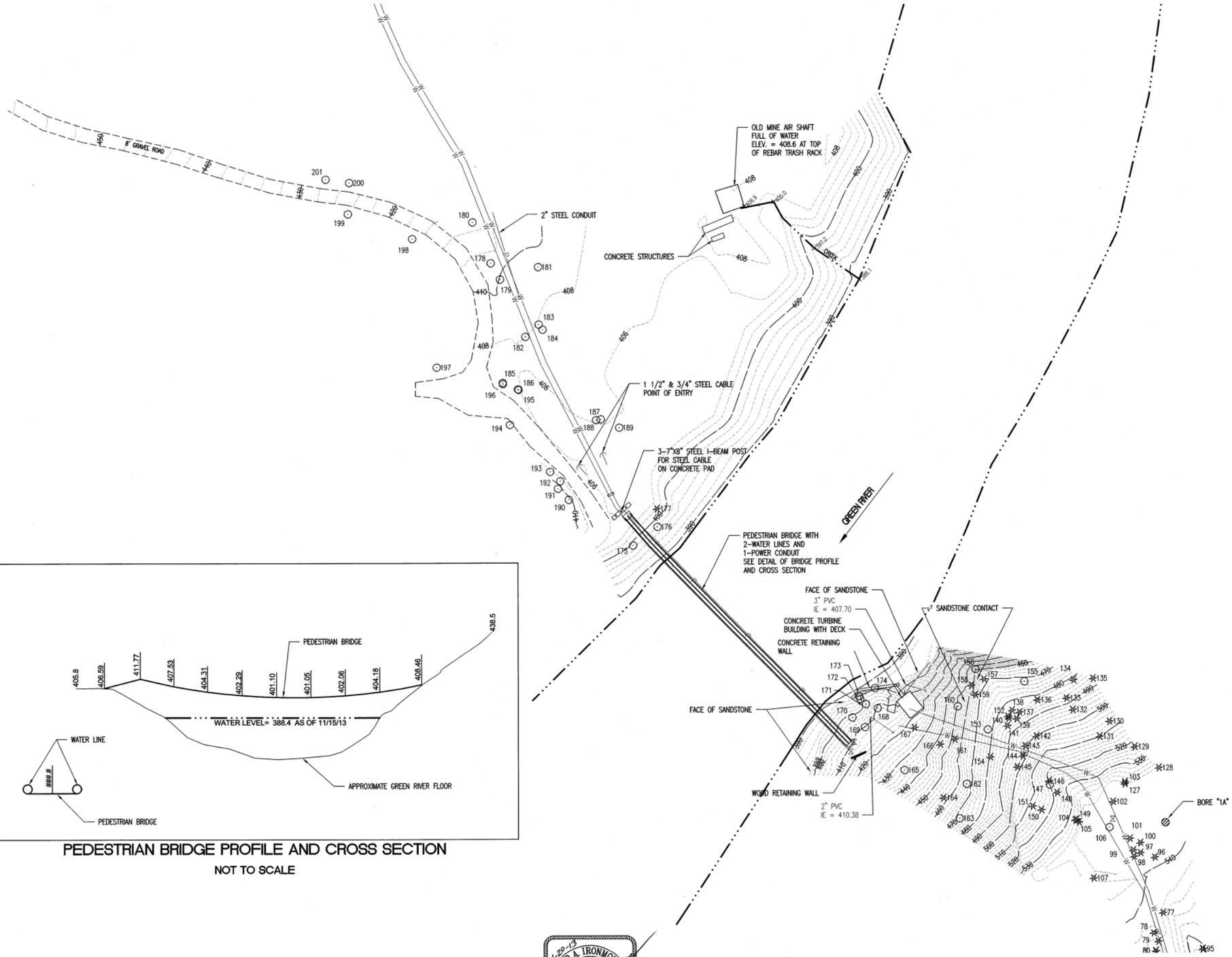

PEDESTRIAN BRIDGE PROFILE AND CROSS SECTION

NOT TO SCALE

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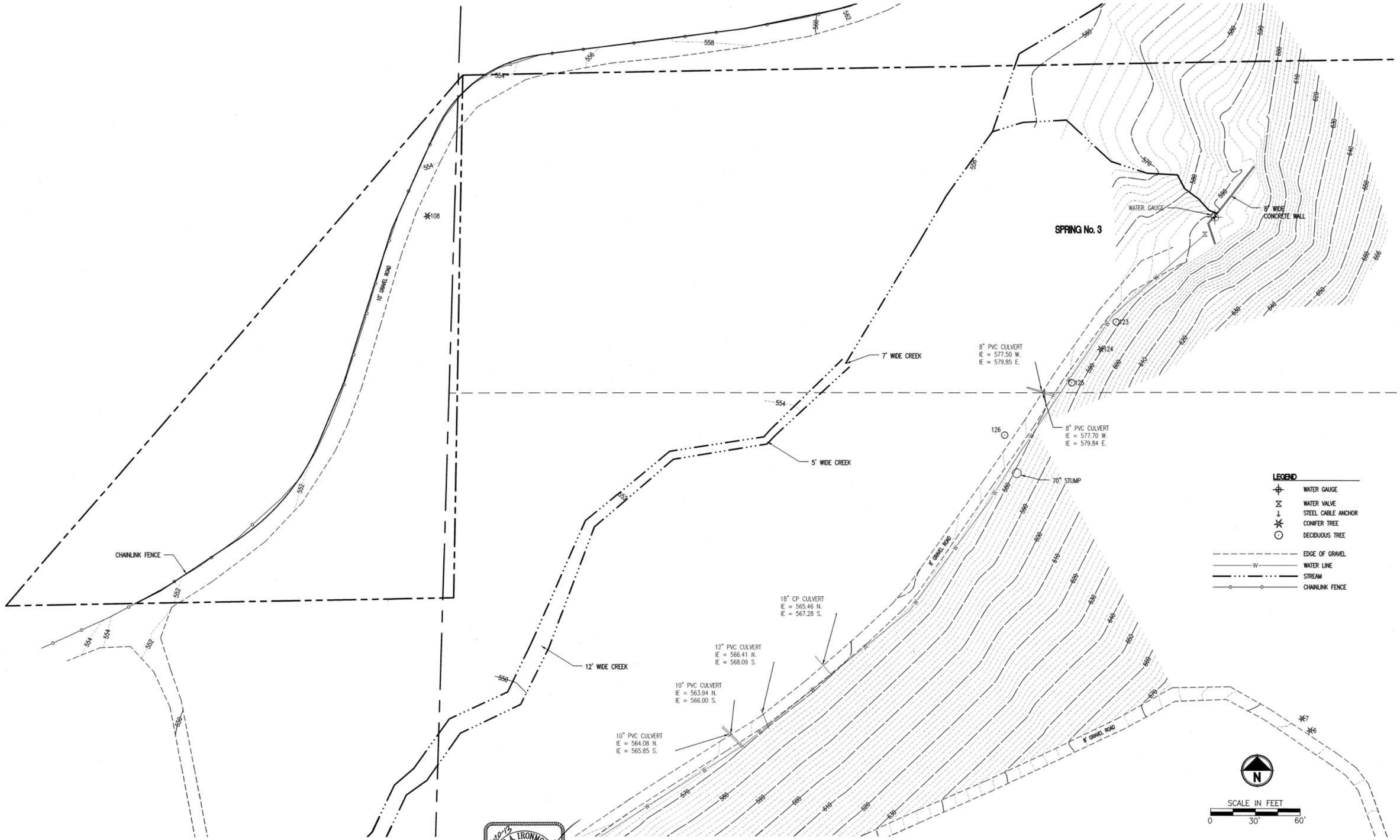
SV1



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			CHECKED
			APPROVED

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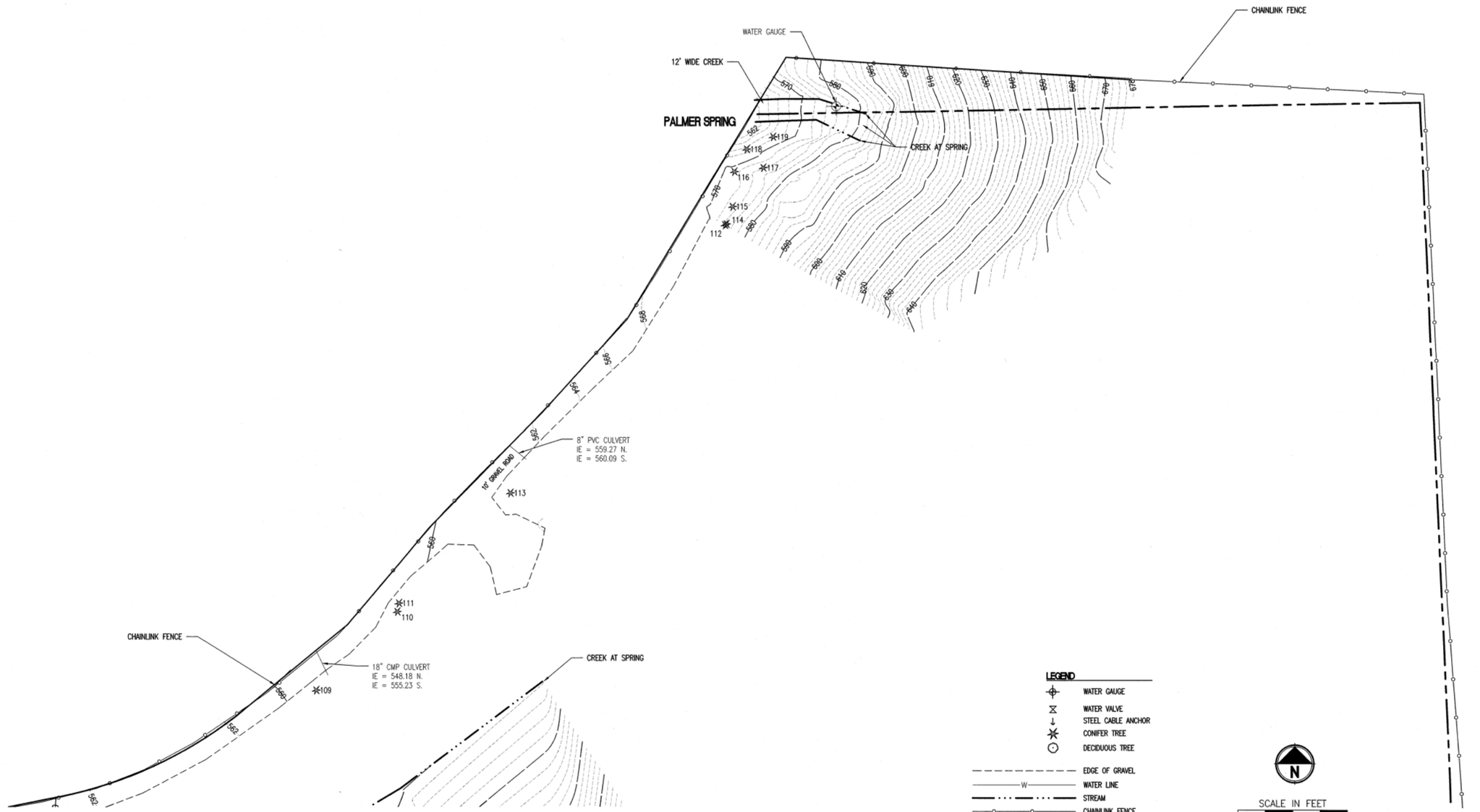

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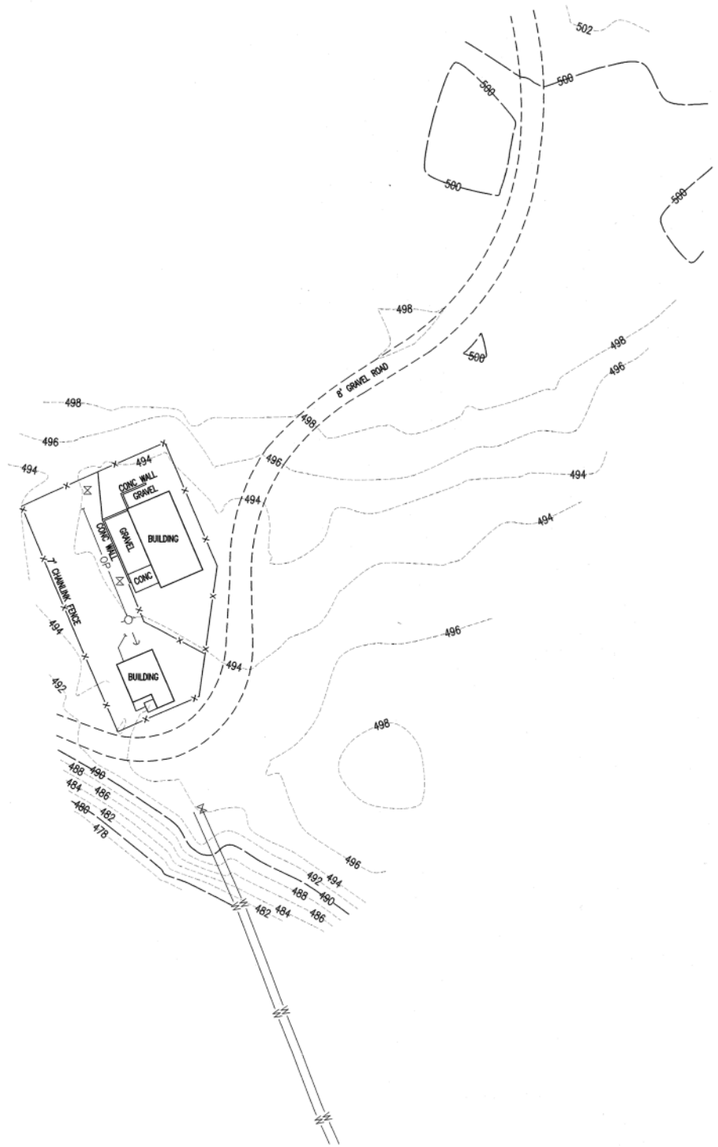
SV1



LEGEND

- WATER GAUGE
- WATER VALVE
- STEEL CABLE ANCHOR
- CONIFER TREE
- DECIDUOUS TREE
- GUY ANCHOR
- POWER POLE
- EDGE OF GRAVEL
- WATER LINE
- STREAM
- CHAINLINK FENCE

N

SCALE IN FEET
0 30' 60'

11-20-13
DAVID A. IRONMONGER
STATE OF WASHINGTON
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6 OF 6

SV1

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Appendix D

Geology Report

By RH2 Engineering, Inc., October 2013

- ENGINEERING GEOLOGY REPORT-

REPORT ON SITE GEOLOGY, ENGINEERING GEOLOGY, AND GEOTECHNICAL ISSUES

CITY OF BLACK DIAMOND

BLACK DIAMOND SPRINGS PRELIMINARY ALTERNATIVES ANALYSIS

Prepared by RH2 Engineering, Inc.,
for the City of Black Diamond

January 2014

This preliminary report is based on site investigations completed in September and October 2013, and subsequent analysis, interpretation, and evaluation of site geology, engineering geology, and potential geotechnical issues specific to the design and constructability of a water main.

RH2 Project: BD 1113.105

RH2 ENGINEERS PLANNERS SCIENTISTS

Bothell
Bellingham
East Wenatchee
Issaquah
Richland
Tacoma
Central Point
North bend
Portland

City of Black Diamond

Black Diamond Springs Preliminary Alternatives Analysis

REPORT ON SITE GEOLOGY, ENGINEERING GEOLOGY, AND POTENTIAL GEOTECHNICAL ENGINEERING ISSUES

January 2014

Report based on Site Investigations Completed in September and October, 2013

RH2 Engineering, Inc., (RH2) has prepared this report for exclusive use by the City of Black Diamond (City) to provide preliminary geologic and geotechnical information to support the analysis of source alternatives for the Black Diamond Springs (BD Springs). The City is considering several options to beneficially use the existing diversions of the BD Springs on the south side of the Green River or to relocate the point of withdrawal for the water right associated with the BD Springs to the north side of Green River.

In accordance with the scope of work agreed to by the City, RH2 has completed a review of available geologic information and conducted a limited geologic exploration to provide information and analysis to identify issues related to design and construction of a new water main from the BD Springs collection system to the south shoreline of the Green River at the abutment of the bridge supporting the existing water mains. The geologic services were conducted in accordance with the locally accepted practices of a licensed engineering geologist and per the elements of the Revised Code of Washington State (RCW) Chapter 18.220 and the Washington Administrative Code (WAC) Chapter 308-15. The conclusions and recommendations contained in this report are based upon surface and subsurface geologic exploration of the earth materials (native soil, bedrock, and sediment) and groundwater conditions at the site, and review of previous studies and maps of the project area. Use of this report by others, or for another project, is at the user's sole risk.

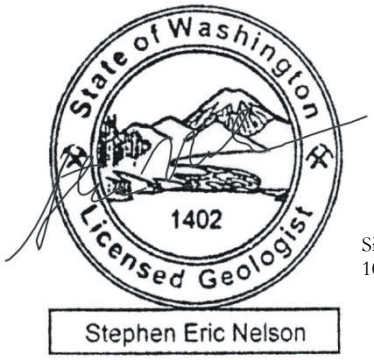
Based on the explorations completed under the scope of work, RH2 predicts that the types of earth materials encountered during excavation and construction of the water main will vary considerably, depending on the location within the overall project area. Earth materials will likely include unconsolidated glacial outwash (primarily loose to moderately dense sand and gravel with silt) overlying fresh to weathered glacial till, overlying sandstone bedrock. The lateral continuity and composition of these materials, and the subsurface contacts between these materials, varies significantly.

Design, construction, and operation of the proposed water main in the project area appear feasible; the earth materials and groundwater conditions in the project area should accommodate the proposed location and construction of the project. This report provides recommendations for the potential design and construction conditions for the proposed water main.

More detailed geologic and geotechnical evaluation will be necessary to confirm the site conditions once the final location and preferred design of the water main has been selected. We look forward to assisting and supporting the City on the successful construction of the project.

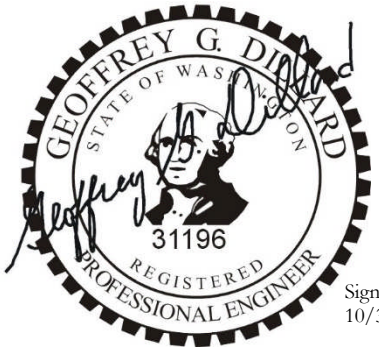
Sincerely,

RH2 Engineering, Inc.



Signed:
10/3/2013

Steve Nelson, L.G., L.HG, L.E.G
Licensed Geologist, Hydrogeologist, and Engineering Geologist



Signed:
10/3/2013

Geoff Dillard, P.E.
Project Manager and Principal-in-Charge

This report is a final and complete response to all elements in the Scope of Work and Contract agreement between the City of Black Diamond and RH2 Engineering, Inc.

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ENGINEERING GEOLOGY REPORT

INTRODUCTION

Project Description

The City of Black Diamond (City) is considering several alternatives to improve an existing source of municipal water supply. One alternative includes upgrading the existing water mains that conveys raw water from the Black Diamond Springs (BD Springs) from the spring collection system to the south shoreline of the Green River, where a suspension bridge will support the proposed water main across the river to a booster pump station. The exact route of the proposed water main pipe is not yet determined but will likely follow the existing water mains down a steep slope to the Green River shoreline. The existing water mains would likely be removed or abandoned in place.

Location and Existing Conditions

The project area is located approximately 2 miles southeast of the City. The project area is at an elevation of 540 feet above mean sea level (NAVD 88). The BD Springs and existing water mains are located on City-owned property. **Appendix A** contains a topographic map of the site, which includes survey data, existing contours, location of the existing water mains, and a soil test pit location from this investigation (labeled on the map as "Bore 1A").

The existing water mains follow approximately 250 feet on top of a nearly flat terrace, then drop steeply down the existing 100-percent slope for 270 feet to the Green River shoreline (see photo and Site Map in **Appendix A**). Construction of the proposed water main would require the excavation of a new trench along the terrace, placing the water main in the terrace, constructing a thrust block/pipe anchor at the top and bottom of the slope, and constructing the water main between the upper and lower anchors. It does not appear economically viable to excavate a new trench along the steep slope and bury the new water main in the trench or to directionally drill a conductor casing for the water main below the surface of the slope due to the dense vegetation, tree roots, and complex geology of the slope.

Slope between BD Springs and Green River along Water Main Alignment

Previous Work

RH2 reviewed the following documents and websites.

- GeoEngineers, Inc., 2009. *Critical Areas Reconnaissance Report, Black Diamond, Washington*. Report Prepared by GeoEngineers for L&L Gates LLP. May 12, 2009.
- Historical mine shaft maps for the region.
- Icicle Creek Engineers. 2003. *Report, Phase 1, Geological and Hydrogeological Engineering Services, Existing City of Black Diamond Water Supply System, Black Diamond Springs, Black Diamond, Washington.* Report prepared for Penhallegon Associates Consulting Engineers (PACE) and the City of Black Diamond.
- Pacific Groundwater Group (PGG). 2009a. *Geophysical Surveys, Springs Investigation, City of Black Diamond*. Report prepared by Pacific Groundwater Group for City of Black Diamond. February 3, 2009.
- Pacific Groundwater Group. 2009b. *Conceptual Hydrogeologic Profiles, Black Diamond Springs*. Technical Memorandum prepared by Pacific Groundwater Group for City of Black Diamond. May 26, 2009.

- United States Department of Agriculture Natural Resource Conservation Service (NCRS) Web Soil Survey. Accessed November, 2013. http://websoilsurvey.nrcs.usda.gov/app/WebSoil Survey.aspx
- Vine, James D. 1969. Geology and Coal Resources of the Cumberland, Hobart, and Maple Valley Quadrangles, King County, Washington. USGS Professional Paper 624.
- Washington State Department of Ecology; Online well log database; on file with the wells within ½-mile of the project site reviewed.
- Washington State Department of Natural Resources (WDNR) Washington Interactive Geologic Map. Accessed November, 2013. http://wigm.dnr.wa.gov/

Exploration Methods and Strategy

Before site exploration, RH2 reviewed available geologic maps and soil maps for the local area. RH2 performed a reconnaissance of the area at the existing water mains and identified geologic units, inspected slopes for indications of instability, and identified a preferred test pit location. On October 23, 2013, the City used a small backhoe and operator to excavate a test pit to a depth of 6.5 feet. The City prepared a summary of observed soil types and RH2 reviewed the summary to identify the probable stratigraphy, composition, texture, and structure of native earth materials encountered in the test pit.

REGIONAL GEOLOGY

The project site is located on a terrace approximately 300 feet in elevation above the Green River, which has incised a relatively narrow channel into sandstone bedrock identified as the Puget Group (Vine, 1969). The Puget Group is comprised of layered sandstone, siltstone, shale, and coal comprised primarily of fine to medium-grained feldspar, quartz, and mica.

The area has been influenced by glaciation, and the area includes dense glacial till that covers the bedrock and is in turn overlain by loose, unconsolidated glacial outwash. The site is mapped in the Pierce County soil survey as being sandstone overlain by several feet of alluvium and loess (wind deposited fine-grained glacial sediment).

The Puget Sound Lowland frequently experiences moderate earthquakes (magnitude 5 to 6) due to active plate motion and shearing forces acting on the entire region. Active deep plate subduction west of the Cascade Mountains dominates the seismic activity of western Washington. Active normal and reverse fault motion occurs along the shallow Tacoma fault zone, which extends beneath the Green River Valley. Within the next 50 years, there is a high probability that the engine generator (EG) building site will experience a moderate earthquake. Approximate 50-year probabilities for central Washington earthquakes predicted by the United States Geological Survey (USGS) (http://earthquake.usgs.gov/hazards/) are as follows.

- Magnitude (M) $\geq$ 7.0 4 percent
- M $\geq$ 6.0 30 percent
- M $\geq$ 5.0 90 percent

The WDNR Interactive Geologic Map, based on the National Earthquake Hazards Reduction Program (NEHRP), assigned a Seismic Site Class C to D, Very Stiff to Stiff Soil, for the local area. The *Geophysical Surveys Report* (PGG, 2009a) indicated seismic velocities of the outwash deposits of 1,500 to 3,000 feet per second, more characteristic of Seismic Site Class C, Very Stiff Soil. The WDNR Interactive Geologic Map indicates a low liquefaction potential for outwash deposits in the region and no liquefaction potential for bedrock in the region.

SITE GEOLOGY

Geologic and soil mapping describing the project site indicates that the surficial geologic unit is glacial outwash underlain by sandstone bedrock, which were observed during the field reconnaissance and at the test pit.

Recent Subsurface Exploration and Investigation

On September 24, 2013, RH2 reconnoitered the site along the existing water mains and identified several distinct geologic units.

On October 23, 2013, the City supervised the excavation of one 6.5-foot-deep test pit at the proposed water main site to explore and characterize the shallow geology (**Appendix A**) at the top of the slope along the proposed alignment for the new water main. The test pit was completed using a small backhoe owned and operated by the City. Upon completion of the geological investigation, the test pit was backfilled with compacted excavated material.

According to City staff, the following earth materials were observed.

SOIL LOG

0 – 4 inches	Dark brown gravelly sand with organics and duff.
4 – 36 inches	Brown gravelly loamy sand; most roots to 36 inches.
36 – 47 inches	Grayish tan gravely loamy sand with cobbles slightly cemented in spots.
47 – 76 inches	Clean dense gravely coarse sand [recessional outwash].
76 inches	Very dense cemented Hard Pan, mottled at the surface [glacial till]. Unable to dig further.

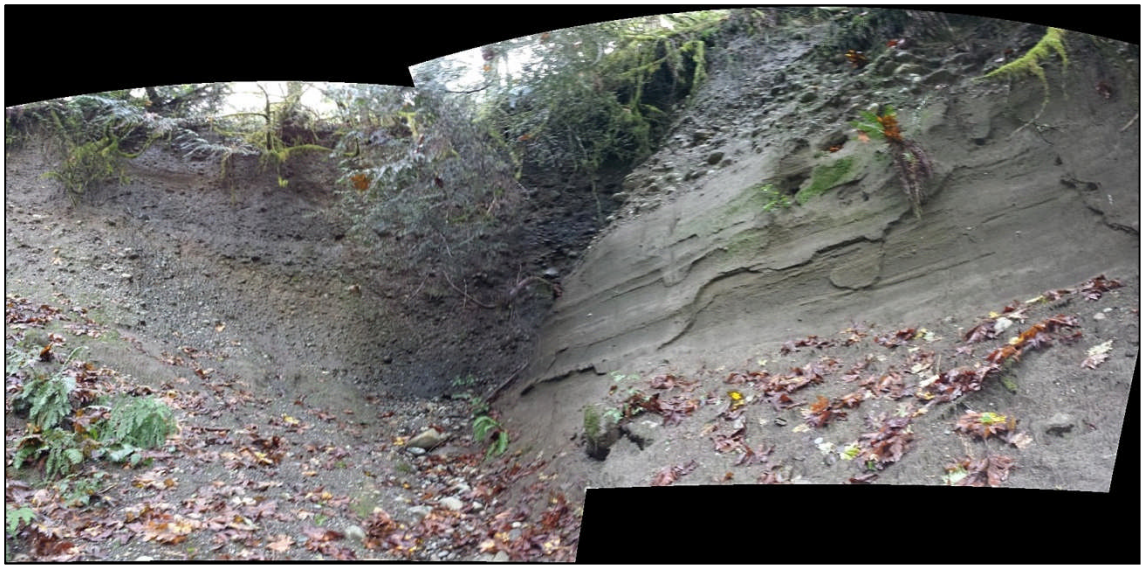
Summary of Geologic Units

The surficial exposures of earth materials on the terrace and upper slopes below the terrace consist of stratified recessional outwash sand and gravel consisting of variable percentages of sand and gravel with minor silt and cobbles. The outwash is generally loose to compact and is more compact with depth. Dense glacial till consisting of sandy silt with gravel and cobbles underlies the terrace and forms steep near-vertical slopes on exposed faces below the terrace (see photo below). Dense, stratified compact sand with gravel underlies the glacial till and is likely advance outwash.

Based on field exposures, the recessional outwash is a few feet to more than 10 feet thick, the glacial till is at least 10 to 20 feet thick, and the advance outwash is at least 20 to 30 feet thick.

Massive sandstone bedrock occurs on the lower slopes at the Green River shoreline and on rock knobs on the slope between the shoreline and terrace. The contact between advance outwash and sandstone bedrock was not observed. The sandstone rock quality is high,

consisting of massive, unjointed and slightly to moderately fractured, uniform, fine to medium-grained rock.



Glacial Till Overlying Advance Outwash near Water Main Alignment

Hydrogeology

The geologic contact between recessional outwash and underlying glacial till likely forms the interface where groundwater collects and flows laterally along this surface and discharges at the surface as the BD Springs. No evidence of springs or moist zones were observed along the existing pipeline or in adjacent erosional troughs or swales on the slope between the terrace and river shoreline. The BD springs likely capture most or all groundwater within the recessional outwash on the terrace.

Geologic Laboratory Tests

No laboratory tests were performed as part of this report.

Geologic In-situ Tests

No in-situ tests were performed as part of this report.

INTERPRETATION, ANALYSIS, AND EVALUATION OF SITE GEOLOGY

Geologic Conditions

The site is predominantly underlain by a layer of consolidated gravelly sand recessional outwash that forms the uppermost levels of the terrace at the BD Springs. The recessional outwash overlies dense glacial till, advance outwash, and sandstone bedrock that form the steep slope from the terrace to the Green River shoreline. These geologic units observed in the field confirm the previous geologic mapping and findings of geologic investigations.

Geologic Hazards

Icicle Creek Engineers (2003) summarized slope stability issues which were apparent in the field investigation: steep slopes are at risk to infrequent, but potentially large landslides, occasional small slides, and persistent soil creep.

The terrace portion of the site is generally stable at distances more than 50 feet from the edge of the terrace. The top edge of the terrace and the slope below the terrace are susceptible to erosion from stormwater runoff, high intensity stream flow in the BD Springs discharge channel east of the existing water mains, and landslides on the steep slopes.

Earth Strength, Bearing Capacity, and Earth Pressure

Bearing capacity and earth pressures were estimated based on observed soil characteristics.

- The water main anchors would be entirely supported by very dense glacial till or sandstone. For planning purposes, a net allowable bearing capacity of 4,000 pounds per square foot (psf), may be assumed for the glacial till and 6,000 psf for the sandstone bedrock.
- The coefficient of friction between the undisturbed native dense glacial till and the concrete footings would be between 0.45 and 0.55.

Site Construction Approach

The existing water mains are secured to the slope by gravity and cables attached to large trees. Access to the site for constructing a proposed water main at the top of the slope is possible from the BD Springs access road, but access to the bottom of the slope is only available by the footbridge over the river.

Icicle Creek Engineers (2003) recommended the alternative to directionally drill a subsurface conduit to embed the new water main in soil and bedrock along the existing water main alignment and within a boring below the Green River. This recommendation was proposed to provide a lower risk method to convey water from the BD Springs to the north side of the Green River. However, the challenge of directional drilling through till, outwash, and bedrock

down a steep slope was not fully described, and potentially may not avoid the risks of a large landslide, could reduce slope instability through the drilling process, and may face significant challenges of the highly variable contrasting composition and density of the geologic layers through which the boring would pass.

The current water mains are connected to the slope by gravity and cables. A more secure approach for constructing the water main would involve anchoring the water main to the top and bottom of the slope with concrete foundations that would also serve as thrust blocks for the water main. Secondary anchors could consist of cables from the middle of the pipe to secondary foundations at the top of the slope.

CONCLUSIONS AND RECOMMENDATIONS

Risks, Hazards, and Mitigation

- Risks from landslides and soil creep are moderate to high.
- No risks from flooding exist on the site.
- The risk of earthquakes of M 5 to 6 is high to moderate.
- Liquefaction risk is low to non-existent.

Excavation for Water Main Anchors

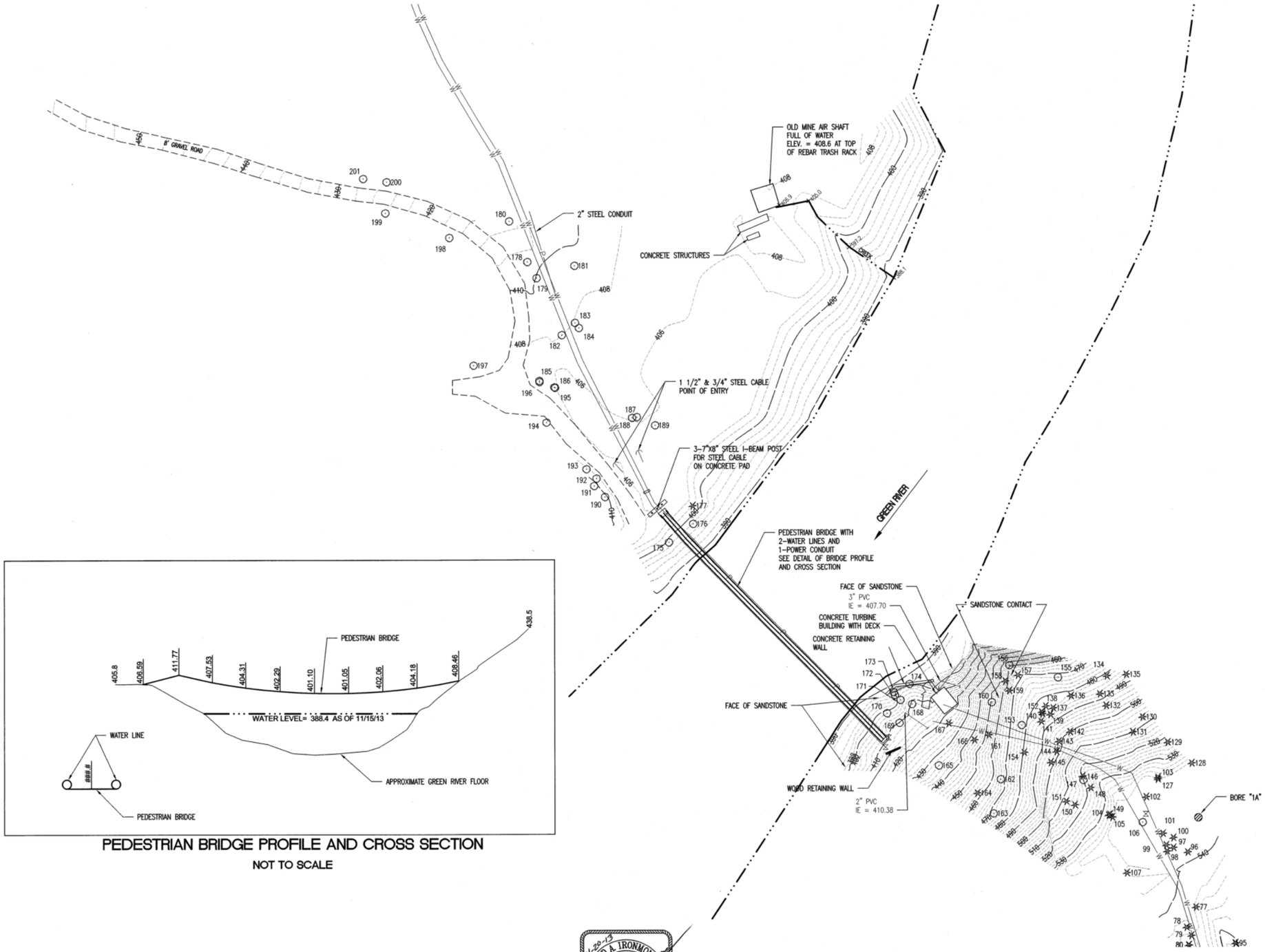
- The anchors for the water main at the top of the slope could be constructed in an excavation cut into and supported on glacial till. The excavation would likely be 6 to 10 feet deep and would not require shoring if the slopes were laid back at 2H:1V.
- The anchor for the water main at the base of the slope would be constructed in moderate to high quality sandstone bedrock. The anchor could be constructed by drilling bolts into the rock and securing the anchor to the bolts.

Excavation for Water Main

- The piping trench for the water main on the terrace will likely intercept readily excavated unconsolidated recessional outwash. No issues or challenges to the water main trench are expected.
- Excavated recessional outwash from the water main trench excavation could be stockpiled for reuse as common fill or as trench backfill above the water main

APPENDIX A

SITE MAP



PEDESTRIAN BRIDGE PROFILE AND CROSS SECTION

NOT TO SCALE

11-20-13
DAVID A. IRONMONGER
STATE OF WASHINGTON
22133
REGISTERED
PROFESSIONAL LAND SURVEYOR

	REVISIONS	DATE	BY

DESIGNED JMM
DRAWN JMM
CHECKED
APPROVED

ONE INCH AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

FILE NAME 2473043013-SV-BA
JOB No. XX
DATE XX

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES
1019 39TH AVENUE SE, SUITE 100
PUYALLUP, WASHINGTON 98374
T. 253.804.6600 F. 253.804.6799
www.parametrix.com

PROJECT NAME
TOPOGRAPHIC MAP
FOR
CITY OF BLACK DIAMOND

SPRING SITES EXISTING CONDITIONS

DRAWING NO.
3 OF 6

SV1

LAYOUT: SHEET 3 PATH: U:\Puya\Projects\Clients\3043-City of Black Diamond\247-3043-013 2012 Survey On-call\999\cv3\Survey\00Current\Dwg\Block Diamond Springs\ PLOTTED BY: munrojoy DATE: Wednesday, November 20, 2013 2:12:47 PM

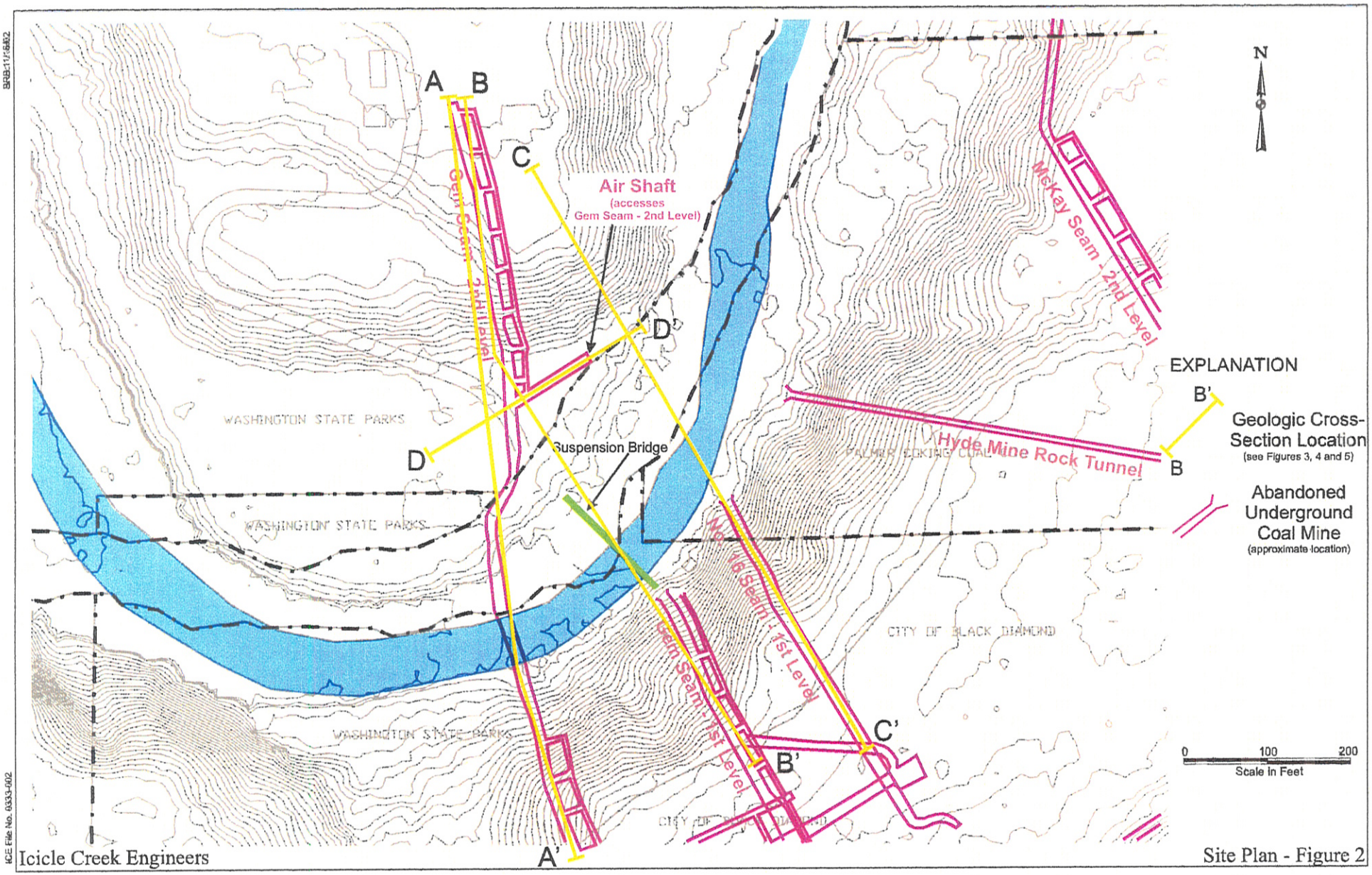
Appendix E

Cross-sections of Abandoned Underground Coal Mine

By Icicle Creek Engineers

Well Drilling Budget Quote

From Tacoma Pump and Drilling, January 2014

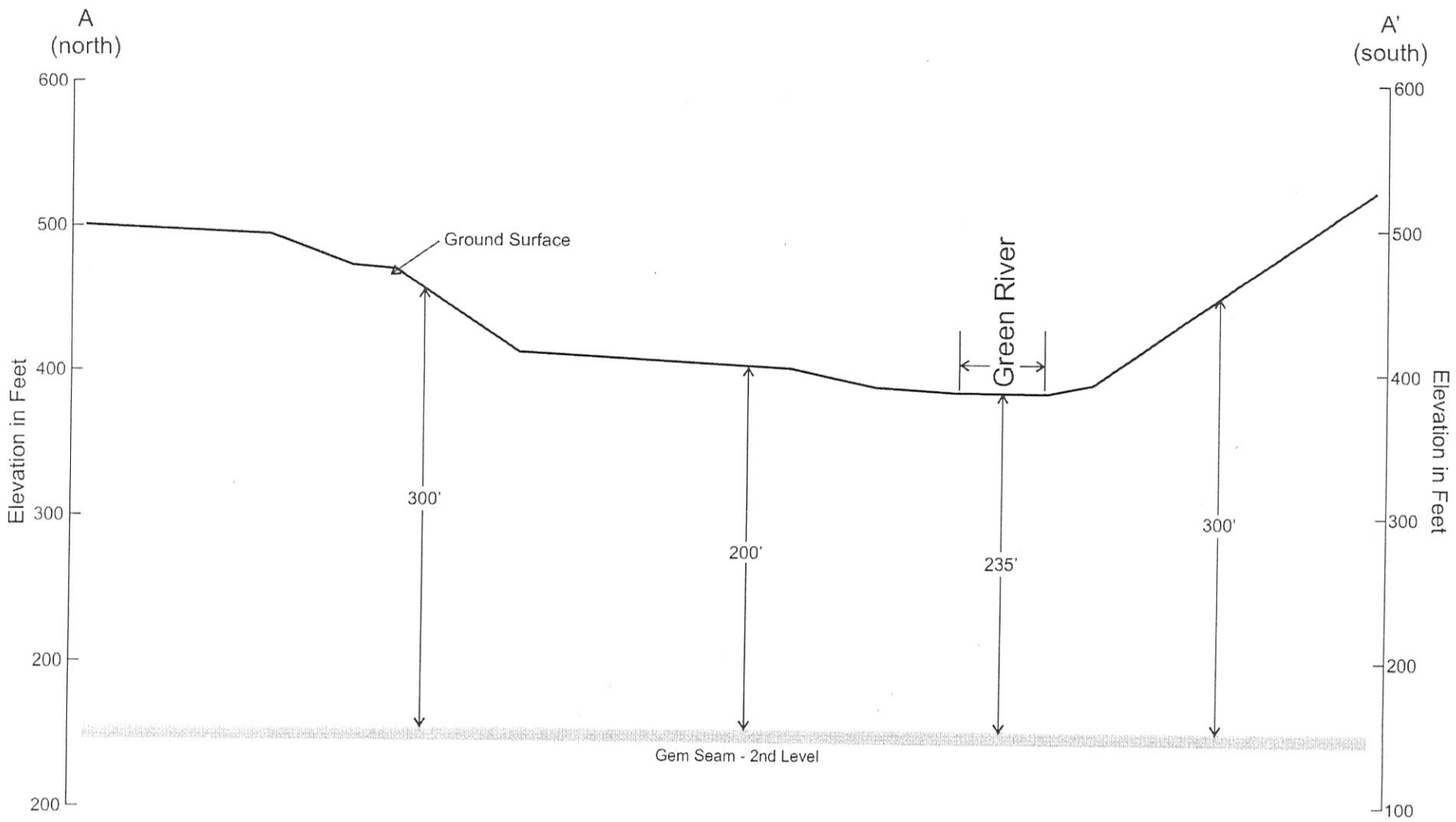


Icicle Creek Engineers

Site Plan - Figure 2

BRB-11/6402

ICE File No. 0333-002



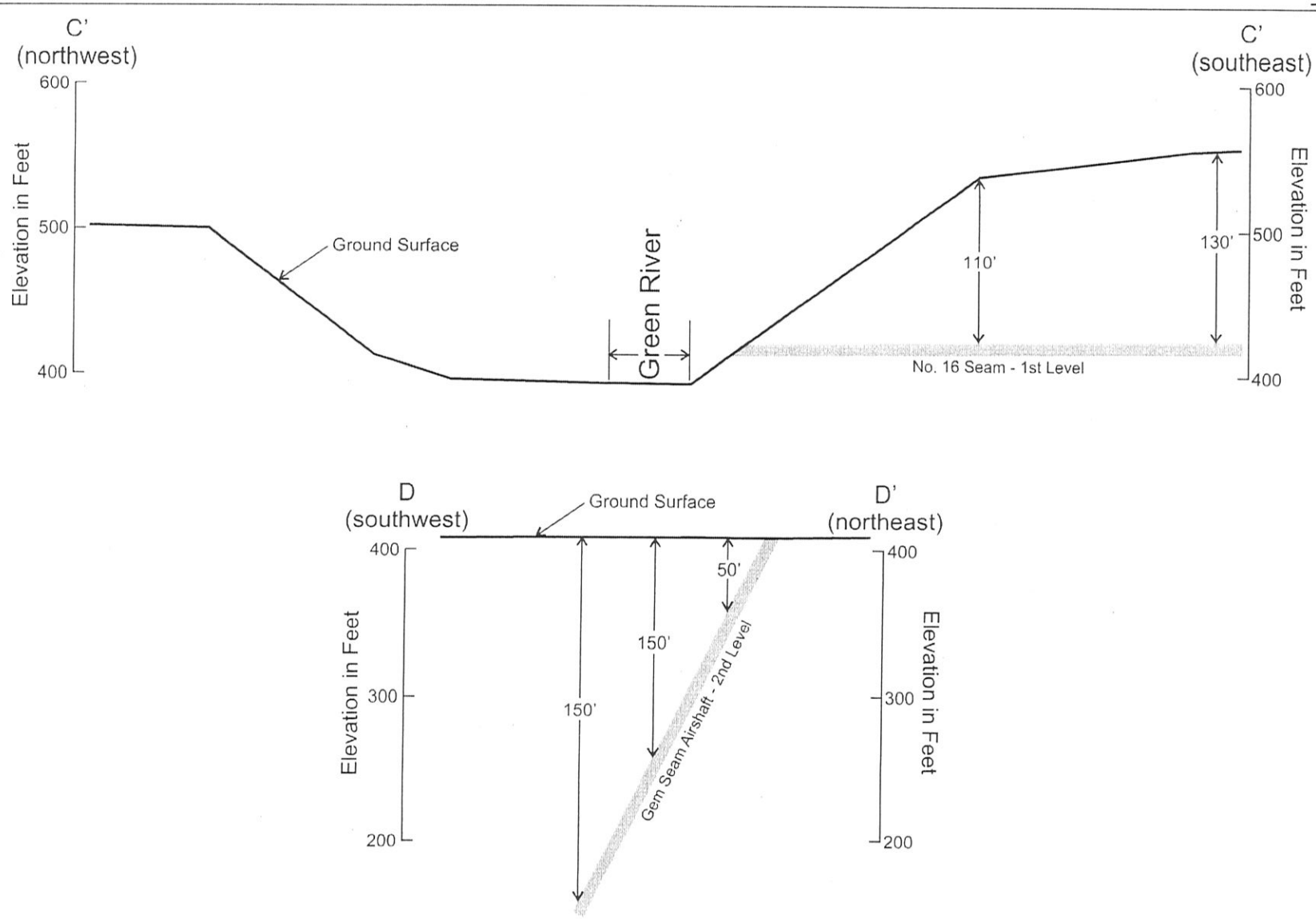
Notes: 1) Geologic cross-section location shown on Figure 2.
2) Subsurface bedrock and underground coal mine conditions shown on the geologic cross-section are based on USGS topographic mapping and historic mine maps. Actual subsurface conditions may vary.

