BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

WA DOH ID #13344P

2004 to 2009
WATER SYSTEM PLAN

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BULLERVILLE UTILITY DISTRICT
2004 – 2009 WATER SYSTEM PLAN

I. PURPOSE

The purposes of this *Water System Plan* are to:

1. Document the evaluation of the system.
2. Recommend the design of the initial system to comply with the Washington Department of Health (WA DOH) guidelines.
3. Provide budget-level cost estimates for construction of the initial system.

This Plan includes the following:

(1) Standard specifications and construction details for the installation of water mains.
(2) Cross Connection Control Program
(3) Water Conservation Plan and Water Shortage Response Plan
(4) Wellhead Protection Plan
(5) Water Quality Monitoring Plan (e.g., Coliform Monitoring Plan)
(6) Emergency Plan
(7) Six-year and twenty-year capital improvement programs
(8) Financial Viability Assessment
(9) Management Program Consistency Statement Checklist

The above noted operating programs and plans for this Water System Plan are also incorporated into the *Management and Operations Manual* for the new system.

Accompanying the submittal of Water System Plan is a Project Report for the construction of reservoirs, booster pump station, connection of wells and installation of water mains to supply the customers supplied at the formation of the system.

II. BACKGROUND

The water system is owned by the Bullerville Utility District (D.O.H. ID #13344P). The system is located in Skagit County on Highway 20 between the communities of Marblemount and Rockport, Washington.

The Skagit County Board of Commissioners approved the formation of the Bullerville Sewer District on April 8, 1977. On December 17, 2001 the County approved a grant from the Rural Distressed County sales tax of $360,000 for improvement to the Bullerville water system. On November 5, 2002 voters approved formation of the District and elected officers. The name was officially changed from Bullerville Sewer District to Bullerville Utility District on December 9, 2002.

The following are names, addresses and telephone numbers of the Commissioners:

Don Clark (360) 873-4077
58468 Clark Cabins Road
Rockport, WA 98283

Robert Brooks
58468 Clark Cabins Road
Rockport, WA 98283

Madrene Clark
58439 Hwy. 20
Rockport, WA 98283

The operation of the new system will be delegated to a contract operator. The following WA DOH certified operator that will take charge of the new system on startup:

Kelly Wynn (360) 466-4443
Water/Wastewater Services
14263 Calhoun Road
Mt. Vernon, WA 98273

The District existing sources of supply consisted of three shallow wells, 1 primary and two backup sources. All wells are completed in a gravel aquifer to a depth between 30 and 40 feet. The static water depth is approximately 25 feet.

The primary source (Well No. 1) pumps at a rate of 17 gpm. Well Nos. 2 and 3 pump at rates of 11 and 10 gpm, respectively.

The shallow wells are subject to groundwater under the influence of surface water (GWI).

The wells are located within the resort area. Sanitary sewers (collections line to the large on site septic system) are within the 100-foot requisite sanitary control area of Well Nos. 1 and 2. Well No. 3, located within 100 feet of S.R. 20 and 800 feet of the Skagit River, is subject to flooding.

The District had the following three options for supply water:

- Purchase water through an intertie or amalgamate with a public water system with adequate facilities, Marblemount, WA.
- Provide water treatment for the present shallow wells.
- Drill new wells deeper into the aquifer and at a site with the requisite sanitary control radius.

The distance to Marblemount made this option for supply impractical.

To utilize the three existing wells, water treatment for GWI is recommended. The rough cost estimate for treating 38 gpm was $216,000.

The capacity of the existing wells is less than the production needed for the proposed growth within the District's service area. Therefore, the proposed new wells would be required to provide additional capacity. The added cost of water treatment is beyond the resources of the District and would jeopardize the completion of the project to mitigate the public health risks identified with the existing system.

The drilling of two replacement wells was necessary to avoid the unacceptable treatment cost.

No water storage is provided. The present wells discharge into the distribution system. One 50 gallon and three 80 gallon bladder tanks are provided for the operation of the wells.

The present distribution system consists of 2-inch PVC pipe, and 1 ¼-inch and ¾-inch polyethylene pipe.

For fire protection, both storage, booster pumps and new distribution system was needed.

The population currently supplied is primarily transient, non-community. The customers consists of:

34	cabins/lodge rooms
7	permanent single-family residential units (ERUs)
56	mobile home and recreational vehicle units/sites
2	campgrounds
1	restaurant and store
1	laundromat

The year-round population is greater than 25 persons. The summer population is assessed as 75 ERUs. The ultimate population is assessed as 381 ERUs.[1]

III. DESCRIPTION OF SYSTEM

The general configuration of the new water system is shown in the drawings in the appendices to this Plan. Since the old wells and distribution system will be abandoned or utilized as part of customer plumbing systems, no further description beyond the above background information is provided in this plan.

[1] Current and future demand estimate from letter by Economic and Engineering Services, Inc., dated February 14, 2003 (copy in Appendix A).

For the purposes of discussion, the facilities have been grouped into areas of supply; water quality and treatment; storage, pumping and pressure reduction; and distribution.

Sources of Supply

The two new wells in the water system are located on the District owned parcel containing the reservoirs and booster pump house.

Mr. Don Clark, owner of Clarks Cabins River Resort assigned to the District a portion of Water Right Claim Number 158491. An Application for Change/Transfer was submitted to the WA Department of Ecology. The application requests a change:

- In the purpose of use from domestic and commercial to municipal.
- In the point of withdrawal from Section 23 to Section 14.
- In the place of use from Clarks Skagit River Resort to the area served by Bullerville Utility District.

The application requests 160 gpm and 260 acre-feet per year.

The 100-foot radius sanitary control areas for the wells lie within the property owned by the District.

The District has signed Declarations of Covenants for the well sites.

The following information is provided in the appendices to this Plan for both wells:

Driller's reports
Water right claim and change application
Well site approvals
Well logs
Well pump curve (same of both wells)
Well pumping test and hydrogeologist reports
Sanitary zone declaration of covenants
Wellhead protection plan
WA DOH "Ground Water Susceptibility Assessment Survey"
Water right self-assessment

Water Quality and Treatment

Table 1 shows the results of the inorganic compound analysis for both wells.

The water quality analyses results for production from the new wells are included in the appendices. All water quality parameters comply with WA DOH guidelines with the exception of manganese. Although both wells are developed in the same aquifer, one well has a level of manganese above the maximum contaminant level (MCL). Manganese is an aesthetic concern only and is classified as a secondary, non-health related contaminant.

Since the production from one well will meet the short-term needs of the District, the well with a manganese level below the MCL will be used as the lead source. The second well will be used as a standby (emergency) source.

TABLE - 1
WATER QUALITY SUMMARY - INORGANIC CHEMICALS

PARAMETER	UNITS	MCL	Well No. 1 (2004)	Well No. 2 (2004)
Arsenic (1)	Mg/L	0.05	0.005	ND
Barium (1)	Mg/L	2.0	ND	ND
Cadmium (1)	Mg/L	0.005	ND	ND
Chromium (1)	Mg/L	0.1	ND	ND
Mercury (1)	Mg/L	0.002	ND	ND
Selenium (1)	Mg/L	0.05	ND	ND
Beryllium (1)	Mg/L	0.004	ND	ND
Nickel (1)	Mg/L	0.01	ND	ND
Antimony (1)	Mg/L	0.006	ND	ND
Thallium (1)	Mg/L	0.002	ND	ND
Cyanide (1)	Mg/L	0.2	ND	ND
Fluoride (1)	Mg/L	4.0	ND	ND
Nitrite (1)	Mg/L	1.0	ND	ND
Nitrate (1)	Mg/L	10.0	ND	ND
Total Nitrate/Nitrite (1)	Mg/L	10.0	ND	ND
Iron (2)	Mg/L	0.3	ND	0.125
Manganese (2)	Mg/L	0.05	0.014	**0.225**
Silver (2)	Mg/L	0.05	ND	ND
Zinc (2)	Mg/L	5.0	ND	ND
Chloride (2)	Mg/L	250	ND	ND
Sulfate (2)	Mg/L	250	ND	ND
Turbidity (3)	NTU	1.0	0.38	0.93
Sodium (3)	Mg/L		2.0	2.0
Hardness (3)	Mg/L		49.1	47.6
Electrical Conductivity (3)	uS/cm	700	97	103
Color (3)	Color Units	15	ND	7
Total Dissolved Solids (3)	Mg/L	500	NR	NR
Lead (4)	Mg/L	0.015	ND	ND
Copper (4)	Mg/L	1.3	ND	ND

(1) EPA Regulated – Primary
(2) EPA Regulated – Secondary
(3) State Regulated
(4) State Unregulated

MCL – Maximum Contamination Level
ND – Not Detected
NR – No Report

Bratton {4/22/2004}

No water treatment is provided. Hypochlorination may be provided as a precautionary measure with solution injection in the reservoir inlet line from the wells. For this purpose the installation of a hypochlorinator is included in the accompanying project report. After completion of the construction of the new facilities, water quality will be monitored to determine the need for chlorination.

Although one of the two wells shows a level of manganese above the MCL, treatment for manganese is not planned at this time. With operation of the new well(s) the level of manganese may change. Treatment for manganese removal will be considered if aesthetic complaints from the primarily transient service area population become a concern.

Manganese is classified as a secondary, non-health related contaminant that will mainly affect the aesthetic quality of the water (black water complaints). However, manganese will cause a chlorine demand (when chlorination is provide).

The well with manganese at a level below the MCL will be used as the primary source, with the second well as a standby or lag source. Treatment, if desired, will not be needed until expansion of the service area population occurs.

The appendices includes the following:

- Water quality monitoring schedule
- Coliform monitoring program
- DDBP monitoring program (for future chlorination)
- Copper and lead monitoring program

Storage, Pumping and Pressure Reduction Facilities

Water storage will be provided in two 79,400-gallon, 26-foot diameter by 20-foot high Mt. Baker Silo concrete reservoirs.

The reservoir will be equipped with the requisite isolating valves, sealed hatch, and screened air vents, etc.

The entire distribution system will be supplied from booster pumps. The initial set of four booster pumps will supply both domestic demand and 500 gpm fire flow.

An emergency generator will be provided to supply emergency power to operate one 7.5 hp booster pump plus building load. During a power outage, the booster pumps shall not be operated to provide fire flow to the system. Fire flow will be provided during power outage by the local fire district use of tanker trucks. Future expansion of facilities requiring fire flow greater than 500 gpm will require improvement to the booster pumps and emergency generator.

Further details on the proposed facilities are provided in the Project Report "Reservoirs, Booster Pump Station and Connection of Wells", accompanying this Plan.

Distribution System

The proposed distribution system is shown in the accompanying Water Distribution System Comprehensive Map.

The new distribution mains will be installed mostly in easements parallel to the County road rights-of-way. One crossing of State Highway 20 is planned. A copy of the WA DOT crossing permit is included in the appendices.

The distribution mains area sized to provide 500 gpm fire flow to residential areas and [future] 1,000 gpm fire flow for a future resort complex.

The District will install water meters on the services to each customer (parcel of property). Each customer desiring water meters to individual dwelling units (e.g., cabins or rental homes) shall be responsible for the installation of private meters. The District will not read private meters for the customer's distribution of costs to individual renters.

The proposed distribution system will consist of the following inventory:

TABLE - 2
DISTRIBUTION SYSTEM INVENTORY

	C900 PVC Distribution Mains	Ductile Iron Yard Piping
8-inch	850	140
6-inch	825	0
4-inch	900	140
< 4-inch	0	0
Sub-total	2,575	280

Fire hydrants:	5
Isolating gate valves:	12 (includes hydrant valves)
Blow-off assemblies:	2
Air release valves:	0
Services:	5 (all commercial)
Backflow Assemblies	0

IV. PLANNING

Present and Future Service Area

The present service area is shown in Figure 1 and on the accompanying Comprehensive Map – Service Area. The Comprehensive Map also shows the area for possible expansion of the service area. The design of the system is based on the future supply of the expanded service area.

As shown in Figure 2, the service area is essentially flat. The new wells, reservoirs and booster pump house are located at the highest elevation in the service area.

Service Area Agreement

The signed service area agreement (present service area) is included in the appendices to this Plan.

County Franchise

The Skagit County Franchise Agreement required for the portion of the water distribution system on County road rights-of-way is included in the appendices.

System Interties

An emergency or wholesale supply intertie to an adjoining system is not planned.

Water Supply and Demand Forecast

A history of annual water use is not available. Source meters were not installed on the existing wells.

The water demand in the current service area was described in Section II, Background.

The letter report by Economic and Engineering Services, Inc. (EES), dated February 14, 2003 (copy in Appendix A) provides the estimate of water demand for the possible future service area. The future number of ERUs estimated in the EES report is 381.

For design of the distribution system and booster pumping facility the forecast of future demand assumed a MDD of 800 gallons per day (gpd) per equivalent single-family residences (ERU). For the design of the reservoirs and sources of supply, the design assumes that the long-term conservation goals for the MDD of 600 gpd/ERU.

The County designated land use within the service area is shown in Figure 3 and in the Comprehensive Map – Initial Facilities.

A copy of the Consistency Statement Checklist signed by Skagit County is included in Appendix A.

Water Conservation & Water Shortage Response Plan

The District has adopted with this Plan a water conservation program and water shortage response plan. Copies of these plans are included in the appendices. The water conservation plan includes the requisite WA DOH "Water Use Data Collection Requirements Checklist" and "Demand Forecast Requirements Checklist".

The water conservation plan will primarily consist of public education and an inclining water rate structure or surcharge to promote water conservation.