0 100 200

Horizontal Scale = Vertical Scale 1 inch = 100 feet

Icicle Creek Engineers

Geologic Cross-Section A-A' - Figure 3



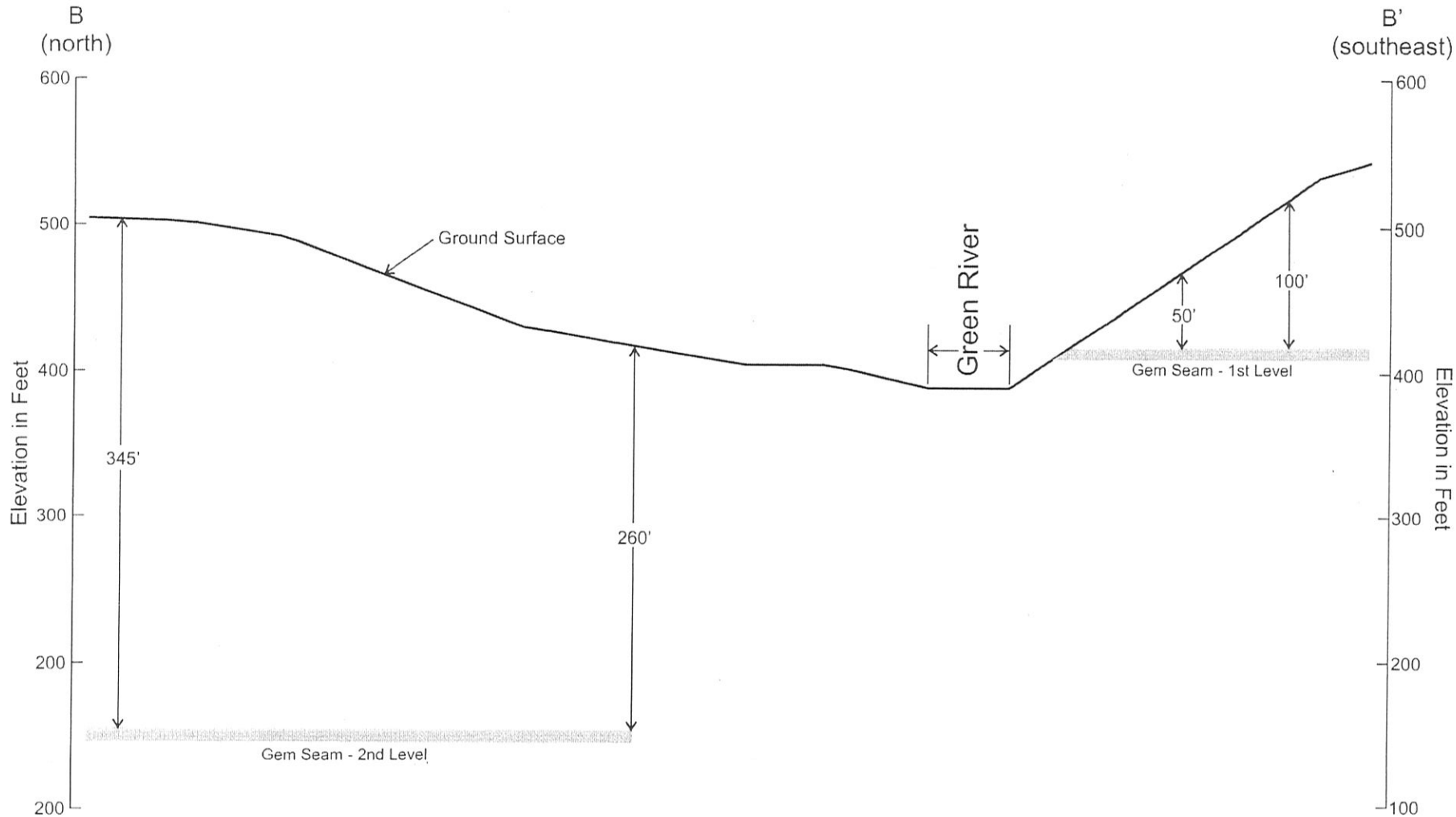
Notes: 1) Geologic cross-section location shown on Figure 2.
2) Subsurface bedrock and underground coal mine conditions shown on the geologic cross-section are based on USGS topographic mapping and historic mine maps. Actual subsurface conditions may vary.

0 100 200

Horizontal Scale = Vertical Scale 1 inch = 100 feet

Icicle Creek Engineers

Geologic Cross-Section C-C'/D-D' - Figure 5



Notes: 1) Geologic cross-section location shown on Figure 2.
2) Subsurface bedrock and underground coal mine conditions shown on the geologic cross-section are based on USGS topographic mapping and historic mine maps. Actual subsurface conditions may vary.

0 100 200

Horizontal Scale = Vertical Scale 1 inch = 100 feet

Icicle Creek Engineers

Geologic Cross-Section B-B' - Figure 4

To:

Andy Dunn

RH2 Engineering, Inc.

12100 NE 195th Street, Suite 100

Bothell, WA 98011

Email: adunn@rh2.com

Phone: (425) 951-5406 (office)

Date: 21-Jan-14

Site: Black Diamond / Enumclaw

Scope: **Budget Quote, Production Well**

From:

Jon Hansen / Eric Hansen

Tacoma Pump & Drilling Co. Inc.

Phone: (253) 847 9352

Washington Lic. TACOMPD203PF

Qty.		DESCRIPTION	UNIT	TOTAL
		Drilling		
1	**ea.**	Mobilization / Demob	6500.00	**6,500.00**
1	**ea.**	DOE "Intent to Construct" permit	350.00	**350.00**
1	**ea.**	16" Drill Shoe	550.00	**550.00**
1	**ea.**	50 ft. of 20" X 16" Surface Seal Install	7500.00	**7,500.00**
375	**ft.**	16" Drilled Hole	125.00	**46,875.00**
375	**ft.**	16" X ..375 Casing	60.00	**22,500.00**
0	**hrs**	Operational Standby Time	375.00	-
		Well Screen		
10	**ft.**	14" SS Screen .100 +/-	245.00	**2,450.00**
1	**misc.**	Screen fittings, K-Packer, Riser/Sump	1500.00	**1,500.00**
20	**hrs**	Screen install & develop	525.00	**10,500.00**
		Well Testing		
1	**ea.**	Test pump Install/remove @800gpm	7950.00	**7,950.00**
30	**hrs**	Operational test pump time	240.00	**7,200.00**
		Total for 16 inch Production Well		**113,875.00**
	15%	**Total for 20 inch Production Well**		**130,956.25**

This budget quote is intended to provide a close approximation of costs. It is based on our past experience and preliminary information provided. Other costs maybe applicable.

Cost of steel casing at time of notice to proceed could change.

Drill cuttings to remain on site, uncontained.

Please call if you have any questions concerning this quote.

Appendix F

Technical Memorandum Water Right Change to North Bank Mine Shaft

By RH2 Engineering, Inc., 2013

RH2 ENGINEERS PLANNERS SCIENTISTS

RH2 TECHNICAL

Memorandum

Client: City of Black Diamond

Project: Black Diamond Springs Preliminary Alternatives Analysis

Project File: BD 1113.105.01.101 **Project Manager:** Dan Ervin, P.E.

Composed by: Andrew B. Dunn, L.G., L.HG, CWRE

Reviewed by: Geoff Dillard, P.E.

Subject: Water Right Change to North Bank Mine Shaft

Date: February 3, 2014

BACKGROUND

The City of Black Diamond (City) holds Water Right Certificate S1-00506C for the diversion of 8 cubic feet per second (cfs) and 551 acre-feet per year (afy) from Black Diamond Springs, which are tributary to the Green River, for municipal supply. The upholding of the Municipal Water Law by the Washington State Supreme Court and minor revisions made to the Washington State Department of Ecology's (Ecology) Water Resources Program Policy 2030 (Municipal Water Law Interpretive and Policy Statement - Revised) have all proved to be beneficial to the City. In March 2012, due to the law and policy clarification, and in response to a letter prepared by RH2 Engineering, Inc., (RH2) for the City, Ecology recognized that this water right was for municipal water supply purposes, rescinded earlier change authorizations that contained language suggesting that a portion of the water right should be relinquished, and issued a superseding certificate for the full instantaneous rate and annual volume. This action by Ecology provided clarity on the extent and validity of the water right.

Purpose of Memo

The City has requested that RH2 provide guidance on the feasibility of transferring the point of diversion from Black Diamond Springs to a well that would be drilled with the intention of intersecting one of the abandoned coal mines in the area.

Discussion

Currently, the City collects water from Spring Nos. 1 and 3 that flows into a junction box and is then routed down the slope, across a pipe bridge spanning the Green River, and up to a pump station before being boosted to the City's reservoir. Collection of water at the springs reduces the amount of spring water reaching the Green River at a number of locations on the south bank of the river. The proposed well would be drilled on the north side of the Green River, which is the opposite side of the river from the Black Diamond Springs. The target mine shaft is located approximately 235 feet below river level and is referred to as the Second Level of the Gem Seam. Water from the Second Level of the Gem Seam exits the mine by

flowing upward through an old air shaft that is located approximately 200 feet north and upstream of the existing pipe bridge where it flows for a short distance and then cascades down the river bank into the Green River. It is anticipated that pumping water from a well tapping the Second Level of the Gem Seam will reduce water discharge from the air shaft, which will reduce the flow into the Green River at this location.

The City, through its Water System Plan (WSP), forecasted that demand would exceed the annual volume of its existing municipal water right, which is 551 acre-feet per year (afy), by the year 2012. Growth projected in the WSP has not yet occurred, but if it does, demand will exceed the water right annual volume in the near future. Additional supply for the City, beyond the water right, is from an intertie with Tacoma Water. Spring discharge monitoring performed in 2013 by RH2 shows that the rate water that can be captured by the springs currently utilized by the City (Spring No.'s 1 and 3) exceeds 8 cubic feet per second (cfs) for much of the year, and even in the lowest flow conditions, does not drop below 4 cfs. If discharge from Spring No. 2 is included, which used to be connected to the municipal supply but was disconnected due to water quality concerns (groundwater source under the influence of surface water), that increases the available supply up to more than 6 cfs during periods of low flow. Since there is a physical limitation on the amount of water discharging from the historically developed springs during the low-flow period, it is likely that Ecology will not allow the City to pump more than what is physically available from the existing spring source at the new well. This limitation would be placed on the water right during the review of the change request to ensure that the change does not allow the City to enlarge the water right by expanding water availability beyond that which exists at the springs. During the change application process, the City should be prepared to agree to limit the water right to approximately 6 cfs during the low-flow period of August through October.

Washington Administrative Code (WAC) 173-509-040 indicates that all tributaries to the Green River are legally closed to further consumptive appropriation. Normally, a water right holder would not be allowed to move their diversion from one tributary to another because to do so would constitute a change in the source of the water. However, since the tributary that would be impacted emanates from the old mine air shaft and flows less than 200 feet before entering the river, with no other water right holders tapping that same source, it might be possible to convince Ecology to look at the impacts with respect to the Green River as opposed to this minor tributary emanating from a man-made feature. If this is the approach, the change would be considered water budget neutral because the reduction in flow from the mine shaft will be offset by the increase in flow when the City stops diverting water from the springs. This interpretation should be confirmed with Ecology in a pre-application meeting. If the water right change application can be processed, and if ceasing diversion from Black Diamond Springs is considered a substantial enhancement of the natural environment, the City can request that Ecology prioritize processing of the application under WAC 173.152.050(3)(a). Typically, the Northwest Regional Office of Ecology has processed applications that qualify for priority processing internally as opposed to requiring applicants to go through the cost reimbursement process. If this is the case, the water right processing fee paid to Ecology would be approximately $400. If Ecology elects not to prioritize processing of the application in a reasonable amount of time, the City can enter into a cost

reimbursement agreement with Ecology to have the application processed by one of its cost-reimbursement contractors (other than RH2). Based on RH2's experience with cost reimbursement processing, the fee to process the change application under this scenario would likely be approximately $15,000.

Conclusions and Recommendations

RH2 feels that the proposed change in point of diversion from the Black Diamond Springs to a well on the north side of the Green River tapping the Second Level of the Gem Seam has a high likelihood of success.

It is recommended that the City discuss the proposed change with the Muckleshoot Tribe (Tribe) as early in the process as possible to better identify any concerns that the Tribe has with the change. If the Muckleshoot Tribe supports the proposed change, this can greatly improve the chances that the change application will be approved by Ecology.

If additional support for the transfer is needed to gain the support of the Muckleshoot Tribe and Ecology, the City might need to propose mitigation. Mitigation could include things like removing the pipe bridge across the Green River, voluntarily reducing the instantaneous rate of the water right, or offering to sell or donate the City's Black Diamond Springs property to Washington State Parks for inclusion in the Green River Gorge State Park. The mitigation might allow the proposed transfer to qualify for the previously mentioned priority processing based on the fact that the change would substantially enhance the quality of the natural environment.

Going forward, RH2 recommends that the City take the following steps if it decides to continue exploring transferring the water right to the new well.

1. Share the proposal with the Muckleshoot Tribe (Tribe) and see if they would support the idea and identify if they have concerns.
2. Work with the Tribe to address any concerns.
3. Have a pre-application meeting with Ecology to discuss the proposed change, further refine the feasibility of success from a water right transfer standpoint, and identify the processing pathway that will best meet the City's and Ecology's needs.
4. Submit a water right change application and request that Ecology issue a preliminary permit to drill and test a well or wells.
5. Drill the well to see if the mine shaft can be tapped.
6. Perform a pumping test on the well while monitoring water quality, pumping rate, water level in the well, and discharge from the air shaft to establish connection and estimate the yield from the well and associated mine shaft and connected bedrock aquifer.
7. Submit the drilling and testing report to Ecology to comply with the anticipated provisions of the preliminary permit.
8. Proceed with the water right processing pathway identified at the pre-application meeting.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

MAR 09 2012

COMMUNITY DEVELOPMENT

MAR 14 2012

RECEIVED

Seth Boettcher
Public Works Director
City of Black Diamond
P.O. Box 599
Black Diamond, WA 98010

RE: Administrative Order No. 12WRNR – DE 9035 to Surface Water Reports of Examinations for CS1-00506C and CS1-00506C@1

Dear Mr. Boettcher:

Enclosed is Administrative Order No. 12WRNR – DE 9035 to change Surface Water Reports of Examinations for CS1-00506C and CS1-00506C@1.

If you have any questions, please contact Doug Wood at 425.649.7077 or at Doug.Wood@ecy.wa.gov.

Sincerely,

Jacqueline Klug
Section Manager
Water Resources Program

jl/dw/mc

Enclosure(s): Order No. 12WRNR – DE 9035
Your Right to be Heard

By certified mail: 7010 3090 0000 1910 1408

WASHINGTON STATE DEPARTMENT OF ECOLOGY

BEFORE THE
DEPARTMENT OF ECOLOGY
STATE OF WASHINGTON

IN THE MATTER OF REPORTS OF EXAMINATION FOR CHANGE NUMBERED CS1-00506C AND CS1-00506C@1 ISSUED ON APRIL 29, 1992 AND JUNE 30, 1992 RESPECTIVELY	)))))	REPORT OF INVESTIGATION, FINDINGS OF FACT, DETERMINATION, AND ORDER DOCKET NO 12WRNR – DE 9035

REPORT OF INVESTIGATION

The City of Black Diamond filed two applications for change to S1-00506C with the Department of Ecology on January 18, 1990 and August 13, 1990. The first application, CS1-00506C, sought to change the source from a spring collection system to a well. The second change application, CS1-00506C@1, sought to change the place of use to allow interties to be established between the City of Black Diamond and several municipal water purveyors located in Southwest King County.

FINDINGS OF FACT

The Report of Examination (ROE) for the first application (CS1-00596C), issued on April 29, 1990, recommended denial of the application to change the point of diversion and further recommended that an order be issued to reduce the rate of diversion (Qi) of S1-00506C from 8 cubic feet per second (cfs) to 550 gallons per minute (gpm). The ROE for the second application (CS1-00506C@1), issued on June 30, 1992, recommended partial approval of the change in place of use, and also recommended that an order be issued to reduce the Qi from 8 cfs to 550 gpm.

In the case of both ROE's, a cover letter accompanied the issuance of the report which stated that the letter constituted an order implementing the recommendations contained within the reports. However no further action was taken by Department of Ecology regarding issuance of an order to reduce the Qi of S1-00506C.

Ecology's rationale in recommending reduction of the Qi, as stated in its 1993 ROE's, was that an ministerial error had occurred when the certificate for S1-00506C was issued in 1974. The Proof of Appropriation (PA) in the file for S1-00506C has a notation on it, initialed by Ecology permitting staff, which indicates approval for a certificate to be issued for the same quantities as the permit, namely 8 cfs and 551 acre-feet per year (afy). These are the quantities for which the certificate was issued.

In 2003 the legislature passed and the Governor signed into law Second Engrossed Second Substitute House Bill 1338 (SESSB 1338), also known as the Municipal Water Law of 2003. Specifically SESSB 1338 added two new subsections to RCW 90.03.330, which address and restrict Ecology's authority to reduce quantities of existing water right certificates.

RCW 90.03.330(2) states that: *"Except as provided for the issuance of certificates under RCW 90.03.240 and for the issuance of certificates following the approval of a change, transfer, or amendment under RCW 90.03.380 or 90.44.100, the department shall not revoke or diminish a certificate for a surface or ground water right for municipal water supply purposes as defined in RCW 90.03.015 unless the certificate was issued with ministerial errors or was obtained through misrepresentation. The department may adjust such a certificate under this subsection if ministerial errors are discovered, but only to the extent necessary to correct the ministerial errors. The department may diminish the right represented by such a certificate if the certificate was obtained through a misrepresentation on the part of the applicant or permit holder, but only to the extent of the misrepresentation. The authority provided by this subsection does not include revoking, diminishing, or adjusting a certificate based on any change in policy regarding the issuance of such certificates that has occurred since the certificate was issued. This subsection may not be construed as providing any authority to the department to revoke, diminish, or adjust any other water right."*

RCW 90.03.330(3) states that: *"This subsection applies to the water right represented by a water right certificate issued prior to September 9, 2003, for municipal water supply purposes as defined in RCW 90.03.015 where the certificate was issued based on an administrative policy for issuing such certificates once works for diverting or withdrawing and distributing water for municipal supply purposes were constructed rather than after the water had been placed to actual beneficial use. Such a water right is a right in good standing."*

It is apparent that the reasoning for reducing the quantities was not the result of a ministerial error. The record reveals that Ecology permitting staff reviewed the quantities and approved issuance of the certificate at 8 cfs rather than for what was stated on the PA, which suggests more strongly that the certificate was issued based on an administrative policy as described in RCW 90.03.330(3).

The partial approval of changes proposed through application CS1-00506C@1, namely modifying the place of use to allow intertie flexibility, was made moot by another amendment to the Water Code enacted through SESSB 1338. Section 5 of SESSB 1338 amended RCW 90.03.386 by specifying that a municipal water purveyor's service area is established and modified through the water system planning process under the authority of the Department of Health.

The 2008 Water System Comprehensive Plan, the most recent plan in Ecology Files, reports that the City of Black Diamond two water rights, a 2.93 cfs surface water right (Certificate 3580) dedicated to hydro power and Certificate S1-000506C with 8 cfs and 551 afy serving municipal supply purposes.

In addition the plan shows that the City of Black Diamond has a wholesale contract and intertie with the City of Tacoma Second Supply Pipeline which can supply 3.4 cfs for average demand and 7.7 cfs for peak use (7.3 cfs averaged over 4 days).

DETERMINATION AND ORDER

The recommendation and order contained in the Reports of Examination for changes CS1-00506C and CS1-00506C@1 that an order be issued to reduce the quantities allocated through certificate S1-00506C

is hereby rescinded. The approval of the change in place of use for change application CS1-00506C@1 is deemed to be moot and also rescinded.

The effect of the above is to restore Certificate S1-00506C to its attributes as they existed when the certificate was issued in 1974, namely that the quantities are 8 cubic feet per second and 551 acre-feet per year, and that the authorized place of the use is the area served by the City of Black Diamond.

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk P.O. Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board Environmental Hearings Office 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board P.O. Box 40903 Olympia, WA 98504-0903

Dated at Bellevue, Washington this 9th day of March, 2012.

Jacqueline Klug
Section Manager
Water Resources – NW Region
Department of Ecology

Appendix G

Easement Agreement

City of Black Diamond Resolution No. 57

Gem Seam Air Shaft Inorganic Chemicals (IOCS) Report

By Water Management Laboratories, 2005

ADDENDUM TO EASEMENT AGREEMENT

WHEREAS, The TOWN of BLACK DIAMOND, a municipal corporation within the County of King, State of Washington, and the WASHINGTON STATE PARKS AND RECREATION COMMISSION have entered into an Easement Agreement dated the ____ day of _____, 1976, attached hereto and by reference incorporated herein, and

WHEREAS, It would be the mutual benefit of the parties to establish this addendum to said Easement Agreement,

NOW, THEREFORE, In consideration of the mutual benefits and conditions hereinafter contained, the parties do hereby agree to the following:

1. An addition to paragraph three, page two, of that Easement Agreement dated the ____ day of _____, 1976, shall be the following:

It is specifically understood and agreed that all future improvements developed on the premises by Black Diamond shall be limited to facilities for the transportation of water and shall not include facilities for treatment, collection or storage of water. Further, all such water transportation facilities shall be located and constructed within that certain portion of the above described property being a strip of land 70 feet in width lying 35 feet on either side of the existing water transmission pipeline leading from Black Diamond's springs to the previously mentioned existing pumping station. The legal description is as follows:

Centerline of water transmission and 70 foot easement.

That portion of the southeast quarter of the southwest quarter of Section 10, Township 21 North, Range 7 East, W.M. and described as follows: Beginning at the intersection of the southline of the north 100 feet of said southeast quarter of the southwest quarter and a point heretofore described as the northeasterly boundary point of Washington State Parks and Recreation Commission: THENCE South 57°45'35" west along easterly boundary, 92.35 feet; THENCE South 35° 41'37" west, along said easterly boundary, 251.37 feet, and intersect an existing water transmission line, and the True Beginning of a 70 foot easement, 35 feet each side of the following line; THENCE north 16°19'48" west along the waterline, 76.5 feet; THENCE north 12°04'27" west, 56.5 feet; THENCE north 34° 43'25" west, 62.6 feet; THENCE north 75°51'43" west, along said waterline, 124.1 feet to the center of turbine concrete structure; THENCE south 49°22' 29" west to the left bank end of suspension bridge (southeasterly shoreline of Green River); THENCE north 45°15'48" west, on the suspensionbridge and water transmission line crossing Green River and intersect the north line of the southeast quarter of the southwest quarter.

DATED this ____ day of _____, 1976.

TOWN OF BLACK DIAMOND

By Mayor James Evans Jr.

By_____
Town Clerk

WASHINGTON STATE PARKS AND
RECREATION COMMISSION

By_____
Charles H. Odegaard, Director

APPROVED AS TO FORM this____day of
_____, 1976.

Slade Gorton, Attorney General

By_____
Assistant Attorney General

STATE OF WASHINGTON)
) SS.
COUNTY OF KING)

On this____day of_____, 1976, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared GOMER EVANS, JR., and KAREN GIESEN, to me known to be the Mayor and Town Clerk respectively, of the TOWN OF BLACK DIAMOND, one of the corporations that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned, and on oath stated that they authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

_____
NOTARY PUBLIC in and for the State
of Washington residing at Enumclaw.

STATE OF WASHINGTON)
) SS.
COUNTY OF THURSTON)

On this____day of_____, 1976, before me, the undersigned, a Notary Public, in and for the State of Washington, duly commissioned and sworn, personally appeared CHARLES H. ODEGAARD, to me known to be the Director respectively, of the WASHINGTON STATE PARKS AND RECREATION COMMISSION, one of the corporations that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation for the uses and purposes therein mentioned and on oath stated that he authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

_____
NOTARY PUBLIC in and for the State
of Washington residing at Olympia.

RESOLUTION NO. 57

A RESOLUTION FOR THE TOWN OF BLACK DIAMOND, KING COUNTY, WASHINGTON, AUTHORIZING THE INTERGOVERNMENTAL DISPOSITION OF PROPERTY FROM THE TOWN OF BLACK DIAMOND TO THE STATE OF WASHINGTON DEPARTMENT OF PARKS.

WHEREAS, The legal description described herein as Exhibit "A" is hereby declared to be surplus property of the Town of Black Diamond; and

WHEREAS, The State of Washington, by and through its department of Parks and Recreation hereby desires to purchase the property described on Exhibit "A"; and

WHEREAS, The Revised Code of Washington provides legal procedures to make an intergovernmental disposition of property between the Town of Black Diamond and the State of Washington,

NOW, THEREFORE, THE TOWN COUNCIL OF THE TOWN OF BLACK DIAMOND, KING COUNTY, WASHINGTON, DO RESOLVE AS FOLLOWS:

SECTION I: The Town of Black Diamond shall sell to the State of Washington the property described on Exhibit "A" for a total sum of $48,000.00 subject to a reservation providing for ingress and egress in behalf of the Town of Black Diamond, its employees, and agents for purposes of maintaining water lines and related facilities, all as described on Exhibit "B" attached hereto and by reference incorporated herein.

SECTION II: That this Resolution shall be in full force and effect from and after the date subsequent to it reading, passage, approval and posting as required by law.

PASSED IN OPEN AND REGULAR SESSION AND APPROVED BY THE MAYOR ON READING THIS THE 1 day of April, 1976.

APPROVED:

James Coors Jr.
MAYOR

CORRECT ATTEST:

Karen Giesen
TOWN CLERK

APPROVED AS TO FORM:

TOWN ATTORNEY

Resolution #57

EXHIBIT "A"

All that portion of the SE ¼ SW ¼ Section 19, Township 21 North, Range 7 East, W.M., described as follows:

Beginning at the intersection of the south line of the north 100 feet of said SE ¼ SW ¼ and the line of ordinary high water on the southeasterly shoreline of the Green River. THENCE in a westerly direction downstream along said line of ordinary high water a distance of 794 feet more or less to the west line of said SE ¼ SW ¼. THENCE S 0°22'00" W along said west line 524.08 feet to the northerly edge of an existing roadway; THENCE south 79°21'10" east along the northerly edge of said existing road 176.29 feet; THENCE south 62°57'30" east along said road, 174.26 feet; THENCE north 55°26'16" east, 190.90 feet; THENCE north 46°10'59" east, 257.79 feet; THENCE north 59°27'57" east, 216.83 feet; THENCE north 35°41'47" east, 279.50 feet; THENCE north 57°45'35" east to the south line of said north 100 feet of said SE ¼ SW ¼ THENCE westerly along said south line to the point of beginning, containing 8.6 acres more or less. TOGETHER WITH all that portion of said SE ¼ SW ¼ lying northerly of the Green River.

EXHIBIT "B"

EASEMENT

This Easement made and entered into this 1st day of April, 1976, by and between the TOWN OF BLACK DIAMOND, a municipal corporation within the County of King, State of Washington, hereinafter designated "Black Diamond", and the WASHINGTON STATE DEPARTMENT OF PARKS AND RECREATION, of the State of Washington, hereinafter designated "Washington State";

WITNESSETH

WHEREAS, Black Diamond has sold to Washington State real property within the County of King, State of Washington, more particularly described as follows:

Beginning at the south quarter corner of Section 19, Township 21 North, Range 7 East, W.M., which point is an iron pin; thence northerly along the north-south center line of said section to an iron pin bolt and the northwest corner 1208.0 feet; an existing property corner; THENCE south 88°26'00" west, 216.97 feet and the True Point of Beginning; THENCE continuing on the preceeding course 419.24 feet to the left bank shore line (south B ank) of Green River; THENCE southwesterly along the south bank shore line 428 feet to an angle point on the shore line; THENCE northwesterly along the south bank shore line 366 feet, more or less, to intersect the west line of the southeast quarter of the southwest quarter of Section 19; THENCE south 0°22'00" west along the west line of the southeast quarter of the southwest quarter, a distance of 524.08 feet to the northerly edge of an existing road; THENCE south 79°21'10" east along the northerly edge of an existing road 178.29 feet; THENCE south 62°57'30" east along said road, 174.26 feet; THENCE north 55°26'16" east, 190.90 feet; THENCE north 46°10'59" east, 257.79 feet; THENCE north 59°27'57" east, 216.83 feet; THENCE north 35°41'47" east, 278.50 feet; THENCE north 57°45'35" east, 92.35 feet and the True point of Beginning, containing 8.6 acres. And a parcel on the north bank (right bank) of Green River, the True Point of Beginning being the northwest corner of the southeast quarter of southwest corner and is 1271.70 feet north and 1289.34 feet from the south quarter corner of Section 19, Township 21 North, Range 7 East, W.M.; THENCE south 60°17' east along the north bank shoreline a distance of 298.4 feet; THENCE north 82°22' east, a distance of 143.8 feet; THENCE north 71°01' east, a distance of 111.1 feet; THENCE north 37°57' east, a distance of 138.0 feet and the intersection of the east-west Black Diamond Watershed boundary; THENCE south 86°26'00" west, along the said east-west boundary a distance of 591.9 feet and the True Point of Beginning containing 1.4 acres.

WHEREAS, A portion of the consideration in the sale of the above described property to Washington State constituted a reservation in favor of Black Diamond for

an easement of ingress and egress providing access in and through the above described property for purposes of maintenance, repair, and improvements of water transmission facilities including pump houses, water lines, maintenance roads, bridge across Green River separating the above described property together with an agreement to facilitate the use of the property between Washington State and Black Diamond; and

WHEREAS, Washington State and Black Diamond desire to establish their agreement in writing with regard to the easement for ingress and egress, maintenance, repair and improvements of water transmission facilities and water rights;

NOW, THEREFORE, In consideration of the mutual benefits hereby acknowledged and exchanged by and between the parties, Black Diamond and Washington State hereby agree to the following conditions:

1. Black Diamond shall have and hereby reserves the right to have ingress and egress into the above described property, together with the right to maintain, install, and improve any and all water transmission lines and associated facilities on the above described premises.

2. It is understood and agreed by and between Black Diamond and Washington State that Black Diamond will continue to use the above described property for water transmission lines and facilities from the watershed, which serves as a source for Black Diamond's water supply and any use by Washington State of the above described property shall not harm or in any way violate the Town of Black Diamond's right and responsibility to safely transmit water across the property legally described herein.

3. It is further understood and agreed by and between the parties that Black Diamond shall have and hereby reserves the right for any future construction required for public water supply in compliance with health standards and clean water requirements, said improvements including but not necessarily exclusive of a roof over the springs, settlement basin alterations, maintenance, repair, or new construction on the presently existing suspension bridge located across the Green River connecting the northeasterly portions of the above described properties, together with maintenance or

construction of water transmission lines from the springs north of the above described property to the pumping station, presently existing and established on the south shoreline of the Green River in the northeasterly portion of the above described property. additional

4. Black Diamond shall install, at its own cost, a fence along the southeasterly boundary of the above described property. The materials, height and type of fence shall be selected by Black Diamond, and will be maintained by Black Diamond with regard to natural wear, usage, damage or wear by natural elements, storms, and falling trees; provided however, vandalism and unnatural damage to the fence caused by users of the recreation area on the above described property on the northwesterly side of the fence shall be the responsibility of the Washington State Parks and Recreation to repair and replace in its original condition. Signs facing in a northwesterly direction shall be placed on the fence at 100 foot intervals stating: "DO NOT ENTER, PUBLIC WATER SUPPLY." The cost of the signs shall be the responsibility of Washington State.

5. This Easement and reservation of certain rights for use of transporting water and related facilities also includes an electrical pumping station (auxiliary to turbine) and is located on the north bank (right bank) housed in a 16 foot by 16 foot concrete block building. The power supply is from the north side of the river. This construction and facility shall be posted and protected by Washington State from public vandalism. Should Washington State require underground transmission lines in the future, the difference in cost between the overhead and underground transmission will be born by the Washington State Parks.

6. Black Diamond shall have the right, if necessary, to modify, redesign, and reconstruct the existing suspension bridge carrying the present water supply line and all other facilities on the above described property provided further that Black Diamond will be responsible for any repair for any improvements of Washington State if required as a result of construction or reconstruction of the water line or its related facilities.

7. It is further understood and agreed by and between the parties that Black Diamond reserves the right to remove any trees felled by winds, storm or natural elements considered to be dangerous to the water supply lines or their facilities or

Town Clerk respectively, of the TOWN OF BLACK DIAMOND and _____ and _____, to me known to be the _____ and the _____ of the WASHINGTON STATE DEPARTMENT OF PARKS AND RECREATION, the corporations that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporations for the uses and purposes therein mentioned, and on oath stated that they authorized to execute the said instrument and that the seals affixed are the corporate seals of said corporations.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

_____
NOTARY PUBLIC in and for the State of Washington, residing at _____.

Black Diamond personnel working on the water supply lines or their facilities. In addition, Black Diamond shall have the right to remove any potentially dangerous trees that would appear after reasonable observation and investigation that potential damage exists to the water supply lines, facilities, or Black Diamond personnel working on same.

8. Black Diamond shall have the right and use of any and all access roads that exist within the watershed area on both the north and south banks of Green River, and on the above described property.

9. In the event Washington State ever desires to sell all or a portion of the above described property, or in any way convey any interest in the above described property, then it is hereby understood and agreed by and between both parties to this document that Black Diamond shall have first option to purchase the property back to be exercised within six (6) months from written notice served upon Black Diamond by Washington State with regard to notice to sell.

DATED this ____ day of _____, 1976.

TOWN OF BLACK DIAMOND

By _____
Mayor

By _____
Town Clerk

WASHINGTON STATE DEPARTMENT
OF PARKS AND RECREATION

By _____

By _____

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this ___ day of _____, 1976, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared COMER EVANS, JR. and KAREN GIESEN, to me known to be the Mayor and

Please Print Plainly
USE HEAVY PEN

WATER MANAGEMENT LABORATORIES INC.
1515 80th St. E.
Tacoma, WA 98404
(253) 531-3121

SEE BACK FOR INSTRUCTIONS

INORGANIC CHEMICALS (IOCS) REPORT

System ID No: NA	System Name: NA	
Lab/Sample No: 08968441	Date Collected: 6-22-04	DOH Source No: NA
Multiple Source Nos: NA	Sample Type: NA	Sample Purpose: B
Date Received: 6-22-04	Date Reported: 6-25-04	Supervisor: WMK
County: KING	Date Digested: NA	Group: A B Other NA
Sample Location: GEM SEAM AIR SHAFT		
Send Results & Bill To: CITY OF BLACK DIAMOND PO BOX 599 BLACK DIAMOND, WA 98010	Remarks:	

DOH#	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	EXCEEDS Trigger?	EXCEEDS MCL?	Method / Analyst	
	EPA REGULATED									
4	Arsenic	<0.002	mg/l	0.002	0.05	0.05	NO	NO	3113B	JMB
5	Barium	<0.1	mg/l	0.1	2	2			3113B	JMB
6	Cadmium	<0.002	mg/l	0.002	0.005	0.005			3113B	JMB
7	Chromium	<0.01	mg/l	0.01	0.1	0.1			3113B	JMB
11	Mercury	<0.0005	mg/l	0.0005	0.002	0.002			3112B	JMB
12	Selenium	<0.005	mg/l	0.005	0.05	0.05			3113B	JMB
110	Beryllium	<0.003	mg/l	0.003	0.004	0.004			3113B	JMB
111	Nickel	<0.04	mg/l	0.04	0.1	0.1			3111B	JMB
112	Antimony	<0.005	mg/l	0.005	0.006	0.006			3113B	JMB
113	Thallium	<0.002	mg/l	0.002	0.002	0.002			200.9	JMB
116	Cyanide	<0.05	mg/l	0.05	0.2	0.2			4500-CNF	LHL
19	Fluoride	<0.2	mg/l	0.2	2	4			4110B	erb
114	Nitrite - N	<0.2	mg/l	0.5	0.5	1			4110B	erb
20	Nitrate - N	0.4	mg/l	0.5	5	10			4110B	erb
161	Total Nitrate/Nitrite	0.4	mg/l	0.5	5	10	↓	↓	4110B	erb
	EPA REGULATED (Secondary)									
8	Iron	<0.1	mg/l	0.1	0.3	0.3	NO	NO	3111B	KAS
10	Manganese	0.02	mg/l	0.01	0.05	0.05			3111B	JMB
13	Silver	<0.01	mg/l	0.01	0.1	0.1			3111B	JMB
21	Chloride	2	mg/l	20	250	250			4110B	erb
22	Sulfate	4	mg/l	10	250	250			4110B	erb
24	Zinc	<0.2	mg/l	0.2	5	5	↓	↓	3111B	JMB
	STATE REGULATED									
14	Sodium	4	mg/l	5					3111B	JMB
15	Hardness	48	mg/l	10					2340C	KAS
16	Conductivity	112	umhos/cm	10	700	700	NO	NO	2510B	KAS
17	Turbidity	0.4	NTU	0.1	1		↓		2130B	KAS
18	Color	<5	color units	5	15	15	↓	NO	2120B	KAS
26	Total Dissolved Solids	NA	mg/l	150	500	500			2540C	—
	STATE UNREGULATED									
9	Lead	<0.002	mg/l	0.002					3113B	JMB
23	Copper	<0.02	mg/l	0.02					3111B	JMB

COMMENTS: FC 28

LAB USE ONLY: BAC (X) VOC ( ) SOC ( ) MISC ( )

1986 * PROPERTY OF WATER MANAGEMENT LABORATORIES, INC.

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Appendix V

Operations and Maintenance Forms

CITY OF BLACK DIAMOND
EXAMPLE FIELD MAINTENANCE FORMS

- ❑ Main Repair Report
- ❑ Hydrant Maintenance/Inspection Report
- ❑ Valve Repair Report
- ❑ Valve Maintenance/Inspection Report
- ❑ Storage Inspection Report

MAIN REPAIR REPORT

Main # _____ Main Size _____ Section _____/4 Map # _____
Node # _____ (Valve/Main #) _____ to Node # _____ (Valve/Main #) _____
Date Installed ____/____/____ Type _____
Manufacturer _____
Length of Main (ft) _____ Number of Connections to Main _____
Valves to Isolate _____, _____, _____, _____, _____, _____
Location:
_____ side of _____ Street
From _____ Street to _____
Other Location Information:
_____
_____
Specific Location:
_____ feet of _____
_____ feet of _____

Site Map:

Last Corrected ____/____/____ dBase Entered ____/____/____
Map Entered ____/____/____ Remarks on Back of Page ____ Yes ____ No

HYDRANT MAINTENANCE/INSPECTION REPORT

Hydrant #_____ Valve Size _____ Section _____ /4 Map # _____

Location: _____

Principal Street: _____ _____ feet off centerline

Intersecting Street: _____ _____ feet off centerline

Specific Location: Checked OK _____ or measured as follows

_____ feet _____ of _____

_____ feet _____ of _____

_____ feet _____ of _____

Caps: Missing _____ Replaced _____ Greased _____

Chains: Missing _____ Replaced _____ Freed _____

Paint: OK _____ Repaint _____

Operating Nut: OK _____ Greased _____ Replaced _____

Nozzles: OK _____ Caulked _____ Replaced _____

Valve & Seat: OK _____ Replaced _____

Packing: OK _____ Tightened _____ Replaced _____

Drainage: OK _____ Corrected _____

Flushed: Minutes _____ Nozzle Open _____

Pressure: Static _____ Residual _____ Flow _____ gpm

Branch Valve Condition: _____

_____

_____

Other Problems/Work Needed: _____

_____

_____

Work Repairs Completed:

_____ By: _____ Date: ___/___/___

_____ By: _____ Date: ___/___/___

_____ By: _____ Date: ___/___/___

_____ By: _____ Date: ___/___/___

_____ By: _____ Date: ___/___/___

Inspection/Maintenance Completed by: _____ Date: ___/___/___

Remarks on Back of Page: Yes _____ No _____

VALVE REPAIR REPORT

Valve # _____ Valve Size _____ Section _____ /4 Map # _____
Connecting Pipe # _____ to Pipe #/Node _____ Installed ____/____/____
Type _____ Connecting Ends _____ x _____
Make _____
Opens _____ Number of Turns _____
Depth to Operate Nut _____
Normally _____ Valve Box Cold-Mixed? _____ Needed? _____
General Location: _____
Principal Street: _____ _____ feet off centerline
Intersecting Street: _____ _____ feet off centerline

Specific Location:

_____ feet _____ of _____
_____ feet _____ of _____
_____ feet _____ of _____

Valve/Site Map:

Last Corrected ____/____/____ dBase Entered ____/____/____
Map Entered ____/____/____ Remarks on Back of Page _____ Yes _____ No

VALVE MAINTENANCE/INSPECTION REPORT

valve # _____ Valve Size _____ Section _____ /4 Map # _____

Location: _____

Principal Street: _____ _____ feet off centerline

Intersecting Street: _____ _____ feet off centerline

Specific Location: Checked OK _____ or measured as follows

_____ feet _____ of _____

_____ feet _____ of _____

_____ feet _____ of _____ _____

Found: _____ # of Turns: _____ Left: _____

Packing: OK _____ Leaking: _____

Stem: OK _____ Bent/Broken: _____

Nut: OK _____ Missing/Damaged: _____

Gears: OK _____ Faulty: _____ _____

Lid: OK _____ Missing/Broken: _____ Replaced: _____

Box: OK _____ Cold Mixed: Yes / No Needed? Yes / No

Buried: Yes / No Protruding: Yes / No _____ inches

Too Close to Operating Nut? Yes / No

Other Problems/Work Needed: _____

_____

_____

Work Repairs Completed:

_____ By: _____ Date: ____ / ____ / ____

_____ By: _____ Date: ____ / ____ / ____

_____ By: _____ Date: ____ / ____ / ____

_____ By: _____ Date: ____ / ____ / ____

_____ By: _____ Date: ____ / ____ / ____

Inspection/Maintenance Completed by: _____ Date: ____ / ____ / ____

Remarks on Back of Page: Yes _____ No _____

STORAGE INSPECTION REPORT

Elevated Tank/Reservoir Name or Location _____

		YES	NO	N/A
1	Capacity: Gallons			
2	Ventilation provided?			
3	Ventilation screen ok?			
4	Tank outlet through bottom?			
5	Tank inlet and outlet insulated?			
6	Overflow pipe flushed?			
7	Angle flap valve screen on overflow pipe ok?			
8	Tank drain operated and flushed?			
9	Tank drain separate from inlet and outlet piping?			
10	Screen at discharge end of drain pipe ok?			
11	Manhole Cover			
11a	Lockable?			
11b	Watertight?			
11c	Overhanging?			
12	Exterior ladder(s) usable and access controlled?			
13	Interior Ladder			
13a	Provided?			
13b	Usable?			
14	Roof watertight?			
15	Steel Tanks			
15a	Interior paint adequate?			
15b	Exterior paint adequate?			
16	Liquid level control checked?			
17	Low and high level arm checked?			
18	Recent trespass or vandalism observed?			
19	Does drain/overflow discharge to storm system?			
20	Does drain/overflow discharge to sewer?			
21	Does drain/overflow discharge adequately?			

Other possible sources of contamination? _____

_____

Improvements needed? _____

_____

Remarks: _____

_____

Inspection/Maintenance Completed by: _____ Date: ____/____/____

Remarks on Back of Page: Yes _____ No _____

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Appendix W

Water Supply and Facilities Funding Agreement

COPY

PALMER COKING COAL CO.
IN CITY WATER SUPPLY AND FACILITIES FUNDING AGREEMENT

1. Date and Parties.

This Agreement, for reference purposes only, is dated the 11th day of August, 2003, and entered into by and between the City of Black Diamond, a political subdivision of the State of Washington, and Palmer Coking Coal Co., a Washington partnership, herein referred to as "Property Owner".

2. Definitions.

When used in this document, unless the context indicates otherwise, the following words when capitalized shall be defined as set forth in this paragraph.

2.1. ADEQUATE ASSURANCES shall mean such security as the City determines, in its sole discretion, is adequate to fully secure any obligation that the City has agreed to incur in order to fund any or all of the expenditures required to be paid by the Property Owner, or to fully secure any required deposit for which the Property Owner, pursuant to paragraph 8.1, has chosen to provide security in lieu of making the deposit.

2.2. AGREEMENT, shall mean this Water Supply and Facilities Funding Agreement.

2.3. AGREEMENT DATE shall mean the date set forth in paragraph 1.

2.4. ANNEXED PROPERTY shall refer to the real property owned by the Property Owner that was included in the annexation to the City completed by the adoption of City Ordinance 515 and 517. The Annexed Property is legally described in Exhibit A and pictorially illustrated in Exhibit B.

2.5. BDUGAA shall refer to the document entitled the Black Diamond Urban Growth Area Agreement that is dated December 31, 1996 and was entered into between the City, Plum Creek Timber Company, a limited partnership, King County, and Palmer Coking Coal Company.

2.6. CITY shall mean the City of Black Diamond.

2.7. COSTS or CITY COSTS, shall mean all City expenditures, obligations or debt incurred, including, but not limited to: staff time; legal consultant fees; engineering consultant fees; financial consultant fees; economic consultant fees; publication fees; mailing fees; cost of right-of way, real property and easement acquisition; and fees and costs to other governmental jurisdictions, that are made or incurred by the City in carrying out the intent and purpose of this Agreement, or in defending any legal or administrative challenge to this Agreement or any actions taken in carrying out the intent and purpose of this Agreement, except a challenge otherwise covered by Paragraph 29.

City Property Owner

2.8. CWSFC shall mean the water system facility charge imposed by the City pursuant to the authority of RCW 35A.80.010 and RCW 35.92.025.

2.9. ERU shall mean that quantity of water that is equal to the average daily water usage, expressed in gallons, for one single family residence. For purposes of calculating the TSDC the ERU shall be 230 gallons. However, the parties acknowledge that they intend, through the implementation of conservation measures and regulations, to reduce the actual average daily water usage to 220 gallons or less.

2.10. FUND shall mean the fund within the City's accounting system that is dedicated solely to tracking monies, and interest earned thereon, that is paid by the Property Owner as required by the Agreement terms, and by others subject to separate Water Supply and Facilities Funding Agreement.

2.11 OTHER PROPERTY shall mean any property that is subject to a separate Water Supply and Facilities Funding Agreement executed with the City that includes some or all of the tasks set forth herein.

2.12. PAA shall mean the South and West Annexation Areas and the West Boundary Adjustment as defined in the BDUGAA.

2.13. PAA PROPERTY shall mean the real property that is owned by the Property Owner within the PAA. The PAA Property is legally described in Exhibit C and pictorially illustrated in Exhibit D. This definition shall continue to apply even if the Property Owner ceases to own all or a portion of the PAA Property, or whether or not any or all of it is annexed, prior to full implementation of all the Agreement terms.

2.14 SUBJECT PROPERTY shall mean the real property owned by the Property Owner as of the Agreement Date that:

1. is in the East Annexation Area as defined in the BDUGAA; or
2. is in within the existing City limits as of the Agreement Date, and
   - i. is not within the area annexed by Ordinance 515 or 517; and
   - ii. is not to be included in an MPD that includes property located in the PAA.

Subject Property is legally described in Exhibit E and pictorially illustrated in Exhibit F, attached hereto.

2.15. TACOMA shall mean the City of Tacoma.

2.16. TASK(S) shall refer to the thirteen tasks enumerated in paragraphs 9 through 21. Task, when capitalized and followed by a number, shall refer to the corresponding numbered

City Property Owner

Task set forth herein. The Tasks are numbered for reference purposes only. The numbering bears no relationship to the order in which the Tasks will be started or completed.

2.17. TSDC shall mean the Tacoma System Development Charge imposed by Tacoma in order to guarantee the certain quantity of water that the City has determined it needs Tacoma to provide in order to provide the quantity of water requested by the Property Owner in Paragraph 7.1, based on the City's projected average day use, peak day use and four day peak use, all as defined in Tacoma Municipal Code chapter 12.10.

3. General Recitals.

3.1. City has an existing public water system. However, the City currently does not have the infrastructure or water supply to provide service for the Subject Property at full build out.

3.2. City has the opportunity to become a Tacoma wholesale water customer. In order to do so, however, the City must connect to Tacoma's existing pipeline system and also pay Tacoma a system development charge. The City does not have the financial resources to pay the system development charge required for all water necessary to serve the Subject Property, or to build the needed infrastructure improvements.

3.3. City currently has a certain quantity of water available from its water supply source (referred to as the Spring Water Source). However, certain water system improvements are needed to maximize the use of the Spring Source Water, and the City does not have the financial resources to pay for said improvements.

3.4. In order for Property Owner to develop the Subject Property, the TSDC associated with the water needed for the Subject Property must be paid and the improvements referenced in subparagraphs 3.1 and 3.2 must be constructed.

3.5 When fully implemented, some of the improvements to the City water facilities shall not only benefit the Property Owner, but other properties and property owners within the City, and the areas included in the BDUGAA.

3.6 In March, 2003 the City Council established a projected time schedule for adoption of development regulations and other regulations as set forth in Exhibit C. Although some of the target dates on the projected time schedule have not been met, it is the intent of all parties to work cooperatively together to finalize all regulations in 2003. The City's intent to act in good faith to meet the time schedule is further consideration for the Property Owners to commit to fund the improvements set forth herein.

4. Agreement Purpose.

This Agreement is intended to accomplish the following purposes:

4.1. Provide for the payment of the TSDC;

City Property Owner

4.2. Provide for the funding of the design and construction of needed City water storage facilities;

4.3. Provide for the funding of the design and construction of the infrastructure necessary to connect the Tacoma water supply to the City's system;

4.4. Provide for the funding of the main water transmission line(s) and related appurtenances needed to provide full build out water service and fire flow throughout the Subject Property.

4.5. Provide the Property Owner with guaranteed water availability for its future development of Subject Property;

4.6. Provide a mechanism for the Property Owner to be reimbursed for a portion of its expenditures for the above referenced improvements by requiring contribution from non-contributing benefited properties located within the PAA, the property annexed by the adoption of City Ordinance 515 or 517, and from owners of Other Property; and

4.7. Provide for the payment of the City Costs associated with accomplishing the above purposes; and

5. Projects to be Funded.

5.1. The Property Owner agrees to pay, or reimburse the City in the case of paragraph 5.1.4, for the following upon the terms and conditions set forth in the Agreement:

5.1.1. All costs associated with doing a rate study to determine the appropriate CWSFC and water use rates to be charged to City water customers once the system improvements to be constructed under the Agreement terms are completed.

5.1.2. The design and construction of all system improvements contemplated under the Agreement terms. This shall include the costs of acquiring additional right-of-way, construction easements and property acquisition if necessary.

5.1.3. City Costs.

5.1.4. Upon execution of this Agreement, reimburse the City the amount of $52,000 for amounts paid or costs incurred by the City prior to executing this agreement that would have been deemed City Costs if incurred during the Agreement term. Adequate Assurances may not be used for this obligation.

5.1.5. TSDC associated with the quantity of water needed to develop the Subject Property.

City Property Owner

5.2. In consideration for the Property Owner agreeing to pay for the items listed above the City agrees that the standards and specifications for the required improvements shall be no greater than the standards and specifications required for a project otherwise funded by the City itself, unless the parties, in writing, agree to a more stringent requirement. The applicable standards and specifications for a particular Task shall be those in effect at the time complete construction plans and specifications for that Task are submitted to the City.

6. Funding Deposit.

The City will not advance the funds necessary to pay City Costs. Accordingly, the Property Owner has deposited with the City seventy thousand dollars ($70,000), receipt of which is acknowledged. That amount shall be deposited in the Fund to be applied to City Costs incurred after the Agreement Date. This amount shall be a working capital reserve and will be a minimum Fund balance. Adequate Assurances may not be used for this obligation or for maintaining the working capital reserve balance.

7. Funding the TSDC.

7.1. The Property Owner has requested 2,630 ERUs for the Subject Property. The city is acquiring capacity for 2452 ERUs from Tacoma in order to meet the Property Owner's request. The TSDC is $3,733,768.00. The Property Owner shall pay that amount to the City no later than August 11, 2003. If the Property does not want to pay all cash, then the Property Owner shall tender to the City, no later than August 11, 2003, twenty percent of the TSDC, along with Adequate Assurances that the balance including interest and any other Tacoma related charges, will be timely paid. The tendered amount shall be placed in the Fund, and paid by the City to Tacoma, upon execution of the Wholesale Water Agreement between Tacoma and the City.

7.2. The City's determination of the TSDC will be based in part upon information contained in the Tacoma City Code, and information received from Tacoma personnel. The City may not have entered into the wholesale water agreement with Tacoma at the time the TSDC calculation is made. If Tacoma changes its code or regulations, or the Tacoma personnel have made an error in their calculations, so that its rate structure, or payment plan changes prior to the execution of the wholesale water agreement, then the TSDC will be adjusted accordingly.

8. Funding City Water System Improvements.

8.1. Subject to any conditions precedent to the commencement of any Task set forth in this Agreement, the Property Owner will deposit into the Fund 110% of the amount the City reasonably estimates is necessary to meet the financial obligations of the City for that particular Task. The payment will be made within the time limit specified below for each Task. The Property Owner remains responsible for all the costs associated with each Task, including the City Costs related thereto, regardless of the amount that has been estimated for each task. If it is determined that the amount deposited will not be sufficient to meet the actual costs and the City Costs for the particular Task, then the City will provide the Property Owner with pertinent plans and specifications and revised cost estimates, the City will meet with the Property Owner to discuss the new cost estimates, and the Property Owner shall pay into the Fund 110% of the

City Property Owner

additional amount required to satisfy the new estimate within ten (10) days of receiving notice from the City. In lieu of all or a portion of any required deposit the City may accept Adequate Assurances.

8.2. Any interest earned on the monies deposited by the Property Owner shall be credited to the Property Owner and placed in the Fund. The Property Owner shall receive a monthly accounting of all receipts to and expenditures from the Fund. The City shall provide the Property Owner with an annual report that contains the status of all Tasks, and a full financial reporting on all costs incurred by the City and all monies deposited into and expended from the Fund in connection with Tasks 1 through 13. Any monies in excess of the Fund's working capital reserve that is not expended for a Task shall be credited towards payments required for a subsequent Task. After completion of all Tasks, and payment of all City Costs, indebtedness and expenses of the City for which the Property Owner is obligated under the Agreement, the Fund balance shall be released to the Property Owner.

8.3. Prior to awarding any contract necessary to complete any Task, the City will discuss the contract terms and conditions with the Property Owner. However, the final decision on contract terms and conditions, and contract award shall be in the City's sole discretion.

8.4. The City may apply for grants or loans to complete some or all of the Tasks. The City anticipates applying for Public Works Trust Fund monies, a portion of which might be used to reduce the cost of money for some Tasks, to the extent allowed by law. If grants are received, then the net amount of the grants (the grant less the City Costs associated with obtaining and administering the grant) shall be used to reduce the amount the Property Owner must pay for the applicable Task. If loans are to be used to reduce the cost of money for any Task, then the Property Owner must consent to the use of the loan proceeds for the Task, and provide Adequate Assurances to the City for timely repayment of the loan amount. If loans are to be used for the purpose of funding all or any portion of one or more Tasks, the parties will, by addendum to this Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

8.5. The City will allow the formation of a local improvement district (LID) to fund any of the Tasks for which a LID can lawfully be formed, provided the petition to form the LID is signed by the property owners of all the property to be included within the LID boundaries; provided, however, the City, in its sole discretion, may decide to allow the formation of a LID that includes benefited properties the owners of which do not consent to the formation of a LID. The formation of the LID will not relieve the Property Owner for any funding requirements set forth in this Agreement that are not paid through the LID. In addition, the Property Owner will pay the City Costs associated with the LID formation. The Property Owner may request that the City include those costs in the LID amount or such other City Costs or expenditures required for any Task, that may legally be financed through the LID. The amounts collected from the LID proceeds for the City Costs previously paid by the Property Owner, will be placed in the Fund, unless, prior to receiving the proceeds, the Property Owner provides the City with written notice to pay the reimbursed amount directly to the Property Owner. If a LID is formed for the purpose of funding all or any portion of one or more Tasks, the parties will, by addendum to this

City Property Owner

Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

9. Task 1 -- Tacoma Intertie and Related Water System Improvements Preliminary Design

Task 1 is the planning, environmental review, property acquisition, and preliminary engineering and cost estimates for the design and construction of the intertie with Tacoma Pipeline 5, the water transmission line, the pump station, and related equipment and improvements necessary to transmit the water from the intertie to the City reservoir. Work on Task 1 has been commenced. The City estimates the Task 1 costs and the City Costs related thereto to be one hundred thousand dollars ($100,000.00). The Property Owner shall deposit with the City 110% of that amount by August 1, 2003. Any City costs incurred prior to the deposit being made that are related to Task 1 shall be deducted from the amount deposited.

10. Task 2 – Water Reservoir Improvements Preliminary Design

Task 2 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the Water Reservoir Improvements. These improvements are to be sized to accommodate all of the property within the City, and the areas within the Potential Annexation Areas referenced in the BDUGAA. Task 2 shall commence when authorized by the City Council. The Property Owner shall deposit with the City 110% of the estimated Task 2 costs within 30 days from receiving from the City the Task 2 written cost estimate.

11. Task 3 – Spring Water Source Collection and Transmission System Improvements Preliminary Design.

Task 3 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements to the Spring Water Source collection system, the replacement of the pumps and related improvements, including the addition of any necessary treatment facilities and equipment, and the replacement of the transmission line between the Spring Water Source and the City water reservoir. These improvements are to be sized to accommodate the full use of the City's Spring Water Source water rights. Work on Task 3 has been commenced. The City estimates the Task 3 costs, and related City Costs to be one hundred ten thousand dollars ($110,000.00). The Property Owner shall deposit with the City 110% of that amount by August 1, 2003. Any City Costs incurred prior to the deposit being made that are related to Task 3 shall be deducted from the amount deposited.

12. Task 4 – Main Transmission Lines to and through Subject Property.

Task 4 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements necessary to provide full build out water service and fire flow from the City water reservoir site, through the Subject Property. This may include one or more looped transmission lines. Task 4 shall be deemed

City Property Owner

commenced upon the Agreement Date. The Property Owner shall pay to the City, upon executing the Agreement a $50,000 deposit to be applied toward Task 4 costs and City Costs related thereto. The City will then commence preparation of the estimated costs associated with Task 4. The Property Owner will pay to the City 110% of the estimated Task 4 costs and City Costs related thereto, less the portion of the $50,000 deposit not yet expended, within 30 days from receiving the City's written estimate. The location and sizing of Task 4 improvements will be significantly dependent upon the Property Owner's development plans. Thus, it is anticipated that ongoing and regular input from the Property Owner will be needed. The City and Property Owner will develop a process to assure that the Property Owner's input is timely received and considered in developing the Task 4 work product.

13. Task 5 – Water Reservoir Improvements Final Design and Bid.

Task 5 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 2 improvements. Task 5 shall commence when the City approves the Task 2 work product. The Property Owner will pay to the City 110% of the estimated Task 5 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

14. Task 6 – Spring Water Source Collection and Transmission System Improvements Final Design and Bid.

Task 6 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 3 improvements. Task 6 shall commence when the City approves the Task 3 work product. The Property Owner will pay to the City 110% of the estimated Task 6 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

15. Task 7 – Main Transmission Line(s) Final Design and Bid.

Task 7 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 4 improvements. Task 7 shall commence when the City approves the Task 4 work product and the Property Owner provides the City with written notice to proceed with Task 7. After Task 7 commences the Property Owner will pay to the City 110% of the estimated Task 7 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

16. Task 8 – Water Reservoir Construction.

Task 8 is the award of the Task 5 bid, and the Construction of the Task 5 improvements. Task 8 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 5 construction contract. The Property Owner will pay to the City 110% of the Task 5 bid amount and City Costs related to Task 8 within 45 days from receiving the City's written notice.

City Property Owner

17. Task 9 -- Spring Water Source and Distribution System Improvements Construction.

Task 9 is the award of the Task 6 bid, and the Construction of the Task 6 improvements. Task 9 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 6 construction contract. The Property Owner will pay to the City 110% of the Task 6 bid amount and City Costs related to Task 9 within 45 days from receiving the City's written notice.

18. Task 10 -- Main Transmission Line Construction.

Task 10 is the award of the Task 7 bid, and the Construction of the Task 7 improvements. The City shall provide the Property Owner with written notice that it intends to award the Task 7 bid. The Property Owner will pay to the City 110% of the Task 7 bid amount and City Costs related to Task 10 within 45 days from receiving the City's written notice.

19. Task 11 -- Tacoma Intertie and Related Water System Improvements Final Design and Bid.

Task 11 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 1 improvements. Task 11 shall commence when the City approves the Task 1 work product. The Property Owner will pay to the City 110% of the estimated Task 1 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

20. Task 12 –Tacoma Intertie and Related Water System Improvements Construction.

Task 12 is the award of the Task 11 bid, and the Construction of the Task 11 improvements. Task 12 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 11 construction contract. The Property Owner will pay to the City 110% of the Task 11 bid amount and City Costs related to Task 11 within 45 days from receiving the City's written notice.

21. Task 13 – Development of New CWSFC and New Water Usage Rates.

Task 13 is the development and implementation of a new rate study to set the appropriate CWSFC and water use rates to be charged by the City. Task 13 shall commence upon the City providing written notice to the Property owner that it intends to solicit request for proposals to perform the rate study. The Property Owner will pay to the City the estimated City Costs, and 110% of the anticipated cost for the proposed rate study, within 30 days of receiving the City's written notice for payment. The notice for payment shall not be given until the City has received responses to its request for proposal to perform the rate study. The City reserves the right, at its expense to conduct other CWSFC and water use rate studies throughout the Agreement term. Any new rates adopted as a result of said studies shall apply to any water use or connections occurring after the rates are adopted.

City Property Owner

22. Water Availability Certificates.

22.1. Upon Property Owner's payment of the amounts set forth in paragraphs 5.1.4, 6, 7, 9, 11, and 12, the City shall issue Water Availability Certificates for the number of ERUs requested in paragraph 7.1, or such lesser number of ERUs as chosen by the Property Owner pursuant to the provisions of paragraph 35.3. The certificates shall contain the following conditions:

22.1.1. The water shall be available upon completion of Tasks 1 through 12;

22.1.2. All monies required to be paid pursuant to the terms of this Agreement must be paid prior to use of any certificate;

22.1.3. Failure of the Property Owner to meet its financial obligations set forth in the Agreement, after notice and an opportunity to cure, shall cause the certificates for which corresponding building permits have not been issued to revert to the City. This shall be in addition to other remedies available in law and equity;

22.1.4. The Water Availability Certificates, subject to applicable land use regulations and approvals, may be used by the Property Owner, in its discretion, for development on the Subject Property only;

22.1.5. The Water Availability Certificates only warrant that the City has reserved the quantities of water represented by the certificates. Other water system distribution improvements may be necessary for the actual delivery of water to the benefited properties. The cost of those improvements will be borne by the Property Owner;

22.1.6. Any conditions imposed by the agreement with Tacoma that impact water usage shall apply to the Certificates;

22.1.7. The Certificates shall be subject to surrender to the City pursuant to the provisions of paragraph 28.4;

22.1.8. The CWSFC relating to any certificate proposed to be used must be paid before the Certificate may be used; and

22.1.9. The Certificates shall only apply to development that is both located within the City's water service area and located within the City limits at the time a complete application for a land use development approval is submitted to the City for the development.

22.1.10. The issuance of a Certificate does not expressly or impliedly represent that the City will approve development that will result in the use of all water for which Certificates have been issued.

City Property Owner

22.1.11. The Certificates are for a quantity of water based on 230 gallons per day usage per ERU. If the actual usage is greater, then the number of ERUs authorized by the Certificate shall be correspondingly reduced.

22.2. If the Property Owner determines that it does not need all of the certificates that have been issued, then the unneeded certificates may be returned to the City ("Returned Certificates"). The City shall date stamp the Returned Certificates ("Return Date"). Within 30 days of the Return Date the Property Owner will be notified of how many ERUs of water capacity the City had in its inventory prior to the Return Date ("ERU Inventory"). Any water connections after the Return Date shall come first from the ERU Inventory. After the ERU inventory is exhausted, the City will issue all water connections from water represented by the Returned Certificates ("Returned Certificate Inventory"). The Property Owner shall receive a portion of the CWSFC collected for each connection issued from the Returned Certificate Inventory. The amount shall be that portion of the CWSFC collected on the Returned Certificate Inventory that is attributable to required expenditures made by the Property Owner pursuant to the Agreement terms prior to the Return Date. The reimbursement shall be made on a quarterly basis. The City, upon request by the Property Owner, will seek to have Tacoma repurchase the water capacity represented by the Returned Certificate Inventory. If Tacoma agrees to repurchase then the following shall occur:

22.2.1 The City shall negotiate the repurchase agreement;

22.2.2 Upon receipt of monies from Tacoma for the repurchase, the City will recalculate its CWSFC to take into account the reduction in total ERUs of capacity resulting from the Tacoma water capacity repurchase.

22.2.3 Upon adoption of a new CWSFC, the City will pay the Property Owner the amount received from Tacoma for the repurchased water capacity, up to the amount of the TSDC paid by the Property Owner, less City Costs associated with implementing paragraph provisions 22.2.1, 22.2.2 and 22.2.3.

22.3 If, through the implementation of conservation measures, or by a change in the City's standard for ERUs, the actual average daily water usage for the development of Subject Property is less than 230 gallons, then the number of Water Certificates shall be adjusted so that additional Certificates are issued to take into account the lower average daily water usage rate. To determine actual average daily water usage for the Subject Property may require the installation of a flow meter for the entire PAA Property and/or Annexed Property. If the Property Owner requests the installation of such a meter, then the Property Owner shall be responsible for the meter cost, installation and maintenance expense.

23. Paragraph 23 intentionally omitted.

City

Property Owner

24. Reimbursement Agreement.

Subject to the provisions of RCW 35.91.020, the Property Owner shall be entitled to recapture a pro rata portion of the amounts paid pursuant to the Agreement terms from non-contributing benefited properties located within the area annexed by the adoption of City Ordinance 515 or 517, the properties that are within the PAA, or Other Property.

25. Water Use Rates and Credit Toward CWSFC.

25.1. The CWSFC to be paid by the Property Owner shall be the CWSFC adopted at the completion of Task 13, or the CWSFC in effect at the time a building permit is issued and available for delivery to the Property Owner, whichever amount is greater. If Task 13 is not complete at the time a building permit is ready to be issued, then the City shall issue the permit upon payment of the applicable building permit fees, and payment of a deposit of the anticipated CWSFC, as reasonably determined by the City. When Task 13 is completed, if the resulting CWSFC is less than the deposit amount, then the balance of the deposit shall be returned to the Property Owner. If the CWSFC is greater than the deposit amount, then the Property Owner shall pay the City the difference within 3 business days of receiving written notice. Failure to timely pay the difference shall result in the issuance of a stop work order for work authorized by the building permit.

25.2 The rate to be paid for water use shall be whatever rate is in effect at the time the water is used.

25.3 The Property Owner may be entitled to one or more credits towards its CWSFC under the following circumstances:

25.3.1 When the Property Owner is required to pay a CWSFC, or CWSFC deposit as referenced in Paragraph 25.1, for any ERUs for which it has a Water Availability Certificate, it shall be entitled to a credit for a portion of the CWSFC. The amount of the credit per ERU shall be that portion of the CWSFC for the ERU that is attributable to amounts paid by the Property Owner pursuant to the Agreement terms. For example, if the CWSFC is $4,000 per ERU, and $2,500 of that amount is attributable to monies paid by the Property Owner pursuant to the terms of the Agreement, then the Property Owner would receive a $2,500 credit per ERU.

25.3.2 If the City terminates the Spring Water Source project prior to or at the end of Task 3, as set forth in Paragraph 36, then the Property Owner shall also receive a credit towards the CWSFC of any monies it paid the City that were expended on Task 3, whether or not those monies are included in the calculation that determined the CWSFC rate. The credit for Spring Water Source project expenditures shall be prorated over the remaining ERUs for which the Property Owner has Water Availability Certificates, with the prorated credit for each ERU being applied at the time the CWSFC for the ERU is required to be paid.

City Property Owner

26. Entire Agreement.

The parties have negotiated in good faith with regards to each and every term of this Agreement. The Agreement embodies and supersedes all agreements, and representations, express or implied, verbal or written, regarding the Tasks and the funding thereof. The Agreement cannot be modified except in written addendum to the Agreement, signed by all parties hereto.

27. Other Property.

It is possible that the City will enter into one or more water supply and facilities funding agreements relative to Other Property. These other agreements may include a requirement to provide funding for some of the improvements required by the Agreement. If this occurs, then the Property Owners of the Other Property and the Property Owner shall each be severally liable for all obligations to which they have agreed to in their respective agreements. However, if this results in deposits being received by the City that are greater than the amount the City would have otherwise received relative to a Task, then the City shall refund to the respective party a pro rata portion of the deposit made based upon the ratio between the water required for each party. The Property Owner and the owners of Other Property, in lieu of making multiple deposits may collectively provide only the amount of the deposit required by this Agreement. If Adequate Assurances are provided, then except for Adequate Assurances relating to the TSDC, an Adequate Assurances provided by a Property Owner, shall be for 110% of the Task amount, regardless of whether or not there are multiple Adequate Assurances and regardless of whether or not it is intended to secure only a portion of the total Task amount.

28. Failure to Make Payment or Continuously Provide Adequate Assurances.

28.1. If the Property Owner fails to timely pay any amounts required by the Agreement, then, after five (5) business days notice, the City shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity. If the City proceeds with a Task after the Property Owner has failed to timely make the payments, City Costs and any monies paid toward completing the Task, plus interest thereon at 18 percent per annum, or the maximum lawful rate, whichever is less, accrued from the date the monies are paid by the City, shall be deemed a lien against the Subject Property, and may be foreclosed in the same manner as a labor and materialman's lien filed under Chapter RCW 60.04. The provisions of paragraph 29 shall apply in such proceeding.

28.2. The provisions of paragraph 28.1 notwithstanding, if the Property Owner fails to timely pay any amounts required by the Agreement, and Adequate Assurances have been provided, then after (5) business days notice, the City shall, prior to exercising any termination remedies, make demand upon the Adequate Assurances that the entire amount of the Adequate Assurances provided be paid to the City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund.

28.3 The provisions of paragraph 28.1 and 28.2 notwithstanding, if after the Property Owner has provided Adequate Assurances, the City receives notice that the Adequate

City Property Owner

Assurances will expire or be canceled by the surety or issuer providing the Adequate Assurances, the City may make immediate demand upon such surety or issuer that the entire amount of such Adequate Assurances be paid to the City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund.

28.4. The provisions of paragraph 28.1, 28.2 and 28.3 notwithstanding, if the Property Owner provides the City with notice within 30 days from the completion of Tasks 1, 2, 3, 4 and 11 that it intends to withdraw from the Agreement, and provided that the Property Owner has paid all City Costs incurred to the date of the notice, and the Property Owner has paid all expenses for Tasks 1, 2, 3, 4 and 11, then the Property Owner may withdraw from this Agreement. Within 30 days from receiving the notice of intent to withdraw, the City shall provide the Property Owner a final tabulation of the City Costs incurred through the date the notice of intent to withdraw was received by the City, and the balance owing on the City Costs, if any. In order for the withdrawal to be effective, the balance owing must be paid within 15 days of the City's notice of balance owing. The withdrawal shall be effective upon the date the payment of the balance is received. If the balance is not timely paid, then the Property Owner shall not be allowed to withdraw from the Agreement. If the withdrawal becomes effective, and the TSDC was paid in cash, then the Water Availability Certificates that have been issued to the Property Owner cannot be used by the Property Owner, but must be surrendered to the City, and they will then be processed in the manner set forth in paragraph 22.2. If the TSDC was not paid for in cash, then the Adequate Assurances for the TSDC payment shall not be released, unless and until Tacoma agrees to release the City from its obligation for the water payments associated with the TSDC attributable to the withdrawing Property Owner, or the City decides to assume the obligation. If the Adequate Assurances are released, then the Water Availability Certificates issued to the withdrawing Property Owner shall be surrendered to the City and the provisions of paragraph 22.2 shall not apply.

29. Attorney's Fees.

If any suit or other proceeding is instituted by either party to this Agreement arising out of or pertaining to this Agreement, including but not limited to filing suit or requesting an arbitration, mediation, or other alternative dispute resolution process (collectively "Proceedings"), and any appeals and collateral actions relative to such suit or proceeding, the prevailing party as determined by the court or in the proceeding shall be entitled to recover its reasonable attorneys fees and all costs and expenses incurred relative to such suit or proceeding from the non-prevailing party, in addition to such other available relief. Attorneys fees incurred in connection with the meeting described in paragraph 29 shall not be recoverable.

30. Dispute Resolution.

In the event of a dispute arising from the interpretation or application of any Agreement provision, the parties shall (1) convene a meeting among their principals to discuss the dispute; then (2) refer the matter to mediation if said meeting does not resolve the dispute; and (3) if mediation does not resolve the dispute, the parties may pursue their legal remedies. This provision shall also apply to questions relative to the amount or nature of any expenditures made by the City from funds paid by the Property Owner pursuant to the Agreement terms. Provided,

City Property Owner

however, a dispute relative to an expenditure shall not relieve the Property Owner of its obligation to timely make all required payments while the dispute is pending. Notwithstanding the foregoing, any party shall be entitled to seek equitable remedies through legal process at any time simultaneous with the dispute resolution process outlined herein where irreparable harm will be done if the equitable remedy is not granted before the conclusion of the dispute resolution process.

31. Written Notices.

All Notices required by this Agreement shall be considered properly delivered when personally delivered, when received by facsimile, or on the third day following mailing, postage prepaid, certified mail, return receipt requested, to:

City:	City Administrator City of Black Diamond P.O. Box 599 Black Diamond, WA 98010 Fax: (360) 886-2592
With a copy to:	Loren D. Combs McGavick Graves, P.S. P.O. Box 1317 Tacoma, WA 98401-1317 Fax: (253) 627-2247
Property Owner:	William Kombol Palmer Coking Coal Co. 31407 Highway 169 Black Diamond, WA 98010 Fax: (425) 432-3883
With a copy to:	John C. McCullough, Esq. McCullough Hill Fikso Kretschmer Smith 2025 First Avenue, Suite 1130 Seattle, WA 98121-2100 Fax: (206) 448-3444

32. Failure to Provide Certificates of Availability.

If the City fails to provide Water Availability Certificates as provided in this Agreement, the Property Owner shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity.

City Property Owner

33. Assignment.

The Property Owner and the City may each assign all or a portion of its rights under this Agreement upon written notice to the other party. The City's consent shall be required for the assignment of the Property Owner's rights. Said consent will not be unreasonably withheld. An assignment shall not release the assigning party from its obligations under this Agreement. If the Property Owner seeks approval for assignment, and a release of its obligations hereunder, it shall pay to the City the costs incurred by the City to determine whether the proposed assignee is financially able to perform the obligations required under this Agreement. Any party shall act upon a request for assignment within sixty (60) days. Otherwise the assignment will be deemed approved. Provided, however, if the Property Owner has posted Adequate Assurances, the Property Owner shall not be released from the Adequate Assurances obligations until substitute Adequate Assurances have been accepted, in writing, by the City.

34. Term.

The term of this Agreement shall be thirty (30) years from the Agreement Date unless it is earlier terminated or extended by written agreement or by operation of the Agreement conditions.

35. Tolling of Time Limits.

If any governmental action taken in furtherance of any of this Agreement's terms is administratively or judicially appealed, other than by a party hereto, then all deadlines shall be tolled during the pendency of such appeal.

36. Termination of Spring Water Source Collection and Transmission System Improvements.

It is possible that prior to, or at the conclusion of Task 3 the City might determine it is not in the best interests of the City to continue with the Spring Water Source Collection and Transmission System Improvements. If the City makes that determination, then the following shall occur:

36.1. The City shall provide the Property Owner with written notification that the Spring Water Source Project is terminated.

36.2. Tasks 6 and 9 are deleted from this Agreement and Property Owner is released from any financial obligation with regards thereto.

36.3 The Property Owner shall have 15 days to notify the City in writing that they either will: 1) modify its total water requirements so that the quantity of water requested pursuant to paragraph 7.1 is reduced to equal the existing TSDC; or 2) they still want the full quantity of water requested in paragraph 7.1.

City Property Owner

37. Captions.

The paragraph captions are for convenience and reference only. They do not define or limit any of the rights or responsibilities set forth in the Agreement.

38. Condition Subsequent.

The City intends to exert all reasonable efforts to enter into an agreement with Tacoma wherein the City will be a Tacoma wholesale water customer and will be able to provide the ERU's requested by the Property Owner. If the City is unsuccessful in entering into such agreement with Tacoma by September 30, 2003, then this Agreement shall be terminated, the Adequate Assurances released, and the Fund balance, after payment of outstanding City Costs, shall be released to the Property Owner.

39. Recording Memorandum of Agreement.

The City shall record with King County a Memorandum of Agreement (MOA) that will be placed of record on the property legally described in Exhibit E. The MOA will read as follows:

> The following described real property is subject to the terms of an agreement entitled Water Supply and Facilities Funding Agreement, dated the 11 day August, 2003, a copy of which is on file with the City Clerk for the City of Black Diamond, Washington: (legal description attached)

CITY OF BLACK DIAMOND

Howard Botts, Mayor

PROPERTY OWNER

By: _____
William Kombol
Its: Manager

ATTEST:

Cris Kandior, City Clerk

APPROVED AS TO FORM:

Loren D. Combs, City Attorney

City _____ Property Owner

STATE OF WASHINGTON)
) ss.
County of King)

I certify that I know or have satisfactory evidence that WILLIAM KOMBOL is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he was authorized to execute the instrument and acknowledged it as the MANAGER of PALMER COKING COAL CO. to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

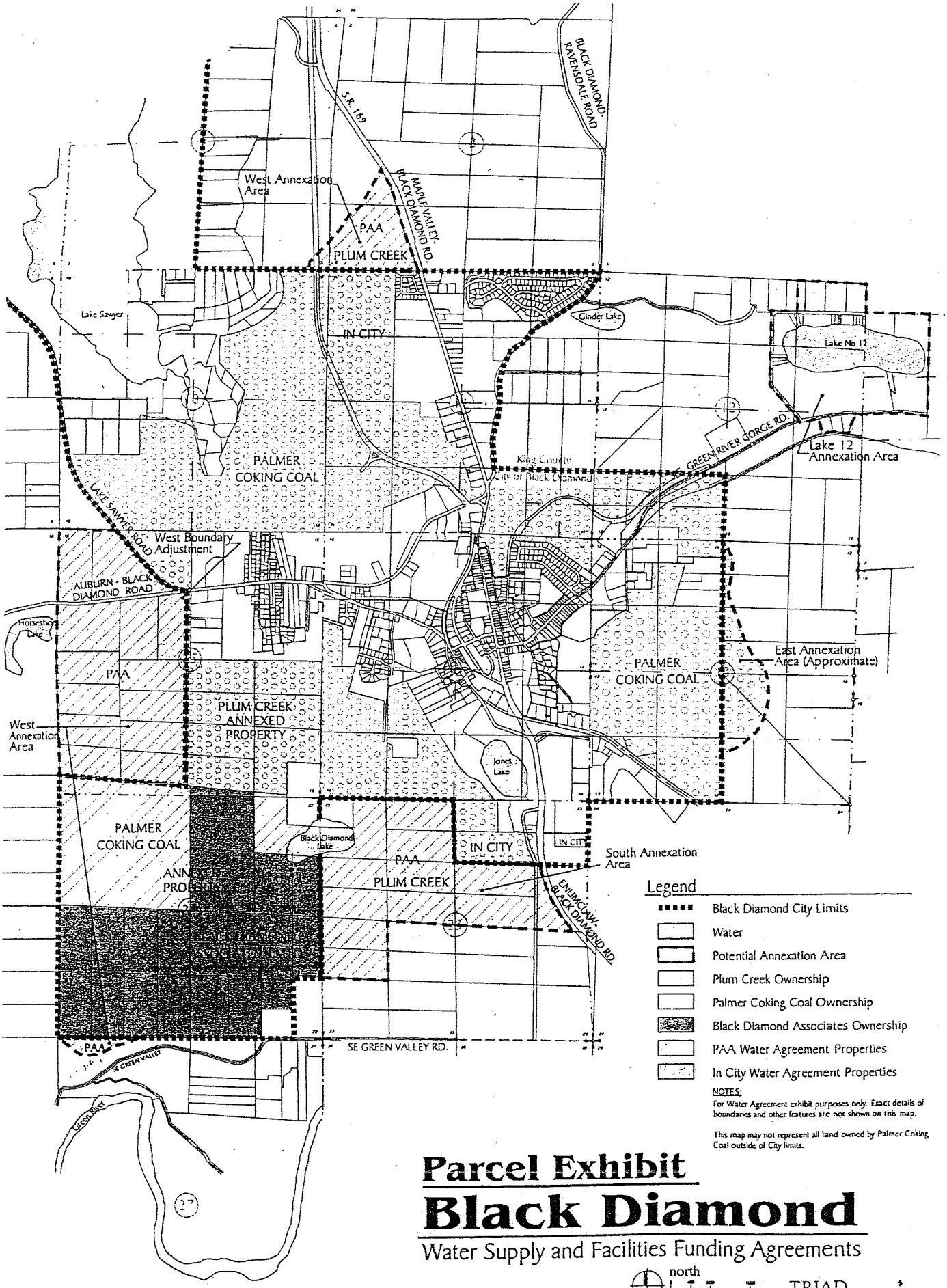
DATED: Aug 8, 2003.

JOYCE M. ROSS NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 8-21-06

Joyce M Ross
NOTARY PUBLIC
Print Name: Joyce M Ross
My appointment expires: 8/21/06

b\24108\080803in-citypalmer.doc

City Property Owner


BLACK DIAMOND-RAVENSDALE ROAD
S.R. 169
West Annexation Area
PAA
PLUM CREEK
MAPLE VALLEY-BLACK DIAMOND RD.
Lake Sawyer
IN CITY
Cinder Lake
Lake No. 12
PALMER COKING COAL
King County
City of Black Diamond
GREEN RIVER GORGE RD.
Lake 12 Annexation Area
LAKE SAWYER ROAD
West Boundary Adjustment
AUBURN - BLACK DIAMOND ROAD
Horseshoe Lake
PAA
PALMER COKING COAL
East Annexation Area (Approximate)
West Annexation Area
PLUM CREEK ANNEXED PROPERTY
Jones Lake
PALMER COKING COAL
Black Diamond Lake
IN CITY
IN CITY
South Annexation Area
PAA
PLUM CREEK
ENUMCLAW-BLACK DIAMOND RD.
PAA
SE GREEN VALLEY RD.
SE GREEN VALLEY
27
Legend
Black Diamond City Limits
Water
Potential Annexation Area
Plum Creek Ownership
Palmer Coking Coal Ownership
Black Diamond Associates Ownership
PAA Water Agreement Properties
In City Water Agreement Properties
NOTES:
For Water Agreement exhibit purposes only. Exact details of boundaries and other features are not shown on this map.
This map may not represent all land owned by Palmer Coking Coal outside of City limits.
Parcel Exhibit
Black Diamond
Water Supply and Facilities Funding Agreements
north
SCALE: 1" = 800'
02070/bbck diamond parcels 7/25/2003
TRIAD

LEGAL DESCRIPTIONS: SECTION 10-21-6

All of those portions of Section 10, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter, except those portions of the following lands described in the Record of Survey recorded in Book 135 of Surveys at pages 18 under recording number 20001209000002, being lands conveyed by deed under recording numbers 19990625001627 and 19991014001161. The following described lands comprise approximately 322 acres, more or less.

See following pages 2 through 24.

LEGAL DESCRIPTIONS: SECTION 11-21-6

All of those portions of Section 11, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 194 acres, more or less.

See following pages 25 through 37.

LEGAL DESCRIPTIONS: SECTION 12-21-6

All of those portions of Section 12, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 68 acres, more or less.

See following pages 38 through 41.

LEGAL DESCRIPTIONS: SECTION 13-21-6

All of those portions of Section 13, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 221 acres, more or less.

See following pages 42 through 51.

LEGAL DESCRIPTIONS: SECTION 14-21-6

All of those portions of Section 14, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 156 acres, more or less.

See following pages 52 through 59.

LEGAL DESCRIPTIONS: SECTION 15-21-6

All of those portions of Section 15, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 25 acres, more or less.

See following pages 60 through 61.

LEGAL DESCRIPTIONS: SECTION 23-21-6

All of those portions of Section 23, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 14 acres, more or less.

See following page 62.

MAP EXHIBITS: *See following pages 63 through 69*

LEGAL DESCRIPTION: EAST ANNEXATION AREA

All of those portions of the Southeast quarter of Section 12, Township 21 North, Range 6 East, W.M., King County, Washington and of the East half of Section 13, Township 21 North, Range 6 East, W.M., King County, Washington, that may at any time prior to their potential annexation to the City of Black Diamond, be more particularly surveyed and described pursuant to the terms and conditions of the Black Diamond Urban Growth Annexation Agreement dated December 31, 1996. The lands to be described comprises exactly 50 acres, pursuant to the terms of that Agreement.

Legals to be provided prior to annexation.

SECTION 10-21-6

LOT ——— PORTION THEREOF

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE S00°24'29"E ALONG THE WEST LINE OF SAID NE 1/4 FOR 1052.28 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N83°08'46"E FOR 710.00 FEET;
THENCE S00°09'50"E FOR 191.98 FEET;
THENCE S13°23'58"W FOR 145.36 FEET;
THENCE S03°37'54"W FOR 181.92 FEET;
THENCE N46°17'00"W FOR 260.76 FEET;
THENCE S89°36'57"W FOR 470.00 FEET TO THE WEST LINE OF SAID NE 1/4;
THENCE N00°24'29"W ALONG SAID WEST LINE FOR 253.15 FEET TO THE TRUE POINT OF BEGINNING.

LOT ——— PORTION THEREOF

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 578.01 FEET;
THENCE S07°51'08"E FOR 984.14 FEET;
THENCE S00°09'50"E FOR 191.98 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N58°34'54"E FOR 349.80 FEET;
THENCE S45°58'40"E FOR 459.47 FEET;
THENCE S64°24'11"W FOR 617.21 FEET;
THENCE N60°27'16"W FOR 93.50 FEET;
THENCE N46°17'00"W FOR 50.00 FEET;
THENCE N03°37'54"E FOR 181.92 FEET;
THENCE N13°23'58"E FOR 145.36 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
HENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 1637.33 FEET;
THENCE S04°08'35"W FOR 1319.51 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S14°46'34"W FOR 568.61 FEET;
THENCE N49°51'41"W FOR 113.90 FEET;
THENCE N79°59'06"W FOR 231.43 FEET;
THENCE N60°27'16"W FOR 340.97 FEET;
THENCE N64°24'11"E FOR 617.21 FEET;
THENCE N89°36'57"E FOR 200.00 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

LOT [redacted] PORTION THEREOF

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 1637.33 FEET;
THENCE S04°08'35"W FOR 1319.51 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°36'57"W FOR 200.00 FEET;
THENCE N45°58'40"W FOR 459.47 FEET;
THENCE N58°34'54"E FOR 385.00 FEET;
THENCE N87°45'05"E FOR 309.80 FEET;
THENCE S11°28'21"W FOR 541.63 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 1637.33 FEET;
THENCE S04°08'35"W FOR 1319.51 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N11°28'21"E FOR 541.63 FEET;
THENCE S89°37'41"E FOR 423.33 FEET;
THENCE S13°31'29"W FOR 540.33 FEET;
THENCE S89°36'57"W FOR 404.70 FEET TO THE TRUE POINT OF BEGINNING.

LOT [redacted] PORTION THEREOF

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 1637.33 FEET;
THENCE S00°36'03"E FOR 474.86 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N77°12'43"E FOR 498.84 FEET;
THENCE S10°10'16"E FOR 204.52 FEET;
THENCE S16°44'58"W FOR 187.10 FEET;
THENCE S41°20'17"W FOR 57.41 FEET;
THENCE N89°37'41"W FOR 423.33 FEET;
THENCE S87°54'05"W FOR 309.80 FEET;
THENCE N43°07'41"E FOR 441.98 FEET TO THE TRUE POINT OF BEGINNING.

LOT [redacted] PORTION THEREOF

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA, DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH 1/4 CORNER OF SECTION 10;
THENCE N89°16'02"E ALONG THE NORTH LINE OF SAID NE 1/4 FOR 1637.33 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°16'02"E ALONG SAID NORTH LINE FOR 637.33 FEET;
THENCE S21°22'36"W FOR 400.10 FEET;
THENCE S77°12'43"W FOR 498.84 FEET;
THENCE N00°36'03"W FOR 474.86 FEET TO THE TRUE POINT OF BEGINNING.

LOT _____ PORTION THEREOF

A PORTION OF THE SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SECTION 10;
THENCE N89°26'01"E ALONG THE SOUTH LINE OF SAID SE 1/4 FOR 398.55 FEET;
THENCE N00°33'59"W FOR 831.31 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N42°11'08"E FOR 100.00 FEET;
THENCE N40°36'35"W FOR 173.20 FEET;
THENCE N18°37'12"W FOR 381.66 FEET;
THENCE N09°11'49"E FOR 171.09 FEET;
THENCE N84°27'23"E FOR 341.14 FEET;
THENCE S21°34'54"W FOR 141.43 FEET;
THENCE S26°13'17"E FOR 222.08 FEET;
THENCE S19°17'06"W FOR 155.31 FEET;
THENCE S22°15'21"E FOR 125.00 FEET;
THENCE S13°19'36"W FOR 180.44 FEET;
THENCE S89°51'19"W FOR 200.00 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

A PORTION OF THE SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
BEGINNING AT THE SE CORNER OF SECTION 10;
THENCE N12°48'45"W FOR 297.28 FEET;
THENCE N03°40'17"W FOR 204.91 FEET;
THENCE N04°53'35"W FOR 160.32 FEET;
THENCE N13°16'34"W FOR 248.00 FEET;
THENCE N27°02'35"W FOR 625.45 FEET;
THENCE N89°41'58"E FOR 416.69 FEET TO THE EAST LINE OF SAID SE 1/4;
THENCE S00°41'01"E ALONG SAID EAST LINE FOR 1454.82 FEET TO THE SE CORNER OF SECTION 10 AND THE TRUE POINT OF BEGINNING.

A PORTION OF THE SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA. DESCRIBED AS FOLLOWS:
COMMENCING AT THE SE CORNER OF SECTION 10;
THENCE N00°41'01"W ALONG THE EAST LINE OF SAID SE 1/4 FOR 1454.82 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°41'58"W FOR 416.69 FEET;
THENCE N27°02'35"W FOR 369.41 FEET;
THENCE N00°52'39"W FOR 92.00 FEET;
THENCE N89°41'58"E FOR 581.02 FEET TO THE EAST LINE OF SAID SE 1/4;
THENCE S00°41'01"E ALONG SAID EAST LINE FOR 421.91 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SE CORNER OF SECTION 10;
THENCE N00°41'01"W ALONG THE EAST LINE OF SAID SE 1/4 FOR 1876.73 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°41'58"W FOR 581.02 FEET;
THENCE N00°52'39"W FOR 375.00 FEET;
THENCE N89°41'55"E FOR 582.29 FEET TO THE EAST LINE OF SAID SE 1/4;
THENCE S00°41'01"E ALONG SAID EAST LINE FOR 375.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE EAST 1/4 CORNER OF SECTION 10;
THENCE S00°41'01"E ALONG THE EAST LINE OF SAID SE 1/4 FOR 32.92 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S00°41'01"E FOR 375.00 FEET;
THENCE S89°41'55"W FOR 582.29 FEET;
THENCE N00°52'39"W FOR 375.00 FEET;
THENCE N89°41'51"E FOR 583.56 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

A PORTION OF THE NE 1/4 AND SE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE EAST 1/4 CORNER OF SECTION 10 AND THE TRUE POINT OF BEGINNING;
THENCE S00°41'01"E ALONG THE EAST LINE OF SAID SE 1/4 FOR 32.92 FEET;
THENCE S89°41'51"W FOR 583.56 FEET;
THENCE N00°52'39"W FOR 362.21 FEET;
THENCE N87°00'09"E FOR 589.51 FEET TO THE EAST LINE OF SAID NE 1/4;
THENCE S00°00'00"W ALONG SAID EAST LINE FOR 357.00 FEET TO THE EAST 1/4 CORNER OF SECTION 10 AND THE TRUE POINT OF BEGINNING.

A PORTION OF THE NE 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE EAST 1/4 CORNER OF SECTION 10;
THENCE N00°00'00"E ALONG THE EAST LINE OF SAID NE 1/4 FOR 357.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S87°00'09"W FOR 589.51 FEET;
THENCE N49°40'29"E FOR 200.90 FEET;
THENCE N24°04'11"E FOR 595.92 FEET;
THENCE S60°52'36"E FOR 220.36 FEET TO THE EAST LINE OF SAID NE 1/4;
THENCE S00°00'00"W ALONG SAID EAST LINE FOR 536.03 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SECTION 10;
THENCE S00°49'53"E ALONG THE WEST LINE OF SAID SW 1/4 FOR 1155.39 FEET;
THENCE N89°51'19"E FOR 977.16 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°51'19"E FOR 623.00 FEET;
THENCE S00°37'07"E FOR 350.01 FEET;
THENCE S89°51'19"W FOR 623.00 FEET;
THENCE N00°37'07"W FOR 350.01 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SECTION 10;
THENCE S00°49'53"E ALONG THE WEST LINE OF SAID SW 1/4 FOR 1155.39 FEET;
THENCE N89°51'19"E FOR 189.96FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°51'19"E FOR 787.20 FEET;
THENCE S00°37'07"E FOR 307.01 FEET;
THENCE S89°51'19"W FOR 693.06 FEET MORE OR LESS TO THE EASTERLY RIGHT-OF-WAY OF LAKE SAWYER ROAD SE AND A POINT ON A CURVE TO THE RIGHT THE RADIUS OF WHICH BEARS N67°30'23"E 1896.41 FEET;
THENCE NORTHWESTERLY ALONG SAID RIGHT-OF-WAY AND THE ARC OF SAID CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 09°44'10" FOR 322.25 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SECTION 10;
THENCE N00°49'53"W ALONG THE WEST LINE OF SAID SW 1/4 FOR 802.59 FEET;
THENCE S89°51'19"W FOR 497.56 FEET TO THE TRUE POINT OF BEGINNING BEING A POINT ON THE EASTERLY RIGHT-OF- WAY OF LAKE SAWYER ROAD SE AND A POINT ON A CURVE TO THE RIGHT THE RADIUS OF WHICH BEARS N53°52'38"E 1896.41 FEET;
THENCE NORTHWESTERLY ALONG SAID RIGHT-OF-WAY AND THE ARC OF SAID CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 13°37'46" FOR 451.11 FEET;
THENCE N89°51'19"E FOR 693.06 FEET;
THENCE S00°37'07"E FOR 393.01 FEET;
THENCE S89°51'19"W FOR 477.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SECTION 10;
THENCE N00°49'53"W ALONG THE WEST LINE OF SAID SW 1/4 FOR 802.59 FEET;
THENCE S89°51'19"W FOR 974.56 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N00°37'07"W FOR 350.01 FEET;
THENCE N89°51'19"E FOR 623.00 FEET;
THENCE S00°37'07"E FOR 350.01 FEET;
THENCE S89°51'19"W FOR 623.00 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

LOT ——— PORTION THEREOF

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE CENTER 1/4 CORNER OF SAID SECTION 10;
THENCE S89°58'45"W ALONG THE NORTH LINE OF SAID SW 1/4 FOR 155.49 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S09°34'15"E FOR 360.40 FEET;
THENCE S33°14'40"E FOR 89.17 FEET;
THENCE S89°58'01"W FOR 888.83 FEET;
THENCE N00°38'14"W FOR 126.22 FEET;
THENCE N89°58'45"E FOR 330.00 FEET;
THENCE N00°38'14"W FOR 304.00 FEET TO THE NORTH LINE OF SAID SW 1/4;
THENCE N89°58'45"E ALONG SAID NORTH LINE FOR 454.80 FEET TO THE TRUE POINT OF BEGINNING.

LOT ——— PORTION THEREOF

A PORTION OF THE SW 1/4 OF SECTION 10, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SECTION 10;
THENCE N89°57'16"E ALONG THE NORTH LINE OF SAID SW 1/4 FOR 1182.82 FEET; THENCE S00°49'53"E FOR 30.00 FEET TO THE SOUTH RIGHT OF WAY LINE OF SOUTH 312TH ST. AND THE TRUE POINT OF BEGINNING;
THENCE N89°57'16"E FOR 152.83 FEET;
THENCE N89°58'45"E FOR 396.67 FEET;
THENCE S00°38'14"E FOR 400.22 FEET;
THENCE S89°58'01"W FOR 548.13 FEET;
THENCE N00°49'53"W FOR 400.29 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 10, THENCE S00°49'53"E A DISTANCE OF 430.03 FEET ALONG THE WEST LINE OF SECTION 10, THENCE N89°58'01"E A DISTANCE OF 1602.89 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°58'01"E A DISTANCE OF 312.81 FEET;
THENCE S00°37'07"E A DISTANCE OF 721.61 FEET;
THENCE S89°51'19"W A DISTANCE OF 312.80 FEET;
THENCE N00°37'07"W A DISTANCE OF 722.22 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 10;
THENCE S00°49'53"E A DISTANCE OF 430.03 FEET ALONG THE WEST LINE OF SECTION 10; THENCE N89°58'01"E A DISTANCE OF 1915.70 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°58'01"E A DISTANCE OF 301.96 FEET;
THENCE S00°37'07"E A DISTANCE OF 721.02 FEET;
THENCE S89°51'19"W A DISTANCE OF 301.96 FEET;
THENCE N00°37'07"W A DISTANCE OF 721.61 FEET TO THE TRUE POINT OF BEGINNING.

LOT ~~_____~~ PORTION THEREOF

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 10;
THENCE S00°49'53"E A DISTANCE OF 430.03 FEET ALONG THE WEST LINE OF SECTION 10; THENCE N89°58'01"E A DISTANCE OF 2217.66 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°58'01"E A DISTANCE OF 302.21 FEET;
THENCE S00°37'07"E A DISTANCE OF 720.43 FEET;
THENCE S89°51'19"W A DISTANCE OF 302.21 FEET;
THENCE N00°37'07"W A DISTANCE OF 721.02 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 48.36 TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 217.80 FEET;
THENCE N00°24'29"W A DISTANCE OF 1000.01;
THENCE N89°51'19"E A DISTANCE OF 217.80 FEET;

THENCE S00°24'29"E A DISTANCE OF 1000.01 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 266.16 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 217.80 FEET;
THENCE N00°24'29"W A DISTANCE OF 1000.01 FEET;
THENCE N89°51'19"E A DISTANCE OF 217.80 FEET;
THENCE S00°24'29"E A DISTANCE OF 1000.01 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 483.96 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 217.80 FEET;
THENCE N00°24'29"W A DISTANCE OF 1000.01 FEET;
THENCE N89°51'19"E A DISTANCE OF 217.80 FEET;
THENCE S00°24'29"E A DISTANCE OF 1000.01 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 701.76 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 217.80 FEET;
THENCE N00°24'29"W A DISTANCE OF 1000.01 FEET;
THENCE N89°51'19"E A DISTANCE OF 217.80 FEET;
THENCE S00°24'29"E A DISTANCE OF 1000.01 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 919.56 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 392.05 FEET;
THENCE N00°24'29"W A DISTANCE OF 300.01 FEET;
THENCE N89°51'19"E A DISTANCE OF 250.21 FEET;
THENCE N00°37'07"W A DISTANCE OF 700.02 FEET;
THENCE N89°51'19"E A DISTANCE OF 144.41 FEET;
THENCE S00°24'29"E A DISTANCE OF 1000.01 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET, ALONG THE CENTER SECTION LINE; THENCE S89°51'19"W A DISTANCE OF 1311.61 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°51'19"W A DISTANCE OF 602.20 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF THE MAPLE VALLEY-LAKE SAWYER ROAD;
THENCE N40°44'11"W A DISTANCE OF 237.27 FEET, ALONG THE EASTERLY RIGHT-OF-WAY OF SAID ROAD, TO A POINT ON A CURVE TO THE RIGHT, HAVING A RADIUS OF 1896.41 FEET AND A CENTRAL ANGLE OF 04°36'49" FOR 152.70 FEET;
THENCE N89°51'19"E A DISTANCE OF 849.79 FEET;
THENCE S00°24'29"E A DISTANCE OF 300.01 FEET TO THE POINT OF TRUE BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N89°27'37"W A DISTANCE OF 1241.00 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°27'37"W A DISTANCE OF 232.70 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF LAKE SAWYER RD. S.E.;
THENCE N40°44'11"W A DISTANCE OF 680.33 FEET, ALONG THE EASTERLY RIGHT-OF-WAY OF LAKE SAWYER RD. S.E.;
THENCE N89°51'19"E A DISTANCE OF 672.81 FEET;
THENCE S00°25'31"E A DISTANCE OF 519.41 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N89°27'37"W A DISTANCE OF 823.50 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°27'37"W A DISTANCE OF 417.50 FEET;
THENCE N00°25'31"W A DISTANCE OF 519.41 FEET;
THENCE N89°51'19"E A DISTANCE OF 417.50 FEET;
THENCE S00°25'10"E A DISTANCE OF 524.39 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N89°27'37"W A DISTANCE OF 410.00 FEET ALONG THE SOUTH LINE OF SECTION 10, TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°27'37"W A DISTANCE OF 413.50 FEET;
THENCE N00°25'10"W A DISTANCE OF 524.39 FEET;
THENCE N89°51'19"E A DISTANCE OF 413.50 FEET;
THENCE S00°24'49"E A DISTANCE OF 529.33 FEET TO THE TRUE POINT OF BEGINNING.

BEGINNING AT THE SOUTH QUARTER CORNER OF SECTION 10;
THENCE N89°27'37"W A DISTANCE OF 410.00 FEET, ALONG THE SOUTH LINE OF SECTION 10;
THENCE N00°24'49"W A DISTANCE OF 529.33 FEET;
THENCE N89°51'19"E A DISTANCE OF 410.00 FEET;
THENCE S00°24'29"E A DISTANCE OF 534.23 FEET TO THE POINT OF BEGINNING.

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 10, T.21N., R.6E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTH QUARTER CORNER OF SECTION 10;
THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE;
THENCE N89°51'19"E A DISTANCE OF 536.18 FEET;
THENCE S00°24'29"E A DISTANCE OF 530.28 FEET;
THENCE S89°26'01"W A DISTANCE OF 536.18 FEET TO THE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10;
THENCE N89°26'01"E A DISTANCE OF 536.18 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N00°24'29"W A DISTANCE OF 530.28 FEET;
THENCE N89°51'19"E A DISTANCE OF 411.91 FEET;
THENCE S00°24'29"E A DISTANCE OF 527.25 FEET;
THENCE S89°26'01"W A DISTANCE OF 411.90 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10;
THENCE N89°26'01"E A DISTANCE OF 948.08 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N00°24'29"W A DISTANCE OF 527.25 FEET;
THENCE N89°51'19"E A DISTANCE OF 414.29 FEET;
THENCE S00°24'29"E A DISTANCE OF 524.20 FEET;
THENCE S89°26'01"W A DISTANCE OF 414.29 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 10;
THENCE S89°26'01"W A DISTANCE OF 889.52 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°26'01"W A DISTANCE OF 416.71 FEET;
THENCE N00°24'29"W A DISTANCE OF 524.20 FEET;
THENCE N89°51'19"E A DISTANCE OF 416.71 FEET;
THENCE S00°24'29"E A DISTANCE OF 521.13 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 10;
THENCE S89°26'01"W A DISTANCE OF 470.34 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S89°26'01"W A DISTANCE OF 419.18 FEET;

THENCE N00°24'29"W A DISTANCE OF 521.13 FEET;
THENCE N89°51'19"E A DISTANCE OF 419.18 FEET;
THENCE S00°24'29"E A DISTANCE OF 518.05 FEET TO THE TRUE POINT OF BEGINNING.