The short-term water conservation goal for the maximum day demand (MDD) is 700 gpd/ERU. The long-term (20-year) goal is 600 gpd/ERU.

The short-term and long-term goals for the average day demand (ADD) are 300 gpd/ERU and 250 gpd/ERU, respectively. These goals will provide an estimated short-term and long-term savings in water use of 12 and 25 percent, respectively.

Emergency Plan

An emergency plan is included in the appendices.

System Vulnerability

The most vulnerable system component is the failure of a well. The two wells provides system redundancy, either well may be removed from service for maintenance or replacement.

The wellhead protection plan addresses the potential contamination of a source of supply. There is enough distance between the two wells to ensure that a local source of contamination will not impact both wells within a short time period. There is adequate undeveloped land in the area to secure a replacement well site.

The second most vulnerable component of the system that could have a major impact on customer service is a water main break. Since the system is new, the most likely cause of a break is damage by a contractor working near a water main. The distribution system is looped and provided with isolating valves to allow a section of main to be removed from service with a minimum disruption of service to the customers. The District emergency plan includes the storage of material to facilitate the quick repair of any break.

Service Policies

A copy of the service policies for adoption by the District is included in Appendix T. The service policies include conditions for service and extension of the system.

V. DESIGN CRITERIA

The major design requirements of the Washington Department of Health (WA DOH are summarized by the following criteria:

Distribution

1) The system shall provide a minimum of 30 psi (preferably higher) operating pressure to all customers during peak hour demand (PHD) conditions, with the equalizing component of storage depleted. The calculation of PHD shall be based on WA DOH guidelines.

2) The system shall provide more than 20 psi residual pressure at all operating fire hydrants during maximum day demand (MDD) plus fire flow conditions. The calculation of MDD shall be based on WA DOH guidelines.

3) The system shall provide more than 20 psi operating pressure to all customers during MDD plus fire flow conditions.

4) All new or expanding water systems shall provide fire hydrants in residential areas at a maximum spacing of 900 ft., or maximum hose lay of 500 ft., whichever is the lesser, and shall provide a basic fire flow from any one hydrant of 500 gpm.

5) For new or expanding systems, the minimum water main size shall be 6-inch, except into cul-de-sacs or other locations where further expansion is very improbable, where lines shall not be less than 2-inch.

6) The system shall be equipped with adequate isolating valves, air release valves, blow-off assemblies, etc., for proper system operation and maintenance.

7) An individual service booster pump is allowed as an interim measure (less than six years) where distribution system pressure is deficient.

Supply

8) The minimum production capacity shall equal the maximum day demand (MDD).

9) Where the County Coordinated Water System Plan recommends the establishment of a water conservation program, the purveyor's conservation program should follow the latest edition of "Water Conservation Planning Handbook for Public Water Systems", and "Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs".

10)A Step-Drawdown Test and a 24-hour Constant-Rate Test conforming to WA DOH guidelines shall be made to support the source's ability to reliably provide a safe yield. Low water demand sources in high production aquifers may continue the Step-Drawdown Test to stabilization, and forego the subsequent 24 hour Constant-Rate Test.

Storage

11)The minimum standby (i.e., emergency) storage shall be equal to the maximum day demand (MDD).

Where multiple sources of supply are available, the standby storage may be reduced by the existing pumping capacity of the wells, assuming the highest capacity well is out of service. A minimum standby storage of 200 gpd/ERU, should be provided regardless of the number of, and/or excess capacity of, the sources available.

12)The minimum equalizing storage shall be provided based on the formula: 150 min. x (PHD-Q), where `Q' is the sum of the capacities of the active sources of supply.

13)The minimum fire protection storage for single-family residences shall be based on a fire flow of 500 gpm for 30 minutes (15,000 gallons). Standby storage may be used for fire protection storage.

Pressurization of System

14)The operating cycle of any booster pump shall not exceed 6 cycles per hour.

15)The booster pumps shall have capacity to supply peak hour demand (PHD), with the highest capacity pump out of service.

16)The booster pumps shall have capacity to supply fire flow plus maximum day demand (MDD), with the highest capacity pump out of service.

17)Hydropneumatic tanks shall be ASME approved (labeled) and equipped with a ASME relief valve. Small (up to 120 gallons), non-approved ASME tanks may be used if equipped with a ASME relief valve.

18)Hydropneumatic tanks shall be sized in accordance with WA DOH guidelines.

Treatment for Manganese & Iron

19)All iron and manganese facilities must be pilot plant tested at the site (or full scale tested after installation).

20)The maximum filter unit application rate and minimum backwash application rate shall be 5 gpm/sq.ft. and 12 gpm/sq.ft.

21)Documentation must be provided that the method of waste disposal [backwash] is acceptable to the WA Department of Ecology.

22)All treatment media must have NSF approval.

Chlorination

23)A WA DOH Hypochlorination Facilities for Small Systems submittal checklist shall be submitted where chlorination is provided.

Equalizing storage is defined as the volume of storage needed to supplement supply of consumers when the peak hourly demand exceeds the total source pumping capacity. Standby storage is defined as the volume of stored water available for use during a loss of source capacity, power or similar short-term emergency.

A reduction in the requirement for production capacity and standby storage may be requested if adequate water use data is available to demonstrate that the actual average per customer maximum day demand is lower than that specified in the WA DOH Design Guidelines, and that conservation measures can be relied upon to limit new customers to this average water usage. Daily source meter data collected over a two-year period is usually adequate, provided the summer months are typical of warm weather patterns.

The provision of standby storage is a recommendation (not a requirement) of the Design Guidelines. The amount of standby storage may be reduced below the recommended level in the Design Guidelines if "community expectations are amenable to a lesser standby storage capacity".

The above criteria are adopted in the District service policies for the design of future improvements to the system.

VI. SYSTEM EVALUATION

The basic system evaluation was provided in the Section III, Description of System.

Calculations to support the evaluation are provided in the appendices.

The major points in the system evaluation are summarized below:

Sources of Supply

The requested water right rate of withdrawal and annual withdrawal are adequate for the anticipated number of customers in the service area. With conservation, the water rights are adequate for the identified potential future service area.

Well production capacity exceeds the requested water rights (see hydrogeologist's report in appendices).

The initial well production will be less than the requested water rights. The production will be adequate from one of the two wells for the present service population.

To meet future growth, larger capacity well pumps may be installed to supply the requested water right rate of withdrawal.

Water Quality and Treatment

No water treatment is necessary for the lead well. If the community desires, in the future for use of the standby well, water treatment to remove manganese may be provided. A project report will need to be submitted to and approved by WA DOH for the addition of water treatment equipment.

Storage, Pumping and Pressure Reduction

With water conservation, the proposed twin reservoirs will be adequate to provide domestic demand and up to 1,000 gpm fire flow for 60 minutes.

If the future resort complex requires increased fire storage, a third reservoir will be needed. The District owned parcel has adequate space for a third reservoir.