BEGINNING AT THE SOUTHEAST QUARTER OF SECTION 10;
THENCE S89°26'01"W A DISTANCE OF 470.34 FEET ALONG THE SOUTH SECTION LINE;
THENCE N00°24'29"W A DISTANCE OF 518.05 FEET;
THENCE N89°51'19"E A DISTANCE OF 393.25 FEET;
THENCE S04°53'36"E A DISTANCE OF 20.09 FEET;
THENCE S03°40'17"E A DISTANCE OF 204.91 FEET;
THENCE S12°48'45"E A DISTANCE OF 297.28 FEET TO THE POINT OF BEGINNING.

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 10;
THENCE N12°48'45"W A DISTANCE OF 297.28 FEET;
THENCE N03°40'17"W A DISTANCE OF 204.91 FEET;
THENCE N04°53'36"W A DISTANCE OF 20.09 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°51'19"W A DISTANCE OF 382.29 FEET;
THENCE N00°24'29"W A DISTANCE OF 813.96 FEET;
THENCE N89°41'58"E A DISTANCE OF 98.44 FEET;
THENCE S27°02'35"E A DISTANCE OF 485.48 FEET;
THENCE S13°16'34"E A DISTANCE OF 248.00 FEET;
THENCE S04°53'36"E A DISTANCE OF 140.23 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTHEAST CORNER OF SECTION 10;
THENCE S89°26'01"W A DISTANCE OF 470.34 FEET ALONG THE SOUTH SECTION LINE; THENCE N00°24'29"E A DISTANCE OF 518.05 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°51'19"W A DISTANCE OF 256.74 FEET;
THENCE N00°24'29"W A DISTANCE OF 813.24 FEET;
THENCE N89°41'58"E A DISTANCE OF 267.70 FEET;
THENCE S00°24'29"E A DISTANCE OF 813.96 FEET;
THENCE S89°51'19"W A DISTANCE OF 10.96 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE N89°51'19"E A DISTANCE OF 1673.59 FEET TO THE TRUE POINT OF BEGINNING; THENCE N00°24'29"W A DISTANCE OF 812.51 FEET; THENCE N89°41'58"E A DISTANCE OF 267.94 FEET; THENCE S00°24'29"E A DISTANCE OF 813.24 FEET; THENCE S89°51'19"W A DISTANCE OF 267.94 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE N89°51'19"E A DISTANCE OF 1405.41 FEET TO THE TRUE POINT OF BEGINNING; THENCE N00°24'29"W A DISTANCE OF 811.78 FEET; THENCE N89°41'58"E A DISTANCE OF 268.18 FEET; THENCE S00°24'29"E A DISTANCE OF 812.51 FEET; THENCE S89°51'19"W A DISTANCE OF 268.18 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE N89°51'19"E A DISTANCE OF 1136.99 FEET TO THE TRUE POINT OF BEGINNING; THENCE N00°24'29"W A DISTANCE OF 811.05 FEET; THENCE N89°41'58"E A DISTANCE OF 268.42 FEET; THENCE S00°24'29"E A DISTANCE OF 811.78 FEET; THENCE S89°51'19"W A DISTANCE OF 268.42 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE N89°51'19"E A DISTANCE OF 868.32 FEET TO THE TRUE POINT OF BEGINNING; THENCE N00°24'29"W A DISTANCE OF 810.32 FEET; THENCE N89°41'58"E A DISTANCE OF 268.66 FEET; THENCE S00°24'29"E A DISTANCE OF 811.05 FEET; THENCE S89°51'19"W A DISTANCE OF 268.67 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE; THENCE N89°51'19"E A DISTANCE OF 536.18 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N10°55'33"E A DISTANCE OF 305.69 FEET;
THENCE N13°19'36"E A DISTANCE OF 180.44 FEET;
THENCE N22°15'21"W A DISTANCE OF 125.00 FEET;
THENCE N19°17'06"E A DISTANCE OF 155.31 FEET;
THENCE N26°13'17"W A DISTANCE OF 80.00 FEET;
THENCE N89°41'58"E A DISTANCE OF 258.24 FEET;
THENCE S00°24'29"E A DISTANCE OF 810.32 FEET;
THENCE S89°51'19"W A DISTANCE OF 332.14 FEET TO THE TRUE POINT OF BEGINNING

LOT ~~PORTION THEREOF~~

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE N00°24'29"W A DISTANCE OF 534.23 FEET; THENCE N89°51'19"E A DISTANCE OF 169.43 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N00°24'29"W A DISTANCE OF 1000.01 FEET;
THENCE N89°51'19"E A DISTANCE OF 85.79 FEET;
THENCE S09°11'49"W A DISTANCE OF 134.09 FEET;
THENCE S18°37'12"E A DISTANCE OF 381.66 FEET;
THENCE S40°36'35"E A DISTANCE OF 173.20 FEET;
THENCE S42°11'08"W A DISTANCE OF 100.00 FEET;
THENCE N89°51'19"E A DISTANCE OF 200.00 FEET;
THENCE S10°55'33"W A DISTANCE OF 305.69 FEET;
THENCE S89°51'19"W A DISTANCE OF 366.75 FEET TO THE TRUE POINT OF BEGINNING

LOT ~~PORTION THEREOF~~

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 817.66 FEET; THENCE N87°30'21"W A DISTANCE OF 1117.17 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°32'42"E A DISTANCE OF 569.37 FEET;
THENCE S89°41'58"W A DITANCE OF 354.36 FEET;
THENCE N26°13'17"W A DISTANCE OF 142.08 FEET;
THENCE N21°34'54"E A DISTANCE OF 141.43 FEET;
THENCE N04°35'09"W A DISTANCE OF 301.46 FEET;
THENCE N81°13'23"E A DISTANCE OF 145.39 FEET;
THENCE S87°30'21"E A DISTANCE OF 240.34 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SOUTHWEST AND SOUTHEAST QUARTERS OF SECTION 10, T.21N.,R.6E., W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

LOT ~~PORTION THEREOF~~

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 10; THENCE NOO 24'29"W A DISTANCE OF 534.23 FEET ALONG THE CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE S89 51'19"W A DISTANCE OF 48.36 FEET;
THENCE N00 24'29"W A DISTANCE OF 1000.01 FEET;
THENCE N89 51'19"W A DISTANCE OF 217.80 FEET;
THENCE S00 24'29"E A DISTANCE OF 1000.01 FEET;
THENCE S89 51'19"W A DISTANCE OF 169.44 FEET TO THE TRUE POINT OF BEGINNING.

LOT ~~PORTION THEREOF~~

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 10; THENCE S00 49'53"E A DISTANCE OF 430.01 FEET ALONG THE WEST SECTION LINE; THENCE N89 58'01"E A DISTANCE OF 2519.87 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89 58'01"E A DISTANCE OF 99.91 FEET;
THENCE S33 14'40"E A DISTANCE OF 230.83 FEET;
THENCE S09 29'14"E A DISTANCE OF 200.83 FEET;
THENCE S82 19'17"E A DISTANCE OF 201.32 FEET;
THENCE S09 11'49"W A DISTANCE OF 306.15 FEET;
THENCE S89 51'19"E A DISTANCE OF 402.23 FEET;
THENCE N00 37'07"E A DISTANCE OF 720.43 FEET TO THE TRUE POINT OF BEGINNING.POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 817.66 FEET; THENCE 727.60 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°32'42"E A DISTANCE OF 550.37 FEET;
THENCE S89°41'58"W A DISTANCE OF 389.02 FEET;
THENCE N00°32'42"W A DISTANCE OF 569.37 FEET;
THENCE S87°30'21"E A DISTANCE OF 389.57 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 817.66 FEET; THENCE N87°30'21"W A DISTANCE OF 324.10 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°32'42"E A DISTANCE OF 530.70 FEET;
THENCE S89°41'58"W A DISTANCE OF 402.94 FEET;
THENCE N00°32'42"W A DISTANCE OF 550.37 FEET;
THENCE S87°30'21"E A DISTANCE OF 403.50 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 817.66 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S00°52'39"E A DISTANCE OF 60.00 FEET;
THENCE S27°02'35"E A DISTANCE OF 509.38 FEET;
THENCE S89°41'58"W A DISTANCE OF 551.27 FEET;
THENCE N00°32'42"W A DISTANCE OF 530.70 FEET;
THENCE S87°30'21"E A DISTANCE OF 324.10 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 505.39 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°52'39"E A DISTANCE OF 312.27 FEET;
THENCE N87°30'21"W A DISTANCE OF 727.60 FEET;
THENCE N09°42'48"E A DISTANCE OF 314.22 FEET;
THENCE S87°30'21"E A DISTANCE OF 669.75 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 121.66 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°52'39"E A DISTANCE OF 383.73 FEET;
THENCE N87°30'21"W A DISTANCE OF 669.75 FEET;
THENCE N09°42'48"E A DISTANCE OF 386.12 FEET;
THENCE S87°30'21"E A DISTANCE OF 598.66 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 121.66 FEET; THENCE N87°30'21"W A DISTANCE OF 598.66 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S09°42'48"W A DISTANCE OF 700.34 FEET;
THENCE N87°30'21"W A DISTANCE OF 629.90 FEET;
THENCE N48°25'54"E A DISTANCE OF 999.07 FEET TO THE TRUE POINT OF BEGINNING.

PORTION THEREOF

LOT

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 583.71 FEET ALONG THE CENTER SECTION LINE; THENCE S00°52'39"E A DISTANCE OF 121.66 FEET; THENCE N87°30'21"W A DISTANCE OF 598.66 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S48°25'54"W A DISTANCE OF 999.07 FEET;
THENCE S81°13'23"W A DISTANCE OF 145.39 FEET;
THENCE N49°43'44"W A DISTANCE OF 212.37 FEET;
THENCE N18°17'14"E A DISTANCE OF 102.51 FEET;
THENCE N59°13'36"E A DISTANCE OF 87.82 FEET;
THENCE N88°36'06"E A DISTANCE OF 330.33 FEET;
THENCE N05°27'13"E A DISTANCE OF 358.33 FEET;
THENCE N85°59'16"E A DISTANCE OF 582.71 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

A PORTION OF THE NORTHEAST AND SOUTHEAST QUARTERS OF SECTION 10, TOWNSHIP 21 N., RANGE 6 E., W.M. IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10, THENCE S89°58'01"W A DISTANCE OF 1323.26 FEET ALONG THE CENTER SECTION LINE; THENCE S03°24'55"W A DISTANCE OF 105.85 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S89°59'16"W A DISTANCE OF 432.70 FEET;
THENCE N24°46'10"E A DISTANCE OF 1037.69 FEET;
THENCE S49°51'41"E A DISTANCE OF 63.90 FEET;
THENCE S03°24'55"W A DISTANCE OF 872.31 FEET TO THE TRUE POINT OF BEGINNING.

LOT ~~_____~~ PORTION THEREOF

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10, THENCE S89°58'01"W A DISTANCE OF 1698.59 FEET ALONG THE CENTER SECTION LINE; THENCE S24°46'10"W A DISTANCE OF 149.48 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N34°47'31"W A DISTANCE OF 240.06 FEET;
THENCE N10°53'37"E A DISTANCE OF 140.13 FEET;
THENCE N23°27'21"E A DISTANCE OF 738.36 FEET;
THENCE S79°59'06"E A DISTANCE OF 216.43 FEET;
THENCE S49°51'41"E A DISTANCE OF 50.00 FEET;
THENCE S24°46'10"W A DISTANCE OF 1037.69 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10;
THENCE S89°58'01"W A DISTANCE OF 1323.26 FEET ALONG THE CENTER SECTION LINE;
THENCE N03°24'55"E A DISTANCE OF 209.15 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S88°48'37"E A DISTANCE OF 724.29 FEET;
THENCE S00°52'39"E A DISTANCE OF 314.99 FEET;
THENCE N87°30'21"W A DISTANCE OF 598.66 FEET;
THENCE S85°59'16"W A DISTANCE OF 150.00 FEET;
THENCE N03°24'55"E A DISTANCE OF 315.00 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

A PORTION OF THE NORTHEAST QUARTER OF SECTION 10, TOWNSHIP 21 N., RANGE 6 E., W.M. IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

LOT ~~~~~ PORTION THEREOF

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10;
THENCE S89°58'01"W A DISTANCE OF 1910.03 FEET ALONG THE CENTER SECTION LINE; THENCE N10°53'37"E A DISTANCE OF 202.80 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N50°46'31"W A DISTANCE OF 275.08 FEET;
THENCE N16°10'45"E A DISTANCE OF 701.94 FEET;
THENCE S60°27'16"E A DISTANCE OF 340.97 FEET;
THENCE S79°59'06"E A DISTANCE OF 15.00 FEET;
THENCE S23°27'21"W A DISTANCE OF 738.36 FEET TO THE TRUE POINT OF BEGINNING.

LOT ~~~~~ PORTION THEREOF

COMMENCING AT THE NORTH QUARTER CORNER OF SECTION 10; THENCE S00°24'29"E A DISTANCE OF 1305.43 FEET ALONG THE CENTER SECTION LINE; THENCE N89°36'57"E A DISTANCE OF 470.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S46°17'00"E A DISTANCE OF 310.76 FEET;
THENCE S60°27'16"E A DISTANCE OF 93.50 FEET;
THENCE S16°10'45"W A DISTANCE OF 701.94 FEET;
THENCE N33°14'36"W A DISTANCE OF 190.31 FEET;
THENCE N08°37'27"W A DISTANCE OF 154.64 FEET;
THENCE S78°25'11"W A DISTANCE OF 206.00 FEET;
THENCE N18°14'32"E A DISTANCE OF 699.46 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 10-21-6

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 1323.26 FEET ALONG THE CENTER SECTION LINE; THENCE N03°24'55"E A DISTANCE OF 209.15 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N03°24'55"E A DISTANCE OF 300.00 FEET;
THENCE S88°07'13"E A DISTANCE OF 868.05 FEET;
THENCE S24°04'11"W A DISTANCE OF 25.00 FEET;
THENCE S49°40'29"W A DISTANCE OF 200.90 FEET;
THENCE S00°52'39"E A DISTANCE OF 133.22 FEET;
THENCE N88°48'37"W A DISTANCE OF 724.29 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 1323.26 FEET ALONG THE CENTER SECTION LINE; THENCE N03°24'55"E A DISTANCE OF 509.15 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N03°24'55"E A DISTANCE OF 239.63 FEET;
THENCE S87°59'16"E A DISTANCE OF 958.43 FEET;
THENCE S24°04'11"W A DISTANCE OF 256.30 FEET;
THENCE N88°07'13"W A DISTANCE OF 868.05 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE EAST QUARTER CORNER OF SECTION 10; THENCE S89°58'01"W A DISTANCE OF 1323.26 FEET ALONG THE CENTER SECTION LINE; THENCE N03°24'55"E A DISTANCE OF 748.78 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N03°24'55"E A DISTANCE OF 17.68 FEET;
THENCE N14°46'34"E A DISTANCE OF 211.48 FEET;
THENCE S87°59'16"E A DISTANCE OF 1002.01 FEET;
THENCE S24°04'11"W A DISTANCE OF 241.61 FEET;
THENCE N87°59'16"W A DISTANCE OF 958.43 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE NORTHEAST CORNER OF SECTION 10; THENCE SOUTH A DISTANCE OF 1750.43 FEET ALONG THE EAST LINE OF SECTION 10, TO THE TRUE POINT OF BEGINNING;
THENCE N60°52'35"W A DISTANCE OF 220.36 FEET;
THENCE S24°04'11"W A DISTANCE OF 73.00 FEET;
THENCE N87°59'16"W A DISTANCE OF 1002.01 FEET;
THENCE N14°46'34"E A DISTANCE OF 198.00 FEET;
THENCE S88°07'13"E A DISTANCE OF 1093.46 FEET TO A POINT ON A CURVE TO THE LEFT, HAVING A RADIUS OF 2849.56 FEET AND A CENTRAL ANGLE OF 01°18'53"; THENCE ALONG SAID CURVE 65.39 FEET; THENCE S19°18'57"E A DISTANCE OF 179.52 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE NORTHEAST CORNER OF SECTION 10; THENCE SOUTH A DISTANCE OF 1277.69 FEET ALONG THE EAST LINE OF SECTION 10; THENCE N88°07'13"W A DISTANCE OF 148.35 FEET TO THE TRUE POINT OF BEGINNING AND A POINT ON A CURVE TO THE LEFT HAVING A RADIUS OF 2849.56 FEET AND A CENTRAL ANGLE OF 05°08'16"; THENCE ALONG SAID CURVE FOR 255.53 FEET;
THENCE N88°07'13"W A DISTANCE OF 1093.46 FEET;
THENCE N14°46'34"E A DISTANCE OF 159.14 FEET;
THENCE N89°36'57"E A DISTANCE OF 404.70 FEET;
THENCE N13°31'30"E A DISTANCE OF 74.30 FEET;
THENCE S88°07'13"E A DISTANCE OF 562.55 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE NORTHEAST CORNER OF SECTION 10; THENCE SOUTH A DISTANCE OF 810.73 FEET ALONG THE EAST LINE OF SECTION 10; THENCE N88°07'13"W A DISTANCE OF 215.11 FEET TO THE TRUE POINT OF BEGINNING; THENCE ALONG A CURVE TO THE LEFT, HAVING A RADIUS OF 2849.56 FEET AND A CENTRAL ANGLE OF 09°32'21", FOR 474.42 FEET;
THENCE N88°07'13"W A DISTANCE OF 562.55 FEET;
THENCE N13°31'30"E A DISTANCE OF 466.04 FEET;
THENCE N41°20'17"E A DISTANCE OF 13.30 FEET;
THENCE S88°07'13"E A DISTANCE OF 377.96 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE NORTHEAST CORNER OF SECTION 10; THENCE S89°16'02"W A DISTANCE OF 248.25 FEET ALONG THE NORTH LINE OF SECTION 10 TO THE TRUE POINT OF BEGINNING;
THENCE S02°21'00"E A DISTANCE OF 764.36 FEET TO A POINT OF CURVATURE TO THE LEFT HAVING A RADIUS OF 2849.56 FEET AND A

CENTRAL ANGLE OF 00°44'26"; THENCE ALONG SAID CURVE FOR 36.83 FEET;
THENCE N88°07'13"W A DISTANCE OF 377.96 FEET;
THENCE N41°20'17"E A DISTANCE OF 44.11 FEET;
THENCE N16°44'58"E A DISTANCE OF 187.10 FEET;
THENCE N10°10'16"W A DISTANCE OF 204.52 FEET;
THENCE N21°22'35"E A DISTANCE OF 400.10 FEET;
THENCE N89°16'02"E A DISTANCE OF 151.75 FEET TO THE TRUE POINT OF BEGINNING.

BEGINNING AT THE NORTHEAST CORNER OF SECTION 10;
THENCE SOUTH A DISTANCE OF 1599.27 FEET;
THENCE N19°18'55"W A DISTANCE OF 36.87 FEET TO A POINT OF CURVATURE TO THE RIGHT HAVING A RADIUS OF 2799.56 FEET AND A CENTRAL ANGLE OF 16°43'57"; THENCE ALONG SAID CURVE 817.58 FEET; THENCE N02°21'05"W A DISTANCE OF 762.74 FEET; THENCE N89°16'02"E A DISTANCE OF 198.25 FEET TO THE POINT OF BEGINNING.

TAX PARCEL 102106-9016:

Fifty foot abandoned railroad right-of-way across the East half of the Northeast quarter of Section 10, Township 21 North, Range 6 East, W.M.

SECTION 11-21-6

A PORTION OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SECTION 11;
THENCE S00°41'01"E FOR 1329.83 FEET ALONG THE WEST SECTION LINE OF SAID SECTION 11;
THENCE N89°31'48"E FOR 667.84 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N89°31'48"E FOR 97.17 FEET;
THENCE S39°31'48"W FOR 110.00 FEET;
THENCE S50°28'12"E FOR 60.00 FEET;
THENCE N39°31'48"E FOR 160.35 FEET;
THENCE N89°31'48"E FOR 492.34 FEET;
THENCE S00°23'19"E FOR 413.95 FEET;
THENCE S89°19'13"W FOR 333.38 FEET;
THENCE S00°27'46"E FOR 246.08 FEET;
THENCE S89°19'13"W FOR 333.06 FEET;
THENCE N00°32'12"W FOR 662.47 FEET TO THE TRUE POINT OF BEGINNING.

THE EAST 1/2 OF THE NW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA.

THE WEST 1/2 OF THE NW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA.

THE WEST 1/2 OF THE SW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA.

SECTION 11-21-6

THE EAST 1/2 OF THE SW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA.

THE WEST 1/2 OF THE SE 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA.

A PORTION OF THE SW 1/4 OF THE SW 1/4 OF SECTION 11, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 11;
THENCE N89°06'34"E FOR 996.66 FEET ALONG THE SOUTH LINE OF SAID SECTION 11 TO THE TRUE POINT OF BEGINNING;
THENCE N00°27'46"W FOR 907.33 FEET;
THENCE N89°19'13"E FOR 333.38 FEET;
THENCE S00°23'19"E FOR 348.97 FEET;
THENCE S66°55'41"W FOR 172.92 FEET;
THENCE S00°20'09"E FOR 491.86 FEET TO THE SOUTH LINE OF SAID SEC. 11;
THENCE S89°06'34"W ALONG SAID SOUTH LINE FOR 172.22 FEET TO THE TRUE POINT OF BEGINNING.

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Recording No. 20001130900007

Volume 103 Page 97 (Original)
Recording No. 9504209010

SECTION 11-21-6

A PORTION OF THE SW 1/4 OF THE SE 1/4 OF SECTION 11, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 11;
THENCE N87°39'05"W ALONG THE SOUTH LINE THEREOF FOR 1315.97 FEET TO THE EAST LINE OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION; THENCE N00°24'24"E ALONG SAID LINE FOR 1337.98 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°24'24"W FOR 340.00 FEET;
THENCE N89°33'10"W FOR 791.70 FEET, MORE OR LESS, TO THE EASTERLY LINE OF STATE HWY. 169;
THENCE NORTHERLY ALONG THE EASTERLY LINE OF STATE HWY. 169 AND ALONG THE EASTERLY LINE OF BLACK DIAMOND-RAVENSDALE ROAD TO A POINT THAT BEARS N88°51'45"W FROM THE TRUE POINT OF BEGINNING; THENCE S88°51'45"E FOR 677.43 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF THE SE 1/4 OF SECTION 11, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHEAST CORNER OF SAID SECTION 11;
THENCE N87°39'05"W ALONG THE SOUTH LINE THEREOF FOR 1315.97 FEET TO THE EAST LINE OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION;
THENCE N00°24'24"E ALONG SAID EAST LINE FOR 997.98 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°24'24"W FOR 410.00 FEET;
THENCE N84°35'15"W FOR 609.36 FEET;
THENCE N10°18'00"E FOR 200.00 FEET;
THENCE N79°42'00"W FOR 209.05 FEET, MORE OR LESS, TO THE EASTERLY LINE OF STATE HWY. 169;
THENCE NORTHERLY ALONG SAID EASTERLY LINE TO A POINT THAT BEARS N89°33'10"W FROM THE TRUE POINT OF BEGINNING;
THENCE S89°33'10"E FOR 791.70 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

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Recording No. 20001130900007 Recording No. 9504209010

SECTION 11-21-6

A PORTION OF THE SW 1/4 OF THE SE 1/4 OF SECTION 11, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 11;
THENCE S87°39'05"E ALONG THE SOUTH LINE THEREOF FOR 398.99 FEET, MORE OR LESS, TO A POINT ON THE EASTERLY LINE OF STATE HWY. 169; THENCE N10°18'00"E ALONG SAID EASTERLY LINE FOR 309.65 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N10°18'00"E FOR 344.51 FEET;
THENCE S79°42'00"E FOR 200.00 FEET;
THENCE S84°35'15"E FOR 609.36 FEET, MORE OR LESS, TO THE EAST LINE OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION;
THENCE S00°24'24"W ALONG SAID EAST LINE FOR 261.98 FEET;
THENCE N88°55'18"W FOR 863.31 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF THE SE 1/4 OF SECTION 11, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 11;
THENCE S87°39'05"E ALONG THE SOUTH LINE THEREOF FOR 398.99 FEET, MORE OR LESS, TO A POINT ON THE EASTERLY LINE OF STATE HWY. 169 AND TO THE TRUE POINT OF BEGINNING;
THENCE N10°18'00"E ALONG SAID EASTERLY LINE FOR 309.65 FEET;
THENCE S88°55'18"E FOR 863.31 FEET, MORE OR LESS, TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF THE PACIFIC COAST RAILROAD AND A POINT ON A CURVE TO THE LEFT, THE RADIUS POINT OF WHICH BEARS S39°28'09"E 650.00 FEET; THENCE ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 34°03'30", FOR 386.38 FEET TO A POINT ON THE SOUTH LINE OF SAID SECTION 11; THENCE N87°39'05"W ALONG SAID SOUTH LINE FOR 708.98 FEET, MORE OR LESS, TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 11, TOWNSHIP 21 N., RANGE 6 E., W.M. IN KING COUNTY WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N87°39'05"W A DISTANCE OF 895.38 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N87°39'05"W A DISTANCE OF 628.58 FEET TO A POINT ON A CURVE, THE RADIUS OF WHICH BEARS S73°31'39"E A DISTANCE OF 650.00 FEET;
THENCE NORTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 34°03'30", FOR 386.38 FEET;
THENCE S69°49'26"E A DISTANCE OF 78.30 FEET;
THENCE N48°26'37"E A DISTANCE OF 473.24 FEET;
THENCE S00°52'57"W A DISTANCE OF 630.22 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N87°39'05"W A DISTANCE OF 596.34 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N87°39'05"W A DISTANCE OF 299.04 FEET;
THENCE N00°52'57"E A DISTANCE OF 630.22 FEET;
THENCE N48°26'37"E A DISTANCE OF 21.06 FEET;
THENCE NORTHEASTERLY ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 553.69 FEET AND A CENTRAL ANGLE OF 33°03'37", FOR 319.48 FEET; THENCE S00°52'57"W A DISTANCE OF 789.75 FEET TO THE TRUE POINT OF BEGINNING.

LOT 14:
COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N87°39'05"W A DISTANCE OF 321.55 FEET ALONG THE SOUTH SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N87°39'05"W A DISTANCE OF 274.79 FEET;
THENCE N00°52'57"E A DISTANCE OF 789.75 FEET TO A POINT ON A CURVE, THE RADIUS OF WHICH BEARS S08°29'46"E A DISTANCE OF 553.69 FEET;
THENCE EASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 28°50'24", FOR 278.70 FEET;
THENCE S00°52'57"W A DISTANCE 772.55 FEET TO THE TRUE POINT OF BEGINNING.

BEGINNING AT THE S.E. CORNER OF SECTION 11;
THENCE N87°39'05"W A DISTANCE OF 321.55 FEET;
THENCE N00°52'57"E A DISTANCE OF 772.55 FEET TO A POINT ON A CURVE, THE RADIUS OF WHICH BEARS S20°20'38"W A DISTANCE OF 553.69 FEET;
THENCE SOUTHEASTERLY ALONG THE ARC OF SAID CURVE, THROUGH A CENTRAL ANGLE OF 22°07'57", FOR 213.88 FEET;
THENCE S47°31'25"E A DISTANCE OF 185.00 FEET;
THENCE S00°52'57"W A DISTANCE OF 550.00 FEET TO THE POINT OF BEGINNING.

COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N87°39'05"W A DISTANCE OF 895.38 FEET ALONG THE SOUTH SECTION LINE;
THENCE N00°52'57"E A DISTANCE OF 630.22 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S48°26'37"W A DISTANCE OF 473.24 FEET;
THENCE N69°49'26"W A DISTANCE OF 78.30 FEET;
THENCE N00°24'24"E A DISTANCE OF 1011.98 FEET;
THENCE S88°51'45"E A DISTANCE OF 211.68 FEET;
THENCE S00°24'24"W A DISTANCE OF 719.44 FEET;
THENCE S89°35'36"E A DISTANCE OF 213.91 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE S.E. CORNER OF SECTION 11;

THENCE N87°39'05"W A DISTANCE OF 895.38 FEET ALONG THE SOUTH SECTION LINE;
THENCE N00°52'57"E A DISTANCE OF 630.22 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N89°35'36"W A DISTANCE OF 213.91 FEET;
THENCE N00°24'24"E A DISTANCE OF 719.44 FEET;
THENCE S88°51'45"E A DISTANCE OF 309.38 FEET; **
NCE S00°24'24"W A DISTANCE OF 641.61 FEET TO A POINT ON A CURVE, THE RADIUS
WHICH BEARS S31°13'55"E A DISTANCE OF 553.69 FEET;
THENCE SOUTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 10°19'28", FOR 99.77 FEET;
THENCE S48°26'37"W A DISTANCE OF 21.06 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N00°52'57"E A DISTANCE OF 550.00 FEET ALONG THE EAST SECTION LINE;
THENCE N47°31'25"W A DISTANCE OF 185.00 FEET;
THENCE NORTHWESTERLY ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 553.69 FEET AND A CENTRAL ANGLE OF 27°14'38", A DISTANCE OF 263.28 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING ALONG SAID CURVE A DISTANCE OF 449.02 FEET;
THENCE N00°24'24"E A DISTANCE OF 641.61 FEET;
THENCE S88°51'45"E A DISTANCE OF 432.16 FEET;
THENCE S00°24'24"W A DISTANCE OF 572.24 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE S.E. CORNER OF SECTION 11;
THENCE N00°52'57"E A DISTANCE OF 550.00 FEET ALONG THE EAST SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N47°31'25"W A DISTANCE OF 185.00 FEET;
THENCE NORTHWESTERLY ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 553.69 FEET AND A CENTRAL ANGLE OF 27°14'38", A DISTANCE OF 263.38 FEET;
CE N00°24'24"E A DISTANCE OF 572.24 FEET;
CE S88°51'45"E A DISTANCE OF 373.45 FEET;
THENCE S00°52'57"W A DISTANCE OF 815.70 FEET TO THE TRUE POINT OF BEGINNING.

** NOTE: legal descriptions corrected by "AFFIDAVIT OF CORRECTION OF SURVEY" recorded under King County recording number 20000914001054.

A PORTION OF THE SOUTHWEST QUARTER OF SECTION 11, T.21 N., R.6 E.,W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 11; THENCE N00°05'20"W A DISTANCE OF 793.10 FEET ALONG THE CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE NORTHWESTERLY ALONG A CURVE TO THE LEFT, HAVING A RADIUS WHICH BEARS S53°16'47"W A DISTANCE OF 1323.06 FEET, THROUGH A CENTRAL ANGLE OF 37°44'52" FOR 871.66 FEET;
THENCE N61°41'29"E A DISTANCE OF 597.04 FEET;
THENCE S17°30'30"E A DISTANCE OF 262.55 FEET;
THENCE N89°31'47"E A DISTANCE OF 100.81 FEET;
THENCE S00°05'20"E A DISTANCE OF 517.25 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 11; THENCE N00°05'20"W A DISTANCE OF 1310.35 FEET ALONG THE CENTER SECTION LINE; THENCE S89°31'48"W A DISTANCE OF 100.81 FEET; THENCE N17°30'30"W A DISTANCE OF 262.55 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S61°41'29"W A DISTANCE OF 597.04 FEET;
THENCE N02°17'29"W A DISTANCE OF 573.32 FEET;
THENCE N89°56'46"E A DISTANCE OF 457.03 FEET;
THENCE S17°30'30"E A DISTANCE OF 304.26 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE N89°56'46"E A DISTANCE OF 1872.53 FEET ALONG THE CENTER SECTION LINE; THENCE S00°05'25"E A DISTANCE OF 300.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N89°54'35"E A DISTANCE OF 394.35 FEET;
THENCE S17°30'30"E A DISTANCE OF 493.34 FEET;
THENCE S89°56'46"W A DISTANCE OF 542.03 FEET;
THENCE N00°05'25"W A DISTANCE OF 470.37 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE SOUTH QUARTER CORNER OF SECTION 11; THENCE N00°05'20"W A DISTANCE OF 1310.35 FEET ALONG THE CENTER SECTION LINE; THENCE S89°31'48"W A DISTANCE OF 100.81 FEET; THENCE N17°30'30"W A DISTANCE OF 566.81 FEET; THENCE S89°56'46"W A DISTANCE OF 457.03 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S02°17'29"E A DISTANCE OF 573.32 FEET;
THENCE N74°28'05"W A DISTANCE OF 426.50 FEET;

THENCE NORTHWESTERLY ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 1382.39 FEET AND A CENTRAL ANGLE OF 04°47'33", FOR 115.63 FEET;
THENCE N19°17'37"E A DISTANCE OF 447.89 FEET;
THENCE N89°56'46"E A DISTANCE OF 350.00 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE N89°56'46"E A DISTANCE OF 1872.53 FEET ALONG THE CENTER SECTION LINE; THENCE S00°05'25"E A DISTANCE OF 300.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°05'25"E A DISTANCE OF 470.37 FEET;
THENCE S89°56'46"W A DISTANCE OF 265.00 FEET;
THENCE N44°28'32"W A DISTANCE OF 600.45 FEET;
THENCE N86°28'35"E A DISTANCE OF 686.23 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE N89°56'46"E A DISTANCE OF 1187.53 FEET ALONG THE CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°56'46"E A DISTANCE OF 685.00 FEET;
THENCE S00°05'25"E A DISTANCE OF 300.00 FEET;
THENCE S86°28'35"W A DISTANCE OF 686.23 FEET;.
THENCE N00°05'25"W A DISTANCE OF 341.53 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE N89°56'46"E A DISTANCE OF 1187.53 FEET ALONG THE CENTER SECTION LINE; THENCE S00°05'25"E A DISTANCE OF 341.53 FEET; THENCE S44°28'32"E A DISTANCE OF 250.45 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING S44°28'32"E A DISTANCE OF 350.00 FEET;
THENCE S19°17'37"W A DISTANCE OF 447.89 FEET TO A POINT ON A CURVE, THE RADIUS OF WHICH BEARS N20°19'28"E A DISTANCE OF 1382.39 FEET; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 25°09'12", FOR 606.88 FEET;
THENCE N49°45'38"E A DISTANCE OF 534.79 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE N89°56'46"E A DISTANCE OF 465.58 FEET ALONG THE CENTER SECTION LINE ; THENCE S24°52'05"E A DISTANCE OF 525.80 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N59°24'51"E A DISTANCE OF 582.11 FEET;
THENCE S00°05'25"E A DISTANCE OF 160.00 FEET;
THENCE S44°28'32"E A DISTANCE OF 250.45 FEET;
THENCE S49°45'38"W A DISTANCE OF 534.79 FEET TO A POINT ON A CURVE, THE RADIUS OF WHICH BEARS N45°28'40"E A DISTANCE OF 1382.39 FEET; THENCE NORTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 19°39'15", FOR 474.20 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11;
THENCE N89°56'46"E A DISTANCE OF 465.58 FEET ALONG THE CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°56'46"E A DISTANCE OF 721.95 FEET;
THENCE S00°05'25"E A DISTANCE OF 181.54 FEET;
THENCE S59°24'51"W A DISTANCE OF 582.11 FEET;
THENCE N24°52'05"W A DISTANCE OF 525.80 FEET TO THE TRUE POINT OF BEGINNING.

BEGINNING AT THE WEST QUARTER CORNER OF SECTION 11;
THENCE N89°56'46"E A DISTANCE OF 355.41 FEET ALONG THE CENTER SECTION LINE;
THENCE S24°52'05"E A DISTANCE OF 519.56 FEET;
THENCE S89°56'46"W A DISTANCE OF 568.28 FEET;
THENCE N00°41'01"W A DISTANCE OF 471.62 FEET TO THE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE S00°41'01"E A DISTANCE OF 471.62 FEET ALONG THE WEST SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N89°56'46"E A DISTANCE OF 568.28 FEET;
THENCE S24°52'05"E A DISTANCE OF 52.48 FEET; THENCE SOUTH-WESTERLY ALONG A CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 1482.39 FEET AND A CENTRAL ANGLE OF 12°54'56", FOR 334.16 FEET;
THENCE S89°56'46"W A DISTANCE OF 759.74 FEET;
THENCE N00°41'01"W A DISTANCE OF 332.66 FEET ALONG THE WEST SECTION LINE TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE S00°41'01"E A DISTANCE OF 804.28 FEET ALONG THE WEST SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N89°56'46"E A DISTANCE OF 759.74 FEET TO A POINT ON A CURVE TO THE LEFT, THE RADIUS OF WHICH BEARS N52°12'59"E A DISTANCE OF 1482.39 FEET; THENCE SOUTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 07°50'49", FOR 203.02 FEET TO A POINT ON A CURVE TO THE RIGHT, THE RADIUS OF WHICH BEARS S78°38'19"W A DISTANCE OF 377.35 FEET; THENCE SOUTHERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 15°48'35", FOR 104.12 FEET;
THENCE S89°56'46"W A DISTANCE OF 897.92 FEET;
THENCE N00°41'01"W A DISTANCE OF 255.20 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE S00°41'01"E A DISTANCE OF 1059.48 FEET ALONG THE WEST SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N89°56'46"E A DISTANCE OF 897.92 FEET TO A POINT ON A CURVE TO THE RIGHT, THE RADIUS OF WHICH BEARS N85°33'06"W A DISTANCE OF 377.35 FEET; THENCE SOUTHWESTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 35°04'54", FOR 231.05 FEET;
THENCE S39°31'48"W A DISTANCE OF 70.00 FEET;
THENCE S89°31'48"W A DISTANCE OF 765.00 FEET ALONG THE WEST SECTION LINE;
THENCE N00°41'01"W A DISTANCE OF 270.35 FEET TO THE TRUE POINT OF BEGINNING.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE S00°41'01"E A DISTANCE OF 1329.83 FEET ALONG THE WEST SECTION LINE; THENCE N89°31'48"E A DISTANCE OF 843.32 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N39°31'48"E A DISTANCE OF 19.65 FEET; THENCE ALONG A CURVE TO THE RIGHT, SAID CURVE HAVING A RADIUS OF 377.35 FEET AND A CENTRAL ANGLE OF 54°03'09", FOR 355.99 FEET TO A POINT ON A CURVE TO THE LEFT, THE RADIUS OF WHICH BEARS N30°36'03"E A DISTANCE OF 1482.39 FEET; THENCE SOUTHEASTERLY ALONG SAID CURVE, THROUGH A CENTRAL ANGLE OF 15°04'08" FOR 389.87 FEET;
THENCE S12°42'31"E A DISTANCE OF 633.59 FEET;
THENCE S66°47'23"W A DISTANCE OF 355.46 FEET;
THENCE N00°23'19"W A DISTANCE OF 762.93 FEET;
THENCE S89°31'48"W A DISTANCE OF 492.34 FEET TO THE TRUE POINT OF BEGINNING, TOGETHER WITH THE AREA BETWEEN THE "Y"

OF THE RAILROAD SPUR EXEPTION AND THE BURLINGTON NORTHERN R.R. RIGHT-OF-WAY.

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 11; THENCE S00°41'01"E A DISTANCE OF 1329.83 FEET ALONG THE WEST SECTION LINE;
THENCE N89°31'48"E A DISTANCE OF 1335.66 FEET;
THENCE S00°23'19"E A DISTANCE OF 762.93 FEET;
THENCE N66°47'23"E A DISTANCE OF 355.46 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N12°42'31"W A DISTANCE OF 633.59 FEET;
THENCE S74°28'05"E A DISTANCE OF 426.50 FEET; THENCE SOUTHEASTERLY ALONG A TANGENT CURVE TO THE RIGHT, HAVING A RADIUS OF 1223.06 FEET, THROUGH A CENTRAL ANGLE OF 13°59'25" FOR 298.64 FEET;
THENCE S27°06'26"W A DISTANCE OF 183.54 FEET;
THENCE S57°41'21"W A DISTANCE OF 161.37 FEET;
THENCE S66°47'23"W A DISTANCE OF 355.46 FEET TO THE TRUE POINT OF BEGINNING.

TAX PARCEL 112106-9097:
Lot 1 of Black Diamond Short Plat 89-52; Recording #8912089006.

TAX PARCEL 112106-9099:
Lot 4 of Black Diamond Short Plat 89-52; Recording #8912089006.

TAX PARCEL 112106-9096:
Lot 2 of Black Diamond Short Plat 89-52; Recording #8912089006.

TAX PARCEL 112106-9017:

Abandoned railroad right-of-way over the Southwest quarter and the Southwest quarter of the Southeast quarter of Section 11, Township 21 North, Range 6 East, W.M., King County, Washington.

TAX PARCEL 112106-9024:
Abandoned railroad right-of-way "wye" over the West half of the Southwest quarter of Section 11, Township 21 North, Range 6 East, W.M., King County, Washington

TAX PARCEL 112106-9009:
Portion of the North half of the South half of Section lying westerly of State Hwy 5 and easterly of a line 400 feet westerly of parallel with said highway less portion lying north of a line beginning S 17-08-00 E, 1113 feet of northeasterly corner, etc.

TAX PARCEL 112106-9039:
Parcel 1 of Black Diamond Lot-Line Adjustment No. 97-01-LLA recorded under recording number 9708111559 and more particularly shown in R.O.S. in Vol. 115 Pg. 274, Rec. No. 9707119004.

PARCEL 1
(New Legal Description for "New" Tax Lot 112106-9039-02)

That portion of the south half of Section 11, Township 21 North, Range 6 East, W.M., in King County Washington, more particularly described as follows:

Beginning at the intersection of the north line of the southwest quarter of the above named section with the westerly boundary of Primary State Highway No. 5;
and running thence south 17 degrees 08 minutes east a distance of 883.12 feet to the point of true beginning;
thence south 17 degrees 18 minutes east a distance of 230 feet;
thence south 72 degrees 52 minutes west a distance of 400 feet;
thence north 17 degrees 08 minutes west a distance of 430 feet;
thence south 80 degrees 34 minutes east a distance of 447.21 feet to the true point of beginning; AND

That portion of the south half of Section 11, Township 21 North, Range 6 East, W.M., in King County, Washington, described as follows:

Beginning at the intersection of the north line of the southwest quarter of said Section with the westerly boundary of Primary State Highway No. 5;
and running thence south 17 degrees 08 minutes east a distance of 683.12 feet to the true point of beginning;
thence south 17 degrees 08 minutes east a distance of 200 feet;
thence north 80 degrees 34 minutes 06 seconds west a distance of 447.21 feet, more or less, to intersect a line from which the true point of beginning bears north 72 degrees 52 minutes east;
thence north 72 degrees 52 minutes east 400 feet to the true point of beginning;

AND LESS any portion of the following:

That portion of the south 1/2 of Section 11, Township 21 North, Range 6 East, Willamete Meridian, described as follows:

Beginning at the intersection of the north line of the southwest 1/4 of said section with the westerly boundary of primary state Highway No. 5 and running thence south 17 degrees 08 minutes east a distance of 683.12 feet to the true point of beginning; thence continuing south 17 degrees 08 minutes east a distance of 150 feet; thence south 72 degrees 52 minutes west a distance of 240.00 feet; thence north 17 degrees 08 minutes west a distance of

150.00 feet; thence north 72 degrees 52 minutes east a distance of 240.00 feet to the true point of beginning;

AND LESS any portion of the following:

A parcel in the southeast quarter of Section 11, Township 21 North, Range 6 East, W.M., in King County, Washington, described more particularly as follows:

Beginning at the center of Section 11, said point being a car axle within the State Highway No. 5 right of way;
thence south 72 degrees 27 minutes 10 seconds west a distance of 23.38 feet to the center of concrete pavement of said State Highway;
thence south 17 degrees 32 minutes 50 seconds east, along the centerline of State Highway for a distance of 1,047.81 feet to a point on the said State Highway centerline;
thence south 72 degrees 27 minutes 10 seconds west a distance of 30.0 feet to the westerly right of way of the State Highway and the true point of beginning;
thence south 72 degrees 27 minutes 10 west, a distance of 200.0 feet;
thence south 17 degrees 32 minutes 50 seconds east, a distance of 200.00 feet;
thence north 72 degrees 27 minutes 10 seconds east, a distance of 200.00 feet and a point on the westerly right of way of said State Highway;
thence north 17 degrees 32 minutes 50 seconds west along the said right of way, a distance of 200.00 feet and to the true point of beginning and containing 0.92 acres.

TAX PARCEL: 112106-9044:
That part of the southwest quarter of the southeast quarter of Section 11, Township 21 North, Range 6 East, W.M., in King County, Washington, described as follows:

Beginning at the south quarter corner of said Section 11;
thence south 87°38'54" east 366.46 feet along the south line thereof to the centerline of Primary State Highway No. 5;
thence along said centerline north 10°18' east 654.47 feet;
thence south 79°42' east 30 feet to the easterly right of way line of said highway and the true point of beginning;
thence continuing south 79°42' east 200 feet;
thence north 10°18' east 200 feet;
thence north 79°42' west 208.96 feet, more or less, to the easterly line of said Primary State Highway No. 5;
thence southerly along the said easterly line of said highway 200.39 feet, more or less, to the true point of beginning.

A PORTION OF THE SE 1/4 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 12;
THENCE N00°37'15"E FOR 666.03 FEET ALONG THE NORTH-SOUTH CENTER LINE OF SAID SECTION 12, TO THE TRUE POINT OF BEGINNING;
THENCE N89°26'51"W FOR 329.32 FEET;
THENCE N00°39'31"E FOR 663.70 FEET;
THENCE N62°55'04"E FOR 9.43 FEET;
THENCE S89°04'56"E FOR 320.54 FEET TO THE EAST LINE OF SAID SW 1/4;
THENCE S00°37'15"W ALONG SAID EAST LINE FOR 666.03 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SE 1/4 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 12;
THENCE N00°37'15"E FOR 666.03 FEET ALONG THE NORTH-SOUTH CENTER LINE OF SAID SECTION 12;
THENCE N89°26'51"W FOR 329.32 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N89°26'51"W FOR 329.32 FEET;
THENCE N14°02'25"W FOR 446.18 FEET MORE OR LESS TO A POINT ON THE SOUTHERLY RIGHT OF WAY OF GREEN RIVER GORGE ROAD SE;
THENCE N62°55'04"E ALONG SAID RIGHT OF WAY FOR 500.00 FEET;
THENCE S00°39'31"W FOR 663.70 FEET TO THE TRUE POINT OF BEGINNING.

THE EAST 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA.

THE WEST 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA.

A PORTION OF THE SE 1/4 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 12;
THENCE S89°48'43"E FOR 1727.54 FEET ALONG THE SOUTH LINE OF SAID SECTION 12 TO THE TRUE POINT OF BEGINNING;
THENCE N00°33'00"E FOR 249.80 FEET;
THENCE N89°48'43"W FOR 110.85 FEET;
THENCE N01°29'06"W FOR 423.00 FEET;
THENCE S89°26'51"E FOR 378.64 FEET;
THENCE S00°41'45"W FOR 670.23 FEET;
THENCE N89°48'43"W FOR 251.07 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 12-21-6

A PORTION OF THE S 1/2 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE S1/4 CORNER OF SAID SECTION 12;
THENCE N00°37'15"E ALONG THE NORTH-SOUTH CENTER LINE OF SAID SECTION 12 FOR 666.03 FEET;
THENCE N89°26'51"W FOR 658.64 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N89°26'51"W FOR 378.64 FEET;
THENCE S01°29'06"E FOR 100.00 FEET;
THENCE N82°43'41"W FOR 454.14 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF SE GREEN RIVER GORGE ROAD AND A POINT ON A CURVE TO THE RIGHT, THE RADIUS POINT OF WHICH BEARS S49°17'14"E 1253.42 FEET;
THENCE ALONG THE ARC OF SAID CURVE AND RIGHT-OF-WAY THROUGH A CENTRAL ANGLE OF 22°12'17" FOR 485.76 FEET;
THENCE CONTINUING ALONG SAID RIGHT-OF-WAY N62°55'04"E FOR 380.57 FEET;
THENCE S14°02'25"E FOR 446.18 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SOUTH 1/2 OF THE SW 1/4 OF SECTION 12, T21N, R6E, W.M., KING CO., WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 12;
THENCE S89°48'43"E ALONG THE SOUTH LINE OF SAID SECTION 12 FOR 777.56 FEET MORE OR LESS TO A POINT ON THE EASTERLY LINE OF SE GREEN RIVER GORGE ROAD AND THE TRUE POINT OF BEGINNING;
THENCE N36°49'00"E ALONG SAID EASTERLY LINE FOR 155.00 FEET;
THENCE N25°42'46"E ALONG SAID EASTERLY LINE FOR 254.79 FEET TO A POINT ON A CURVE TO THE RIGHT, THE RADIUS POINT OF WHICH BEARS S64°17'14"E 1253.42 FEET;
THENCE ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 15°00'00" FOR 328.15 FEET;
THENCE S82°43'41"E FOR 454.14 FEET;
THENCE S01°29'06"E FOR 323.00 FEET;
THENCE N89°48'43"W FOR 615.00 FEET;
THENCE S36°49'00"W FOR 311.26 FEET TO THE SOUTH LINE OF SAID SW 1/4;
THENCE N89°48'43"W ALONG SAID SOUTH LINE FOR 40.00 FEET TO THE TRUE POINT OF BEGINNING.

* * * * *

TAX PARCEL 122106-9038:
That portion of the Pacific Coast Railroad Right-of-Way as described in an instrument recorded under recording number 3303463, records of King County, Washington, lying within the South half of the Southwest quarter of Section 12, Township 21 North, Range 6 East, W.M., King County, WA. and less any portion lying within the Northeast quarter of the Southwest quarter of said Section 12, T.21N., R6E.

THE NORTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON.

BEGINNING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON; THENCE S89°06'58"E ALONG THE NORTH LINE OF SAID SUBDIVISION A DISTANCE OF 657.77 FEET, MORE OR LESS, TO THE NORTHEAST CORNER OF SAID SUBDIVISION; THENCE S00°44'10"W ALONG THE EAST LINE OF SAID SUBDIVISION A DISTANCE OF 253.85 FEET, MORE OR LESS, TO A POINT ON THE NORTHWESTERLY MARGIN OF THE VACATED PACIFIC COAST RAILROAD RIGHT-OF-WAY; THENCE S51°40'35"W ALONG SAID MARGIN A DISTANCE OF 231.84 FEET; THENCE N81°50'18"W A DISTANCE OF 482.22 FEET, MORE OR LESS, TO THE SOUTHWEST CORNER OF THE NORTH HALF OF SAID SUBDIVISION; THENCE N00°48'33"E ALONG THE WEST LINE OF SAID SUBDIVISION A DISTANCE OF 339.31 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON.

ALL THAT PORTION OF LAND LYING IN THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON, LYING NORTHERLY OF THE NORTH MARGIN OF THE VACATED PACIFIC COAST RAILROAD RIGHT-OF-WAY, AND LYING SOUTHERLY AND EASTERLY OF THE FOLLOWING DESCRIBED LINE:
BEGINNING AT THE SOUTHWEST CORNER OF THE NORTHWEST QUARTER OF SAID SUBDIVISION; THENCE S89°28'54"E ALONG THE SOUTH LINE OF THE NORTHWEST QUARTER OF SAID SUBDIVISION A DISTANCE OF 658.64 FEET, MORE OR LESS, TO THE SOUTHEAST CORNER OF THE NORTHWEST QUARTER OF SAID SUBDIVISION; THENCE N00°48'33"E ALONG THE EAST LINE OF THE NORTHWEST QUARTER OF SAID SUBDIVISION A DISTANCE OF 339.31 FEET, MORE OR LESS, TO THE NORTHEAST CORNER OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SUBDIVISION; THENCE S81°50'18"E A DISTANCE OF 482.22 FEET, MORE OR LESS, TO A POINT ON THE NORTHWESTERLY MARGIN OF SAID RAILROAD RIGHT-OF-WAY, AND THE TERMINUS OF SAID LINE.

SECTION 12-21-6

TAX PARCEL: 122106-9054

THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINTON LYING NORTHWESTERLY OF THE PACIFIC COAST RAILROAD RIGHT-OF-WAY AS DESCRIBED IN AN INSTRUMENT RECORDED UNDER KING COUNTY RECORDING NUMBER 3303463, CONTAINING 1.94 ACRES MORE OR LESS.

TAX PARCEL: 122106-9055

THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASHINTON LYING SOUTHEASTERLY OF THE PACIFIC COAST RAILROAD RIGHT-OF-WAY AS DESCRIBED IN AN INSTRUMENT RECORDED UNDER KING COUNTY RECORDING NUMBER 3303463 AND NORTH-WESTERLY OF THE S.E. GREEN RIVER GORGE ROAD (FORMERLY KNOWN AS FRANKLIN-HOWARD ROAD NUMBER 1018), CONTAINING 1.24 ACRES MORE OR LESS.

THE EAST HALF OF THE NE QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T.21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE NE QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T.21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE NW QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T.21 N., R. 6 E., W.M., KING COUNTY, WA.

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTH QUARTER CORNER OF SAID SECTION 13;
THENCE S00°54'11"E A DISTANCE OF 2011.45 FEET ALONG THE NORTH-SOUTH CENTER SECTION LINE;
THENCE N89°38'53"W FOR 993.18 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N61°31'44"W FOR 46.32 FEET;
THENCE N00°22'10"W FOR 121.00 FEET;
THENCE S89°37'50'W FOR 180.00 FEET;
THENCE S00°22'10"E FOR 121.00 FEET;
THENCE N55°45'15"W FOR 163.78 FEET;
THENCE N72°11'25"W FOR 250.00 FEET;
THENCE N07°56'14"W FOR 294.05 FEET;
THENCE S89°48'42"E FOR 557.35 FEET;
THENCE N14°42'46"E FOR 197.05 FEET;
THENCE S89°42'09"E FOR 18.05 FEET;
THENCE S00°47'40"E FOR 669.51FEET TO THE TRUE POINT OF BEGINNING.

SECTION 13-21-6

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 13;
THENCE S89°35'37"E FOR 662.98 FEET ALONG THE EAST-WEST CENTER SECTION LINE;
THENCE N00°41'07"W FOR 518.87 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N00°41'07"W FOR 149.68 FEET ;
THENCE N16°00'10"E FOR 342.82 FEET;
THENCE N39°44'00"W FOR 100.00 FEET;
THENCE N06°22'00"W FOR 161.80 FEET;
THENCE N86°04'23"E FOR 23.20 FEET;
THENCE S73°44'00"E FOR 336.10 FEET;
THENCE S07°56'14"E FOR 294.05 FEET;
THENCE S17°48'35"W FOR 351.75 FEET;
THENCE N89°38'53"W FOR 289.67 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE NORTHWEST QUARTER CORNER OF SAID SECTION 13;
THENCE S00°36'44"E FOR 2007.46 FEET ALONG THE WEST SECTION LINE;
THENCE N66°50'00"E FOR 9.42 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N66°50'00"E FOR 83.84 FEET ;
THENCE N18°50'00"E FOR 144.72 FEET;
THENCE N52°10'00"E FOR 472.52 FEET;
THENCE N58°32'19E" FOR 198.19 FEET;
THENCE S06°22'00"E FOR 161.80 FEET;
THENCE S39°44'00"E FOR 100.00 FEET;
THENCE S16°00'10"W FOR 342.82 FEET;
THENCE N89°38'53"W FOR 653.42 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
BEGINNING AT THE WEST QUARTER CORNER OF SAID SECTION 13;
THENCE N00°36'44"W FOR 664.14 FEET ALONG THE WEST LINE OF SAID NW 1/4;
THENCE N66°50'00"E FOR 9.42 FEET;
THENCE S89°38'53"E FOR 322.36 FEET;
THENCE S00°38'56"E FOR 668.22 FEET;
THENCE N89°35'37"W FOR 331.49 FEET TO THE POINT OF BEGINNING.

THE EAST HALF OF THE SW QUARTER OF THE SW QUARTER OF THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

SECTION 13-21-6

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 13;
THENCE S89°35'37"E FOR 662.98 FEET ALONG THE EAST-WEST CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N00°41'07"W FOR 518.87 FEET;
THENCE S89°38'53"E FOR 289.67 FEET;
THENCE S72°11'25"E FOR 250.00 FEET;
THENCE S17°37'36"E FOR 467.22 FEET TO THE E-W CENTER SECTION LINE;
THENCE N89°35'37"W FOR 662.98 FEET ALONG SAID EAST-WEST CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING.

A PORTION OF LAND IN THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 13;
THENCE S89°35'37"E FOR 1325.96 FEET ALONG THE EAST-WEST CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE N17°37'36"W FOR 467.22 FEET;
THENCE N17°48'35"E FOR 351.75 FEET;
THENCE S55°45'15""E FOR 163.78 FEET;
THENCE N89°37'50"E FOR OF 180.00 FEET;
THENCE S61°31'44"E FOR 46.32 FEET;
THENCE S00°47'40"E FOR 669.51 FEET TO THE E-W CENTER SECTION LINE;
THENCE N89°35'37"W FOR 331.49 FEET ALONG SAID EAST-WEST CENTER SECTION LINE TO THE TRUE POINT OF BEGINNING.

THE EAST HALF OF THE SW QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE SE QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE SE QUARTER OF THE SE QUARTER OF THE NW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

SECTION 13-21-6

THE EAST HALF OF THE NE QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE NE QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE NW QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE NW QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE NE QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE NE QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE NW QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE NW QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE NORTH HALF OF THE SW QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

A PORTION OF LAND IN THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 13;
THENCE S00°35'16"E A DISTANCE OF 1001.82 FEET ALONG THE WEST SECTION LINE TO THE TRUE POINT OF BEGINNING;
THENCE S89°43'03"E A DISTANCE OF 664.33 FEET;
THENCE S00°39'59"E A DISTANCE OF 333.47 FEET;
THENCE S18°20'34"E A DISTANCE OF 259.79 FEET MORE OR LESS TO THE NORTHEASTERLY RIGHT-OF-WAY OF THE CHICAGO AND PUGET SOUND RAILROAD;
THENCE NORTHWESTERLY ALONG SAID RIGHT-OF-WAY TO A POINT ON THE WEST LINE OF SECTION 13;
THENCE N00°35'16"W, ALONG SAID WEST LINE A DISTANCE OF 189.71 FEET, MORE OR LESS TO THE TRUE POINT OF BEGINNING.

THE WEST HALF OF THE SE QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE SE QUARTER OF THE NW QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE SW QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE SW QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE WEST HALF OF THE SE QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE SE QUARTER OF THE NE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE NORTH HALF OF THE NE QUARTER OF THE SE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE NORTH HALF OF THE NW QUARTER OF THE SE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

A PORTION OF LAND IN THE SW QUARTER OF SECTION 13, T. 21 N., R 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
BEGINNING AT THE NE CORNER OF THE SW 1/4 OF THE SW 1/4 OF SAID SECTION 13;
THENCE S00°44'42"E ALONG THE EAST LINE THEREOF FOR 333.00 FEET;
THENCE S78°38'30"W FOR 380.38 FEET MORE OR LESS TO THE NORTHEASTERLY RIGHT-OF-WAY OF THE C.& P.S. R.R.;
THENCE N52°34'22"W ALONG SAID RIGHT-OF-WAY FOR 270.00 FEET;
THENCE N18°20'34"W FOR 259.79 FEET TO THE NW CORNER OF THE NE 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SAID SECTION 13;
THENCE S89°45'31"E ALONG THE NORTH LINE THEREOF FOR 664.78 FEET TO THE POINT OF BEGINNING.

A PORTION OF LAND IN THE SW QUARTER OF SECTION 13, T. 21 N., R 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 13;
THENCE N00°54'11"W ALONG THE EAST LINE OF SAID SW 1/4 FOR 996.18 FEET;
THENCE N89°47'59"W FOR 1020.46 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°44'42"E A DISTANCE OF 602.53 FEET MORE OR LESS TO THE NORTHEASTERLY RIGHT-OF-WAY OF THE C.& P.S. R.R.;
THENCE N52°34'22"W ALONG SAID RIGHT-OF-WAY FOR 869.84 FEET;
THENCE N78°38'30"E FOR 380.38 FEET;
THENCE S89°47'59"E FOR 310.00 FEET TO THE TRUE POINT OF BEGINNING.

— SECTION 13-21-6

A PORTION OF LAND IN THE SW QUARTER OF SECTION 13, T. 21 N., R 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 13;
THENCE N00°54'11"W ALONG THE EAST LINE OF SAID SW 1/4 FOR 996.18 FEET;
THENCE N89°47'59"W FOR 665.23 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S00°49'26"E FOR 332.53 FEET;
THENCE S14°10'32"W FOR 465.23 FEET MORE OR LESS TO THE NORTHEASTERLY RIGHT-OF-WAY OF THE C.& P.S. R.R.;
THENCE N52°34'33"W ALONG SAID RIGHT-OF-WAY FOR 300.00 FEET;
THENCE N00°44'42"W FOR 605.53 FEET;
THENCE S89°47'59"E FOR 355.23 FEET TO THE TRUE POINT OF BEGINNING.

THE SOUTH HALF OF THE NE QUARTER OF THE SE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

THE EAST HALF OF THE SE QUARTER OF THE SE QUARTER OF THE SW QUARTER OF SECTION 13, T. 21 N., R. 6 E., W.M., KING COUNTY, WA.

A PORTION OF LAND IN THE SW QUARTER OF SECTION 13, T. 21 N., R 6 E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS;
COMMENCING AT THE SOUTH QUARTER CORNER OF SAID SECTION 13;
THENCE N89°55'22"W ALONG THE SOUTH SECTION LINE FOR 333.29 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N89°55'22"W A DISTANCE OF 176.99 FEET MORE OR LESS TO THE NORTHEASTERLY RIGHT-OF-WAY OF THE C.& P.S. R.R.;
THENCE N52°34'22"W ALONG SAID RIGHT-OF-WAY FOR 352.33 FEET;
THENCE N14°10'32"E FOR 465.23 FEET;
THENCE S89°50'27"E FOR 332.84 FEET;
THENCE S00°51'49"E FOR 664.59 FEET TO THE TRUE POINT OF BEGINNING.

LEGAL DESCRIPTIONS:

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 13, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT, WHICH IS 472.70 FEET SOUTH AND 807.97 FEET EAST OF THE NORTHWEST CORNER OF SAID SECTION 13, SAID POINT BEING IDENTICAL WITH THE SOUTHWEST CORNER OF A PARCEL SOLD TO JOHN MAKS;
AND RUNNING THENCE S89°48'42"E A DISTANCE OF 391.51 FEET TO THE POINT OF BEGINNING;
THENCE CONTINUING S89°48'42"E A DISTANCE OF 668.49 FEET;
THENCE S14°42'46"W A DISTANCE OF 378.95 FEET;
THENCE N89°49'34"W A DISTANCE OF 570.03 FEET;
THENCE N00°20'42"W A DISTANCE OF 367.00 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 13, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT, WHICH IS 472.70 FEET SOUTH AND 807.97 FEET EAST OF THE NORTHWEST CORNER OF SAID SECTION 13, SAID POINT BEING IDENTICAL WITH THE SOUTHWEST CORNER OF A PARCEL SOLD TO JOHN MAKS;
AND RUNNING THENCE S89°48'42"E A DISTANCE OF 391.51 FEET;
THENCE S00°20'42"E A DISTANCE OF 367.00 FEET TO THE POINT OF BEGINNING;
THENCE S89°49'34"E A DISTANCE OF 570.03 FEET;
THENCE S14°42'46"W A DISTANCE OF 712.84 FEET;
THENCE N89°48'42"W A DISTANCE OF 384.84 FEET;
THENCE N00°20'42"W A DISTANCE OF 689.95 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 13, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT, WHICH IS 472.70 FEET SOUTH AND 807.97 FEET EAST OF THE NORTHWEST CORNER OF SAID SECTION 13, SAID POINT BEING IDENTICAL WITH THE SOUTHWEST CORNER OF A PARCEL SOLD TO JOHN MAKS;
AND RUNNING THENCE S89°48'42"E A DISTANCE OF 391.51 FEET;
THENCE S00°20'42"E A DISTANCE OF 538.93 FEET TO THE POINT OF BEGINNING;
THENCE CONTINUING S00°20'42"E A DISTANCE OF 518.02 FEET;
THENCE N89°48'42"W A DISTANCE OF 172.51 FEET;
THENCE N73°44'00"W A DISTANCE OF 336.10 FEET;
THENCE N03°40'00"W A DISTANCE OF 348.10 FEET;
THENCE N00°09'00"E A DISTANCE OF 76.85 FEET;
THENCE S89°53'42"E A DISTANCE OF 514.10 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 132106-9007:

A parcel of land lying in the southwest quarter of the Northwest quarter of Section 13, Township 21 North, Range 6 East, W.M., King County, Washington, described as follows:

Beginning 1438.12 feet south and 680.73 east of the Northwest corner of the Northwest quarter of the Northwest quarter, thence South 6-22-00 East 161.8 feet, thence S 39-44-00 East 198.5 feet, thence S 73-46-00 East 251.6 feet to the true point of beginning: thence S 72-11-25 East, thence N 17-48-35 East 351.75 feet, thence S 72-11-25 East 250 feet, thence S 17-48-35 West 351.75 feet to the true point of beginning; containing 2.02 acres more or less.

PARCEL 132106-9017:

That portion of the Pacific Coast Railroad Company Right-of-Way (formerly known as the abandoned track of the Columbia and Puget Sound Railroad) lying within the Southwest quarter of Section 13, Township 21 North, Range 6 East, W.M., King County, Washington, containing 5.92 acres more or less.

PARCEL 132106-9064:

That portion of the Southeast quarter of the Southwest quarter of Section 13, Township 21 North, Range 6 East, W.M. lying southwesterly of the Pacific Coast Railroad Company Right-Of-Way (formerly known as the abandoned track of the Columbia and Puget Sound Railroad) less the portion lying westerly of a line beginning 715.08 feet North and 1029.40 feet East of the Southwest Corner of said Section 13, thence N 37-30-00 East 258.19 feet, thence S 43-40-30 East 1255.20 feet, thence to the westerly line in question bearing N 33-10-00 East 500 feet, more or less to the southerly margin of King County Assessor Tax Parcel 132106-9017, containing .05 acres, more or less.

PARCEL 132106-9046:

The North half of the North half of the Northeast quarter of the Northwest quarter of Section 13, Township 21 North, Range 6 East, W.M., in King County, Washington;
EXCEPT portion thereof lying within the following described tract:

Beginning at point 472.70 feet South and 807.97 feet East of Northwest corner of said Section;
thence North 0°33'00" East 469.94 feet;
thence North 36°49'00" East 311.26 feet;
thence South 89°48'42" East 725.85 feet;
thence South 0°33'00" West 719.72 feet;
thence North 89°48'42" West 865 feet to point of beginning;
AND EXCEPT portion lying within the following described Tract:

Beginning at a point which is 472.70 feet South and 807.97 feet East of the Northwest corner of said Section;
thence South 0°32'00" 178.96 feet;
thence North 89°43'00" West 116.74 feet;
thence South 0°09'00" West 438.25 feet;
thence South 3°40'00" East 348.10 feet;
thence South 73°44'00" East 336.10 feet;
thence South 89°48'42" East 557.35 feet, more or less, to a line parallel with and 20.00 feet Westerly from center of a skid road;
thence Northerly along said parallel line 1110.00 feet more or less;
thence North 89°48'42" West 1060.00 feet, more or less, to point of beginning.

PARCEL 132106-9053:

A tract of land lying in the SE¼ of the NW¼ of Section 13, Township 21 North, Range 6 East, W.M., in King County, State of Washington bounded and described as follows:

Commencing at the Northwest corner of said SE¼ of the NW¼; thence South 00° 22' 10" East along the east line of said SW¼ of the NW¼, a distance of 530.00 feet; thence North 89° 37' 50" East, a distance of 115.00 feet to the TRUE POINT OF BEGINNING; thence continuing North 89° 37' 50" East, a distance of 180.00 feet; thence South 00° 22' 10" East, a distance of 121.00 feet; thence South 89° 37' 50" West, a distance of 180.00 feet; thence North 00° 22' 10" West, a distance of 121.00 feet to the TRUE POINT OF BEGINNING.

Containing an area of 21,780.00 square feet or 0.5 acres.

LEGAL DESCRIPTIONS LOCATED IN THE S.W. 1/4 OF THE N.W. 1/4 OF SECTION 14, T. 21 N., R. 6 E., W.M., IN KING COUNTY, WASHINGTON.

A PORTION OF THE S.W. 1/4 OF THE N.W. 1/4 OF SECTON 14, T. 21 N., R. 6 E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS: COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14; THENCE N 01° 02'29" E, ALONG THE WEST LINE OF SAID SECTION FOR 325.40 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING N 01° 02'29" E FOR 602.00 FEET; THENCE S 72° 30'49" E FOR 417.04 FEET; THENCE S01° 02'29"W FOR 487.74 FEET; THENCE N 88° 24'52" W FOR 400.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE WEST 1/2 OF SECTION 14, T.21 N., R.6 E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS: BEGINNING AT THE WEST 1/4 CORNER OF SAID SECTION 14; THENCE N 01° 02'29" E, ALONG THE WEST LINE OF SAID SECTION FOR 325.40 FEET; THENCE S 88° 24'52" E FOR 400.00 FEET; THENCE S 01° 02'29" W FOR 550.40 FEET; THENCE N 88° 24'52" W FOR 400.00 FEET TO THE WEST LINE OF SAID SECTION; THENCE N 01° 02'29" E FOR 225.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE WEST 1/2 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS: COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14; THENCE S 01° 02'29" W, ALONG THE WEST LINE OF SAID SECTION FOR 225.00 FEET TO THE TRUE POINT OF BEGINNING; THENCE S 88° 24'52" E FOR 400.00 FEET; THENCE N 01° 02'29" E FOR 235.00 FEET; THENCE S 88° 24'52" E FOR 272.48 FEET; THENCE S 15° 01'11" W FOR 530.28 FEET; THENCE N 87° 48'17" W FOR 544.47 FEET TO THE WEST LINE OF SAID SECTION; THENCE N 01° 02'29" E FOR 275.00 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 14-21-6

BEGIN: VOLUME 103 PAGE 102 RECORDING # 9504209015

A PORTION OF THE N.W.1/4 OF THE S.W.1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14;
THENCE S01°02'29"W ALONG THE WEST LINE OF SAID SECTION FOR 500.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S87°48'17"E FOR 544.47 FEET;
THENCE S07°05'49"E FOR 500.00 FEET;
THENCE N79°11'16"W FOR 624.20 FEET TO THE WEST LINE OF SAID SECTION;
THENCE N01°02'29"E ALONG SAID WEST LINE FOR 400.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE N.W.1/4 OF THE S.W.1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14;
THENCE S01°02'29"W ALONG THE WEST LINE OF SAID SECTION FOR 900.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S79°11'16"E FOR 624.20 FEET;
THENCE S07°05'49"E FOR 354.75 FEET;
THENCE N88°34'42"W FOR 665.38 FEET TO THE WEST LINE OF SAID SECTION;
THENCE N01°02'29'E ALONG SAID WEST LINE FOR 452.70 FEET TO THE TRUE POINT OF BEGINNING.

THE NORTH 1/2 OF THE NW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA.

A PORTION OF THE SW 1/4 OF THE SW 1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE N01°02'29"E ALONG THE WEST LINE OF SAID SECTION FOR 445.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N01°02'29"E FOR 569.52 FEET;
THENCE S88°37'09"E FOR 665.46 FEET;
THENCE S01°01'40"W FOR 173.24 FEET;
THENCE S66°00'53"W FOR 217.67 FEET;
THENCE S54°07'53"W FOR 148.92 FEET;
THENCE S76°54'53"W FOR 171.25 FEET;
THENCE S48°19'53"W FOR 249.20 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF THE SW 1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA. DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE N01°02'29"E ALONG THE WEST LINE OF SAID SECTION FOR 338.17 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N01°02'29"E FOR 106.83 FEET;
THENCE N48°19'53"E FOR 249.20 FEET;
THENCE N76°54'53"E FOR 171.25 FEET;
THENCE N54°07'53"E FOR 148.92 FEET;
THENCE N66°00'53"E FOR 217.67 FEET;
THENCE S01°01'40"W FOR 502.16 FEET;
THENCE N88°42'04"W FOR 665.61 FEET TO THE TRUE POINT OF BEGINNING.

THE SOUTH 1/2 OF THE SW 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 14, T.21N., R.6E., W.M., KING CO., WA.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14;
THENCE S88°24'52"E FOR 670.00 FEET ALONG THE EAST-WEST CENTER SECTION LINE;
THENCE S15°01'11"W FOR 520.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S74°55'53"E FOR 739.88 FEET TO THE WESTERLY RIGHT-OF-WAY OF 248TH AVE. S.E.;
THENCE S02°21'27"W ALONG SAID RIGHT-OF-WAY FOR 200.00 FEET ;
THENCE S80°50'01"W FOR 652.77 FEET;
THENCE N07°05'49"W FOR 500.00 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E., W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE N01°02'29"E ALONG THE WEST SECTION LINE FOR 1352.70 FEET ;
THENCE S88°34'42"E FOR 665.38 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N07°05'49"W FOR 354.75 FEET;
THENCE N80°50'01"E FOR 652.77 FEET TO THE WESTERLY RIGHT-OF-WAY OF 248TH AVE. S.E.;
THENCE S02°21'26"W ALONG SAID RIGHT-OF-WAY FOR 354.85 FEET ;
THENCE S80°10'33"W FOR 594.73 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE N01°02'29"E ALONG THE WEST SECTION LINE FOR 1352.70 FEET;
THENCE S88°34'42"E FOR 665.38 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N80°10'33"E FOR 594.73 FEET TO THE WESTERLY RIGHT-OF-WAY OF 248TH AVE. S.E.;
THENCE S02°21'26"W FOR 238.17 FEET ALONG SAID RIGHT-OF-WAY;
THENCE S50°54'53"W FOR 116.35 FEET;
THENCE S64°40'53"W FOR 229.50 FEET;
THENCE S46°43'53"W FOR 203.90 FEET;
THENCE S65°27'53"W FOR 113.60 FEET;
THENCE S66°00'53"W FOR 39.18 FEET;
THENCE N01°01'40"E FOR 510.94 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE S88°44'32"E ALONG THE SOUTH SECTION LINE FOR 665.69 FEET;
THENCE N01°01'40"E FOR 675.39 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N01°01'40"E FOR 164.46 FEET;
THENCE N66°00'53"E FOR 39.18 FEET;
THENCE N65°27'53"E FOR 113.60 FEET;
THENCE N46°43'53"E FOR 203.90 FEET;
THENCE N64°40'53"E FOR 229.50 FEET;
THENCE N50°54'53"E FOR 116.35 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY OF 248TH AVE. S.E.;
THENCE S02°21'26"W FOR 53.48 FEET TO THE SW CORNER OF SAID RIGHT-OF-WAY;
THENCE S87°59'09"E FOR 40.00 FEET TO THE SE CORNER OF SAID RIGHT-OF-WAY;
THENCE N02°21'21"E FOR 176.06 FEET ALONG THE EASTERLY RIGHT-OF-WAY;
THENCE S88°34'42"E FOR 43.96 FEET;
THENCE S01°00'51"W FOR 674.45 FEET;
THENCE N88°39'37"W FOR 665.54 FEET TO THE TRUE POINT OF BEGINNING.

THE NORTH 1/2 OF THE SE 1/4OF THE SW 1/4OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA.

THE SOUTH 1/2 OF THE SE 1/4 OF THE SW 1/4 OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 14;
THENCE S88°24'52"E ALONG THE EAST-WEST CENTER SECTION LINE FOR 1330.15 FEET;
THENCE S03°39'49"E FOR 375.74 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF 248TH AVE. S.E. AND THE POINT OF BEGINNING;
THENCE N72°37'21"E FOR 355.00 FEET;
THENCE S27°18'39"E FOR 615.00 FEET;
THENCE N79°06'18"W FOR 698.06 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF 248TH AVE. S.E.;
THENCE N07°59'21"E ALONG SAID RIGHT-OF-WAY FOR 230.16 FEET;
THENCE N21°59'08"E ALONG SAID RIGHT-OF-WAY FOR 86.86 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SW CORNER OF SAID SECTION 14;
THENCE N01°02'29"E ALONG THE WEST SECTION LINE FOR 1352.70 FEET;
THENCE S88°34'42"E FOR 1286.80 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF 248TH AVE. S.E. AND THE TRUE POINT OF BEGINNING;
THENCE N02°21'21"E ALONG SAID RIGHT-OF-WAY FOR 664.70 FEET ;
THENCE S79°06'18"E FOR 349.03 FEET;
THENCE S07°29'44"E FOR 614.59 FEET;
THENCE N88°34'42"W FOR 450.37 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 14-21-6

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 14;
THENCE N00°59'11"E ALONG THE NORTH-SOUTH CENTER SECTION LINE FOR 1345.09 FEET;
THENCE N88°34'42"W FOR 373.98 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N88°34'42"W FOR 550.37 FEET;
THENCE N07°29'44"W FOR 614.59 FEET;
THENCE S79°06'18"E FOR 349.03 FEET;
THENCE S27°18'39"E FOR 626.91 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 14;
THENCE N00°59'11"E ALONG THE NORTH-SOUTH CENTER SECTION LINE FOR 1345.09 FEET;
THENCE N88°34'42"W FOR 373.98 FEET TO THE TRUE POINT OF BEGINNING;
THENCE S02°30'56"E FOR 454.59 FEET;
THENCE N88°47'55"W FOR 384.75 FEET;
THENCE N01°00'51"E FOR 370.01 FEET;
THENCE N88°34'42"W FOR 600.02 FEET;
THENCE N01°00'51"E FOR 85.00 FEET;
THENCE S88°34'42"E FOR 956.78 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 14;
THENCE N00°59'11"E ALONG THE NORTH-SOUTH CENTER SECTION LINE FOR 672.54 FEET;
THENCE N88°39'37"W FOR 332.77 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N88°39'37"W FOR 998.30 FEET;
THENCE N01°00'51"E FOR 489.44 FEET;
THENCE S57°43'06"E FOR 116.99 FEET;
THENCE S01°00'51"W FOR 250.00 FEET;
THENCE S88°34'42"E FOR 500.02 FEET;
THENCE N01°00'51"E FOR 40.00 FEET;
THENCE S88°47'55"E FOR 384.75 FEET;
THENCE S02°30'56"E FOR 220.00 FEET TO THE TRUE POINT OF BEGINNING.

THE WEST 1/2 OF THE SW 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA.

THE EAST 1/2 OF THE SW 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 14, T21N., R6E, W.M., KING COUNTY, WA.

THE SOUTH 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA.

THE NORTH 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE SW 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA.

A PORTION OF THE SOUTH 1/2 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 14;
THENCE N00°59'11"E ALONG THE NORTH-SOUTH CENTER SECTION LINE FOR 336.27 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING N00°59'11"E FOR 336.27 FEET;
THENCE N88°39'37"W FOR 332.77 FEET;
THENCE N02°30'56"W FOR 674.59 FEET;
THENCE S88°34'42"E FOR 62.32 FEET;
THENCE S31°10'57"E FOR 782.21 FEET;
THENCE S41°04'43"E FOR 266.29 FEET;
THENCE S62°51'53"W FOR 321.14 FEET TO THE TRUE POINT OF BEGINNING.

A PORTION OF THE SE 1/4 OF SECTION 14, T21N, R6E, W.M., KING COUNTY, WA., DESCRIBED AS FOLLOWS:
BEGINNING AT THE SOUTH 1/4 CORNER OF SAID SECTION 14;
THENCE N00°59'11"E ALONG THE NORTH-SOUTH CENTER SECTION LINE FOR 336.27 FEET;
THENCE N62°51'53"E FOR 321.14 FEET;
THENCE S68°44'35"E FOR 119.51 FEET;
THENCE S59°05'23"E FOR 114.05 FEET;
THENCE S38°22'15"E FOR 420.46 FEET;
THENCE S28°00'37"E FOR 76.51 FEET TO A POINT ON THE SOUTH SECTION LINE;
THENCE N88°49'16"W FOR 797.91 FEET ALONG SAID SOUTH SECTION LINE TO THE POINT OF BEGINNING.

TAX PARCEL: 142106-9001

That portion of the Northeast quarter of the Northeast quarter of Section 14, Township 21 North, Range 6 East, W.M. in King County, Washington lying northerly of the Plat of Lawson Hill Estates, Volume 162, Pages 20-24, records of King County, and lying southwesterly of a line bearing North 53-33-40 West, said line being the southwest property line of King County Assessor Tax Parcel 142106-9186, containing 1.06 acres, more or less.

LEGAL DESCRIPTION: TAX PARCEL 142106-9002

THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 14, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WA.;
EXCEPT THAT PORTION PLATTED AS BLACK DIAMOND TOWNSITE, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 35 OF PLATS, PAGES 23 THROUGH 27, INCLUSIVE, IN KING COUNTY, WASHINGTON;
EXCEPT THAT PORTION LYING EAST OF BRUCE SWITCH AND SOUTH OF A LINE BEGINNING 609.24 FEET SOUTH AND 978.51 FEET WEST OF THE NORTHEAST CORNER OF SAID SECTION AND BEARING N88°22'W;
EXCEPT THAT PORTION LYING WESTERLY OF THE EASTERLY RIGHT-OF-WAY MARGIN OF STATE ROAD NO. 5, AS CONVEYED TO KING COUNTY BY DEED RECORDED UNDER RECORDING NO. 1107075;
AND EXCEPT THAT PORTION LYING WITHIN BRUCE SWITCH.

LEGAL DESCRIPTIONS

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE NORTH 88°13'57" WEST ALONG THE NORTH LINE OF SAID SECTION 15 A DISTANCE OF 635.77 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING NORTH 88°13'57" WEST ALONG SAID NORTH LINE 834.82 FEET TO THE NORTHEASTERLY MARGIN OF LAKE SAWYER ROAD S.E.;
THENCE SOUTH 39°33'23" EAST ALONG SAID NORTHEASTERLY MARGIN 697.70 FEET TO A POINT WHICH BEARS SOUTH 37°17'43" WEST FROM THE TRUE POINT OF BEGINNING;
THENCE NORTH 37°17'43" EAST 643.82 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE NORTH 88°13'57" WEST ALONG THE NORTH LINE OF SAID SECTION 15 A DISTANCE OF 635.77 FEET TO THE TRUE POINT OF BEGINNING;
THENCE SOUTH 88°13'57" EAST ALONG SAID NORTH LINE 335.69 FEET TO THE WEST LINE OF THE EAST 300.00 FEET OF SAID NORTHWEST QUARTER;
THENCE SOUTH 00°27'30" WEST ALONG SAID WEST LINE 18.45 FEET;
THENCE SOUTH 37°35'22" WEST 889.47 FEET TO THE NORTHEASTERLY MARGIN OF LAKE SAWYER ROAD S.E.;
THENCE NORTH 39°33'23" WEST ALONG SAID NORTHEASTERLY MARGIN 287.22 FEET TO A POINT WHICH BEARS SOUTH 37°17'43" WEST FROM THE TRUE POINT OF BEGINNING;
THENCE NORTH 37°17'43" EAST 643.82 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE NORTH 88°13'57" WEST ALONG THE NORTH LINE OF SAID SECTION 15 A DISTANCE OF 300.08 FEET TO THE WEST LINE OF THE EAST 300.00 FEET OF SAID NORTHWEST QUARTER;
THENCE SOUTH 00°27'30" ALONG SAID WEST LINE 18.45 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING SOUTH 00°27'30" WEST ALONG SAID WEST LINE 533.01 FEET;
THENCE SOUTH 41°44'20" WEST 519.80 FEET TO THE NORTHEASTERLY MARGIN OF LAKE SAWYER ROAD S.E. AND A POINT OF CURVE, THE CENTER OF WHICH BEARS NORTH 41°44'20" EAST;
THENCE NORTHWESTERLY ALONG SAID NORTHEASTERLY MARGIN AND ON SAID CURVE TO THE RIGHT HAVING A RADIUS OF 925.37 FEET, A CENTRAL ANGLE OF 08°42'17 AND AN ARC LENGTH OF 140.59 FEET;
THENCE NORTH 39°33'23" WEST ALONG SAID NORTHEASTERLY MARGIN 148.96 FEET TO A POINT WHICH BEARS SOUTH 37°35'22" WEST FROM THE TRUE POINT OF BEGINNING;
THENCE NORTH 37°35'22" EAST 889.47 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE NORTH 88°13'57" WEST ALONG THE NORTH LINE OF SAID SECTION 15 A DISTANCE OF 300.08 FEET TO THE WEST LINE OF THE EAST 300.00 FEET OF SAID NORTHWEST QUARTER;
THENCE SOUTH 00°27'30" WEST ALONG SAID WEST LINE 551.46 FEET TO THE TRUE POINT OF BEGINNING;
THENCE NORTH 00°27'30" EAST ALONG SAID WEST LINE 551.46 FEET TO THE NORTH LINE OF SAID SECTION 15;
THENCE SOUTH 88°13'57" EAST ALONG SAID NORTH LINE 300.08 FEET TO THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE SOUTH 00°27'30" WEST ALONG THE EAST LINE OF SAID NORTHWEST QUARTER 779.00 FEET;
THENCE NORTH 59°33'57" WEST 357.02 FEET;
THENCE SOUTH 41°44'20" WEST 471.10 FEET TO THE NORTHEASTERLY MARGIN OF LAKE SAWYER ROAD S.E. AND A POINT OF CURVE, THE CENTER OF WHICH BEARS NORTH 39°52'52" EAST;
THENCE ALONG SAID NORTHEASTERLY MARGIN AND SAID CURVE TO THE RIGHT HAVING A RADIUS OF 925.37 FEET, A CENTRAL ANGLE OF 01°51'28" AND AN ARC LENGTH OF 30.00 FEET TO A POINT WHICH BEARS SOUTH 41°44'20" WEST FROM THE TRUE POINT OF BEGINNING;
THENCE NORTH 41°44'20" EAST 519.80 FEET TO THE TRUE POINT OF BEGINNING.

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTH QUARTER CORNER OF SAID SECTION 15;
THENCE SOUTH 00°27'30" WEST ALONG THE EAST LINE OF SAID NORTHWEST QUARTER 779.00 FEET TO THE TRUE POINT OF BEGINNING;
THENCE NORTH 59°33'57" WEST 357.02 FEET;
THENCE SOUTH 41°44'20" WEST 471.10 FEET TO THE NORTHEASTERLY MARGIN OF LAKE SAWYER ROAD S.E. AND A POINT OF CURVE, THE CENTER OF WHICH BEARS NORTH 39°52'52" EAST;
THENCE SOUTHEASTERLY ALONG SAID NORTHEASTERLY MARGIN AND A CURVE TO THE LEFT HAVING A RADIUS OF 925.37 FEET, A CENTRAL ANGLE OF 41°35'51" AND AN ARC LENGTH OF 669.14 FEET TO THE EAST LINE OF SAID NORTHWEST QUARTER;
THENCE NORTH 00°27'30" EAST ALONG THE EAST LINE OF SAID NORTHWEST QUARTER 385.62 FEET TO THE TRUE POINT OF BEGINNING.

SECTION 23, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., KING COUNTY, WASH.

TAX PARCELS 232106-9036; 232106-9037; 232106-9038

The following described real estate, situated in the County of KING, State of Washington:

PARCEL A: Lots 2, 3 and 4, as delineated on City of Black Diamond Short Plat No. 86-81 recorded under King County Recording No. 8108189003, being a portion of the North half of the Northwest quarter of the Northeast quarter of Section 23, Township 21 North, Range 6 East, W.M., in King County, Washington.

PARCEL B: An easement for ingress, egress and utilities as disclosed in City of Black Diamond Short Plat No. 86-81, recorded under King County Recording No. 8108189003, over the South 30 feet of all lots in said Short Plat.

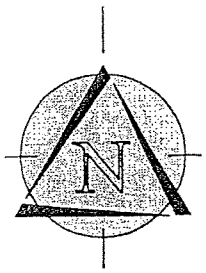
TOGETHER WITH the South 20 feet of that portion of the North half of the Northwest quarter lying Easterly of the centerline of the creek bed which enters into Jones Lake.

TAX PARCEL: 232106-9026

A TRACT IN THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M., IN KING COUNTY, WASHINGTON, DESCRIBED MORE PARTICULARLY AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID SECTION 23; THENCE SOUTH 68°32'30" WEST A DISTANCE OF 1,366.8 FEET TO THE NORTHWEST CORNER OF TRACT, TO A POINT ON THE EASTERLY RIGHT-OF-WAY OF COUNTY ROAD AND THE TRUE POINT OF BEGINNING;
THENCE SOUTH 14°28'00" EAST ALONG THE COUNTY ROAD RIGHT-OF-WAY FOR A DISTANCE OF 155.4 FEET TO A POINT ON THE SAID COUNTY ROAD RIGHT-OF-WAY TO THE SOUTHWEST CORNER OF TRACT AND THE SOUTH BOUNDARY OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER;
THENCE SOUTH 89°23'04" EAST A DISTANCE OF 225 FEET, MORE OR LESS, ALONG SAID SOUTH BOUNDARY TO THE SOUTHEAST CORNER OF TRACT AND A POINT ON THE WESTERLY RIGHT-OF-WAY OF STATE HIGHWAY;
THENCE NORTH 1°10'00" EAST A DISTANCE OF 150 FEET, MORE OR LESS, ALONG THE SAID STATE HIGHWAY RIGHT-OF-WAY AND THE NORTHEAST CORNER OF TRACT;
THENCE NORTH 89°23'04" WEST, A DISTANCE OF 267 FEET, MORE OR LESS, TO THE NORTHWEST CORNER OF TRACT ON THE EASTERLY RIGHT-OF-WAY OF THE COUNTY ROAD AND THE TRUE POINT OF BEGINNING.

POR. SECTION 11, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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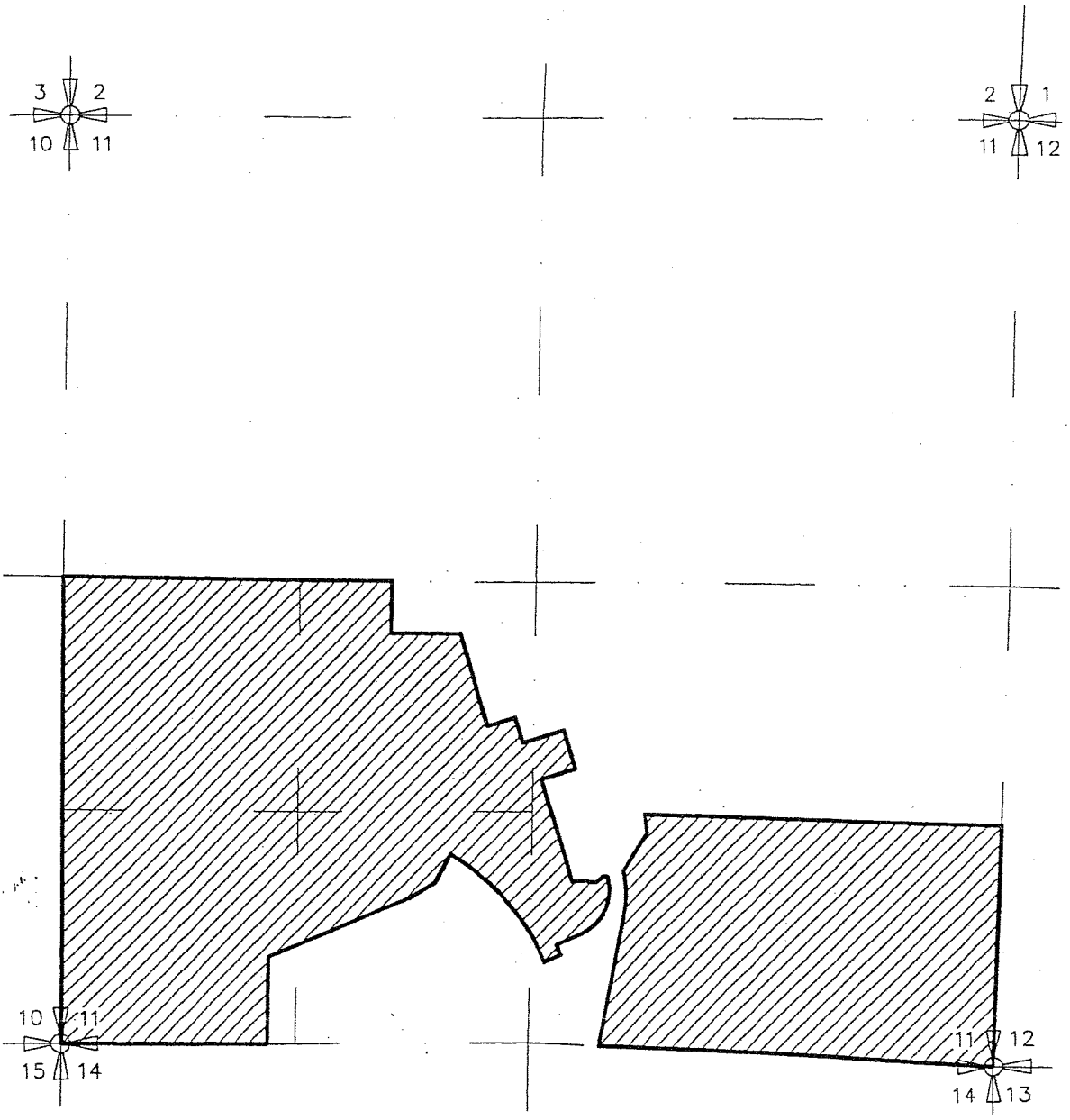
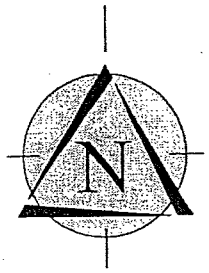


6/05/03

POR. SECTION 12, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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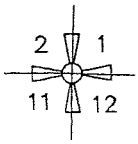
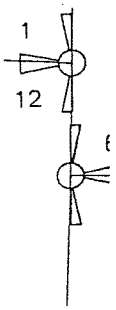
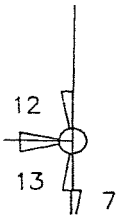
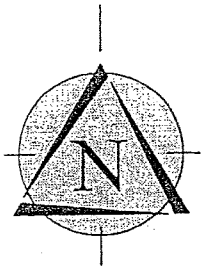






6/05/03

POR. SECTION 13, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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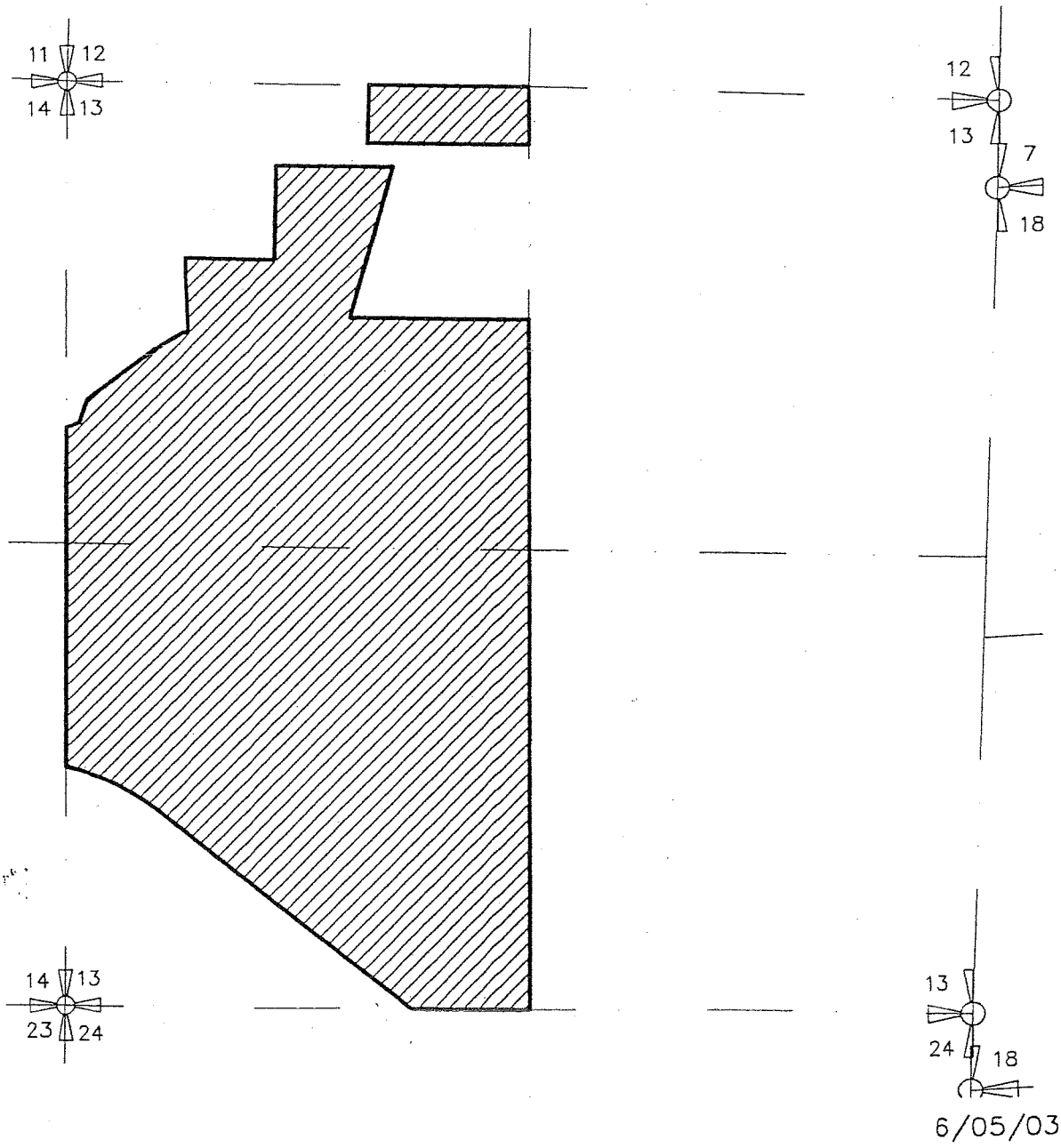
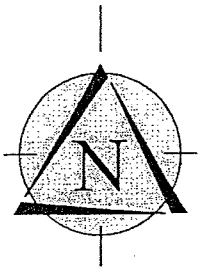


6/05/03

POR. SECTION 14, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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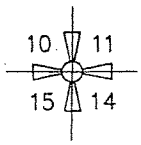
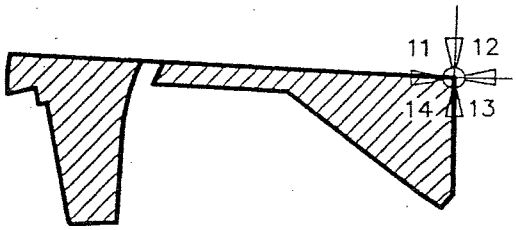
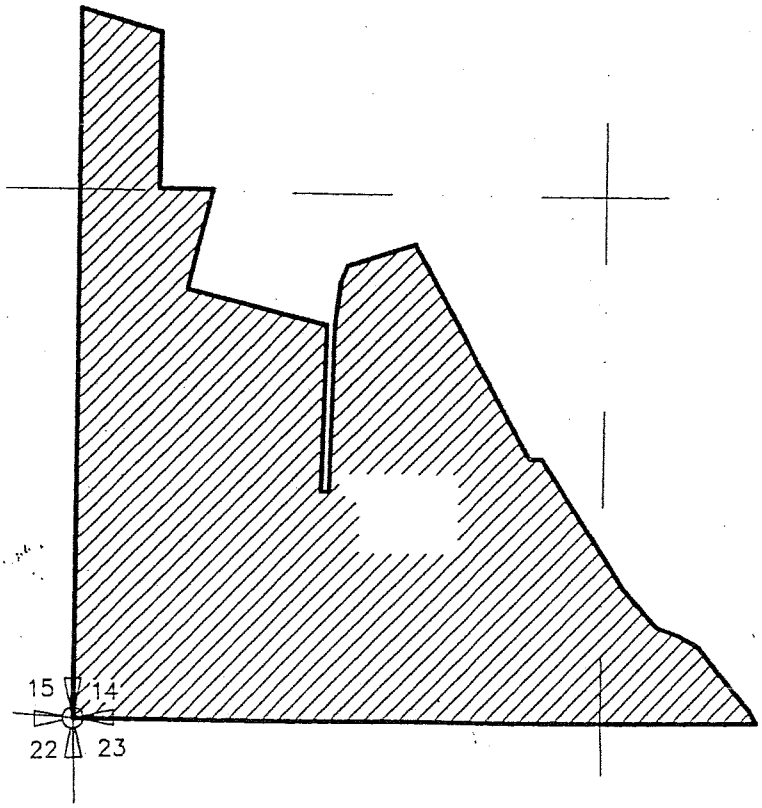
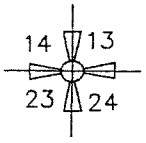