The booster pump station is designed to provide domestic demand plus 500 gpm fire flow. The station is designed for the future addition of pumps to supply for increased fire flow.

An emergency generator is provided for operation of one pump to meet domestic demand. The generator will be equipped with an automatic transfer switch.

Distribution

The distribution system has capacity to supply domestic demand at a minimum of 45 psi. The highest pressure in the system will be 75 psi.

The minimum distribution main size is 6-inch. An 8-inch distribution main is provided from the booster pump station to Highway 20 for future expansion of the service area and to provide *1,000 gpm fire flow.*

Copies of network analyses of the system under various operating assumptions are included under the "Calculations" section of this Plan.

VII. RECOMMENDED IMPROVEMENTS

Since the grant from the Rural Distressed County sales tax of $360,000 includes all of the initial facilities, no additional improvements are recommended in this plan.

Any future improvements to the system to supply an extension of the service area will require submission of a revision to this Plan.

VIII. CAPITAL FACILITIES PLAN

Details of the budget level cost estimates are provided in the appendices.

The following capital improvement budget is provided for the installation of the initial system. No additional work is anticipated within the next 6 years.

Item	Description	Budget	Schedule
A	Construct two 79,400 gallons reservoirs.	$ 111,470	2004
B	Construct pump station at reservoir site.	$81,108	2004
C	Install emergency generator	$20,036	2004
D	Drill and equip two wells	$44,758	2004
E	Install new distribution system, 6 & 8" PVC pipe	$100,874	2004

Total budget is $358,246.

The above assumes that the cost of customer meters will be assessed to each customer.

IX. FINANCES

A financial viability assessment, developed in accordance with the Washington Department of Health Financial Viability Manual, March 1995, is provided in the appendices.

The grant from the Rural Distressed County sales tax covers the cost of the initial facilities. The funding for the operation of the water system will be obtained from the water rates and charges established by the Purveyor, copy included in the appendices.

X. OPERATION AND MAINTENANCE

Details on the routine maintenance of hydrants, valves, reservoirs, etc., are included in the Management and Operations Manual accompanying this Plan.

Details on the following operation programs and plans are included in appendices and in the M. & O. Manual.

- Cross Connection Control Program
- Water Conservation Plan
- Water Shortage response Plan
- Wellhead Protection Program
- Coliform Monitoring Plan
- Lead and Copper Monitoring Plan
- Emergency Plan

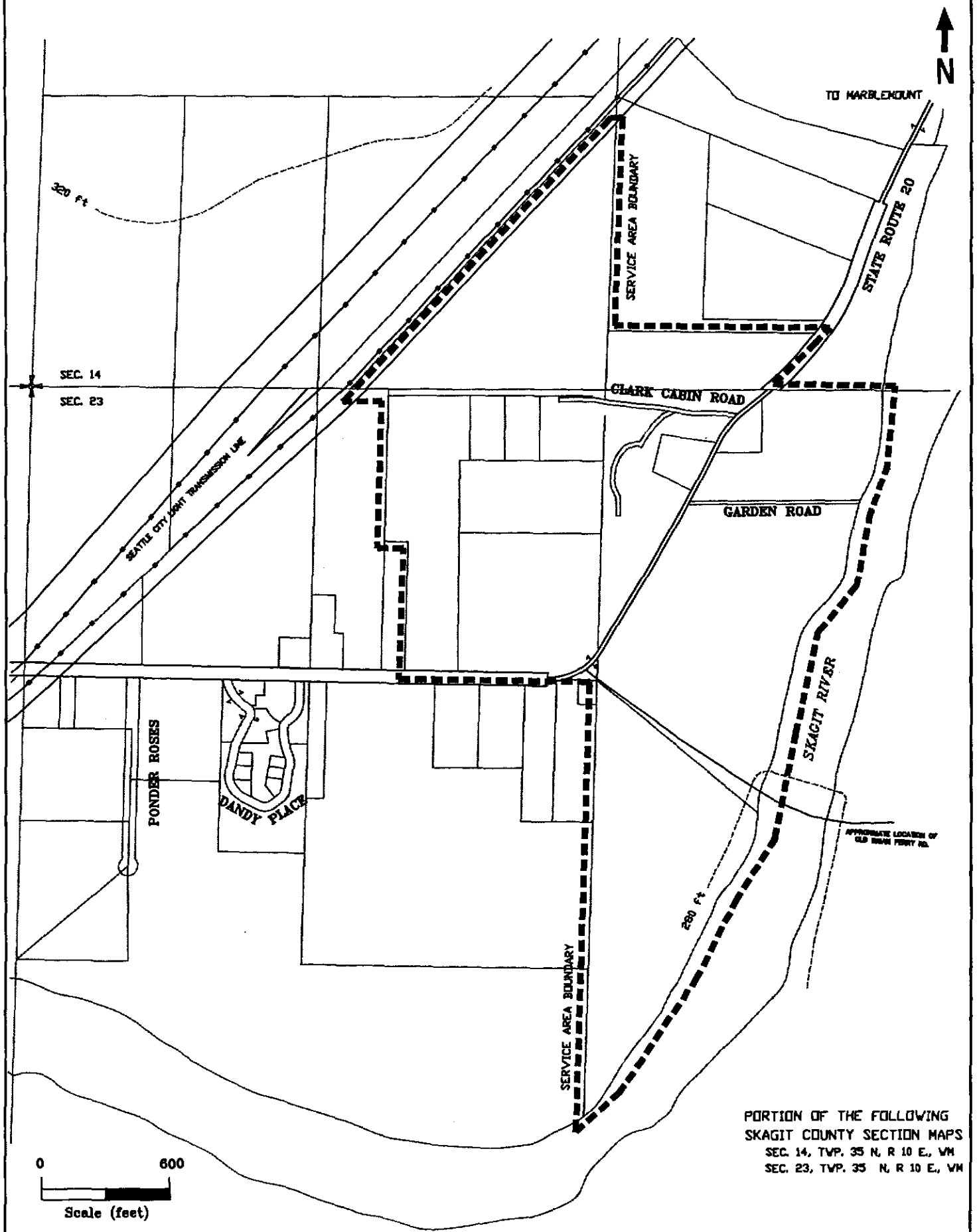
A safety program has not been developed. The contract operator shall be responsible for the safety of his employees.

The operating policies are included in the appendices.

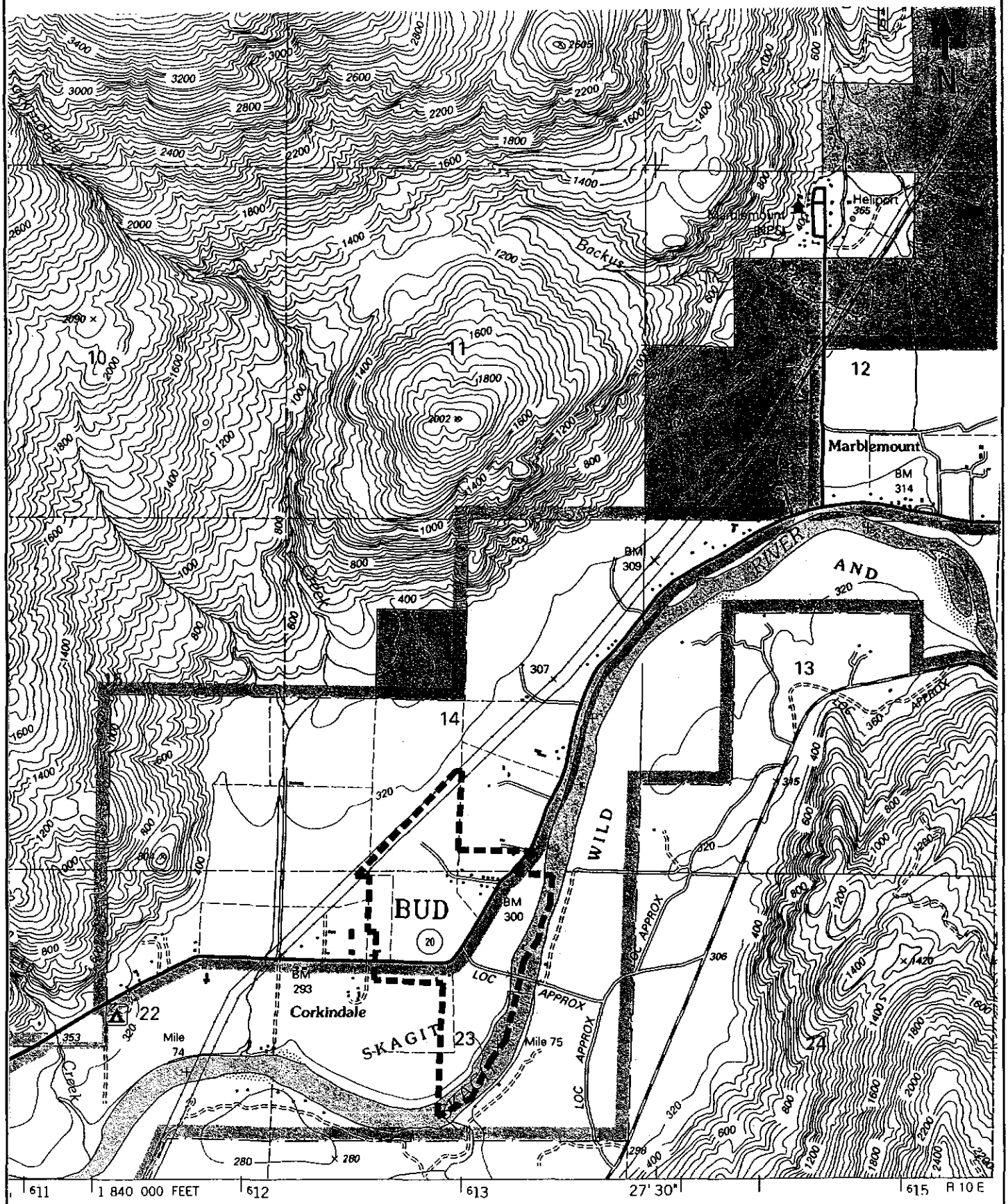
XI. STANDARD SPECIFICATIONS - WATER MAIN

For any future extension or replacement of water mains, the appendices include standard specifications and construction plans for water mains 2 to 12-inch in diameter.

FIGURES

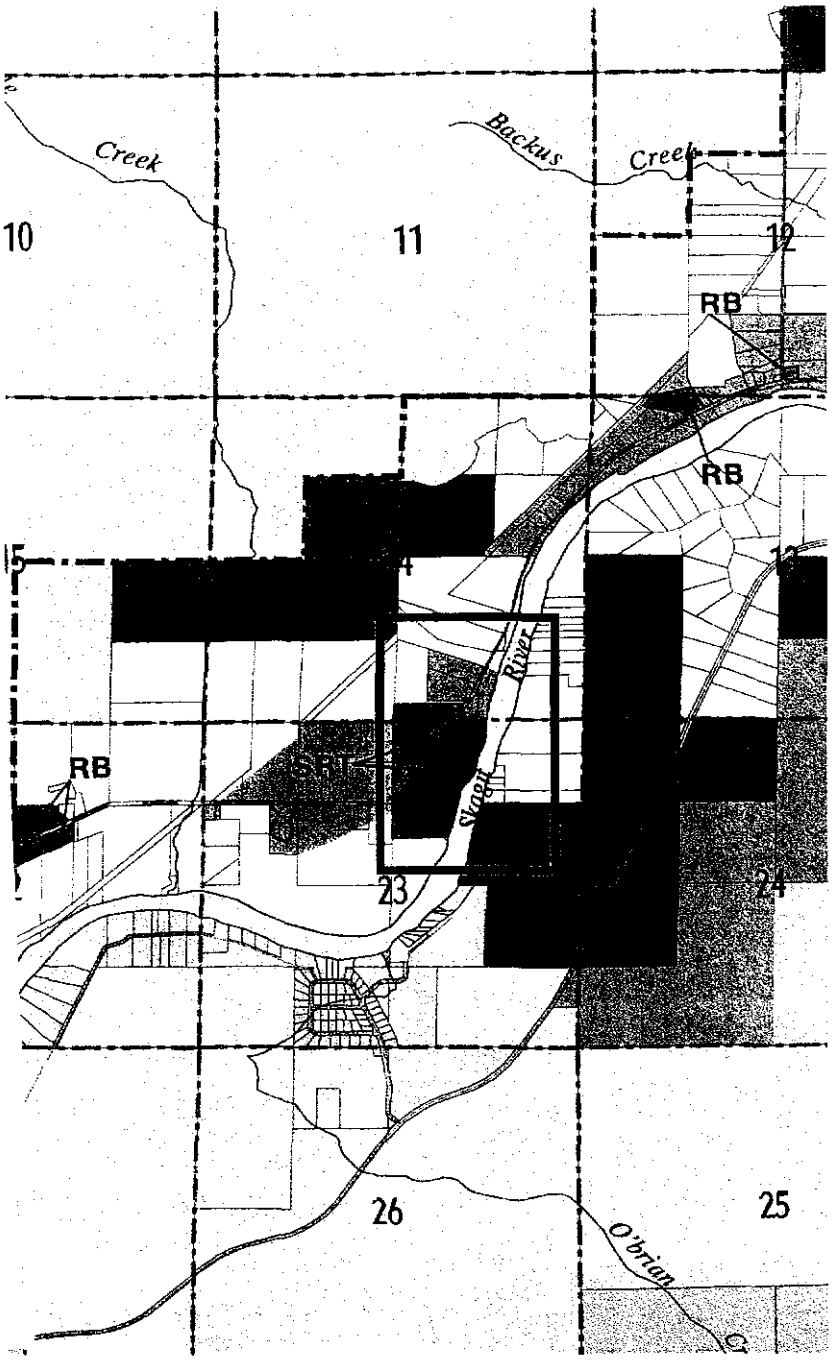


Date: Feb. 04	Scale: as shown	BULLERVILLE UTILITY DISTRICT Service Area Map	Fig. # 1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



PORTION OF USGS MAP "MARBLEMOUNT QUADRANGLE"

Date: Mar. 04	Scale: 1"= 2000'	BULLERVILLE UTILITY DISTRICT Location Plan / Topography	Fig. # 2
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



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This System

Portion of Skagit County Map 'Comprehensive Plan, Designation and Zoning Districts'.