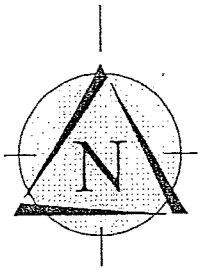






6/26/03

POR. SECTION 15, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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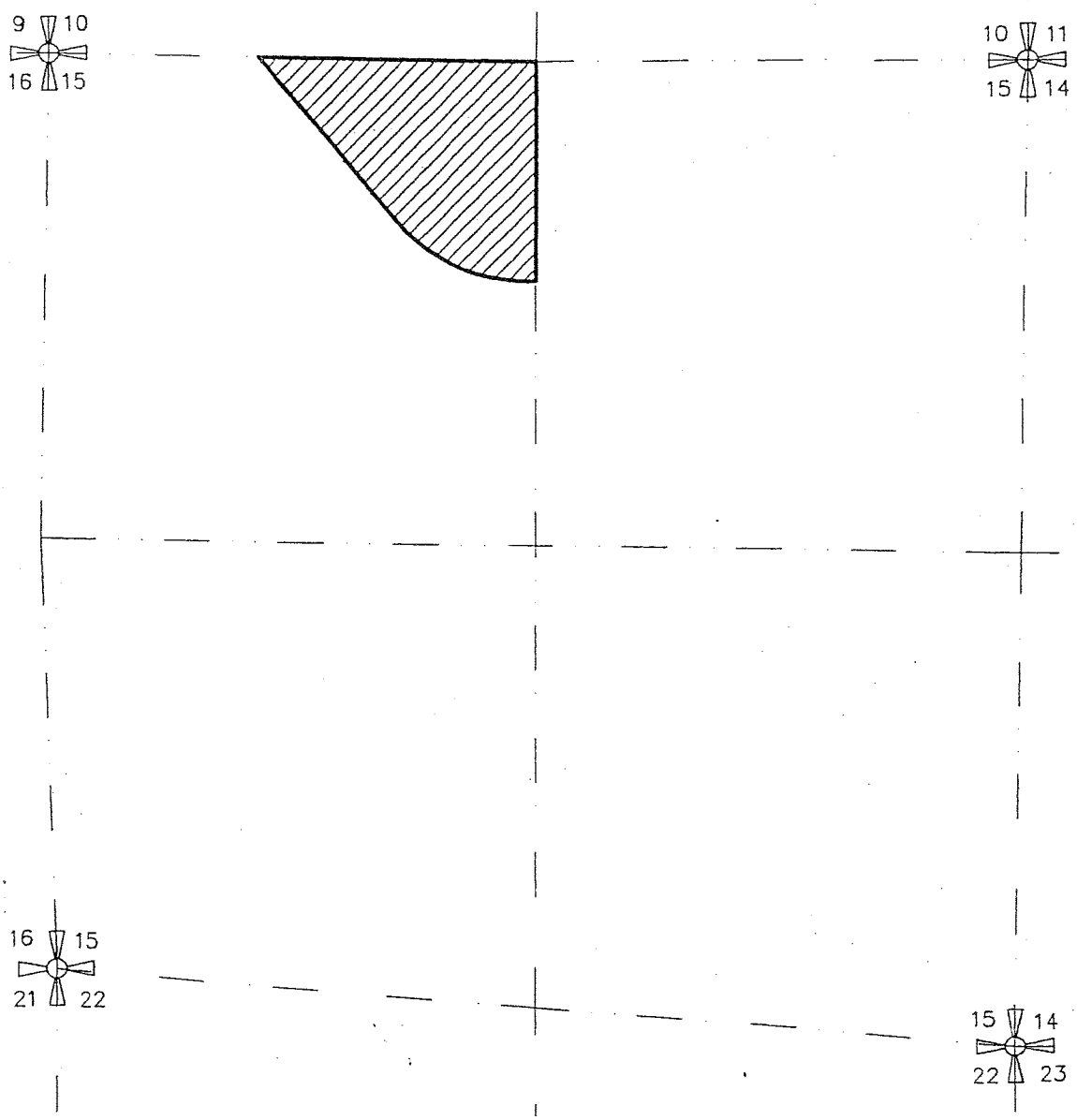
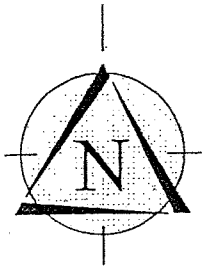


6/05/03

POR. SECTION 23, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



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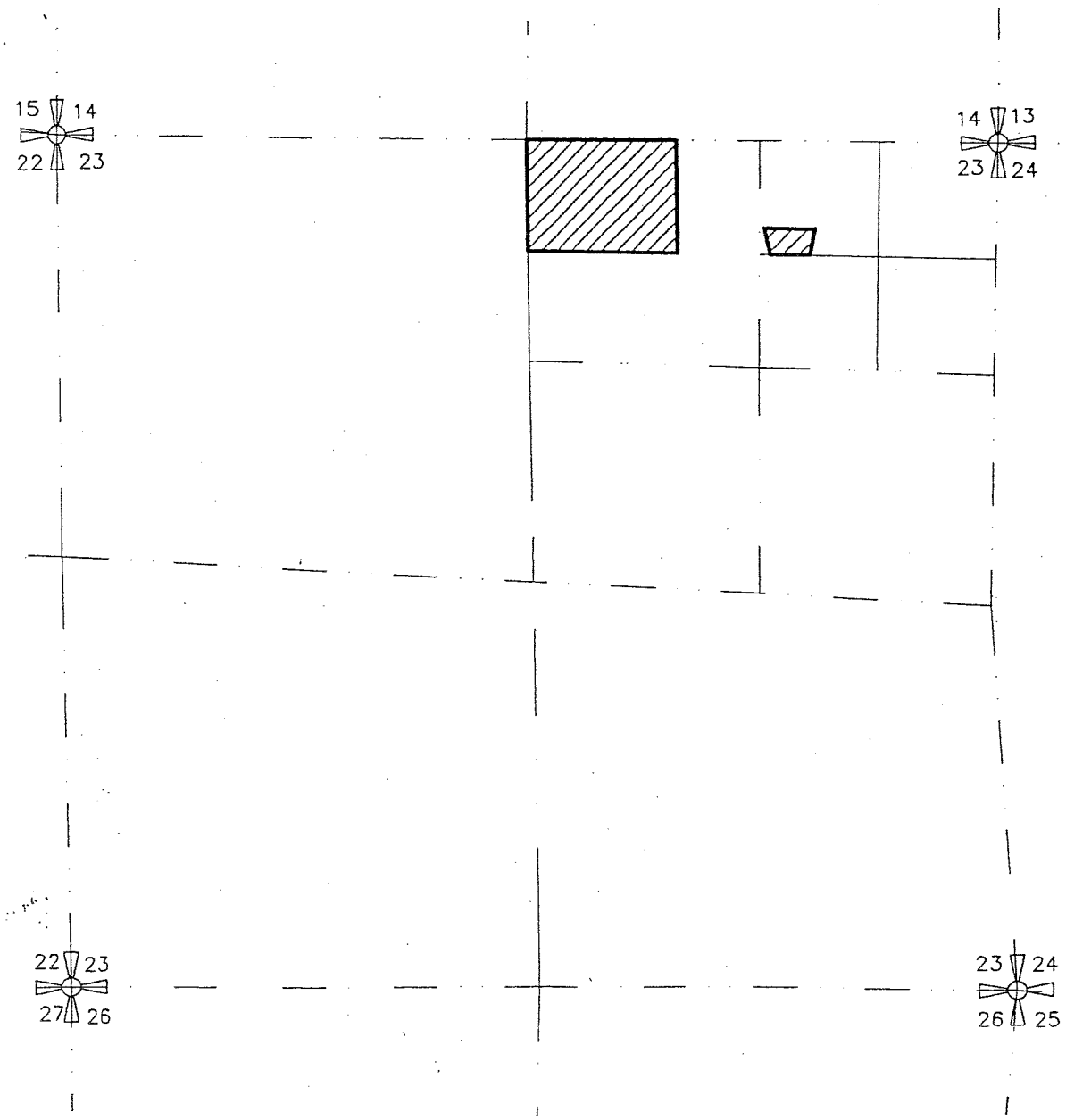

6/05/03

First Addendum to the Palmer Coking Coal Company In City Water Supply and Facilities Funding Agreement

1. Date and Parties.

This First Addendum, for reference purposes only, is dated July 22, 2004, and is entered into by and between the City of Black Diamond, a political subdivision of the State of Washington (the "City"), and Palmer Coking Coal Company, a Washington partnership ("Palmer").

2. General Recitals.

2.1. The City and Palmer entered into the Palmer Coking Coal Company In City Water Supply and Facilities Funding Agreement that is dated, for reference purposes, August 11, 2003, and herein referred to as the "Agreement."

2.2. The Agreement requires Palmer to pay for certain enumerated tasks relating to the design, bid, and construction of City water system improvements.

2.3. The Agreement contemplates that the City may obtain loan(s) to apply towards task costs. In the event the City decides to use the loan proceeds towards the tasks, the Agreement requires Palmer to provide Adequate Assurances of timely repayment of the loan amount. Palmer has already provided the City adequate assurances of repayment (the "Adequate Assurances").

2.4. In the event the City decides to use loan proceeds for certain tasks, the Agreement contemplates an addendum to the Agreement.

2.5. The City obtained a commitment for a Public Works Trust Fund loan (the "Loan"). A portion of the Loan proceeds will be used for tasks 5, 8, 11 and 12 of the Agreement (the "Task(s)"), to the extent the Task(s) are not otherwise completed and constitute allowable expenditures under the Loan, which will result in the construction of improvements that will inure to the benefit of all City system users, including Palmer. The remainder of the Loan will be available to fund the City's SDC obligation for current and future system users other than Palmer.

2.6. The Task(s) for which the Loan proceeds will be utilized involve the construction of general City water system improvements, including a reservoir(s) and intertie to the Tacoma pipeline, as further described in the Agreement, which will benefit all current and future City water system users.

2.7. Palmer has agreed to timely repay that portion of the Loan available for application to the Task(s) and to supply Adequate Assurances for said timely repayment.

2.8. The parties have entered into this First Addendum, in accordance with Section 8.4 of the Agreement, and intend this First Addendum to delineate the timely loan repayment obligation required of Palmer as set forth in Section 8.4 of the Agreement.

3. Incorporation of Agreement Terms.

All the terms and conditions of the Agreement are incorporated into this First Addendum, and the terms of this First Addendum are hereby made a part of the Agreement. This Addendum sets forth a process to apply loan proceeds to Task(s). Consequently, the terms of the Agreement control, except as expressly modified herein.

4. Payment Obligation.

4.1. The Loan amount is the lesser of $5,447,820.00 or eighty-five percent (85%) of the eligible project costs. Of that Loan amount, the City has made $2,416,200 available for application to the Task(s) (the "Available Loan Amount"). Palmer agrees to timely repay the Available Loan Amount, as set forth herein.

4.2. Palmer is liable to the City for repaying such portion of the Available Loan Amount as is disbursed to the City (the "Drawn Loan Amount"). The Drawn Loan Amount shall bear interest at the rate of one-half percent (.5%) per annum with interest accruing upon the disbursal date, and shall be paid in equal annual installments of principal and interest (each, an "Installment"), which will repay the Drawn Loan Amount in full over a twenty-year (20) term. Accordingly, Palmer shall make twenty (20) annual Installment payments to the City due on or before the first day of June of each year, commencing June 1, 2005. The amount of the Installments shall be computed on May 1 of each year and may be adjusted thereafter if the Drawn Loan Amount increases or decreases due to subsequent payments or disbursals. Palmer may pay the Drawn Loan Amount in full or in part at any time prior to maturity without premium or penalty. Once the last Available Loan Amount draw has been disbursed to the City, and the subsequent annual Installment payment has been made, Palmer may annually reduce its Adequate Assurance to the amount of the then existing Drawn Loan Amount, plus the amount of interest that will accrue on said amount through the next year's annual Installment payment.

4.3 The full Available Loan Amount becomes an incurred City Cost(s), as that term is defined in Section 2.7 of the Agreement, immediately upon the City's execution of a Public Works Trust Fund Construction Loan Agreement, regardless of if and/or when the Available Loan Amount is distributed to the City. Provided, however, that if the City does not withdraw the full amount of the Available Loan Amount, the Available Loan Amount will be reduced by the amount not withdrawn.

5. Tasks.

5.1. Task Estimates

The City shall continue to estimate the amount reasonably necessary to meet the City's financial obligations for each Task and provide Palmer with that estimate as provided in the Agreement(s). Ten percent (10%) will be added to each estimate and the City will then apply the portion of the Available Loan Amount available for each Task, as set forth in section 5.2 of this First Addendum, against the One Hundred and Ten Percent (110%) estimated amount for each particular Task. The remaining amount shall constitute Palmer's deposit obligation, as provided in section 8.1 of the Agreement, subject to Palmer's remaining responsibility for subsequent additional cost estimates, City Costs, and all other additional costs as provided in the Agreement. Notwithstanding anything to the

contrary herein, the Available Loan Amount shall not be applied against the estimated cost for a Task to an extent greater than eighty-five percent (85%) of the estimated cost of each particular Task.

5.2. Loan Proceeds

(A) The Loan provides for disbursements to the City using the following formula: (i) twenty percent (20%) ($1,089,564) within 30 days of executing the Loan document ("Initial Draw"); (ii) twenty-five percent (25%) ($1,361,955) upon the formal award of a qualified construction or engineering contract ("Second Draw"); (iii) twenty-five percent (25%) ($1,361,955) upon certification that thirty-five percent of the Loan amount has been spent ("Third Draw"); and, (iv) twenty-five percent (25%) ($1,361,955) upon certification that sixty percent of the Loan amount has been spent ("Fourth Draw"), and the balance of the Loan constitutes reserve funds.

(B) The Loan proceeds disbursed to the City shall be applied to the Task(s) in the following manner, to the extent allowed by law and the Loan Agreement:

(i) Six Hundred Sixty Two Thousand and Sixty Two Dollars and Fifty Seven Cents ($662,062.57) of the First Draw shall not be used for the Task(s), and shall instead be used for the City's SDC obligations or in any other manner the City deems appropriate. The remaining portion of the First Draw ($427,501.43) shall be applied against the Task(s) as costs for each are due from Palmer, to the extent not covered by other funding sources and to the extent the Task(s) and costs constitute allowable expenditures under the Loan, and in no event to an extent greater than eighty-five percent (85%) of the estimated cost of each applicable Task. Said portions of the Available Loan Amount, when received by the City, will correspondingly reduce the estimated amounts that Palmer must deposit into the Fund for each applicable Task under the terms of the Agreement. Palmer will notify the City at the time payment for City Costs and/or estimated City financial obligations are due from Palmer, of (a) the amount of the Available Loan Amount that should be used to pay for such City Costs and/or estimated City financial obligations due from Palmer, from the Available Loan Amount, and (b) the amount of such obligations that will instead be paid in cash.

(ii) To the extent not covered by other funding sources, the Second Draw ($1,361,955) shall be applied against the Task(s) in the manner set forth in (i) above, to the extent the Task(s) and costs constitute allowable expenditures under the Loan, and in no event to an extent greater than eighty-five percent (85%) of the estimated cost of each applicable Task.

(iii) To the extent not covered by other funding sources, a portion of the Third Draw amounting to Three Hundred Fifty Four Thousand Four Hundred Fifty Two Dollars and Fifty Seven Cents ($354,452.57) shall be applied against the Task(s) as set forth in (i) above to the extent that the expenditures constitute allowable expenditures under the Loan, and in no event to an extent greater than eighty-five percent (85%) of the estimated cost of each applicable Task.

(iv) The remaining Available Loan Amount constitutes the reserve amount and may be applied by the City to the Task(s), City Costs, or to other fees, at its sole discretion. The Available Loan Amount will be reduced by the portion of the reserve amount that is applied to the City's SDC obligation or not applied to the Task(s).

(C) Notwithstanding anything to the contrary herein, if any of the draws and/or proceeds described in Section 5.2(B) above are needed by the City to pay System Development Charges, the City may utilize said draws and/or proceeds to pay said System Development Charges, in which event the remaining Available Loan Amount will be drawn out of the subsequent draw(s) and applied to the Task(s) in the manner set forth in Section 5.2(B)(i) above, to the extent subsequent draw(s) are available for application to the Task(s).

(D) All interest earned on the Available Loan Amount disbursed to the City shall accrue solely to the benefit of the City and shall be applied at the City's discretion either to reduce the amount of the Loan, to pay for any costs eligible for payment under the Loan, or to pay Task costs that are in excess of scope of work estimates set forth in the Loan and related documents, if there is an overrun of project costs. Notwithstanding the above, in no event shall any funds be applied contrary to law or the Loan.

(E) Notwithstanding anything to the contrary herein, in no event shall any funds be applied contrary to the law or the Loan.

6. Default.

6.1 In addition to any other remedies provided in the Agreement, upon Palmer's default in timely making any of the payments set forth in this First Addendum, and failure to cure said default within five (5) days of written notice, the City may accelerate the Available Loan Amount, at its option, and/or the City may present Palmer's Adequate Assurance for payment.

6.2 Palmer has indicated that it has made arrangements with another property owner to pay a prorata portion of payments required by this First Addendum. The City is not a party to that arrangement and considers Palmer fully liable for every payment, obligation, City Cost, and any other cost set forth in this First Addendum and the Agreement. However, in order to accommodate Palmer, the City agrees that: 1) if the City issues the five (5) day notice referenced above in section 6.1; and, if 2) during the five (5) day period the City is notified by Palmer that the default is the result of another property owner's failure to honor the separate agreement between Palmer and the other property owner, and 3) the other property owner who is alleged to have not honored the separate agreement between Palmer and that owner has posted Adequate Assurances available to the City for the payment, then 4) the City will first attempt to access the Adequate Assurances of the other property owner who has allegedly defaulted on its separate agreement with Palmer to the extent the other property owner's Adequate Assurances are sufficient to satisfy the amounts owing. If, for any reason, and at any time, the City, in its sole discretion, believes the Adequate Assurances of the other property owner are inaccessible, disputed or insufficient to timely and fully satisfy the amounts owing, the City will advise Palmer, in writing, that unless payment is received from Palmer within five (5) days, the City will present Palmer's Adequate Assurance for payment.

7. Miscellaneous.

7.1 Palmer remains liable for all City Costs and the timely payment of all amounts required by the Agreement and this Addendum.

7.2 If the application of the Loan proceeds in accordance with this First Addendum is determined to be contrary to the law or the Loan Agreement, or must be repaid for any reason, Palmer shall timely repay the Drawn Loan Amount and any additional funds, penalties, or interest the City is required to pay to the Public Works Assistance Account, or any other account directed by the Department of Commerce, Trade and Economic Development, or its successors or assigns, relating to the Available Loan Amount, within thirty (30) days of notice from the City of amounts due.

CITY OF BLACK DIAMOND

Howard Botts, Mayor

PALMER COKING COAL COMPANY

By: _____
William Kombol
Its: Manager

ATTEST:

Cris Kandior, City Clerk

_____
Loren D. Combs, City Attorney

STATE OF WASHINGTON)
) ss.
County of KING)

I certify that I know or have satisfactory evidence that WILLIAM KOMBOL is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he was authorized to execute the instrument and acknowledged it as the Manager of PALMER COKING COAL COMPANY to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: _____

JOYCE M. ROSS
COMMISSION EXPIRES
NOTARY PUBLIC
8-21-06
STATE OF WASHINGTON

_____
NOTARY PUBLIC
Print Name: Joyce M Ross
My appointment expires: 8/21/06

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COPY

PLUM CREEK LAND COMPANY
IN CITY WATER SUPPLY AND FACILITIES FUNDING AGREEMENT

1. Date and Parties.

This Agreement, for reference purposes only, is dated the 27th day of June, 2003, and entered into by and between the City of Black Diamond, a political subdivision of the State of Washington, and Plum Creek Land Company, a Delaware corporation, herein referred to as "Property Owner".

2. Definitions.

When used in this document, unless the context indicates otherwise, the following words when capitalized shall be defined as set forth in this paragraph.

2.1. ADEQUATE ASSURANCES shall mean such security as the City determines, in its sole discretion, is adequate to fully secure any obligation that the City has agreed to incur in order to fund any or all of the expenditures required to be paid by the Property Owner, or to fully secure any required deposit for which the Property Owner, pursuant to paragraph 8.1, has chosen to provide security in lieu of making the deposit.

2.2. AGREEMENT, shall mean this Water Supply and Facilities Funding Agreement.

2.3. AGREEMENT DATE shall mean the date set forth in paragraph 1.

2.4. ANNEXED PROPERTY shall refer to the real property owned by the Property Owner that was included in the annexation to the City completed by the adoption of City Ordinance 515 and 517. The Annexed Property is legally described in Exhibit A and pictorially illustrated in Exhibit B.

2.5. BDUGAA shall refer to the document entitled the Black Diamond Urban Growth Area Agreement that is dated December 31, 1996 and was entered into between the City, Plum Creek Timber Company, a limited partnership, King County, and Palmer Coking Coal Company.

2.6. CITY shall mean the City of Black Diamond.

2.7. COSTS or CITY COSTS, shall mean all City expenditures, obligations or debt incurred, including, but not limited to: staff time; legal consultant fees; engineering consultant fees; financial consultant fees; economic consultant fees; publication fees; mailing fees; cost of right-of way, real property and easement acquisition; and fees and costs to other governmental jurisdictions, that are made or incurred by the City in carrying out the intent and purpose of this Agreement, or in defending any legal or administrative challenge to this Agreement or any actions taken in carrying out the intent and purpose of this Agreement, except a challenge otherwise covered by Paragraph 29.

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2.8. CWSFC shall mean the water system facility charge imposed by the City pursuant to the authority of RCW 35A.80.010 and RCW 35.92.025.

2.9. ERU shall mean that quantity of water that is equal to the average daily water usage, expressed in gallons, for one single family residence. For purposes of calculating the TSDC the ERU shall be 230 gallons. However, the parties acknowledge that they intend, through the implementation of conservation measures and regulations, to reduce the actual average daily water usage to 220 gallons or less.

2.10. FUND shall mean the fund within the City's accounting system that is dedicated solely to tracking monies, and interest earned thereon, that is paid by the Property Owner as required by the Agreement terms, and by others subject to separate Water Supply and Facilities Funding Agreement.

2.11 OTHER PROPERTY shall mean any property that is subject to a separate Water Supply and Facilities Funding Agreement executed with the City that includes some or all of the tasks set forth herein.

2.12. PAA shall mean the South and West Annexation Areas and the West Boundary Adjustment as defined in the BDUGAA.

2.13. PAA PROPERTY shall mean the real property that is owned by the Property Owner within the PAA. The PAA Property is legally described in Exhibit C and pictorially illustrated in Exhibit D. This definition shall continue to apply even if the Property Owner ceases to own all or a portion of the PAA Property, or whether or not any or all of it is annexed, prior to full implementation of all the Agreement terms.

2.14 SUBJECT PROPERTY shall mean the real property owned by the Property Owner as of the Agreement Date that:

1. is in the East Annexation Area as defined in the BDUGAA; or
2. is in within the existing City limits as of the Agreement Date, and
   - i. is not within the area annexed by Ordinance 515 or 517; and
   - ii. is not to be included in an MPD that includes property located in the PAA.

Subject Property is legally described in Exhibit E and pictorially illustrated in Exhibit F, attached hereto.

2.15. TACOMA shall mean the City of Tacoma.

2.16. TASK(S) shall refer to the thirteen tasks enumerated in paragraphs 9 through 21. Task, when capitalized and followed by a number, shall refer to the corresponding numbered

City Property Owner

Task set forth herein. The Tasks are numbered for reference purposes only. The numbering bears no relationship to the order in which the Tasks will be started or completed.

2.17. TSDC shall mean the Tacoma System Development Charge imposed by Tacoma in order to guarantee the certain quantity of water that the City has determined it needs Tacoma to provide in order to provide the quantity of water requested by the Property Owner in Paragraph 7.1, based on the City's projected average day use, peak day use and four day peak use, all as defined in Tacoma Municipal Code chapter 12.10.

3. General Recitals.

3.1. City has an existing public water system. However, the City currently does not have the infrastructure or water supply to provide service for the Subject Property at full build out.

3.2. City has the opportunity to become a Tacoma wholesale water customer. In order to do so, however, the City must connect to Tacoma's existing pipeline system and also pay Tacoma a system development charge. The City does not have the financial resources to pay the system development charge required for all water necessary to serve the Subject Property, or to build the needed infrastructure improvements.

3.3. City currently has a certain quantity of water available from its water supply source (referred to as the Spring Water Source). However, certain water system improvements are needed to maximize the use of the Spring Source Water, and the City does not have the financial resources to pay for said improvements.

3.4. In order for Property Owner to develop the Subject Property, the TSDC associated with the water needed for the Subject Property must be paid and the improvements referenced in subparagraphs 3.1 and 3.2 must be constructed.

3.5 When fully implemented, some of the improvements to the City water facilities shall not only benefit the Property Owner, but other properties and property owners within the City, and the areas included in the BDUGAA.

3.6 In March, 2003 the City Council established a projected time schedule for adoption of development regulations and other regulations as set forth in Exhibit C. Although some of the target dates on the projected time schedule have not been met, it is the intent of all parties to work cooperatively together to finalize all regulations in 2003. The City's intent to act in good faith to meet the time schedule is further consideration for the Property Owners to commit to fund the improvements set forth herein.

4. Agreement Purpose.

This Agreement is intended to accomplish the following purposes:

4.1. Provide for the payment of the TSDC;

City Property Owner

4.2. Provide for the funding of the design and construction of needed City water storage facilities;

4.3. Provide for the funding of the design and construction of the infrastructure necessary to connect the Tacoma water supply to the City's system;

4.4. Provide for the funding of the main water transmission line(s) and related appurtenances needed to provide full build out water service and fire flow throughout the Subject Property.

4.5. Provide the Property Owner with guaranteed water availability for its future development of Subject Property;

4.6. Provide a mechanism for the Property Owner to be reimbursed for a portion of its expenditures for the above referenced improvements by requiring contribution from non-contributing benefited properties located within the PAA, the property annexed by the adoption of City Ordinance 515 or 517, and from owners of Other Property; and

4.7. Provide for the payment of the City Costs associated with accomplishing the above purposes; and

5. Projects to be Funded.

5.1. The Property Owner agrees to pay, or reimburse the City in the case of paragraph 5.1.4, for the following upon the terms and conditions set forth in the Agreement:

5.1.1. All costs associated with doing a rate study to determine the appropriate CWSFC and water use rates to be charged to City water customers once the system improvements to be constructed under the Agreement terms are completed.

5.1.2. The design and construction of all system improvements contemplated under the Agreement terms. This shall include the costs of acquiring additional right-of-way, construction easements and property acquisition if necessary.

5.1.3. City Costs.

5.1.4. Upon execution of this Agreement, reimburse the City the amount of $52,000 for amounts paid or costs incurred by the City prior to executing this agreement that would have been deemed City Costs if incurred during the Agreement term. Adequate Assurances may not be used for this obligation.

5.1.5. TSDC associated with the quantity of water needed to develop the Subject Property.

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5.2. In consideration for the Property Owner agreeing to pay for the items listed above the City agrees that the standards and specifications for the required improvements shall be no greater than the standards and specifications required for a project otherwise funded by the City itself, unless the parties, in writing, agree to a more stringent requirement. The applicable standards and specifications for a particular Task shall be those in effect at the time complete construction plans and specifications for that Task are submitted to the City.

6. Funding Deposit.

The City will not advance the funds necessary to pay City Costs. Accordingly, the Property Owner has deposited with the City seventy thousand dollars ($70,000), receipt of which is acknowledged. That amount shall be deposited in the Fund to be applied to City Costs incurred after the Agreement Date. This amount shall be a working capital reserve and will be a minimum Fund balance. Adequate Assurances may not be used for this obligation or for maintaining the working capital reserve balance.

7. Funding the TSDC.

7.1. The Property Owner has requested 660 ERUs for the Subject Property. The city is acquiring capacity for 615 ERUs from Tacoma in order to meet the Property Owner's request. The TSDC is $936,487.00. The Property Owner shall pay that amount to the City no later than August 11, 2003. If the Property does not want to pay all cash, then the Property Owner shall tender to the City, no later than August 11, 2003, twenty percent of the TSDC, along with Adequate Assurances that the balance including interest and any other Tacoma related charges, will be timely paid. The tendered amount shall be placed in the Fund, and paid by the City to Tacoma, upon execution of the Wholesale Water Agreement between Tacoma and the City.

7.2. The City's determination of the TSDC will be based in part upon information contained in the Tacoma City Code, and information received from Tacoma personnel. The City may not have entered into the wholesale water agreement with Tacoma at the time the TSDC calculation is made. If Tacoma changes its code or regulations, or the Tacoma personnel have made an error in their calculations, so that its rate structure, or payment plan changes prior to the execution of the wholesale water agreement, then the TSDC will be adjusted accordingly.

8. Funding City Water System Improvements.

8.1. Subject to any conditions precedent to the commencement of any Task set forth in this Agreement, the Property Owner will deposit into the Fund 110% of the amount the City reasonably estimates is necessary to meet the financial obligations of the City for that particular Task. The payment will be made within the time limit specified below for each Task. The Property Owner remains responsible for all the costs associated with each Task, including the City Costs related thereto, regardless of the amount that has been estimated for each task. If it is determined that the amount deposited will not be sufficient to meet the actual costs and the City Costs for the particular Task, then the City will provide the Property Owner with pertinent plans and specifications and revised cost estimates, the City will meet with the Property Owner to discuss the new cost estimates, and the Property Owner shall pay into the Fund 110% of the

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additional amount required to satisfy the new estimate within ten (10) days of receiving notice from the City. In lieu of all or a portion of any required deposit the City may accept Adequate Assurances

8.2. Any interest earned on the monies deposited by the Property Owner shall be credited to the Property Owner and placed in the Fund. The Property Owner shall receive a monthly accounting of all receipts to and expenditures from the Fund. The City shall provide the Property Owner with an annual report that contains the status of all Tasks, and a full financial reporting on all costs incurred by the City and all monies deposited into and expended from the Fund in connection with Tasks 1 through 13. Any monies in excess of the Fund's working capital reserve that is not expended for a Task shall be credited towards payments required for a subsequent Task. After completion of all Tasks, and payment of all City Costs, indebtedness and expenses of the City for which the Property Owner is obligated under the Agreement, the Fund balance shall be released to the Property Owner.

8.3. Prior to awarding any contract necessary to complete any Task, the City will discuss the contract terms and conditions with the Property Owner. However, the final decision on contract terms and conditions, and contract award shall be in the City's sole discretion.

8.4. The City may apply for grants or loans to complete some or all of the Tasks. The City anticipates applying for Public Works Trust Fund monies, a portion of which might be used to reduce the cost of money for some Tasks, to the extent allowed by law. If grants are received, then the net amount of the grants (the grant less the City Costs associated with obtaining and administering the grant) shall be used to reduce the amount the Property Owner must pay for the applicable Task. If loans are to be used to reduce the cost of money for any Task, then the Property Owner must consent to the use of the loan proceeds for the Task, and provide Adequate Assurances to the City for timely repayment of the loan amount. If loans are to be used for the purpose of funding all or any portion of one or more Tasks, the parties will, by addendum to this Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

8.5. The City will allow the formation of a local improvement district (LID) to fund any of the Tasks for which a LID can lawfully be formed, provided the petition to form the LID is signed by the property owners of all the property to be included within the LID boundaries; provided, however, the City, in its sole discretion, may decide to allow the formation of a LID that includes benefited properties the owners of which do not consent to the formation of a LID. The formation of the LID will not relieve the Property Owner for any funding requirements set forth in this Agreement that are not paid through the LID. In addition, the Property Owner will pay the City Costs associated with the LID formation. The Property Owner may request that the City include those costs in the LID amount or such other City Costs or expenditures required for any Task, that may legally be financed through the LID. The amounts collected from the LID proceeds for the City Costs previously paid by the Property Owner, will be placed in the Fund, unless, prior to receiving the proceeds, the Property Owner provides the City with written notice to pay the reimbursed amount directly to the Property Owner. If a LID is formed for the purpose of funding all or any portion of one or more Tasks, the parties will, by addendum to this

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Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

9. Task 1 -- Tacoma Intertie and Related Water System Improvements Preliminary Design

Task 1 is the planning, environmental review, property acquisition, and preliminary engineering and cost estimates for the design and construction of the intertie with Tacoma Pipeline 5, the water transmission line, the pump station, and related equipment and improvements necessary to transmit the water from the intertie to the City reservoir. Work on Task 1 has been commenced. The City estimates the Task 1 costs and the City Costs related thereto to be one hundred thousand dollars ($100,000.00). The Property Owner shall deposit with the City 110% of that amount by August 1, 2003. Any City costs incurred prior to the deposit being made that are related to Task 1 shall be deducted from the amount deposited.

10. Task 2 – Water Reservoir Improvements Preliminary Design

Task 2 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the Water Reservoir Improvements. These improvements are to be sized to accommodate all of the property within the City, and the areas within the Potential Annexation Areas referenced in the BDUGAA. Task 2 shall commence when authorized by the City Council. The Property Owner shall deposit with the City 110% of the estimated Task 2 costs within 30 days from receiving from the City the Task 2 written cost estimate.

11. Task 3 – Spring Water Source Collection and Transmission System Improvements Preliminary Design.

Task 3 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements to the Spring Water Source collection system, the replacement of the pumps and related improvements, including the addition of any necessary treatment facilities and equipment, and the replacement of the transmission line between the Spring Water Source and the City water reservoir. These improvements are to be sized to accommodate the full use of the City's Spring Water Source water rights. Work on Task 3 has been commenced. The City estimates the Task 3 costs, and related City Costs to be one hundred ten thousand dollars ($110,000.00). The Property Owner shall deposit with the City 110% of that amount by August 1, 2003. Any City Costs incurred prior to the deposit being made that are related to Task 3 shall be deducted from the amount deposited.

12. Task 4 – Main Transmission Lines to and through Subject Property.

Task 4 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements necessary to provide full build out water service and fire flow from the City water reservoir site, through the Subject Property. This may include one or more looped transmission lines. Task 4 shall be deemed

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commenced upon the Agreement Date. The Property Owner shall pay to the City, upon executing the Agreement a $50,000 deposit to be applied toward Task 4 costs and City Costs related thereto. The City will then commence preparation of the estimated costs associated with Task 4. The Property Owner will pay to the City 110% of the estimated Task 4 costs and City Costs related thereto, less the portion of the $50,000 deposit not yet expended, within 30 days from receiving the City's written estimate. The location and sizing of Task 4 improvements will be significantly dependent upon the Property Owner's development plans. Thus, it is anticipated that ongoing and regular input from the Property Owner will be needed. The City and Property Owner will develop a process to assure that the Property Owner's input is timely received and considered in developing the Task 4 work product.

13. Task 5 – Water Reservoir Improvements Final Design and Bid.

Task 5 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 2 improvements. Task 5 shall commence when the City approves the Task 2 work product. The Property Owner will pay to the City 110% of the estimated Task 5 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

14. Task 6 – Spring Water Source Collection and Transmission System Improvements Final Design and Bid.

Task 6 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 3 improvements. Task 6 shall commence when the City approves the Task 3 work product. The Property Owner will pay to the City 110% of the estimated Task 6 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

15. Task 7 – Main Transmission Line(s) Final Design and Bid.

Task 7 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 4 improvements. Task 7 shall commence when the City approves the Task 4 work product and the Property Owner provides the City with written notice to proceed with Task 7. After Task 7 commences the Property Owner will pay to the City 110% of the estimated Task 7 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

16. Task 8 – Water Reservoir Construction.

Task 8 is the award of the Task 5 bid, and the Construction of the Task 5 improvements. Task 8 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 5 construction contract. The Property Owner will pay to the City 110% of the Task 5 bid amount and City Costs related to Task 8 within 45 days from receiving the City's written notice.

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17. Task 9 -- Spring Water Source and Distribution System Improvements Construction.

Task 9 is the award of the Task 6 bid, and the Construction of the Task 6 improvements. Task 9 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 6 construction contract. The Property Owner will pay to the City 110% of the Task 6 bid amount and City Costs related to Task 9 within 45 days from receiving the City's written notice.

18. Task 10 -- Main Transmission Line Construction.

Task 10 is the award of the Task 7 bid, and the Construction of the Task 7 improvements. The City shall provide the Property Owner with written notice that it intends to award the Task 7 bid. The Property Owner will pay to the City 110% of the Task 7 bid amount and City Costs related to Task 10 within 45 days from receiving the City's written notice.

19. Task 11 -- Tacoma Intertie and Related Water System Improvements Final Design and Bid.

Task 11 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 1 improvements. Task 11 shall commence when the City approves the Task 1 work product. The Property Owner will pay to the City 110% of the estimated Task 1 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

20. Task 12 –Tacoma Intertie and Related Water System Improvements Construction.

Task 12 is the award of the Task 11 bid, and the Construction of the Task 11 improvements. Task 12 shall commence upon the City providing written notice to the Property Owner that it intends to award the Task 11 construction contract. The Property Owner will pay to the City 110% of the Task 11 bid amount and City Costs related to Task 11 within 45 days from receiving the City's written notice.

21. Task 13 – Development of New CWSFC and New Water Usage Rates.

Task 13 is the development and implementation of a new rate study to set the appropriate CWSFC and water use rates to be charged by the City. Task 13 shall commence upon the City providing written notice to the Property owner that it intends to solicit request for proposals to perform the rate study. The Property Owner will pay to the City the estimated City Costs, and 110% of the anticipated cost for the proposed rate study, within 30 days of receiving the City's written notice for payment. The notice for payment shall not be given until the City has received responses to its request for proposal to perform the rate study. The City reserves the right, at its expense to conduct other CWSFC and water use rate studies throughout the Agreement term. Any new rates adopted as a result of said studies shall apply to any water use or connections occurring after the rates are adopted.

City Property Owner

22. Water Availability Certificates.

22.1. Upon Property Owner's payment of the amounts set forth in paragraphs 5.1.4, 6, 7, 9, 11, and 12, the City shall issue Water Availability Certificates for the number of ERUs requested in paragraph 7.1, or such lesser number of ERUs as chosen by the Property Owner pursuant to the provisions of paragraph 35.3. The certificates shall contain the following conditions:

22.1.1. The water shall be available upon completion of Tasks 1 through 12;

22.1.2. All monies required to be paid pursuant to the terms of this Agreement must be paid prior to use of any certificate;

22.1.3. Failure of the Property Owner to meet its financial obligations set forth in the Agreement, after notice and an opportunity to cure, shall cause the certificates for which corresponding building permits have not been issued to revert to the City. This shall be in addition to other remedies available in law and equity;

22.1.4. The Water Availability Certificates, subject to applicable land use regulations and approvals, may be used by the Property Owner, in its discretion, for development on the Subject Property only;

22.1.5. The Water Availability Certificates only warrant that the City has reserved the quantities of water represented by the certificates. Other water system distribution improvements may be necessary for the actual delivery of water to the benefited properties. The cost of those improvements will be borne by the Property Owner;

22.1.6. Any conditions imposed by the agreement with Tacoma that impact water usage shall apply to the Certificates;

22.1.7. The Certificates shall be subject to surrender to the City pursuant to the provisions of paragraph 28.4;

22.1.8. The CWSFC relating to any certificate proposed to be used must be paid before the Certificate may be used; and

22.1.9. The Certificates shall only apply to development that is both located within the City's water service area and located within the City limits at the time a complete application for a land use development approval is submitted to the City for the development.

22.1.10. The issuance of a Certificate does not expressly or impliedly represent that the City will approve development that will result in the use of all water for which Certificates have been issued.

City Property Owner

22.1.11. The Certificates are for a quantity of water based on 230 gallons per day usage per ERU. If the actual usage is greater, then the number of ERUs authorized by the Certificate shall be correspondingly reduced.

22.2. If the Property Owner determines that it does not need all of the certificates that have been issued, then the unneeded certificates may be returned to the City ("Returned Certificates"). The City shall date stamp the Returned Certificates ("Return Date"). Within 30 days of the Return Date the Property Owner will be notified of how many ERUs of water capacity the City had in its inventory prior to the Return Date ("ERU Inventory"). Any water connections after the Return Date shall come first from the ERU Inventory. After the ERU inventory is exhausted, the City will issue all water connections from water represented by the Returned Certificates ("Returned Certificate Inventory"). The Property Owner shall receive a portion of the CWSFC collected for each connection issued from the Returned Certificate Inventory. The amount shall be that portion of the CWSFC collected on the Returned Certificate Inventory that is attributable to required expenditures made by the Property Owner pursuant to the Agreement terms prior to the Return Date. The reimbursement shall be made on a quarterly basis. The City, upon request by the Property Owner, will seek to have Tacoma repurchase the water capacity represented by the Returned Certificate Inventory. If Tacoma agrees to repurchase then the following shall occur:

22.2.1 The City shall negotiate the repurchase agreement;

22.2.2 Upon receipt of monies from Tacoma for the repurchase, the City will recalculate its CWSFC to take into account the reduction in total ERUs of capacity resulting from the Tacoma water capacity repurchase.

22.2.3 Upon adoption of a new CWSFC, the City will pay the Property Owner the amount received from Tacoma for the repurchased water capacity, up to the amount of the TSDC paid by the Property Owner, less City Costs associated with implementing paragraph provisions 22.2.1, 22.2.2 and 22.2.3.

22.3 If, through the implementation of conservation measures, or by a change in the City's standard for ERUs, the actual average daily water usage for the development of Subject Property is less than 230 gallons, then the number of Water Certificates shall be adjusted so that additional Certificates are issued to take into account the lower average daily water usage rate. To determine actual average daily water usage for the Subject Property may require the installation of a flow meter for the entire PAA Property and/or Annexed Property. If the Property Owner requests the installation of such a meter, then the Property Owner shall be responsible for the meter cost, installation and maintenance expense.

23. Paragraph 23 intentionally omitted.

24. Reimbursement Agreement.

Subject to the provisions of RCW 35.91.020, the Property Owner shall be entitled to recapture a pro rata portion of the amounts paid pursuant to the Agreement terms from non-

City Property Owner

contributing benefited properties located within the area annexed by the adoption of City Ordinance 515 or 517, the properties that are within the PAA, or Other Property.

25. Water Use Rates and Credit Toward CWSFC.

25.1. The CWSFC to be paid by the Property Owner shall be the CWSFC adopted at the completion of Task 13, or the CWSFC in effect at the time a building permit is issued and available for delivery to the Property Owner, whichever amount is greater. If Task 13 is not complete at the time a building permit is ready to be issued, then the City shall issue the permit upon payment of the applicable building permit fees, and payment of a deposit of the anticipated CWSFC, as reasonably determined by the City. When Task 13 is completed, if the resulting CWSFC is less than the deposit amount, then the balance of the deposit shall be returned to the Property Owner. If the CWSFC is greater than the deposit amount, then the Property Owner shall pay the City the difference within 3 business days of receiving written notice. Failure to timely pay the difference shall result in the issuance of a stop work order for work authorized by the building permit.

25.2 The rate to be paid for water use shall be whatever rate is in effect at the time the water is used.

25.3 The Property Owner may be entitled to one or more credits towards its CWSFC under the following circumstances:

25.3.1 When the Property Owner is required to pay a CWSFC, or CWSFC deposit as referenced in Paragraph 25.1, for any ERUs for which it has a Water Availability Certificate, it shall be entitled to a credit for a portion of the CWSFC. The amount of the credit per ERU shall be that portion of the CWSFC for the ERU that is attributable to amounts paid by the Property Owner pursuant to the Agreement terms. For example, if the CWSFC is $4,000 per ERU, and $2,500 of that amount is attributable to monies paid by the Property Owner pursuant to the terms of the Agreement, then the Property Owner would receive a $2,500 credit per ERU.

25.3.2 If the City terminates the Spring Water Source project prior to or at the end of Task 3, as set forth in Paragraph 36, then the Property Owner shall also receive a credit towards the CWSFC of any monies it paid the City that were expended on Task 3, whether or not those monies are included in the calculation that determined the CWSFC rate. The credit for Spring Water Source project expenditures shall be prorated over the remaining ERUs for which the Property Owner has Water Availability Certificates, with the prorated credit for each ERU being applied at the time the CWSFC for the ERU is required to be paid.

26. Entire Agreement.

The parties have negotiated in good faith with regards to each and every term of this Agreement. The Agreement embodies and supersedes all agreements, and representations, express or implied, verbal or written, regarding the Tasks and the funding thereof. The Agreement cannot be modified except in written addendum to the Agreement, signed by all parties hereto.

City Property Owner

27. Other Property.

It is possible that the City will enter into one or more water supply and facilities funding agreements relative to Other Property. These other agreements may include a requirement to provide funding for some of the improvements required by the Agreement. If this occurs, then the Property Owners of the Other Property and the Property Owner shall each be severally liable for all obligations to which they have agreed to in their respective agreements. However, if this results in deposits being received by the City that are greater than the amount the City would have otherwise received relative to a Task, then the City shall refund to the respective party a pro rata portion of the deposit made based upon the ratio between the water required for each party. The Property Owner and the owners of Other Property, in lieu of making multiple deposits may collectively provide only the amount of the deposit required by this Agreement. If Adequate Assurances are provided, then except for Adequate Assurances relating to the TSDC, an Adequate Assurances provided by a Property Owner, shall be for 110% of the Task amount, regardless of whether or not there are multiple Adequate Assurances and regardless of whether or not it is intended to secure only a portion of the total Task amount.

28. Failure to Make Payment or Continuously Provide Adequate Assurances.

28.1. If the Property Owner fails to timely pay any amounts required by the Agreement, then, after five (5) business days notice, the City shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity. If the City proceeds with a Task after the Property Owner has failed to timely make the payments, City Costs and any monies paid toward completing the Task, plus interest thereon at 18 percent per annum, or the maximum lawful rate, whichever is less, accrued from the date the monies are paid by the City, shall be deemed a lien against the Subject Property, and may be foreclosed in the same manner as a labor and materialman's lien filed under Chapter RCW 60.04. The provisions of paragraph 29 shall apply in such proceeding.

28.2. The provisions of paragraph 28.1 notwithstanding, if the Property Owner fails to timely pay any amounts required by the Agreement, and Adequate Assurances have been provided, then after (5) business days notice, the City shall, prior to exercising any termination remedies, make demand upon the Adequate Assurance that the entire amount of the Adequate Assurances provided be paid to the City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund.

28.3 The provisions of paragraph 28.1 and 28.2 notwithstanding, if after the Property Owner has provided Adequate Assurances, the City receives notice that the Adequate Assurances will expire or be canceled by the surety or issuer providing the Adequate Assurances, the City may make immediate demand upon such surety or issuer that the entire amount of such Adequate Assurances be paid to the City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund.

28.4. The provisions of paragraph 28.1, 28.2 and 28.3 notwithstanding, if the Property Owner provides the City with notice within 30 days from the completion of Tasks 1, 2, 3, 4 and

City Property Owner

11 that it intends to withdraw from the Agreement, and provided that the Property Owner has paid all City Costs incurred to the date of the notice, and the Property Owner has paid all expenses for Tasks 1, 2, 3, 4 and 11, then the Property Owner may withdraw from this Agreement. Within 30 days from receiving the notice of intent to withdraw, the City shall provide the Property Owner a final tabulation of the City Costs incurred through the date the notice of intent to withdraw was received by the City, and the balance owing on the City Costs, if any. In order for the withdrawal to be effective, the balance owing must be paid within 15 days of the City's notice of balance owing. The withdrawal shall be effective upon the date the payment of the balance is received. If the balance is not timely paid, then the Property Owner shall not be allowed to withdraw from the Agreement. If the withdrawal becomes effective, and the TSDC was paid in cash, then the Water Availability Certificates that have been issued to the Property Owner cannot be used by the Property Owner, but must be surrendered to the City, and they will then be processed in the manner set forth in paragraph 22.2. If the TSDC was not paid for in cash, then the Adequate Assurances for the TSDC payment shall not be released, unless and until Tacoma agrees to release the City from its obligation for the water payments associated with the TSDC attributable to the withdrawing Property Owner, or the City decides to assume the obligation. If the Adequate Assurances are released, then the Water Availability Certificates issued to the withdrawing Property Owner shall be surrendered to the City and the provisions of paragraph 22.2 shall not apply.

29. Attorney's Fees.

If any suit or other proceeding is instituted by either party to this Agreement arising out of or pertaining to this Agreement, including but not limited to filing suit or requesting an arbitration, mediation, or other alternative dispute resolution process (collectively "Proceedings"), and any appeals and collateral actions relative to such suit or proceeding, the prevailing party as determined by the court or in the proceeding shall be entitled to recover its reasonable attorneys fees and all costs and expenses incurred relative to such suit or proceeding from the non-prevailing party, in addition to such other available relief. Attorneys fees incurred in connection with the meeting described in paragraph 29 shall not be recoverable.

30. Dispute Resolution.

In the event of a dispute arising from the interpretation or application of any Agreement provision, the parties shall (1) convene a meeting among their principals to discuss the dispute; then (2) refer the matter to mediation if said meeting does not resolve the dispute; and (3) if mediation does not resolve the dispute, the parties may pursue their legal remedies. This provision shall also apply to questions relative to the amount or nature of any expenditures made by the City from funds paid by the Property Owner pursuant to the Agreement terms. Provided, however, a dispute relative to an expenditure shall not relieve the Property Owner of its obligation to timely make all required payments while the dispute is pending. Notwithstanding the foregoing, any party shall be entitled to seek equitable remedies through legal process at any time simultaneous with the dispute resolution process outlined herein where irreparable harm will be done if the equitable remedy is not granted before the conclusion of the dispute resolution process.

City Property Owner

31. Written Notices.

All Notices required by this Agreement shall be considered properly delivered when personally delivered, when received by facsimile, or on the third day following mailing, postage prepaid, certified mail, return receipt requested, to:

City:
City Administrator
City of Black Diamond
P.O. Box 599
Black Diamond, WA 98010
Fax: (360) 886-2592

With a copy to:
Loren D. Combs
McGavick Graves, P.S.
P.O. Box 1317
Tacoma, WA 98401-1317
Fax: (253) 627-2247

Property Owner:
Randy Hamblin and James A. Kraft
Plum Creek Timber Company, L.P.
999 Third Avenue, Suite 2300
Seattle, WA 98104
Fax: (206) 467-3799

With a copy to:
John Hempelmann
John P. Payseno
Cairncross Hempelmann
524 2nd Avenue
Seattle, WA 98104-2323
Fax: (206) 587-0700

32. Failure to Provide Certificates of Availability.

If the City fails to provide Water Availability Certificates as provided in this Agreement, the Property Owner shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity.

33. Assignment.

The Property Owner and the City may each assign all or a portion of its rights under this Agreement upon written notice to the other party. The City's consent shall be required for the assignment of the Property Owner's rights. Said consent will not be unreasonably withheld. An assignment shall not release the assigning party from its obligations under this Agreement. If the Property Owner seeks approval for assignment, and a release of its obligations hereunder, it shall pay to the City the costs incurred by the City to determine whether the proposed assignee is financially able to perform the obligations required under this Agreement. Any party shall act

City Property Owner

upon a request for assignment within sixty (60) days. Otherwise the assignment will be deemed approved. Provided, however, if the Property Owner has posted Adequate Assurances, the Property Owner shall not be released from the Adequate Assurances obligations until substitute Adequate Assurances have been accepted, in writing, by the City.