See accompanying service area map for details on service boundaries.

Date: Apr. 04	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT Land Use	**Fig. #** 3
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

CALCULATIONS

ALLOWABLE NUMBER OF CONNECTIONS (ERUs)

Summary of System Information:

Water rights:

Well field	160	gpm (Qi)	260	acre-feet/year (Qa)

Note: Assumed permit issued for change from Water Right Claim Number 158491 for 3,000 gpm and 4,839 acre-feet per year.

Well Production:

Well No. 1	55	gpm	Initial pumping rate, 7.5 hp pumps
Well No. 2	55	gpm	Each well has capacity to supply
	110	gpm	160 gpm (Hydrogeologist's report)

Storage:

Reservoir No. 1	79,400	gallons	Mt. Baker 26-ft dia x 20-ft high
Reservoir No. 2	79,400	gallons	Mt. Baker 26-ft dia x 20-ft high
	158,800	gallons	

Treatment plant capacity:	0	gpm	Treatment not provided
Treatment backwash:	na	gpd	
Current service area:	75	ERUs	
Proposed future service area:	380	ERUs	
Recorded MDD with conservation:	none	gpd/ERU	
MDD without conservation:	800	gpd/ERU	Assumed without recorded MDD
MDD short-term goal	700	gpd/ERU	
MDD long-term goal (20-years)	600	gpd/ERU	
ADD short-term goal	300	gpd/ERU	
ADD long-term goal (20-years)	250	gpd/ERU	

Calculated number of allowable ERUs:

The following is a summary of the calculated number of equivalent number of single family residential connections (ERUs) that the system may supply, based on various design criteria.

Water Rights:

288	ERUs	Based on new permit Qi and no water conservation.
329	ERUs	Based on new permit Qi and short-term water conservation goal.
384	ERUs	Based on new permit Qi and long-term water conservation goal.

Allowable number of ERUs (continued)

Water Rights (continued):

774 ERUs	Based on new permit Qa and short-term water conservation goal.

Well Production:

99 ERUs	Assuming single well operating with initial 7.5 hp pumps and no water conservation.
198 ERUs	Assuming both wells operating with initial 7.5 hp pumps and no water conservation.
384 ERUs	Assuming both wells being equipped with new pumps to supply 80 gpm each and operating together or 160 each and alternating, and long-term water conservation goal.

Water Treatment:

na	Treatment not provided

Water Storage:

99 ERUs	Assuming single Mt. Baker Silo 79,400 gallon reservoir, initial well pumping capacity, with credit towards standby storage for two wells no water conservation (MDD based on 800 gpd/ERU) **Note:** well production is the limiting factor
198 ERUs	Assuming twin Mt. Baker Silo 79,400 gallon reservoir, initial well pumping capacity, with credit towards standby storage for two wells no water conservation (MDD based on 800 gpd/ERU) **Note:** well production is the limiting factor
290 ERUs	Assuming twin Mt. Baker Silo 79,400 gallon reservoir, increase well pumping capacity to 160 gpm, one well operating for MDD, credit for second well no water conservation (MDD based on 800 gpd/ERU)
385 ERUs	Assuming twin Mt. Baker Silo 79,400 gallon reservoir, increase well pumping capacity to 160 gpm (water right), lead well alternating, credit for second well and water conservation to reduce MDD to meet long-term goal **Note:** well production at water right is the limiting factor
	The twin reservoirs provide adequate standby storage for 500 gpm fire flow for 30 minutes for residential fires, or 1,000 gpm fire flow for 60 minutes for commercial fires. Should the future resort complex require additional fire storage (e.g., 1,000 gpm for two hours) a third reservoir will be needed.

[a] RESERVOIR SIZING

Allowable number of ERUs, based on two wells, credit towards standby storage for second well, initial well pump (55 gpm each), no water conservation (800 gpd/ERU) and WA DOH August 2001 "Water System Design Guidelines".

Number of service connections (ERUs):	Limited by production		**198**	
Number of wells:			**2**	
Well production:			**110**	gpm
Peak Hour Demand (PHD):			319	gpm
Maximum Day Demand (MDD) based on	**800** gpd/ERU		158,400	gal/day
Required minimum continuous well production			110	gpm (avg)
Minimum standby storage based on MDD **800** *gal/connection [D.O.H.]*			158,400	gal
Credit for multiple well source **55** gpm (credit for one well)		less	79,200	gal
Equalizing storage: whenever source pumping capacity cannot meet peak demands [D.O.H.]			31,350	gal
E.S. = (PHD-Q)(150) Q = source production in gpm				
Added for fire storage (500 gpm for 30 minutes) for single-family residential homes (Included as part of standby storage)			0	gal
Add min. standby storage based on	**200** gpd/ERU		0	gal
Total required storage		[1+2+3]	110,550	gal
Allowance for filter backwash (future)		add	0	gal
Allowance for operating and dead storage (1 ft)		add	7,940	gal
	TOTAL		118,490	gal

Recommended storage:

Two Mt. Baker Silo concrete tank,		nominal	158,800	gal
26 foot diameter	20 foot high			

[b] RESERVOIR SIZING

Allowable number of ERUs, based on two wells, credit towards standby storage for second well, well production increased to 160 gpm each, no water conservation (800 gpd/ERU) and WA DOH August 2001 "Water System Design Guidelines".

Number of service connections (ERUs):	Limited by production		**290**	
Number of wells:			**2**	
Well production:			**160**	gpm
Peak Hour Demand (PHD):			401	gpm
Maximum Day Demand (MDD) based on	**800** gpd/ERU		232,000	gal/day
Required minimum continuous well production			161	gpm (avg)
Minimum standby storage based on MDD **800** gal/connection [D.O.H.]			232,000	gal
Credit for multiple well source **160** gpm		less	230,400	gal
Equalizing storage: whenever source pumping capacity cannot meet peak demands [D.O.H.]			36,117	gal
E.S. = (PHD-Q)(150) Q = source production in gpm				
Added for fire storage (500 gpm for 30 minutes) for single-family residential homes (Included as part of standby storage)			13,400	gal
Add min. standby storage based on	**200** gpd/ERU		43,000	gal
Total required storage		[1+2+3]	94,117	gal
Allowance for filter backwash (future)		add	0	gal
Allowance for operating and dead storage (1 ft)		add	7,940	gal
	TOTAL		102,057	gal

Recommended storage:

One Mt. Baker Silo concrete tank, 26 foot diameter	20 foot high	nominal	158,800	gal

[c] RESERVOIR SIZING

Allowable number of ERUs, based on two wells, credit towards standby storage for second well, well production increased to 160 gpm each, water conservation to meet MDD long-term goal, and WA DOH August 2001 "Water System Design Guidelines".