34. Term.

The term of this Agreement shall be thirty (30) years from the Agreement Date unless it is earlier terminated or extended by written agreement or by operation of the Agreement conditions.

35. Tolling of Time Limits.

If any governmental action taken in furtherance of any of this Agreement's terms is administratively or judicially appealed, other than by a party hereto, then all deadlines shall be tolled during the pendency of such appeal.

36. Termination of Spring Water Source Collection and Transmission System Improvements.

It is possible that prior to, or at the conclusion of Task 3 the City might determine it is not in the best interests of the City to continue with the Spring Water Source Collection and Transmission System Improvements. If the City makes that determination, then the following shall occur:

36.1. The City shall provide the Property Owner with written notification that the Spring Water Source Project is terminated.

36.2. Tasks 6 and 9 are deleted from this Agreement and Property Owner is released from any financial obligation with regards thereto.

36.3 The Property Owner shall have 15 days to notify the City in writing that they either will: 1) modify its total water requirements so that the quantity of water requested pursuant to paragraph 7.1 is reduced to equal the existing TSDC; or 2) they still want the full quantity of water requested in paragraph 7.1.

37. Captions.

The paragraph captions are for convenience and reference only. They do not define or limit any of the rights or responsibilities set forth in the Agreement.

38. Condition Subsequent.

The City intends to exert all reasonable efforts to enter into an agreement with Tacoma wherein the City will be a Tacoma wholesale water customer and will be able to provide the ERU's requested by the Property Owner. If the City is unsuccessful in entering into such

City Property Owner

agreement with Tacoma by September 30, 2003, then this Agreement shall be terminated, the Adequate Assurances released, and the Fund balance, after payment of outstanding City Costs, shall be released to the Property Owner.

39. Recording Memorandum of Agreement.

The City shall record with King County a Memorandum of Agreement (MOA) that will be placed of record on the property legally described in Exhibit E. The MOA will read as follows:

> The following described real property is subject to the terms of an agreement entitled Water Supply and Facilities Funding Agreement, dated the ____ day August, 2003, a copy of which is on file with the City Clerk for the City of Black Diamond, Washington: (legal description attached)

CITY OF BLACK DIAMOND

Howard Botts, Mayor

PROPERTY OWNER

By: _____
William R. Brown
Its: Executive Vice President and
Chief Financial Officer

ATTEST:

Cris Kandior, City Clerk

APPROVED AS TO FORM:

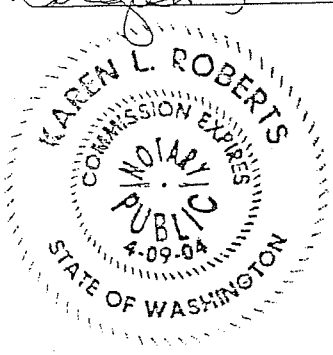
Loren D. Combs, City Attorney

City Property Owner

STATE OF WASHINGTON)
) ss.
County of King)

I certify that I know or have satisfactory evidence that WILLIAM R. BROWN is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he was authorized to execute the instrument and acknowledged it as the Executive Vice President and Chief Financial Officer of PLUM CREEK LAND COMPANY to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

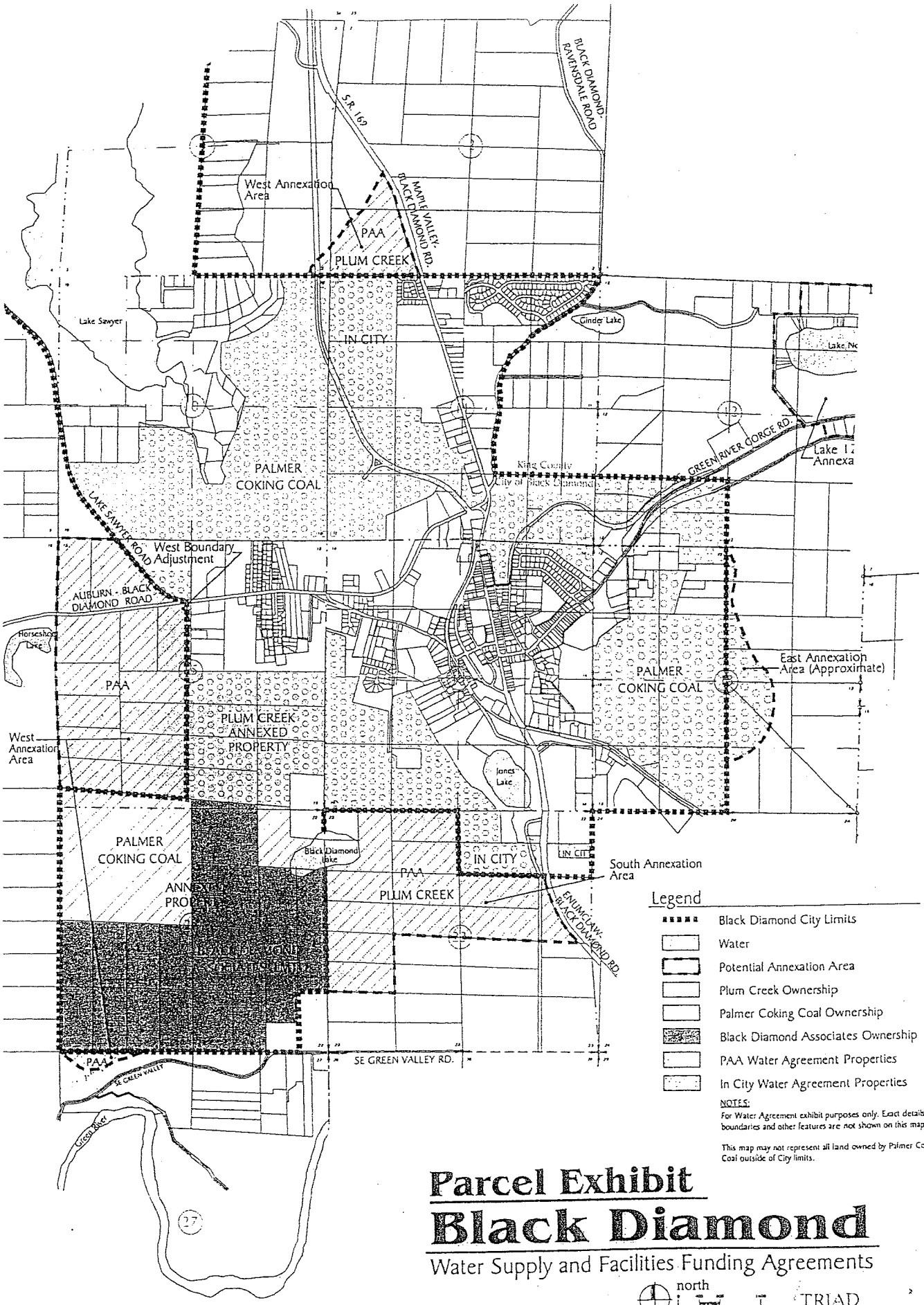
DATED: August 11, 2003.



NOTARY PUBLIC
Print Name: KAREN L ROBERTS
My appointment expires: 4-9-04

b\24108\080803in-cityplum.doc

City Property Owner



Parcel Exhibit

Black Diamond

Water Supply and Facilities Funding Agreements

north

SCALE: 1" = 800'

02070/black diamond parcels
7/25/2003

TRIAD

Legal Descriptions and Tax Parcel Numbers
of
Plum Creek Land Company Ownership to be Served by Black Diamond Water

In-City Water Agreement Properties

Tax Parcel 112106-9006: The W1/2NW1/4 of Section 11, Township 21 North, Range 6 East, W.M. EXCEPT that portion thereof lying within the Burlington Northern and Santa Fe Railway Company's (formerly Pacific Coast Railroad Company) 100' wide Maple Valley to Lake Wilderness, Washington Branch Line right-of-way, now discontinued, being 50' wide on each side of said Railroad Company's Main Track centerline as originally located and constructed upon, over and across the SW1/4NW1/4 of said Section 11.

Tax Parcel 112106-9109: All that portion of the Burlington Northern and Santa Fe Railway Company's (formerly Pacific Coast Railroad Company) 100' wide Maple Valley to Lake Wilderness, Washington Branch Line right-of-way, now discontinued, being 50' wide on each side of said Railroad Company's Main Track centerline as originally located and constructed upon, over and across the SW1/4NW1/4 of Section 11, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9096: The N1/2SE1/4, the SW1/4SE1/4, the N1/2SE1/4SE1/4, the SW1/4SE1/4SE1/4, and that portion of the easterly 80 feet of the W1/2 lying southwesterly of the centerline of Maple Valley-Lake Sawyer Road and southerly of the centerline of the Auburn-Black Diamond Road, all in Section 15, Township 21 North, Range 6 East, W.M.

Portion of Tax Parcel 232106-9001: The S1/2NW1/4NE1/4 and that portion of the S1/2NE1/4NE1/4 lying westerly of the westerly margin of Enumclaw-Black Diamond Road (S.R.169) right-of-way, all in Section 23, Township 21 North, Range 6 East, W.M.

Portion of Tax Parcel 232106-9001: That portion of the NE1/4NE1/4NE1/4 of Section 23, Township 21 North, Range 6 East, W.M. lying northerly of the following described line:

Beginning at a point on the east line of said NE1/4NE1/4NE1/4 and 600 feet south of the northeast section corner of said Section 23; thence extending in a northwesterly direction to a point on the west line of said NE1/4NE1/4NE1/4 and 330 feet south of the northwest corner of said NE1/4NE1/4NE1/4.

WATER SUPPLY AND FACILITIES FUNDING AGREEMENT

1. Date and Parties.

This Agreement, for reference purposes only, is dated the 11th day of August, 2003, and entered into by and between the City of Black Diamond, a political subdivision of the State of Washington, and Plum Creek Land Company, a Delaware corporation ("Plum Creek"), Palmer Coking Coal Co. a Washington ~~corporation~~ partnership ("Palmer"), and Black Diamond Associates, Ltd., a Washington Limited Partnership ("BDA"), herein referred to collectively as "Property Owners" and individually as "Property Owner".

2. Definitions.

When used in this document, unless the context indicates otherwise, the following words when capitalized shall be defined as set forth in this paragraph.

2.1. ADEQUATE ASSURANCES shall mean such security as the City determines, in its sole discretion, is adequate to fully secure any obligation that the City has agreed to incur in order to fund any or all of the expenditures required to be paid by the Property Owners, or to fully secure any required deposit for which the Property Owners, pursuant to paragraph 8.1, have chosen to provide security in lieu of making the deposit.

2.2. AGREEMENT shall mean this Water Supply and Facilities Funding Agreement.

2.3. AGREEMENT DATE shall mean the date set forth in paragraph 1.

2.4. ANNEXED PROPERTY shall refer to the real property owned by the Property Owners that was included in the annexation to the City completed by the adoption of City Ordinance 515 and 517. The Annexed Property is legally described in Exhibit A and pictorially illustrated in Exhibit B.

2.5. BDUGAA shall refer to the document entitled the Black Diamond Urban Growth Area Agreement that is dated December 31, 1996 and was entered into between the City, Plum Creek Timber Company, a limited partnership, King County, and Palmer Coking Coal Company.

2.6. CITY shall mean the City of Black Diamond.

2.7. COSTS or CITY COSTS, shall mean all City expenditures, obligations or debt incurred, including, but not limited to: staff time; legal consultant fees; engineering consultant fees; financial consultant fees; economic consultant fees; publication fees; mailing fees; cost of right-of way, real property and easement acquisition; and fees and costs to other governmental jurisdictions, that are made or incurred by the City in carrying out the intent and purpose of this Agreement, or in defending any legal or administrative challenge to this Agreement or any

City Property Owners

actions taken in carrying out the intent and purpose of this Agreement, except a challenge otherwise covered by Paragraph 29.

2.8. CWSFC shall mean the water system facility charge imposed by the City pursuant to the authority of RCW 35A.80.010 and RCW 35.92.025.

2.9. ERU shall mean that quantity of water that is equal to the average daily water usage, expressed in gallons, for one single family residence. For purposes of calculating the TSDC the ERU shall be 230 gallons. However, the parties acknowledge that they intend, through the implementation of conservation measures and regulations, to reduce the actual average daily water usage to 220 gallons or less.

2.10. FUND shall mean the fund within the City's accounting system that is dedicated solely to tracking monies, and interest earned thereon, that is paid by the Property Owners as required by the Agreement terms.

2.11 OTHER PROPERTY shall mean any property not within the PAA or the Annexed Property that is subject to a separate water supply and facilities funding agreement.

2.12. PAA shall mean the South and West Annexation Areas and the West Boundary Adjustment as defined in the BDUGAA.

2.13. PAA PROPERTY shall mean the real property that is owned by the Property Owners within the PAA. The PAA Property is legally described in Exhibit C and pictorially illustrated in Exhibit D. This definition shall continue to apply even if the Property Owners cease to own all or a portion of the PAA Property, or whether or not any or all of it is annexed, prior to full implementation of all the Agreement terms.

2.14. TACOMA shall mean the City of Tacoma.

2.15. TASK(S) shall refer to the thirteen tasks enumerated in paragraphs 9 through 21. Task, when capitalized and followed by a number, shall refer to the corresponding numbered Task set forth herein. The Tasks are numbered for reference purposes only. The numbering bears no relationship to the order in which the Tasks will be started or completed.

2.16. TSDC shall mean the Tacoma System Development Charge imposed by Tacoma in order to guarantee the certain quantity of water that the City has determined it needs Tacoma to provide in order to provide the quantity of water requested by the Property Owners in Paragraph 7.1, based on the City's projected average day use, peak day use and four day peak use, all as defined in Tacoma Municipal Code chapter 12.10.

3. General Recitals.

3.1. City has an existing public water system intended to serve the Annexed Property

City Property Owners

and the PAA Property once it is annexed into the City. However, the City currently does not have the infrastructure or water supply to provide such service.

3.2. City has the opportunity to become a Tacoma wholesale water customer. In order to do so, however, the City must connect to Tacoma's existing pipeline system and also pay Tacoma a system development charge. The City does not have the financial resources to pay the system development charge required for all water necessary to serve the entire City and the PAA, or to build the needed infrastructure improvements.

3.3. City currently has a certain quantity of water available from its water supply source (referred to as the Spring Water Source). However, certain water system improvements are needed to maximize the use of the Spring Source Water, and the City does not have the financial resources to pay for said improvements.

3.4. In order for Property Owners to develop their Annexed Property and PAA Property, the TSDC associated with the water needed for the Annexed Property and the PAA Property must be paid and the improvements referenced in subparagraphs 3.1, 3.2 and 3.3 must be constructed.

3.5 When fully implemented, the improvements to the city water facilities shall not only benefit the Property Owners and the PAA Property, but other properties and property owners within the City, and the areas included in the BDUGAA.

3.6 In March, 2003 the City Council established a projected time schedule for adoption of development regulations and other regulations as set forth in Exhibit C. Although some of the target dates on the projected time schedule have not been met, it is the intent of all parties to work cooperatively together to finalize all regulations in 2003. The City's intent to act in good faith to meet the time schedule is further consideration for the Property Owners to commit to fund the improvements set forth herein.

4. Agreement Purpose.

This Agreement is intended to accomplish the following purposes:

4.1. Provide for the payment of the TSDC;

4.2. Provide for the funding of design and construction of the needed improvements to the Spring Water Source and the transmission line to the City water storage facility;

4.3. Provide for the funding of the design and construction of needed City water storage facilities;

4.4. Provide for the funding of the design and construction of the infrastructure necessary to connect the Tacoma water supply to the City's system;

City Property Owners

4.5. Provide for the funding of the main water transmission line(s) and related appurtenances needed to provide full build out water service and fire flow throughout the PAA Property and Annexed Property.

4.6. Provide the Property Owners with guaranteed water availability for its future development of the PAA Property and the Annexed Property;

4.7. Provide a mechanism for the Property Owners to be reimbursed for a portion of its expenditures for the above referenced improvements by requiring contribution from non-contributing benefited properties located within the PAA, the property annexed by the adoption of City Ordinance 515 or 517, and from owners of Other Property;

4.8. Provide for the payment of the City Costs associated with accomplishing the above purposes; and

4.9. Further implement the provisions of the BDUGAA and City Ordinance 515 or 517.

4.10. Satisfy a condition precedent to the annexation of the PAA Property, as set forth in paragraph 5.2(B) of the BDUGAA

5. Projects to be Funded.

5.1. The Property Owners agree to pay, or reimburse the City in the case of paragraph 5.1.4, for the following upon the terms and conditions set forth in the Agreement:

5.1.1. All costs associated with doing a rate study to determine the appropriate CWSFC and water use rates to be charged to City water customers once the system improvements to be constructed under the Agreement terms are completed;

5.1.2. The design and construction of all system improvements contemplated under the Agreement terms. This shall include the costs of acquiring additional right-of-way, construction easements and property acquisition if necessary.

5.1.3. City Costs.

5.1.4. Upon execution of this Agreement, reimburse the City the amount of $52,000 for amounts paid or costs incurred by the City prior to executing this agreement that would have been deemed City Costs if incurred during the Agreement term. Adequate Assurances may not be used for this obligation.

5.1.5. TSDC associated with the quantity of water needed to develop the PAA Property and the Annexed Property.

5.2. In consideration for the Property Owners agreeing to pay for the items listed above the City agrees that the standards and specifications for the required improvements shall

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be no greater than the standards and specifications required for a project otherwise funded by the City itself, unless the parties, in writing, agree to a more stringent requirement. The applicable standards and specifications for a particular Task shall be those in effect at the time complete construction plans and specifications for that Task are submitted to the City.

6. Funding Deposit.

The City will not advance the funds necessary to pay City Costs. Accordingly, the Property Owners have deposited with the City seventy thousand dollars ($70,000.00), receipt of which is acknowledged. That amount shall be deposited in the Fund to be applied to City Costs incurred after the Agreement Date. This amount shall be a working capital reserve and will be a minimum Fund balance. Adequate Assurances may not be used for this obligation or for maintaining the working capital reserve balance.

7. Funding the TSDC.

7.1. The Property Owners have requested 4,110 ERUs for the PAA Property and the Annexed Property. Of that amount Palmer is requesting 370 ERUs, Plum Creek is requesting 2,940 ERUs, and BDA is requesting 800 ERUs. The City is acquiring capacity for 3,833 ERUs from Tacoma in order to meet the Property Owners request. The ERU capacity being purchased from Tacoma for the PAA Property and the Annexed Property is allocated between the Property Owners as follows: Palmer, 345 ERUs; Plum Creek, 2,742 ERUs; BDA, 746 ERUs. The TSDC is $5,836,677.00. The Property Owners are responsible for the TSDC as follows: Palmer, $525,347.00; Plum Creek, $4,175,363.00; BDA, $1,135,967. The Property Owners shall pay their respective share of the TSDC to the City no later than August 11, 2003. If a Property Owner does not want to pay all cash, then the Property Owner shall tender to the City, no later than August 11, 2003, twenty percent of the TSDC, along with Adequate Assurances that the balance, including interest and any other Tacoma related charges, will be timely paid. The tendered amount shall be placed in the Fund, and paid by the City to Tacoma, upon execution of the Wholesale Water Agreement between Tacoma and the City.

7.1.1 The other provisions of this Agreement not withstanding, failure to timely pay the TSDC amount by a Property Owner shall result in the City not acquiring the above referenced capacity from Tacoma for the Property Owner that fails to timely pay.

7.1.2 The other provisions of this Agreement not withstanding, if there is a default in any required TSDC payment by a Property Owner that has posted Adequate Assurances for the payment, then the City shall only make demand upon the Adequate Assurances of the defaulting party, and shall only exercise termination remedies against the defaulting party.

7.2. The City's determination of the TSDC will be based in part upon information contained in the Tacoma City Code, and information received from Tacoma personnel. The City may not have entered into the wholesale water agreement with Tacoma at the time the TSDC calculation is made. If Tacoma changes its code or regulations, or the Tacoma personnel have

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made an error in their calculations, so that its rate structure, or payment plan changes prior to the execution of the wholesale water agreement, then the TSDC will be adjusted accordingly.

8. Funding City Water System Improvements.

8.1. Subject to any conditions precedent to the commencement of any Task set forth in this Agreement, the Property Owners will deposit into the Fund 110% of the amount the City reasonably estimates is necessary to meet the financial obligations of the City for that particular Task. The payment will be made within the time limit specified below for each Task. The Property Owners remain responsible for all the costs associated with each Task, including the City Costs related thereto, regardless of the amount that has been estimated for each task. If it is determined that the amount deposited will not be sufficient to meet the actual costs and the City Costs for the particular Task, then the City will provide the Property Owners with pertinent plans and specifications and revised cost estimates, the City will meet with the Property Owners to discuss the new cost estimates, and the Property Owners shall pay into the Fund 110% of the additional amount required to satisfy the new estimate within ten (10) days of receiving notice from the City. In lieu of all or a portion of any required deposit the City may accept Adequate Assurances. Provided, however, except for Adequate Assurances relating to the TSDC, any Adequate Assurances provided by a Property Owner, shall be for 110% of the Task amount, regardless of whether or not there are multiple Adequate Assurances and regardless of whether or not it is intended to secure only a portion of the total Task amount.

8.2. Any interest earned on the monies deposited by the Property Owners shall be credited to the Property Owners and placed in the Fund. The Property Owners shall receive a monthly accounting of all receipts to and expenditures from the Fund. The City shall provide the Property Owners with an annual report that contains the status of all Tasks, and a full financial reporting on all costs incurred by the City and all monies deposited into and expended from the Fund in connection with Tasks 1 through 10. Any monies in excess of the Fund's working capital reserve that are not expended for a Task shall be credited towards payments required for a subsequent Task. After completion of all Tasks, and payment of all City Costs, indebtedness and expenses of the City for which the Property Owners are obligated under the Agreement, the Fund balance shall be released to the Property Owners.

8.3. Prior to awarding any contract necessary to complete any Task, the City will discuss the contract terms and conditions with the Property Owners. However, the final decision on contract terms and conditions, and contract award shall be in the City's sole discretion.

8.4. The City may apply for grants or loans to complete some or all of the Tasks. The City anticipates applying for Public Works Trust Fund monies, a portion of which might be used to reduce the cost of money for some Tasks, to the extent allowed by law. If grants are received, then the net amount of the grants (the grant less the City Costs associated with obtaining and administering the grant) shall be used to reduce the amount the Property Owners must pay for the applicable Task. If loans are to be used to reduce the cost of money for any Task, then the Property Owners must consent to the use of the loan proceeds for the Task, and provide Adequate Assurances to the City for timely repayment of the loan amount. If loans are to be used for the purpose of funding all or any portion of one or more Tasks, the parties will, by

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addendum to this Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

8.5. The City will allow the formation of a local improvement district (LID) to fund any of the Tasks for which a LID can lawfully be formed, provided the petition to form the LID is signed by the property owners of all the property to be included within the LID boundaries; provided, however, the City, in its sole discretion, may decide to allow the formation of a LID that includes benefited properties the owners of which do not consent to the formation of a LID. The formation of the LID will not relieve the Property Owner for any funding requirements set forth in this Agreement that are not paid through the LID. In addition, the Property Owners will pay the City Costs associated with the LID formation. The Property Owners may request that the City include those costs in the LID amount or such other City Costs or expenditures required for any Task, that may legally be financed through the LID. The amounts collected from the LID proceeds for the City Costs previously paid by the Property Owners, will be placed in the Fund, unless, prior to receiving the proceeds, the Property Owners provide the City with written notice to pay the reimbursed amount directly to the Property Owners. If a LID is formed for the purpose of funding all or any portion of one or more Tasks, the parties will, by addendum to this Agreement, modify the timing and amount of payments, deposits and Adequate Assurances that would otherwise apply to those Tasks, as set forth below.

8.6 Costs for the Task set forth below are the same rather than different than the Tasks identified in the In-City Water Supply and Facilities Funding Agreements entered into by the City and Palmer and by the City and Plum Creek, except that the Costs for Tasks 4, 7 and 10 of this Agreement are in addition to transmission line related Tasks in the In-City Water Supply and Facilities Funding Agreements. It is possible that after preliminary engineering is done there may be a combination of some or all of the transmission line Tasks between the various agreements. However, initially, the transmission line tasks in all three agreements are deemed separate and distinct.

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9. Task 1 -- Tacoma Intertie and Related Water System Improvements Preliminary Design

Jan - Feb '04

Task 1 is the planning, environmental review, property acquisition, and preliminary engineering and cost estimates for the design and construction of the intertie with Tacoma Pipeline 5, the water transmission line, the pump station, and related equipment and improvements necessary to transmit the water from the intertie to the City reservoir. Work on Task 1 has been commenced. The City estimates the Task 1 costs and the City Costs related thereto to be one hundred thousand dollars ($100,000.00). The Property Owners shall deposit with the City 110% of that amount by August 1, 2003. Any City Costs incurred prior to the deposit being made that are related to Task 1 shall be deducted from the amount deposited

Approval of Exp. by April '04

10. Task 2 – Water Reservoir Improvements Preliminary Design

Dec. '03 - April '04

Task 2 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the Water Reservoir Improvements. These improvements are to be sized to accommodate all of the property within the City, and the areas within the Potential Annexation Areas referenced in the BDUGAA. Task 2 shall commence when authorized by the City Council. The Property Owners shall deposit with the City 110% of the estimated Task 2 costs within 30 days from receiving from the City the Task 2 written cost estimate.

11. Task 3 – Spring Water Source Collection and Transmission System Improvements Preliminary Design.

Dec. - Apr. '04

Task 3 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements to the Spring Water Source collection system, the replacement of the pumps and related improvements, including the addition of any necessary treatment facilities and equipment, and the replacement of the transmission line between the Spring Water Source and the City water reservoir. These improvements are to be sized to accommodate the full use of the City's Spring Water Source water rights. Work on Task 3 has been commenced. The City estimates the Task 3 costs, and related City Costs to be one hundred ten thousand dollars ($110,000.00). The Property Owners shall deposit with the City 110% of that amount by August 1, 2003. Any City Costs incurred prior to the deposit being made that are related to Task 3 shall be deducted from the amount deposited.

12. Task 4 – Main Transmission Lines to and through PAA Property and Annexed Property Preliminary Design.

Dec. '03 - Apr. '04

Task 4 is the planning, environmental review, preliminary engineering and preliminary cost estimates for the design and construction of the improvements necessary to provide full build out water service and fire flow from the City water reservoir site, through the PAA Property and the Annexed Property. This may include one or more looped transmission lines. Task 4 shall be deemed commenced upon the Agreement Date. The Property Owners shall pay

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to the City, upon executing the Agreement a $50,000 deposit to be applied toward Task 4 costs and City Costs related thereto. The City will then commence preparation of the estimated costs associated with Task 4. The Property Owners will pay to the City 110% of the estimated Task 4 costs and City Costs related thereto, less the portion of the $50,000 deposit not yet expended, within 30 days from receiving the City's written estimate. The location and sizing of Task 4 improvements will be significantly dependent upon the Property Owners' development plans. Thus, it is anticipated that ongoing and regular input from the Property Owners will be needed. The City and Property Owners will develop a process to assure that the Property Owners' input is timely received and considered in developing the Task 4 work product.

13. Task 5 – Water Reservoir Improvements Final Design and Bid.

Task 5 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 2 improvements. Task 5 shall commence when the City approves the Task 2 work product. The Property Owners will pay to the City 110% of the estimated Task 5 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

April '04
B.O. July '04

14. Task 6 – Spring Water Source Collection and Transmission System Improvements Final Design and Bid.

May '04
July '04 to B.O.

Task 6 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 3 improvements. Task 6 shall commence when the City approves the Task 3 work product. The Property Owners will pay to the City 110% of the estimated Task 6 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

15. Task 7 – Main Transmission Line(s) Final Design and Bid.

Task 7 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 4 improvements. Task 7 shall commence when the City approves the Task 4 work product and the Property Owners provide the City with written notice to proceed with Task 7. After Task 7 commences the Property Owners will pay to the City 110% of the estimated Task 7 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

16. Task 8 – Water Reservoir Construction.

Task 8 is the award of the Task 5 bid, and the Construction of the Task 5 improvements. Task 8 shall commence upon the City providing written notice to the Property Owners that it intends to award the Task 5 construction contract. The Property Owners will pay to the City 110% of the Task 5 bid amount and City Costs related to Task 8 within 45 days from receiving the City's written notice.

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17. Task 9 -- Spring Water Source and Distribution System Improvements Construction.

Task 9 is the award of the Task 6 bid, and the Construction of the Task 6 improvements. Task 9 shall commence upon the City providing written notice to the Property Owners that it intends to award the Task 6 construction contract. The Property Owners will pay to the City 110% of the Task 6 bid amount and City Costs related to Task 9 within 45 days from receiving the City's written notice.

18. Task 10 -- Main Looped Transmission Line Construction.

Task 10 is the award of the Task 7 bid, and the Construction of the Task 7 improvements. The City shall provide the Property Owners with written notice that it intends to award the Task 7 bid. The Property Owners will pay to the City 110% of the Task 7 bid amount and City Costs related to Task 10 within 45 days from receiving the City's written notice.

19. Task 11 -- Tacoma Intertie and Related Water System Improvements Final Design and Bid.

Task 11 is the final design, and supplemental environmental requirements, preparation of bid documents, call for bid and bid evaluation for the Task 1 improvements. Task 11 shall commence when the City approves the Task 1 work product. The Property Owners will pay to the City 110% of the estimated Task 1 costs and City Costs related thereto, within 30 days from receiving the City's written estimate.

20. Task 12 –Tacoma Intertie and Related Water System Improvements Construction.

Task 12 is the award of the Task 11 bid, and the Construction of the Task 11 improvements. Task 12 shall commence upon the City providing written notice to the Property Owners that it intends to award the Task 11 construction contract. The Property Owners will pay to the City 110% of the Task 11 bid amount and City Costs related to Task 11 within 45 days from receiving the City's written notice.

21. Task 13 – Development of New CWSFC and New Water Usage Rates.

Task 13 is the development and implementation of a new rate study to set the appropriate CWSFC and water use rates to be charged by the City. Task 13 shall commence upon the City providing written notice to the Property Owners that it intends to solicit request for proposals to perform the rate study. The Property Owners will pay to the City the estimated City Costs, and 110% of the anticipated cost for the proposed rate study, within 30 days of receiving the City's written notice for payment. The notice for payment shall not be given until the City has received responses to its request for proposal to perform the rate study. The City reserves the right, at its expense to conduct other CWSFC and water use rate studies throughout the Agreement term. Any new rates adopted as a result of said studies shall apply to any water use or connections occurring after the rates are adopted.

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22. Water Availability Certificates.

22.1. Upon Property Owners' payment of the amounts set forth in paragraphs 5.1.4, 6, 7, 9, 11, and 12, the City shall issue Water Availability Certificates for the number of ERUs requested in paragraph 7.1, or such lesser number of ERUs as chosen by the Property Owners pursuant to the provisions of paragraph 36.3. Water Availability Certificates shall be issued to each Property Owner based on the division of the ERUs specified in paragraph 7.1. The certificates shall contain the following conditions:

22.1.1. The water shall be available upon completion of Tasks 1 through 12;

22.1.2. The water will not be available to the PAA Property until it is annexed into the City.

22.1.3. All monies required to be paid pursuant to the terms of this Agreement must be paid prior to use of any certificate;

22.1.4. Failure of the Property Owners to meet their financial obligations set forth in the Agreement, after notice and an opportunity to cure, shall cause the certificates for which corresponding building permits have not been issued to revert to the City. This shall be in addition to other remedies available in law and equity;

22.1.5. The Water Availability Certificates, subject to applicable land use regulations and approvals, may be used by the Property Owners, in their discretion, for

A. Development on the PAA Property or the Annexed Property, or

B. Development on Other Property if the Other Property is encompassed within the boundaries of a City approved Master Planned Development (MPD) and the majority of the MPD acreage is located within the PAA Property or the Annexed Property;

22.1.6. The Water Availability Certificates only warrant that the City has reserved the quantities of water represented by the certificates. Other water system distribution improvements may be necessary for the actual delivery of water to the benefited properties. The cost of those improvements will be borne by the Property Owners;

22.1.7. Any conditions imposed by the agreement with Tacoma that impact water usage shall apply to the Certificates;

22.1.8. The Certificates shall be subject to surrender to the City pursuant to the provisions of paragraph 28.4;

22.1.9. The CWSFC relating to any certificate proposed to be used must be paid before the Certificate may be used; and

22.1.10. The Certificates shall only apply to development that is both located within the City's water service area and located within the City limits at the time a complete application for a land use development approval is submitted to the City for the development.

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22.1.11. The issuance of a Certificate does not expressly or impliedly represent that the City will approve development that will result in the use of all water for which certificates have been issued.

22.1.12. The Certificates are for a quantity of water based on 230 gallons per day usage per ERU. If the actual usage is greater, then the number of ERU's authorized by the Certificates shall be correspondingly reduced.

22.2. If a Property Owner determines that it does not need all of the certificates that have been issued, then the unneeded certificates may be returned to the City (Returned Certificates). The City shall date stamp the Returned Certificates ("Return Date"). Within 30 days of the Return Date the Property Owner will be notified of how many ERUs of water capacity the City had in its inventory prior to the Return Date ("ERU Inventory"). Any water connections after the Return Date shall come first from the ERU Inventory. After the ERU inventory is exhausted, the City will issue all water connections from water represented by the Returned Certificates ("Returned Certificate Inventory"). The Property Owner shall receive a portion of the CWSFC collected for each connection issued from the Returned Certificate Inventory. The amount shall be that portion of the CWSFC collected on the Returned Certificate Inventory that is attributable to required expenditures made by the Property Owner pursuant to the Agreement terms prior to the Return Date. The reimbursement shall be made on a quarterly basis. The City, upon request by the Property Owner, will seek to have Tacoma repurchase the water capacity represented by the Returned Certificate Inventory. If Tacoma agrees to the repurchase then the following shall occur:

22.2.1 The City shall negotiate the repurchase agreement;

22.2.2 Upon receipt of monies from Tacoma for the repurchase, the City will recalculate its CWSFC to take into account the reduction in total ERUs of capacity resulting from the Tacoma water capacity repurchase.

22.2.3 Upon adoption of a new CWSFC, the City will pay the Property Owner the amount received from Tacoma for the repurchased water capacity, up to the amount of the TSDC paid by the Property Owner, less City Costs associated with implementing paragraph provisions 22.2.1, 22.2.2 and 22.2.3.

22.3 If, through the implementation of conservation measures, or by a change in the City's standard for ERUs, the actual average daily water usage for the development of PAA Property and Annexed Property is less than 230 gallons, then the number of Water Certificates shall be adjusted so that additional Certificates are issued to take into account the lower average daily water usage rate. To determine actual average daily water usage for the PAA Property and Annexed Property may require the installation of a flow meter for the entire PAA Property and/or Annexed Property. If the Property Owners request the installation of such a meter, then the Property Owners shall be responsible for the meter cost, installation and maintenance expense.

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23. Addition of Parcels and Parties.

23.1. The Parties anticipate that other property owners with property located in the area annexed by City Ordinances 515 and 517, within the PAA, or within other portions of the City that will be included in an MPD that will encompass a significant portion of the PAA Property and the Annexed Property, will want to participate in the funding of the Tasks, and receive Water Availability Certificates. The City and the Property Owner will consent to addition of the other property owners on the same terms and conditions as apply to the Property Owner set forth herein, subject to the additional terms of paragraph 23.1 through 23.4. In case of conflict between any of the provisions of paragraphs 23.1 through 23.4, and other Agreement provisions, the language in paragraphs 23.1 through 23.4 shall control. The definition of "Property Owners" will be modified to include the new parties.

23.2. If monies have already been paid by the Property Owners under the terms of this Agreement, prior to the addition of a new party, then the new party's property shall be subject to a reimbursement agreement for the benefit of the Property Owners, as authorized by RCW 35.91.020, for a pro rata portion of the monies paid, unless the Property Owners request otherwise.

23.3 The City intends to enter into a wholesale water agreement with Tacoma. That agreement will provide for the purchase of a certain amount of water capacity. The City does not intend to purchase with its own money sufficient capacity to serve the area annexed by City Ordinance 515 or 517 or the areas in the BDUGAA that are outside the current City limits. Any property owners that wish to become parties to the Agreement after the City enters into the wholesale water agreement, will not be issued Water Availability Certificates unless and until the City is able to buy additional water capacity from Tacoma. If the City is unable to acquire additional water from Tacoma, then the Water Availability Certificates obtained by Property Owners may be transferred, in whole or in part, to any properties within the area annexed by Ordinance 515 or 517, or to any properties within the PAA.

23.4 The Property Owners and the property owners that wish to become parties may enter into a cost sharing agreement without the City's involvement. However, the failure of a party to the cost sharing agreement to make its payment required by that agreement will not relieve the other property owners or the Property Owners from timely payment of the full amounts required to be paid for each Task under the Agreement terms, or to provide Adequate Assurances therefor, or from the consequences for failing to timely make such payment or provide the Adequate Assurances.

24. Reimbursement Agreement.

Subject to the provisions of RCW 35.91.020, the Property Owners shall be entitled to recapture a pro rata portion of the amounts paid pursuant to the Agreement terms from non-contributing benefited properties located within the area annexed by the adoption of City Ordinance 515 or 517, the properties that are within the PAA, or Other Property.

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25. Water Use Rates and Credit Toward CWSFC.

25.1. The CWSFC to be paid by the Property Owners shall be the CWSFC adopted at the completion of Task 13, or the CWSFC in effect at the time a building permit is issued and available for delivery to the Property Owners, whichever amount is greater. If Task 13 is not complete at the time a building permit is ready to be issued, then the City shall issue the permit upon payment of the applicable building permit fees, and payment of a deposit of the anticipated CWSFC, as reasonably determined by the City. When Task 13 is completed, if the resulting CWSFC is less than the deposit amount, then the balance of the deposit shall be returned to the Property Owners. If the CWSFC is greater than the deposit amount, then the Property Owners shall pay the City the difference within 3 business days of receiving written notice. Failure to timely pay the difference shall result in the issuance of a stop work order for work authorized by the building permit.

25.2 The rate to be paid for water use shall be whatever rate is in effect at the time the water is used.

25.3 The Property Owners may be entitled to one or more credits towards its CWSFC under the following circumstances:

25.3.1 When the Property Owners are required to pay a CWSFC, or CWSFC deposit as referenced in Paragraph 25.1, for any ERUs for which it has a Water Availability Certificate, it shall be entitled to a credit for a portion of the CWSFC. The amount of the credit per ERU shall be that portion of the CWSFC for the ERU that is attributable to amounts paid by the Property Owners pursuant to the Agreement terms. For example, if the CWSFC is $4,000 per ERU, and $2,500 of that amount is attributable to monies paid by the Property Owners pursuant to the terms of the Agreement, then the Property Owners would receive a $2,500 credit per ERU.

25.3.2 If the City terminates the Spring Water Source project prior to or at the end of Task 3, as set forth in Paragraph 36, then the Property Owners shall also receive a credit towards the CWSFC of any monies it paid the City that were expended on Task 3, whether or not those monies are included in the calculation that determined the CWSFC rate. The credit for Spring Water Source project expenditures shall be prorated over the remaining ERUs for which the Property Owners have Water Availability Certificates, with the prorated credit for each ERU being applied at the time the CWSFC for the ERU is required to be paid.

26. Entire Agreement.

The parties have negotiated in good faith with regards to each and every term of this Agreement. The Agreement embodies and supersedes all agreements, and representations, express or implied, verbal or written, regarding the Tasks and the funding thereof. The Agreement cannot be modified except in written addendum to the Agreement, signed by all parties hereto.

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27. Other Property.

It is possible that the City will enter into one or more water supply and facilities funding agreements relative to Other Property. These other agreements may include a requirement to provide funding for some of the improvements required by the Agreement.. If this occurs, then the property owners of the Other Property and the Property Owners shall each be severally liable for all obligations to which they have agreed to in their respective agreements. However, if this results in deposits being received by the City that are greater than the amount the City would have otherwise received relative to a Task, then the City shall refund to the respective party a pro rata portion of the deposit made based upon the ratio between the water required for each party. The Property Owners and the owners of Other Property, in lieu of making multiple deposits may collectively provide only the amount of the deposit required by this Agreement.

28. Failure to Make Payment or Continuously Provide Adequate Assurances.

28.1. The Property Owners are severally liable for all City Costs and the timely payment of all amounts required by the Agreement, except for the individual Property Owner's TSDC obligations, which are solely the obligation of the individual Property Owner. If the Property Owners fail to timely pay any amounts required by the Agreement, then, after five (5) business days notice, the City shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity. If the City proceeds with a Task after the Property Owners have failed to timely make the payments, City Costs and any monies paid toward completing the Task, plus interest thereon at 18 percent per annum, or the maximum lawful rate, whichever is less, accrued from the date the monies are paid by the City, shall be deemed a lien against the Annexed Property, and the PAA Property, and may be foreclosed in the same manner as a labor and materialman's lien filed under Chapter RCW 60.04. The provisions of paragraph 29 shall apply in such proceeding.

28.2. The Property Owners have indicated that they have made arrangement amongst themselves to pay a prorata portion of payments required by this Agreement, so that the City will not receive duplicate payments. The City is not a party to that arrangement, and considers each Property Owner severally liable for each payment. However, in order to accommodate the Property Owners, the City agrees that; 1) if the City issues the 5 day notice referenced in paragraph 28.1; and, 2) if, during the 5 day period, the City is notified by any Property Owner that the default is the result of a Property Owner not honoring the separate agreement between the Property Owners, and 3) the Property Owner who is alleged to have not honored the separate agreement between the Property Owners has posted Adequate Assurances for the payment; then 4) the City, before exercising its other default remedies, shall first make demand upon the Adequate Assurances of the Property Owner identified as the Property Owner who has failed to make the payment that the entire amount of the Adequate Assurance be provided to the City. If, for any reason, the Adequate Assurances of the Property Owner that is alleged to be responsible for the default is not adequate to cover the payment deficiency, then the provisions of paragraph 28.1 notwithstanding, if the Property Owners fail to timely pay any amounts required by the Agreement, and other Adequate Assurances have been provided, then after (5) business days notice, the City shall, prior to exercising any termination remedies, make demand upon the other Adequate Assurances that the entire amount of the Adequate Assurances provided be paid to the

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City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund. .

28.3 The provisions of paragraph 28.1 and 28.2 notwithstanding, if after a Property Owner has provided Adequate Assurances, the City receives notice that the Adequate Assurances will expire or be canceled by the surety or issuer providing the Adequate Assurances, the City may make immediate demand upon such surety or issuer that the entire amount of such Adequate Assurances be paid to the City. Any amounts received by the City from Adequate Assurances shall be placed into the Fund.

28.4. The provisions of paragraph 28.1, 28.2 and 28.3 notwithstanding, if a Property Owner provides the City with notice within 30 days from the completion of Tasks 1, 2, 3, 4 and 11 that it intends to withdraw from the Agreement, and provided that the Property Owners have paid all City Costs incurred to the date of the notice, and the Property Owners have paid all expenses for Tasks 1, 2, 3, 4 and 11, then the Property Owner may withdraw from this Agreement. Within 30 days from receiving the notice of intent to withdraw, the City shall provide the Property Owner a final tabulation of the City Costs incurred through the date the notice of intent to withdraw was received by the City, and the balance owing on the City Costs, if any. In order for the withdrawal to be effective, the balance owing must be paid within 15 days of the City's notice of balance owing. The withdrawal shall be effective upon the date the payment of the balance is received. If the balance is not timely paid, then the Property Owner shall not be allowed to withdraw from the Agreement. If the withdrawal becomes effective, and the TSDC was paid in cash, then the Water Availability Certificates that have been issued to the Property Owner cannot be used by the Property Owner, but must be surrendered to the City, and they will then be processed in the manner set forth in paragraph 22.2. If the TSDC was not paid for in cash, then the Adequate Assurances for the TSDC payment shall not be released, unless and until Tacoma agrees to release the City from its obligation for the water payments associated with the TSDC attributable to the withdrawing Property Owner, or the City decides to assume the obligation. If the Adequate Assurances are released, then the Water Availability Certificates issued to the withdrawing Property Owner shall be surrendered to the City and the provisions of paragraph 22.2 shall not apply.

Opt-Out

29. Attorney's Fees.

If any suit or other proceeding is instituted by either party to this Agreement arising out of or pertaining to this Agreement, including but not limited to filing suit or requesting an arbitration, mediation, or other alternative dispute resolution process (collectively "Proceedings"), and any appeals and collateral actions relative to such suit or proceeding, the prevailing party as determined by the court or in the proceeding shall be entitled to recover its reasonable attorneys fees and all costs and expenses incurred relative to such suit or proceeding from the non-prevailing party, in addition to such other available relief. Attorneys fees incurred in connection with the meeting described in paragraph 30 shall not be recoverable.

30. Dispute Resolution.

City Property Owners

In the event of a dispute arising from the interpretation or application of any Agreement provision, the parties shall (1) convene a meeting among their principals to discuss the dispute; then (2) refer the matter to mediation if said meeting does not resolve the dispute; and (3) if mediation does not resolve the dispute, the parties may pursue their legal remedies. This provision shall also apply to questions relative to the amount or nature of any expenditures made by the City from funds paid by the Property Owners pursuant to the Agreement terms. Provided, however, a dispute relative to an expenditure shall not relieve the Property Owners of their obligation to timely make all required payments while the dispute is pending. Notwithstanding the foregoing, any party shall be entitled to seek equitable remedies through legal process at any time simultaneous with the dispute resolution process outlined herein where irreparable harm will be done if the equitable remedy is not granted before the conclusion of the dispute resolution process.

31. Written Notices.

All Notices required by this Agreement shall be considered properly delivered when personally delivered, when received by facsimile, or on the third day following mailing, postage prepaid, certified mail, return receipt requested, to:

City:

City Administrator
City of Black Diamond
P.O. Box 599
Black Diamond, WA 98010
Fax: 360-886-2592

With a copy to:

Loren D. Combs
McGavick Graves, P.S.
P.O. Box 1317
Tacoma, WA 98401-1317
Fax: 253-627-2247

Randy Hamblin and James A. Kraft
Plum Creek Timber Company, L.P.
999 Third Avenue, Suite 2300
Seattle, WA 98104
Fax: 206-467-3799

Gerald W. Harkleroad
Black Diamond Associates, Ltd.
c/o M & H Development Co., Inc.
14205 SE 36th Street, Suite 100
Bellevue, WA 98006
Fax: (425) 519-3644

William Kombol

City

Property Owners

Palmer Coking Coal Co.
31407 Highway 169
Black Diamond, WA 98010
Fax: (425) 432-3883

With a copy to:

John Hempelmann
John P. Payseno
Cairncross & Hempelmann
524 2nd Avenue
Seattle, WA 98104-2323
Fax: (206) 587-0700

Lawrence B. Bailey
Preston Gates Ellis, LLP
925 Fourth Avenue, Suite 2900
Seattle, WA 98104-1158
Fax: (206) 623-7022

John C. McCullough, Esq.
McCullough Hill Fikso Kretschmer Smith
2025 First Avenue, Suite 1130
Seattle, WA 98121-2100
Fax: (206) 448-3444

32. Failure to Provide Certificates of Availability.

If the City fails to provide Water Availability Certificates as provided in this Agreement, the Property Owners shall have the right to specifically enforce the Agreement, terminate the Agreement, and/or pursue any other remedy available in law or equity.

33. Assignment.

The Property Owners and the City may each assign all or a portion of their rights under this Agreement upon written notice to the other party. A Property Owner's assignment must have the City's consent. Said consent will not be unreasonably withheld. An assignment shall not release the assigning party from its obligations under this Agreement. If the Property Owners seek approval for and assignment, and a release of its obligations hereunder, it shall pay to the City the costs incurred by the City to determine whether the proposed assignee is financially able to perform the obligations required under this Agreement. Any party shall act upon a request for assignment within sixty (60) days. Otherwise the assignment will be deemed approved. Provided, however, if the Property Owners have posted Adequate Assurances, the Property Owners shall not be released from the Adequate Assurances obligations until substitute Adequate Assurances have been accepted, in writing, by the City.

34. Term.

City

Property Owners

The term of this Agreement shall be thirty (30) years from the Agreement Date unless it is earlier terminated or extended by written agreement or by operation of the Agreement conditions.

35. Tolling of Time Limits.

If any governmental action taken in furtherance of any of this Agreement's terms is administratively or judicially appealed, other than by a party hereto, then all deadlines shall be tolled during the pendency of such appeal.

36. Termination of Spring Water Source Collection and Transmission System Improvements.

It is possible that prior to, or at the conclusion of Task 3 the City might determine it is not in the best interests of the City to continue with the Spring Water Source Collection and Transmission System Improvements. If the City makes that determination, then the following shall occur:

36.1. The City shall provide the Property Owners with written notification that the Spring Water Source Project is terminated.

36.2. Tasks 6 and 9 are deleted from this Agreement and Property Owners are released from any financial obligation with regards thereto.

36.3. The Property Owners shall have 15 days to notify the City in writing that they either will: 1) modify its total water requirements so that the quantity of water requested pursuant to the paragraph 7.1 is reduced to equal the existing TSDC; or 2) they still want the full quantity of water requested in Paragraph 7.1.

36.4. If the Property Owners wish to retain the quantity of water requested in Paragraph 7.1, then the City shall have 30 days to notify the Property Owners whether the City will provide the capacity from the capacity the City has already purchased from Tacoma, or, whether it will buy additional capacity from Tacoma. If the City is providing the additional capacity from capacity that it has already purchased, then the Property Owners shall pay to the City the price paid by the City at the time the capacity was purchased from Tacoma. If the City is providing the additional capacity by buying more capacity, then the amount to be paid by the Property Owners will be the rate the City has to pay to buy the additional capacity. The Property Owners shall pay for the additional capacity in cash within 30 days from the date of the City notice. If, however, the additional capacity is being purchased from Tacoma, and it is possible to utilize a payment plan for the additional capacity, as authorized by the Tacoma Municipal Code, then, the Property Owners will, within 30 days, pay the required down payment, and provide Adequate Assurances for the balance.

37. Captions.

City Property Owners

The paragraph captions are for convenience and reference only. They do not define or limit any of the rights or responsibilities set forth in the Agreement.

38. Condition Subsequent.

The City intends to exert all reasonable efforts to enter into an agreement with Tacoma wherein the City will be a Tacoma wholesale water customer and will be able to provide the ERUs requested by the Property Owners. If the City is unsuccessful in entering into such agreement with Tacoma by September 30, 2003, then this Agreement shall be terminated, the Adequate Assurances released, and the Fund balance, after payment of outstanding City Costs, shall be released to the Property Owners.

39. Recording Memorandum of Agreement.

The City shall record with King County a Memorandum of Agreement (MOA) that will be placed of record on the property legally described in Exhibits A and C. The MOA will read as follows:

The following described real property is subject to the terms of an agreement entitled Water Supply and Facilities Funding Agreement, dated the 11 day August, 2003, a copy of which is on file with the City Clerk for the City of Black Diamond, Washington:
(legal description attached

CITY OF BLACK DIAMOND

Howard Botts, Mayor

PLUM CREEK LAND COMPANY

By: _____
William R. Brown
Its: Executive Vice President and
Chief Financial Officer

ATTEST:

Cris Kandior, City Clerk

BLACK DIAMOND ASSOCIATES,
a Washington Limited Partnership

APPROVED AS TO FORM:

Loren D. Combs, City Attorney

By: _____
Gerald W. Harkleroad
Its: Vice President

PALMER COKING COAL CO.

City Property Owners

By: _____
William Kombol
Its: Manager

STATE OF WASHINGTON)
) ss.
County of King)

I certify that I know or have satisfactory evidence that WILLIAM R. BROWN is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he was authorized to execute the instrument and acknowledged it as the Executive Vice President and Chief Financial Officer of PLUM CREEK LAND COMPANY to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: August 11, 2003

KAREN L. ROBERTS NOTARY PUBLIC COMMISSION EXPIRES 4-09-04 STATE OF WASHINGTON

_____
NOTARY PUBLIC
Print Name: KAREN L. ROBERTS
My appointment expires: 4-9-04

STATE OF WASHINGTON)
) ss.
County of King)

I certify that I know or have satisfactory evidence that GERALD W. HARKLEROAD is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he was authorized to execute the instrument and acknowledged it as the Vice President of BLACK DIAMOND ASSOCIATES, LTD. to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: Aug 8th 2003

BILLIE K. BOSWELL COMMISSION EXPIRES NOTARY PUBLIC 07-23-06 STATE OF WASHINGTON

_____
NOTARY PUBLIC
Print Name: Billie Boswell
My appointment expires: ~~7/23/06~~ 7/23/06

STATE OF WASHINGTON)
) ss.
County of _____)

City Property Owners

I certify that I know or have satisfactory evidence that WILLIAM KOMBOL is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath, stated that he/she was authorized to execute the instrument and acknowledged it as the Manager of PALMER COKING COAL CO. to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: Aug 8, 2003.

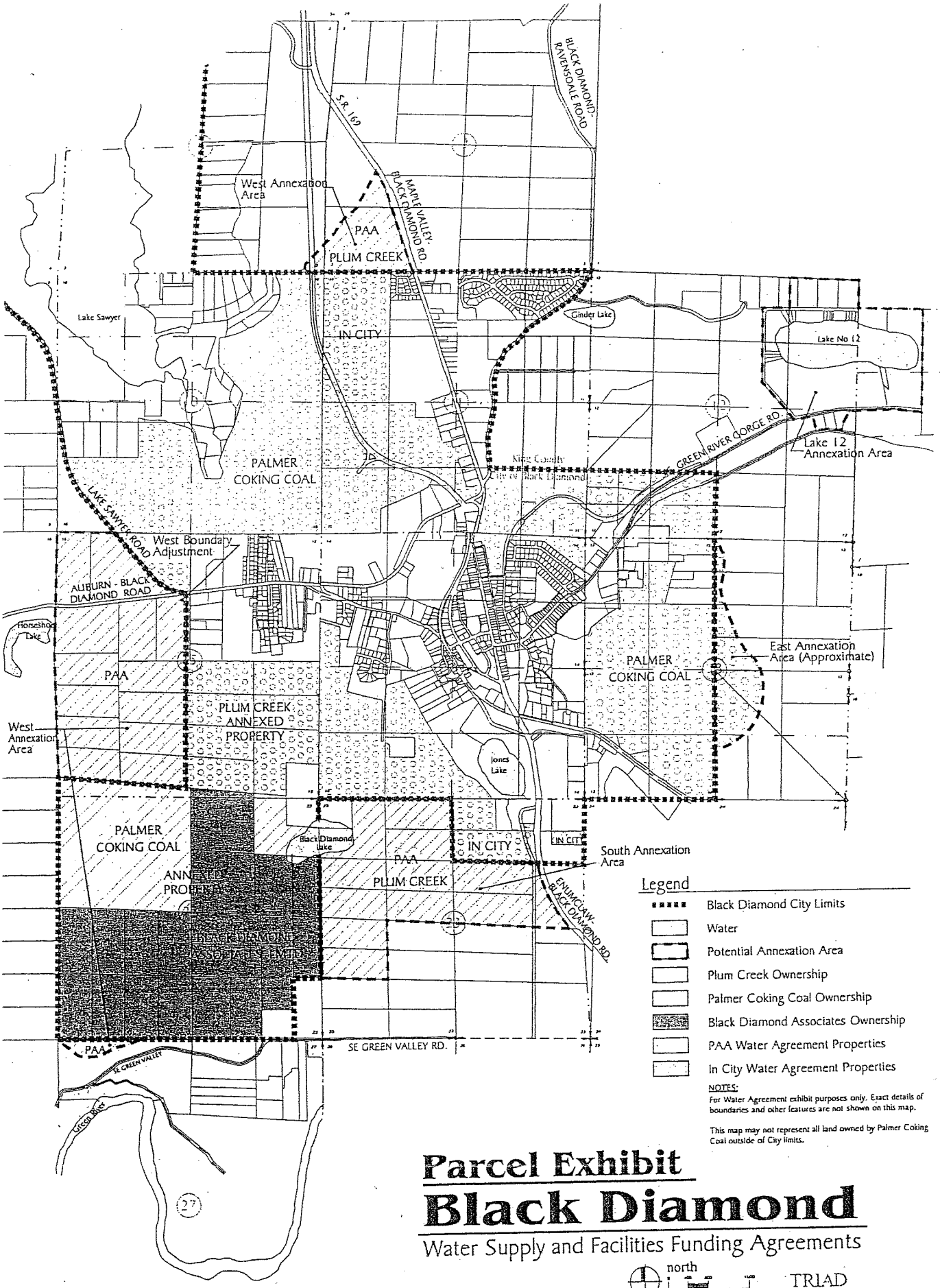
NOTARY PUBLIC
Print Name: Joyce M Ross
My appointment expires: 8/21/06

b\24108\paaagm080703doc

Signed on 080803

City

Property Owners



Legend

- Black Diamond City Limits
- Water
- Potential Annexation Area
- Plum Creek Ownership
- Palmer Coking Coal Ownership
- Black Diamond Associates Ownership
- PAA Water Agreement Properties
- In City Water Agreement Properties

NOTES:
For Water Agreement exhibit purposes only. Exact details of boundaries and other features are not shown on this map.

This map may not represent all land owned by Palmer Coking Coal outside of City limits.

Parcel Exhibit

Black Diamond

Water Supply and Facilities Funding Agreements

north

SCALE: 1" = 800'

0207/black diamond parcels
7/25/2003

TRIAD

Order No.: 10141666

EXHIBIT A

LEGAL DESCRIPTION:

THE NORTHWEST ¼ OF THE NORTHEAST ¼;
THE SOUTH ½ OF THE NORTHEAST ¼;
THE SOUTHWEST ¼;
THE NORTH ½ OF THE SOUTHEAST ¼;
THE SOUTHWEST ¼ OF THE SOUTHEAST ¼;
THE NORTHWEST ¼ OF THE SOUTHEAST ¼ OF THE SOUTHEAST ¼;

ALL IN SECTION 22, TOWNSHIP 21 NORTH, RANGE 6 EAST, W.M.;

EXCEPT THEREFROM THAT PORTION LYING WITHIN SOUTHEAST 352ND STREET (COUNTY ROAD NO. 418) AS ESTABLISHED IN VOLUME 10 OF COMMISSIONERS RECORDS, PAGE 575;

SITUATE IN THE CITY OF BLACK DIAMOND, COUNTY OF KING, STATE OF WASHINGTON.

Legal Descriptions and Tax Parcel Numbers
of
Plum Creek Land Company Ownership to be Served by Black Diamond Water

Potential Annexation Area Water Agreement Properties

Portion of Tax Parcel 022106-9023: Those portions of the NW1/4SW1/4 and the SW1/4NW1/4 of Section 2, Township 21 North, Range 6 East, W.M. lying southwesterly of the centerline of Maple Valley Highway No. 169; EXCEPT that portion thereof lying northwesterly of a line described as follows:

Commencing at a point on the west line of said Section 2 being 888.23 feet northerly of the southwest corner of said Section 2, thence N54°01'41"E a distance of 783.20 feet, thence N34°29'44"E a distance of 839.80 feet to its ending point on the centerline of Maple Valley Highway No. 169.

Portion of Tax Parcel 022106-9024: That portion of the S1/2SW1/4 of Section 2, Township 21 North, Range 6 East, W.M. lying westerly of the centerline of Maple Valley Highway No. 169; EXCEPT that portion thereof lying northwesterly of a line described as follows:

Commencing at a point on the west line of said Section 2 being 888.23 feet northerly of the southwest corner of said Section 2, thence N54°01'41"E a distance of 783.20 feet, thence N34°29'44"E a distance of 839.80 feet to its ending point on the centerline of Maple Valley Highway No. 169.

Portion of Tax Parcel 032106-9001: That portion of the following described real property in Section 3, Township 21 North, Range 6 East, W.M. lying within the West Annexation Area as more particularly delineated and described in the Black Diamond Urban Growth Area Agreement among King County, Washington, the City of Black Diamond, Washington, Palmer Coking Coal Company and Plum Creek Timber Company, L.P., dated December 31, 1996:

Lot AA in said Section 3 as more particularly delineated and described in Boundary Line Adjustment No. L97L0008, recorded in Volume 114 of Surveys at Pages 2, A through D, under King County Recording No. 9703199013; EXCEPT that portion thereof lying approximately 300 feet northwesterly of the centerline of Ravensdale Creek as more particularly described in King County Boundary Line Adjustment No. L97M108 and conveyed by Warranty Deed recorded under King County Recording No. 9712302339, as corrected by Correction Deed recorded under King County Recording No. 9809042499.

Tax Parcel 032106-9014: The southerly 209 feet of that portion of the SE1/4SE1/4 of Section 3, Township 21 North, Range 6 East W.M. lying easterly of the Burlington Northern and Santa Fe Railway Company's (formerly Pacific Coast Railroad Company) 100' wide Maple Valley to Lake Wilderness, Washington Branch Line right-of-way, now discontinued, being 50' wide on each side of said Railroad Company's Main Track centerline as originally located and constructed upon, over and across said Section 3.

Portion of Tax Parcel 032106-9015: That portion of the following described real property in Section 3, Township 21 North, Range 6 East, W.M. lying within the West Annexation Area as more particularly delineated and described in the Black Diamond Urban Growth Area Agreement among King County, Washington, the City of Black Diamond, Washington, Palmer Coking Coal Company and Plum Creek Timber Company, L.P., dated December 31, 1996:

All that portion of the Burlington Northern and Santa Fe Railway Company's (formerly Pacific Coast Railroad Company) 100' wide Maple Valley to Lake Wilderness, Washington Branch Line right-of-way, now discontinued, being 50' wide on each side of said Railroad Company's Main Track centerline as

originally located and constructed upon, over and across Government Lot 1, the SE1/4NE1/4 and the E1/2SE1/4 in said Section 3.

Tax Parcel 152106-9005: Those portions of the E1/2NW1/4 and the E1/2W1/2NW1/4 lying northerly of the centerline of the Auburn-Black Diamond Road and southwesterly of the centerline of the Maple Valley-Lake Sawyer Road, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9097: That portion of the W1/2W1/2NW1/4 lying northerly of the centerline of the Auburn-Black Diamond Road, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9098: That portion of the SW1/4NW1/4 lying southerly of the centerline of Auburn-Black Diamond Road, LESS the easterly 80 feet thereof and LESS the southerly 270 feet thereof, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9099: Those portions of the W1/2E1/2NW1/4 and the easterly 80 feet of the W1/2NW1/4 lying southerly of the centerline of Auburn-Black Diamond Road, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9100: That portion of the E1/2E1/2NW1/4, LESS the westerly 80 feet thereof, lying southerly of the centerline of Auburn-Black Diamond Road, together with the easterly 80 feet of the W1/2E1/2NW1/4 lying southerly of the centerline of Auburn-Black Diamond Road, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9101: The N1/2NW1/4SW1/4 and the southerly 170 feet of the SW1/4NW1/4 LESS the easterly 80 feet of said NW1/4SW1/4 and LESS the easterly 80 feet of said SW1/4NW1/4 and LESS the southerly 120 feet of the NW1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9102: The N1/2NE1/4SW1/4 and the easterly 80 feet of the N1/2NW1/4SW1/4, LESS the easterly 80 feet of said N1/2NE1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9103: The S1/2NE1/4SW1/4 and the easterly 80 feet of the S1/2NW1/4SE1/4, LESS the easterly 80 feet of said S1/2NE1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9104: The S1/2NW1/4SW1/4 and the southerly 120 feet of the N1/2NW1/4SW1/4, LESS the easterly 80 feet of said NW1/4SW1/4 and LESS the southerly 80 feet of said S1/2NW1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9105: The N1/2SW1/4SW1/4 and the southerly 80 feet of the NW1/4SW1/4, LESS the easterly 80 feet of said NW1/4SW1/4 and LESS the easterly 80 feet of said SW1/4SW1/4 and LESS the southerly 40 feet of said N1/2SW1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9106: The N1/2SE1/4SW1/4 and the easterly 80 feet of the N1/2SW1/4SW1/4, LESS the easterly 80 feet of said N1/2SE1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9108: The S1/2SE1/4SW1/4 and the easterly 80 feet of the S1/2SW1/4SW1/4, LESS the easterly 80 feet of said S1/2SE1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 152106-9109: The S1/2SW1/4SW1/4 and the southerly 40 feet of the N1/2SW1/4SW1/4, LESS the easterly 80 feet of said SW1/4SW1/4, all in Section 15, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9003: The NE1/4NW1/4NW1/4 and the S1/2NW1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9046: The N1/2NE1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9047: The S1/2NE1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9048: The N1/2SW1/4NE1/4 and that portion of the N1/2SE1/4NE1/4 lying westerly of the centerline of 257th Avenue SE, all in Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9049: The N1/2SE1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9050: The N1/2SW1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9051: The S1/2SW1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9052: The S1/2SE1/4NW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9053: The S1/2SW1/4NE1/4 and that portion of the S1/2SE1/4NE1/4 lying westerly of the centerline of 257th Avenue SE, all in Section 23, Township 21 North, Range 6 East, W.M.

Portion of Tax Parcel 232106-9054: That portion of the SE1/4NE1/4 lying southwesterly of the southwesterly margin of the Enumclaw-Black Diamond Road (S.R.169) right-of-way and easterly of the centerline of 257th Avenue SE, all in Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9057: The N1/2NW1/4SW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Tax Parcel 232106-9058: The S1/2NW1/4SW1/4 of Section 23, Township 21 North, Range 6 East, W.M.

Portion of Tax Parcel 272106-9056: That portion of the following described real property lying within the West Annexation Area as more particularly delineated and described in the Black Diamond Urban Growth Area Agreement among King County, Washington, the City of Black Diamond, Washington, Palmer Coking Coal Company and Plum Creek Timber Company, L.P., dated December 31, 1996:

That portion of the N1/2NW1/4 in Section 27, Township 21 North, Range 6 East, W.M. lying northerly of the centerline of SE Green Valley Road.

EXHIBIT C (pages 1 - 4)

LEGAL DESCRIPTIONS: SECTION 22-21-6

All of those portions of Section 22, Township 21 North, Range 6 East, W.M., King County, Washington described hereinafter. The following described lands comprise approximately 185 acres, more or less.

See following pages 2 through 4.

MAP EXHIBITS: *See following page 5*

VOLUME 116, PAGE 150; RECORDING NO. 9708119013: SECTION 22-21-6

THE S. 1/2 OF THE SW 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 2, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SW 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NW 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NW 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE SW 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SW 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

S. 1/2 OF THE NW 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NW 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE SE 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SE 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NE 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NE 1/4 OF THE SW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

1/2 OF THE SE 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 2, ..21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SE 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NE 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NE 1/4 OF THE NW 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE SW 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SW 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NW 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NW 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE SW 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SW 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NW 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NW 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

VOLUME 116, PAGE 150; RECORDING NO. 9708119013: SECTION 22-21-6

THE S. 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SE 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NE 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NE 1/4 OF THE SE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE SE 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE SE 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE S. 1/2 OF THE NE 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE N. 1/2 OF THE NE 1/4 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE W. 1/2 OF THE SW 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE E. 1/2 OF THE SW 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE W. 1/2 OF THE SE 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE E. 1/2 OF THE SE 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

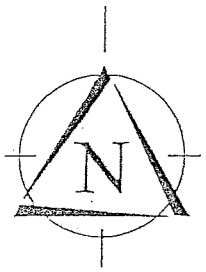
THE W. 1/2 OF THE NW 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

THE E. 1/2 OF THE NW 1/4 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 22, T.21N., R.6E., W.M., KING COUNTY, WA.

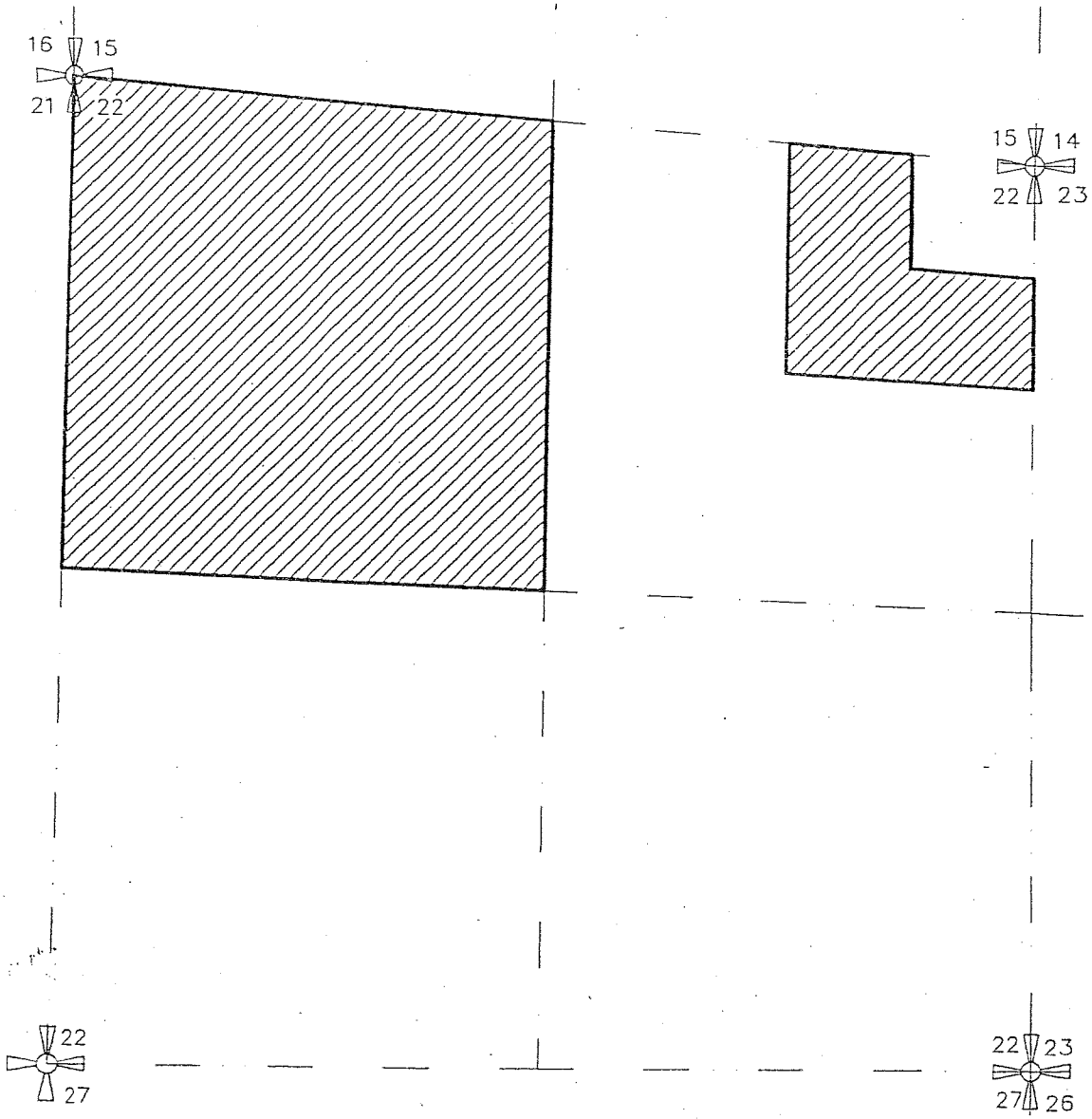
PALMER COKING COAL COMPANY

EXHIBIT D (page 5)

POR. SECTION 22, TWP. 21 N., RGE. 6 E., W.M.
PALMER COKING COAL CO.



SCALE: 1" = 1000'



6/05/03

Washington Trust Bank

COPY

IRREVOCABLE STANDBY
LETTER OF CREDIT NO. 22037
DATE: AUGUST 1, 2003
AMOUNT: $908,770.60

The City of Black Diamond
Attn: City Controller
25510 Lawson Street
Black Diamond, WA 98010

Gentlemen:

We hereby establish our Irrevocable Standby Letter of Credit No. 22037 in your favor for the account of BLACK DIAMOND ASSOCIATES, LTD., 925 Fourth Ave., Suite 2900, Seattle, WA 98104, in the exact amount of NINE HUNDRED EIGHT THOUSAND SEVEN HUNDRED SEVENTY AND 60/100 --------Dollars ($908,770.60) (the "Stated Amount") U.S. currency, available by your draft drawn at sight on us and presented to Washington Trust Bank on or before AUGUST 1, 2004 or any extended date covering Water Supply and Facilities Funding Agreement dated August 1, 2003 and accompanied by the following:

1. A signed statement from The City of Black Diamond reading exactly as follows:

   "I, the undersigned duly authorized representative of The City of Black Diamond, hereby certify that a drawing under Washington Trust Bank Letter of Credit No. 22037 is now authorized and the accompanying draft drawn under such Letter of Credit represents the amount of money necessary to complete the required TSDC payments owed by Black Diamond Associates, Ltd. to The City of Black Diamond under that certain Water Supply and Facilities Funding Agreement dated August 1, 2003.

2. The original of this Letter of Credit.

It is a condition of this Letter of Credit that it shall be automatically extended, without amendment, for an additional period of one year from the present expiration date or each future expiration date, unless we have notified you in writing not less than sixty (60) days before such expiration date, that we elect not to extend this Letter of Credit beyond the current expiration date. All written notification shall be sent via Certified mail return receipt requested. If we notify you that this Letter of Credit will not be extended, the State Amount of this Letter of Credit shall be available to you upon presentation of your sight draft by the current expiration date or within sixty (60) days of your actual receipt of such notification, whichever is later.

Any draft presented under the credit must contain the clause "Drawn under Washington Trust Bank Letter of Credit No. 22037".

Any and all banking charges, other than those of the issuing bank, are for the account of the beneficiary.

We hereby engage with the drawers and bona fide holders of drafts drawn under and in compliance with the terms of this Letter of Credit that the drafts will be duly honored upon presentation and delivery of documents, as specified, to Washington Trust Bank, International Department, 717 W. Sprague Ave., 10th Floor, Spokane, Washington 99201, on or before **AUGUST 1, 2004** or any extended date.

All drawings under this credit will be governed by the Uniform Customs & Practice for Documentary Credits (1993 Revision) International Chamber of Commerce Publication No. 500.

Sincerely,
WASHINGTON TRUS BANK

Renne R. Ditton
Assistant Vice President
International Banking Department

RRD/mss

Bank of America

COPY

COPY

DATE: AUGUST 11, 2003

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 3058079

BENEFICIARY
CITY OF BLACK DIAMOND
ATTN: CITY CONTROLLER
25510 LAWSON ST.
BLACK DIAMOND, WA 98010

APPLICANT
PLUM CREEK TIMBERLANDS, LP
999 3RD AVENUE
SUITE 2300
SEATTLE, WA 98104

AMOUNT
USD 4,089,480.00
FOUR MILLION EIGHTY NINE THOUSAND FOUR HUNDRED EIGHTY AND 00/100'S US DOLLARS

EXPIRATION
AUGUST 11, 2004 AT OUR COUNTERS

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. 3058079 IN YOUR FAVOR FOR THE ACCOUNT OF PLUM CREEK TIMBERLANDS, LP, 999 3RD. AVE., SUITE 2300, SEATTLE, WA 98104, IN THE EXACT AMOUNT OF UNITED STATES DOLLARS FOUR MILLION EIGHTY NINE THOUSAND FOUR HUNDRED EIGHTY AND 00/100 (USD4,089,480.00)(THE"STATED AMOUNT"), AVAILABLE BY YOUR DRAFT(S) DRAWN AT SIGHT ON US AND PRESENTED TO BANK OF AMERICA, N.A. ON OR BEFORE AUGUST 11, 2004 OR ANY EXTENDED DATE, WE ARE ADVISED THAT THIS LETTER OF CREDIT IS COVERING WATER SUPPLY AND FACILITIES FUNDING AGREEMENT DATED AUGUST 1, 2003 AND ACCOMPANIED BY THE FOLLOWING:

1. A SIGNED STATEMENT FROM THE CITY OF BLACK DIAMOND READING EXACTLY AS FOLLOWS:

"I, THE UNDERSIGNED DULY AUTHORIZED REPRESENTATIVE OF THE CITY OF BLACK DIAMOND, HEREBY CERTIFY THAT A DRAWING UNDER BANK OF AMERICA, N.A. LETTER OF CREDIT NO. 3058079 IS NOW AUTHORIZED AND THE ACCOMPANYING DRAFT [illegible] SUCH LETTER OF CREDIT REPRESENTS THE AMOUNT OF MONEY [illegible] BY PLUM CREEK [illegible] CERTAIN WATER [illegible] 2003.

2. THE [illegible]

IT [illegible]
AU[illegible]
WE [illegible]
WILL [illegible]

Bank of America, N.A. Trade Operations
Mail Code: CA9-703-19-09
333 S. Beaudry Avenue, 19th Floor, Los Angeles, CA 90017

00-35-0202NSB 9-1999_CA9 19

Washington Trust Bank

COPY

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LETTER OF CREDIT NO. 22037
DATE: AUGUST 1, 2003
AMOUNT: $908,770.60

The City of Black Diamond
Attn: City Controller
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It is a condition of this Letter of Credit that it shall be automatically extended, without amendment, for an additional period of one year from the present expiration date or each future expiration date, unless we have notified you in writing not less than sixty (60) days before such expiration date, that we elect not to extend this Letter of Credit beyond the current expiration date. All written notification shall be sent via Certified mail return receipt requested. If we notify you that this Letter of Credit will not be extended, the State Amount of this Letter of Credit shall be available to you upon presentation of your sight draft by the current expiration date or within sixty (60) days of your actual receipt of such notification, whichever is later.

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Sincerely,
WASHINGTON TRUS BANK

Renne R. Ditton

Renne R. Ditton
Assistant Vice President
International Banking Department

RRD/mss

Bank of America

COPY

COPY

DATE: AUGUST 11, 2003

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 3058079

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CITY OF BLACK DIAMOND
ATTN: CITY CONTROLLER
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BLACK DIAMOND, WA 98010

APPLICANT
PLUM CREEK TIMBERLANDS, LP
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Bank of America, N.A. Trade Operations
Mail Code: CA9-703-19-09
333 S. Beaudry Avenue, 19th Floor, Los Angeles, CA 90017

00-35-0202NSB 9-1999_CA9 19

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Appendix X
Financial Information

Residential Water Monthly Bill	$64.87	$64.87	$64.87	$64.87	$64.87	$64.87
% Rate Increase	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Accounts	2020	2021	2022	2023	2024	2025
OPERATIONAL SUMMARY						
(+) Total Operating Revenues	1,043,500	1,083,700	1,142,400	1,200,800	1,259,400	1,318,100
(-) Total Operation & Maintenance	825,000	906,400	967,000	982,200	1,023,300	1,062,800
(-) Total Debt	218,800	217,300	215,700	202,900	201,500	0
NET REVENUE	**300**	**40,000**	**40,300**	**15,700**	**34,600**	**255,300**
CAPITAL SUMMARY						
Start of Year Cash	**950,000**	**729,200**	**595,600**	**212,400**	**244,600**	**296,200**
(+) Connection Charges & Interest Inc	42,500	33,800	30,000	27,300	28,000	30,400
(+) Transfer from Operations	0	0	0	15,700	34,600	255,300
(+) Total Loan Funds	0	0	0	0	0	0
(+) Total CIAC Funds	0	499,900	362,500	0	0	0
(-) Total Capital Expenses	263,000	627,300	735,400	10,800	11,000	11,300
(-) Transfer to Operations	300	40,000	40,300	0	0	0
NET CAPITAL REVENUE	220,800	133,600	383,200	32,200	51,600	274,400
End of Year Cash	**729,200**	**595,600**	**212,400**	**244,600**	**296,200**	**570,600**
OPERATING REVENUES						
Water Charges	797,900	856,600	915,300	973,700	1,032,300	1,091,000
Water Late Fees/Name Change Ch	15,000	15,000	15,000	15,000	15,000	15,000
Water Sales from Hydrants	15,000	15,000	15,000	15,000	15,000	15,000
Water Sales from Irrigation	75,000	75,000	75,000	75,000	75,000	75,000
Reimbursable Water Labor & Eq	0	0	0	0	0	0
Water Hydrant Rental	3,000	3,000	3,000	3,000	3,000	3,000
Wtr- Res/Comm. Back Flow Insp Fe	6,800	6,800	6,800	6,800	6,800	6,800
Wtr-New Wtr. Meters & Setting Fee	75,000	60,000	60,000	60,000	60,000	60,000
Wtr-New Irrigation Meter Fee	0	0	0	0	0	0
Wtr-Irrigation Meter setting Fee	2,000	2,000	2,000	2,000	2,000	2,000
Wtr-Irrigation Back Flow Insp	24,000	24,000	24,000	24,000	24,000	24,000
Wtr-New water line conn-part & labc	0	0	0	0	0	0
Water Hydrant Meter Deposits	0	0	0	0	0	0
Water Investigation SF	2,000	2,000	2,000	2,000	2,000	2,000
PW-Eng, Civil Alloc Rev	5,000	5,000	5,000	5,000	5,000	5,000
Water Investigation MF/IN	0	0	0	0	0	0
Wtr-Svs Line Inspection Fee	17,500	14,000	14,000	14,000	14,000	14,000
Wtr-Invest.Cert.-Multi/Comm	5,300	5,300	5,300	5,300	5,300	5,300
TOTAL REVENUES	**1,043,500**	**1,083,700**	**1,142,400**	**1,200,800**	**1,259,400**	**1,318,100**
OPERATING EXPENDITURES						
Expenses						
Water Wages	259,900	266,400	273,100	279,900	286,900	294,100
Overtime	12,000	12,300	12,600	12,900	13,200	13,600
New Employees (Salary & Benefit	0	0	21,700	22,300	22,800	46,800
FA-MDRT Allocation	6,000	6,200	6,300	6,500	6,600	6,800
Proj & Grant-BD Staff Credit	18,000	18,000	18,000	18,000	18,000	18,000
WSFFA Staff Credit	0	0	0	0	0	0
Fac Staff & Veh Alloc	7,100	7,100	7,100	7,100	7,100	7,100
Other Salaries	0	0	0	0	0	0
Social Security & Medicare	20,000	20,500	21,000	21,500	22,100	22,600

Industrial Insurance	2,400	2,400	2,400	2,400	2,400	2,400
Retirement	40,600	41,600	42,700	43,700	44,800	45,900
Medical, Life & Dental Insurance	54,600	56,200	57,900	59,700	61,500	63,300
Unemployment	500	500	500	500	500	500
Water Operating Supplies	5,000	5,100	5,300	5,400	5,500	5,700
Office Supplies	1,200	1,200	1,300	1,300	1,300	1,400
Caustic	7,000	7,200	7,400	7,500	7,700	7,900
Water Meters	37,500	30,000	30,000	30,000	30,000	30,000
Uniforms	400	400	400	400	400	500
Plotter supplies	1,000	1,000	1,100	1,100	1,100	1,100
Fuel	3,000	3,100	3,200	3,200	3,300	3,400
Irrigation Meters purchase	0	0	0	0	0	0
Small Tools & Safety Equip	2,000	2,100	2,100	2,200	2,200	2,300
Alloc of Supplies, Copies, Postage	2,800	2,900	2,900	3,000	3,100	3,200
Pro Serv- City Admin(Prothman)	0	0	0	0	0	0
Water Testing and Sampling	4,000	4,100	4,200	4,300	4,400	4,500
State Auditor Services	11,500	0	12,100	0	12,700	0
Legal Svcs	20,000	20,500	21,000	21,500	22,100	22,600
Tacoma Base Fee for Purchased	76,000	155,800	159,700	163,700	167,800	172,000
Locating Service	1,600	1,600	1,700	1,700	1,800	1,800
Sensus Software Support & Maint	2,500	2,600	2,600	2,700	2,800	2,800
Professional Services	12,000	12,300	12,600	12,900	13,200	13,600
Vision Software maintenance	1,500	1,500	1,600	1,600	1,700	1,700
Advertising	400	400	400	400	400	500
Telephone/DSL/Radios	6,000	6,200	6,300	6,500	6,600	6,800
Postage	3,300	3,600	4,000	4,300	4,700	5,100
GPS Subscription & Costs	1,000	1,000	1,100	1,100	1,100	1,100
Lodging, Meals & Mileage	600	600	600	600	700	700
Utility Taxes	62,600	65,000	68,500	72,000	75,600	79,100
State of WA Utility Excise Tax	47,700	50,300	53,200	56,100	59,100	62,000
Insurance	33,800	35,200	36,600	38,000	39,500	41,100
Electric/Gas	40,000	41,000	42,000	43,100	44,200	45,300
Water	200	200	200	200	200	200
Sewer	200	200	200	200	200	200
Stormwater	500	500	500	500	600	600
Waste Disposal	800	800	800	900	900	900
Water Repair & Maint Shops	800	800	800	900	900	900
Water System Rep & Mtc-Ext/Int	15,000	15,400	15,800	16,200	16,600	17,000
Vehicle Maintenance	2,000	2,100	2,100	2,200	2,200	2,300
Miscellaneous	500	500	500	500	600	600
Memberships	300	300	300	300	300	300
Training	2,000	2,100	2,100	2,200	2,200	2,300
Printing	1,100	1,100	1,200	1,200	1,200	1,200
Permit-Health Dept	3,400	3,500	3,600	3,700	3,800	3,800
Security	300	300	300	300	300	300
Office 365 Lic & Mtc Costs	700	700	700	800	800	800
Bank Analysis Fees/Merch CC/ Li	1,200	1,200	1,300	1,300	1,300	1,400
Alloc of Central Svs-Svs	13,400	13,700	14,100	14,400	14,800	15,200
Fac-CH & Mod-Rent, Land, Ins. Al	15,100	15,500	15,900	16,300	16,700	17,100
Water-Technology & Equip alloc	0	0	0	0	0	0
Trans to Capital Equip Reserve	10,000	10,000	10,000	10,000	10,000	10,000
SUBTOTAL Expenses	**825,000**	**906,400**	**967,000**	**982,200**	**1,023,300**	**1,062,800**
TOTAL O&M EXPENSES	**825,000**	**906,400**	**967,000**	**982,200**	**1,023,300**	**1,062,800**

DEBT PAYMENTS

PW-02-691-005	11,400	11,400	11,300	0	0	0
PW-04-691-006	302,900	301,400	299,900	298,400	297,000	0
Palmer Coking Coal/PWTF04 Contr	95,500	95,500	95,500	95,500	95,500	0
TOTAL DEBT PAYMENTS	**218,800**	**217,300**	**215,700**	**202,900**	**201,500**	**0**

CAPITAL REVENUES

Transfer from Operations	0	0	0	15,700	34,600	255,300
Connection Charges	29,900	23,900	23,900	23,900	23,900	23,900
New CIAC - Fire Flow Loop/N Comr	0	148,600	362,500	0	0	0
New CIAC - Asbestos Wtr Main Rep	0	351,300	0	0	0	0
Interest Earnings from Cash	12,600	9,900	6,100	3,400	4,100	6,500
CAPITAL REVENUES TOTAL	**42,500**	**533,700**	**392,500**	**43,000**	**62,600**	**285,700**

CAPITAL EXPENSES

Water Comp Plan	95,000	0	0	0	0	0
Fire Flow Loop/N Comm	0	148,600	724,900	0	0	0
4.3 Mil Gal tank Mtc	35,000	0	0	0	0	0
Asbestos Wtr Main Replacement	71,000	468,400	0	0	0	0
SCADA System Imp	10,000	10,300	10,500	10,800	11,000	11,300
Water Power Study	52,000	0	0	0	0	0
Transfer to Operations	300	40,000	40,300	0	0	0
CAPITAL EXPENSES TOTAL	**263,300**	**667,300**	**775,700**	**10,800**	**11,000**	**11,300**

City of Black Diamond
Water Fund Analysis 2013-2019

	2013	2014	2015	2016	2017	2018	2019
Beg. Cash & Inv.	$612,107	$567,149	$491,964	$496,903	$529,413	$639,125	$911,073
Beg. Cash & Inv. Deve	$120,011	$59,850	$157,282	$75,679	$116,541	$187,914	$272,486
Total Beg Cash & Inv.	$732,118	$626,999	$649,246	$572,582	$645,954	$827,039	$1,183,559
Revenue							
Charges for Svs.	$487,073	$634,044	$752,436	$754,120	$764,719	$864,715	$937,947
Dev Cont.	$707,499	$243,621	$145,957	$329,928	$418,015	$571,253	$874,085
Grant	$146,857		$33,829	$187,580			
Misc Rev	$102,613	$26,064	$732	$36,010		$0	$2,165
Total Revenue	$1,444,042	$903,729	$932,954	$1,307,638	$1,182,734	$1,435,968	$1,814,197
Total Sources	**$2,176,160**	**$1,530,728**	**$1,582,200**	**$1,880,220**	**$1,828,688**	**$2,263,007**	**$2,997,756**
Expenditures							
Utilities	$382,341	$414,993	$474,356	$526,679	$507,699	$613,740	$829,987
Debt Service	$953,263	$381,672	$378,292	$320,429	$318,896	$317,362	$315,828
Capital Expenditures	$203,557	$69,817	$146,880	$367,158	$155,055	$138,346	$515,037
Transfer to Eq. Replace	$10,000	$15,000	$10,000	$20,000	$20,000	$10,000	$10,000
Total Expenditures	$1,549,161	$881,482	$1,009,528	$1,234,266	$1,001,650	$1,079,448	$1,670,852
Ending Cash & Inv. WTR	$567,149	$491,964	$496,903	$529,413	$639,125	$911,073	$1,075,488
Ending Cash & Inv Deve	$59,850	$157,282	$75,769	$116,541	$187,914	$272,486	$251,415
Total Cash & Inv.	$626,999	$649,246	$572,672	$645,954	$827,039	$1,183,559	$1,326,903
Total Uses	**$2,176,160**	**$1,530,728**	**$1,582,200**	**$1,880,220**	**$1,828,689**	**$2,263,007**	**$2,997,755**

Revenue Summary

2019 Water operating Rev

Fiscal: 2019 - December
Starting Account Number: 401-000-000-308-80-00-00
Ending Account Number: 401-000-600-367-00-00-03

Account Number	Description	Period	Fiscal	Budget	% of Total	Balance
401-000-000-308-80-00-00	Beg Cash & Investment Unreserved	$0.00	$497,143.25	$378,871.00	131.22 %	($118,272.25)
	401-000-000-30 Total	**$0.00**	**$497,143.25**	**$378,871.00**	**131.22 %**	**($118,272.25)**
401-000-000-343-40-00-01	Water Charges	$67,949.97	$813,839.11	$720,000.00	113.03 %	($93,839.11)
401-000-000-343-40-00-05	Water Late Fees/Name Change	$2,377.09	$17,109.85	$17,000.00	100.65 %	($109.85)
401-000-000-343-40-00-07	Water Sales from Hydrants	$2,567.80	$25,671.31	$12,000.00	213.93 %	($13,671.31)
401-000-000-343-40-00-08	Water Sales from Irrigation	$1,481.82	$77,425.24	$90,000.00	86.03 %	$12,574.76
401-000-000-343-50-00-00	Reimbursable Water Labor & Eq	$0.00	$151.00	$0.00		($151.00)
401-000-000-343-60-00-00	Water Hydrant Rental	$500.00	$3,750.00	$7,500.00	50.00 %	$3,750.00
	401-000-000-34 Total	**$74,876.68**	**$937,946.51**	**$846,500.00**	**110.80 %**	**($91,446.51)**
401-000-000-361-11-00-00	LGIP Investment Interest	$516.94	$9,779.12	$7,500.00	130.39 %	($2,279.12)
401-000-000-369-91-00-01	Wtr- Res/Comm. Back Flow Insp	$0.00	$0.00	$1,000.00	0.00 %	$1,000.00
401-000-000-369-91-00-02	Wtr-New Wtr. Meters & Setting Fee	$8,500.00	$123,813.66	$100,000.00	123.81 %	($23,813.66)
401-000-000-369-91-00-03	Wtr-New Irrigation Meter Fee	$759.87	$3,039.48	$7,000.00	43.42 %	$3,960.52
401-000-000-369-91-00-04	Wtr-Irrigation Meter setting Fee	$0.00	$3,000.00	$4,000.00	75.00 %	$1,000.00
401-000-000-369-91-00-05	Wtr-Irrigation Back Flow Insp	$2,484.00	$28,704.00	$17,000.00	168.85 %	($11,704.00)
401-000-000-369-91-00-06	Wtr-New water line conn-part &	$0.00	$0.00	$500.00	0.00 %	$500.00
401-000-000-369-91-03-00	Water Hydrant Meter Deposits	($1,000.00)	$2,000.00	$0.00		($2,000.00)
401-000-000-369-91-04-00	Water Investigation SF	$2,979.25	$4,165.25	$8,000.00	52.07 %	$3,834.75
401-000-000-369-91-05-00	PW-Eng, Civil Alloc Rev	$243.00	$4,519.50	$5,000.00	90.39 %	$480.50
401-000-000-369-91-06-00	Water Investigation MF/IN	$0.00	$3,551.62	$0.00		($3,551.62)
401-000-000-369-91-07-00	Wtr-Svs Line Inspection Fee	$2,070.00	$31,602.00	$14,000.00	225.73 %	($17,602.00)
401-000-000-369-91-08-00	Wtr-Invest.Cert.-Multi/Comm	$0.00	$210.00	$5,250.00	4.00 %	$5,040.00
	401-000-000-36 Total	**$16,553.06**	**$214,384.63**	**$169,250.00**	**126.67 %**	**($45,134.63)**
401-000-000-398-10-00-00	Insurance/Claim Recovery	$0.00	$2,164.94	$0.00		($2,164.94)
	401-000-000-39 Total	**$0.00**	**$2,164.94**	**$0.00**		**($2,164.94)**
401-000-400-369-91-00-01	Permit Clg Depost- Weston-Comm.	$0.00	$4,500.00	$0.00		($4,500.00)
401-000-400-369-91-00-02	Permit Clg-Deposit-Summit S/Pl	$0.00	$4,000.00	$0.00		($4,000.00)
401-000-400-369-91-00-03	PW Deposit Clg-Spartan	$0.00	$10,000.00	$0.00		($10,000.00)
401-000-400-369-91-00-04	PW Permit Clg-Deposit Weston-	$0.00	$15,952.50	$0.00		($15,952.50)
	401-000-400-36 Total	**$0.00**	**$34,452.50**	**$0.00**		**($34,452.50)**
401-000-600-367-00-00-03	Palmer Coking Coal/PWTF04	$0.00	$96,486.47	$90,400.00	106.73 %	($6,086.47)
	401-000-600-36 Total	**$0.00**	**$96,486.47**	**$90,400.00**	**106.73 %**	**($6,086.47)**
	Fund Total	**$91,429.74**	**$1,782,578.30**	**$1,485,021.00**	**120.04 %**	**($297,557.30)**
	Grand Total	**$91,429.74**	**$1,782,578.30**	**$1,485,021.00**	**120.04 %**	**($297,557.30)**

City of Black Diamond

Capital Improvement Plan

2019 – 2024

August 16, 2018

Independence Day on Lake Sawyer
(Photo Credit Craig Goodwin)

City of Black Diamond

Capital Improvement Plan

2019 – 2024

Water Department

CAPITAL PROJECT SUMMARY

Summary by Project		Capital Plan 2019 - 2024						
Project Title		Total $ 2019 - 2024	2019	2020	2021	2022	2023	2024
W1	Springs & Transmission Reconstruction WSFFA	4,735,000	2,645,000	2,090,000				
W2	Fire Flow Loop - North Commercial Area	835,000	145,000	690,000				
W3	4.3 MG Tank Repaint	35,000	35,000					
W4	Water Comprehensive Plan Update	98,243	98,243					
W5	Asbestos Morganville S. Water Main Replace	562,200	1,200	104,000	457,000			
W6	Asbestos Morganville N. Water Main Replace	528,000			1,000	99,000	428,000	
W7	.5 MG Tank Water Reservoir Recoat	235,000		20,000	215,000			
W8	Pacific Street Water Line Loop	240,000					120,000	120,000
W9	2nd Intertie with City of Tacoma	640,000					130,000	510,000
W10	SCADA System Improvements	60,000	10,000	10,000	10,000	10,000	10,000	10,000
W11	Morgan St AC Water Main Replacement	440,000					95,000	345,000
	TOTAL ESTIMATED COSTS	**8,408,443**	**2,934,443**	**2,914,000**	**683,000**	**109,000**	**783,000**	**985,000**
Funding Sources								
Water Reserves and Rates								
W2	Fire Flow Loop - North Commercial Area	417,500	72,500	345,000				
W3	4.3 MG Tank Repaint	35,000	35,000					
W5	Asbestos Morganville S. Water Main Replace	86,200	1,200	14,000	71,000			
W6	Asbestos Morganville N. Water Main Replace	52,000			1,000	9,000	42,000	
W8	Pacific Street Water Line Loop	240,000					120,000	120,000
W10	SCADA System Improvements	30,000	5,000	5,000	5,000	5,000	5,000	5,000
W11	Morgan St AC Water Main Replacement	50,000					12,500	37,500
	Total Water Reserves & Rates	**910,700**	**113,700**	**364,000**	**77,000**	**14,000**	**179,500**	**162,500**
Water System & Facilities Funding Agmt (WSFFA)								
W1	Springs & Transmission Reconstruction WSFFA	4,735,000	2,645,000	2,090,000				
	Total WSFFA Funds	**4,735,000**	**2,645,000**	**2,090,000**				
Grant Funding								
W5	Asbestos Morganville S. Water Main Replace	476,000		90,000	386,000			
W6	Asbestos Morganville N. Water Main Replace	476,000				90,000	386,000	
W11	Morgan St AC Water Main Replacement	390,000					82,500	307,500
	Total Grant Funding	**1,342,000**		**90,000**	**386,000**	**90,000**	**468,500**	**307,500**
Sewer Rates								
W10	SCADA System Improvements	30,000	5,000	5,000	5,000	5,000	5,000	5,000
	Total PWTF Loan	**30,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**
Loan From Sewer Reserve								
W7	.5 MG Tank Water Reservoir Recoat	235,000		20,000	215,000			
	Total PWTF Loan	**235,000**		**20,000**	**215,000**			
Developer Funding								
W2	Fire Flow Loop - North Commercial Area	417,500	72,500	345,000				
W9	2nd Intertie with City of Tacoma	640,000					130,000	510,000
	Total Developer Funding	**1,057,500**	**72,500**	**345,000**			**130,000**	**510,000**
Carryover Funds								
W4	Water Comprehensive Plan Update	98,243	98,243					
	Total PWTF Loan	**98,243**	**98,243**					
	TOTAL ESTIMATED FUNDING SOURCES	**8,408,443**	**2,934,443**	**2,914,000**	**683,000**	**109,000**	**783,000**	**985,000**
W7	**Loan Repay to Sewer Reserves**					48,426	48,426	48,426

Appendix X

SEPA

CITY OF BLACK DIAMOND

Physical Address: 24301 Roberts Drive
Mailing Address: PO Box 599
Black Diamond, WA 98010

Phone: (360) 851-4447
Fax: (360) 851-4501
www.blackdiamondwa.gov

State Environmental Policy Act (SEPA)
Determination of Non-Significance (DNS)

Date of Issuance: March 10, 2025

Lead Agency: City of Black Diamond

Agency Contact: Andy Williamson, Interim Community Development Director/SEPA Official, awilliamson@blackdiamondwa.gov, (360) 851-4447

Project Name: The City of Black Diamond Water System Plan Update (SEPA Environmental Review)

Agency File Number(s): PLN24-0080 (SEPA Environmental Review)

Description of Proposal: This proposal is a Water System Plan to serve the City of Black Diamond water service area which encompasses much of the City limits and some portions of unincorporated King County. The Plan addresses policies, design criteria, assumptions and recommendations for the water system and its service area. The Plan looks at the current service level and where improvements to that level are needed. Elements of these service levels are public health, groundwater and environmental protection, facility reliability, operation and maintenance, and financing issues. Taking all of these factors into consideration, the plan proposes a long-range plan for facility improvements including repair, replacement, upgrading and construction of transmission, distribution, supply and storage facilities; and construction of facilities required to bring service to the areas that are and will be designated as expansion or growth areas. The Water System Plan is programmatic and only lists general recommendations or additions that do not have specific sites or scopes of work. Future projects and their associated impacts will be reviewed as engineering studies and scopes of work are developed and discussed in the SEPA reviews of the individual projects.

Location of Proposal: The area covered by this Water System Plan is the City of Black Diamond's water service area. Service boundaries have been established by agreement and policy, specifically, the agreement between South King County Regional Water Association and the City of Black Diamond.

Applicant/Proponent: City of Black Diamond Public Works Department – c/o Scott Hanis, Public Works Director, 24301 Roberts Drive, Black Diamond, WA 98010; (360) 851-4446

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030. This decision was made after reviewing a completed environmental

checklist and other information on file with the lead agency. This information is available to the public on request.

Public Comment Period: This DNS is issued under WAC 197-11-340(2) and includes a comment period. The Lead Agency will not act on this proposal for 14 days from the date of this decision. Written comments must be submitted no later than 5:00 pm on March 24, 2025, to the City of Black Diamond Agency Contact.

Signature: _____ Date: 3/10/25

Andy Williamson, Interim Community Development Director / SEPA Official

Pursuant to BDMC 19.04.260.A.1, there is no SEPA administrative appeal of non-project actions. Judicial appeals may be filed pursuant to BDMC 19.04.260.M. Contact the Community Development Department at (360) 851-4447 to inquire about the procedures for SEPA appeals. You should be prepared to make specific factual objections in your appeal.