Number of service connections (ERUs):			**385**	
Number of wells:			**2**	
Well production:			**160**	gpm
Peak Hour Demand (PHD):			368	gpm
Maximum Day Demand (MDD) based on	**600** gpd/ERU		231,000	gal/day
Required minimum continuous well production			160	gpm (avg)
Minimum standby storage based on MDD **600** gal/connection [D.O.H.]			231,000	gal
Credit for multiple well source **160** gpm		less	230,400	gal
Equalizing storage: whenever source pumping capacity cannot meet peak demands [D.O.H.]			31,263	gal
E.S. = (PHD-Q)(150) Q = source production in gpm				
Added for fire storage (500 gpm for 30 minutes) for single-family residential homes (Included as part of standby storage)			14,400	gal
Add min. standby storage based on	**200** gpd/ERU		62,000	gal *
Total required storage		[1+2+3]	108,263	gal
Allowance for filter backwash (future)		add	0	gal
Allowance for operating and dead storage (1 ft)		add	7,940	gal
TOTAL			116,203	gal

* Standby storage provides for 1,000 gpm fire flow for 60 minutes, 60,000 gallons.
Should the County require greater storage for the future resort complex, a third reservoir is needed.

Recommended storage:

One Mt. Baker Silo concrete tank, 26 foot diameter	20 foot high	nominal	158,800	gal

PEAK HOUR DEMAND (PHD) AND MAXIMUM DAY DEMAND (MDD) ESTIMATES

For design of the distribution system, no water conservation is assumed for calculation of PHD.

800	gpd/ERU	Assumed Maximum Day Demand (MDD)	
75	ERUs	Current number of equivalent single-family connections (ERUs)	
380	ERUs	Estimated future ERUs	
136	gpm	Current Peak Hour Demand (PHD)	
42	gpm	Current Maximum Day Demand (MDD)	31% of PHD say 30%
467	gpm	Estimated future PHD	
211	gpm	Estimated future MDD	45% of PHD say 50%

Formula for calculations:

PHD = (MDD/1440)*(C*N+F)+18

Avg. MDD = MDD*N/1440

Range of ERUs (N)	C	F	C	F
15 to 50	3.0	0	0.0	0
51 to 100	2.5	25	2.5	25
101 to 250	2.0	75	2.0	0
251 to 500	1.8	125	1.8	0
> 500	1.6	225	0.0	0
	for calc. -->		**2.5**	**25**

DISTRIBUTION OF PEAK HOUR DEMAND:

Node Number	Initial System Customers ERUs	Initial System PHD (gpm)	Future System Customers ERUs	Future System PHD (gpm)
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	10	18	10	12
5	40	73	40	49
6	5	9	5	6
7	0	0	0	0
8	6	11	6	7
9	8	14	8	10
10	6	11	6	7
11	0	0	0	0
12	0	0	75	92
13	0	0	100	123
14	0	0	50	61
15	0	0	20	25
16	0	0	20	25
17	0	0	40	50
Total	75	136	380	467

NOTE: Estimate of current and future demand (as ERUs) obtained from report prepared by Engineering & Economic Services dated 14-Feb-03

[a] BOOSTER PUMP SIZING - PHD ASSUMING 75 ERUs (INITIAL SYSTEM)

Peak Hour Demand based on 800 gpd/ERU (no water conservation).

1) Required capacity for one pump		136	gpm PHD
2) Required pump head, static conditions			
Highest customer elevation (assumed 100 ft at pumps)		120	ft
Required service pressure:	32 psi	74	ft
Minus booster elevation:		-100	ft
Minus water level in reservoir (pump `on'):		-19	ft
Plus equalizing storage allowance:		2	ft
3) Required additional head, for flow conditions			
Pressure loss in pump assembly:		5	ft
[Allowance for check & gate valves]			
Distribution system pressure losses		0.7	ft
length 1850 feet			To highest
diameter 8 inch			customer
H-W coef. 140 PVC or DI			
Allowance for backflow preventer for service isolation (RPBA, 14 psi) plus meter loss (4 psi)		41	ft
4) Contingency allowance		2	ft
Head required at 136 gpm :		126	ft
		54	psi @ pump

Required head at shut off for standard operating pressure range of hydropneumatic tank.

5) Required pump head, static conditions			
Highest customer elevation:		120	ft
Required service pressure:	32 psi	74	ft
Minus booster elevation:		-100	ft
Minus water level in reservoir (pump `on'):		-19	ft
Plus equalizing storage allowance:		2	ft
6) Pressure range of hydropneumatic tank			
Pump `off' pressure minus pump `on' pressure	20 psi	46	ft
7) Allowance for positive pump shut off		10	ft
Shutoff head 0 gpm :		133	ft
		58	psi @ pump
For hydropneumatic tank, say		74	psi @ pump
Required motor	or	171	ft

hp = (Q x H)/(3960 x eff.) = 6.2 hp @ 70% efficiency

Suggested pump:

Flint & Walling Ser. C22000	Flow	136	gpm	0	gpm
2-stage, 7.5 hp 3-phase	Head	138	ft	210	ft

[b] BOOSTER PUMP SIZING - MDD FOR 75 ERUs PLUS 500 GPM FIRE FLOW

PHD/MDD based on 800 gpd/ERU (no water conservation).

1) Required capacity for one pump [42 + 500]/4		135	gpm PHD
2) Required pump head, static conditions			
Highest customer elevation (assumed 100 ft at pumps)		120	ft
Required service pressure:	20 psi	46	ft
Minus booster elevation:		-100	ft
Minus water level in reservoir (pump `on'):		-10	ft
Plus equalizing storage allowance:		0	ft
3) Required additional head, for flow conditions			
Pressure loss in pump assembly:		5	ft
[Allowance for check & gate valves]			
Distribution system pressure losses		0.7	ft
length	1850 feet		To highest
diameter	8 inch		customer
H-W coef.	140 PVC or DI		
Allowance for backflow preventer for service isolation (RPBA, 14 psi) plus meter loss (4 psi)		41	ft
4) Contingency allowance		2	ft
Head required each pump at 135 gpm :		105	ft
		45	psi @ pump

hp = (Q x H)/(3960 x eff.) = 5.1 hp @ 70% efficiency

Suggested pumps:

Flint & Walling Ser. C22000	Flow	0	gpm	0	gpm
2-stage, 7.5 hp 3-phase	Head	138	ft	210	ft
or PACO Model 1250-5 7.5 hp	Flow	135	gpm	0	gpm
	Head	140	ft	180	ft

NOTES:

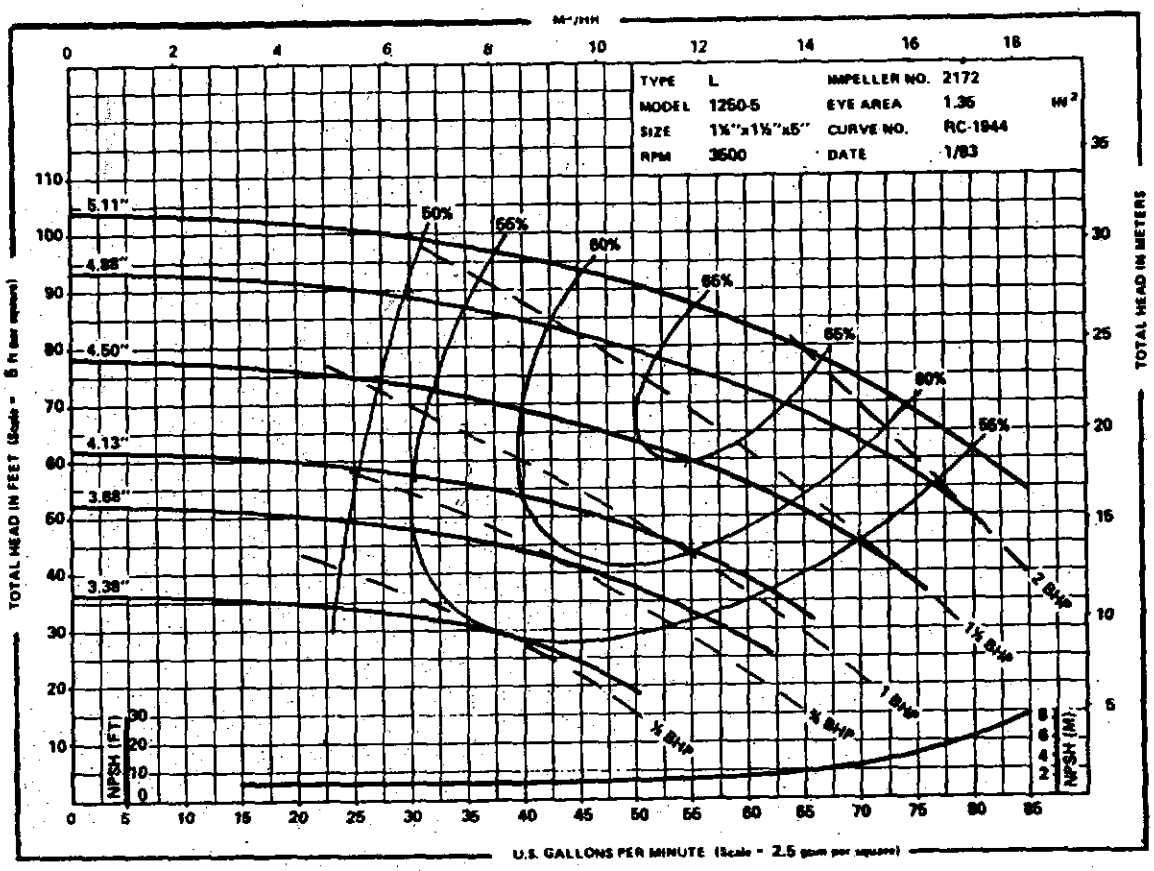
PACO 7.5 hp pump available in single phase

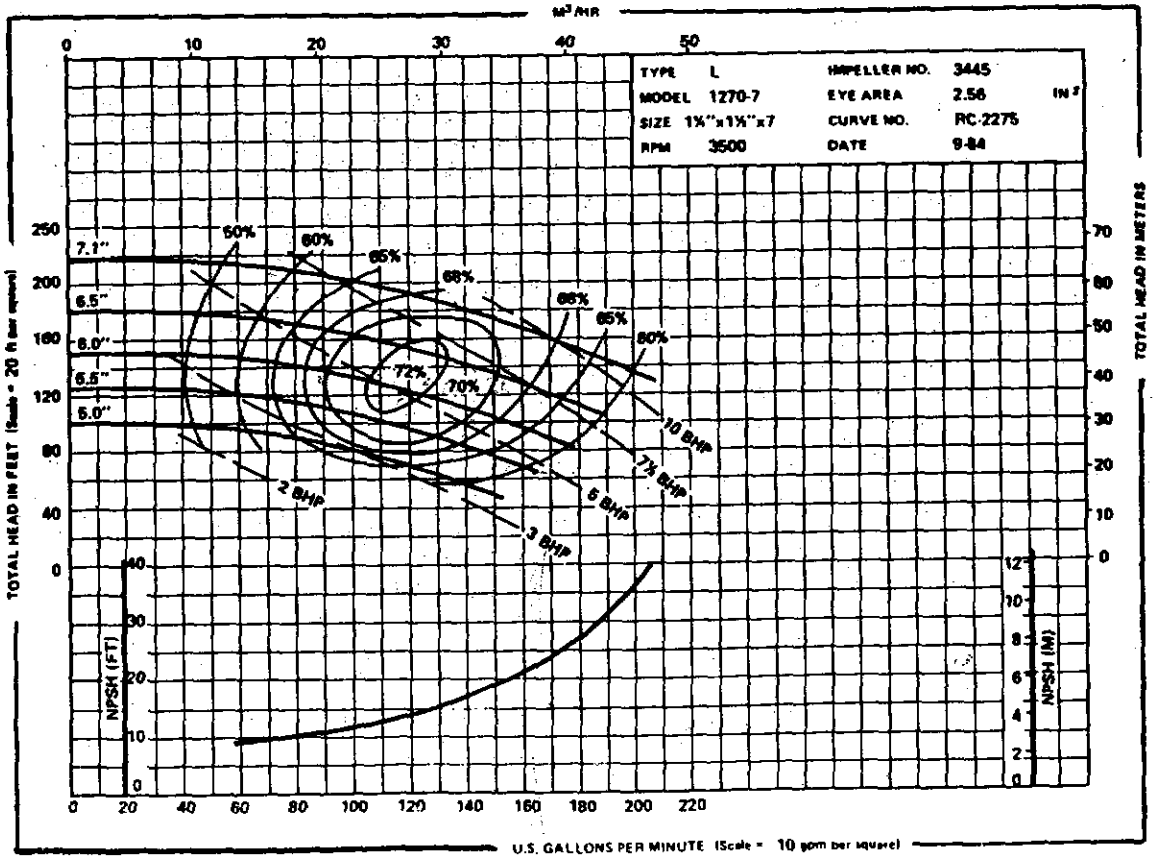
PACO 7.5 hp pump curve for computer analyis

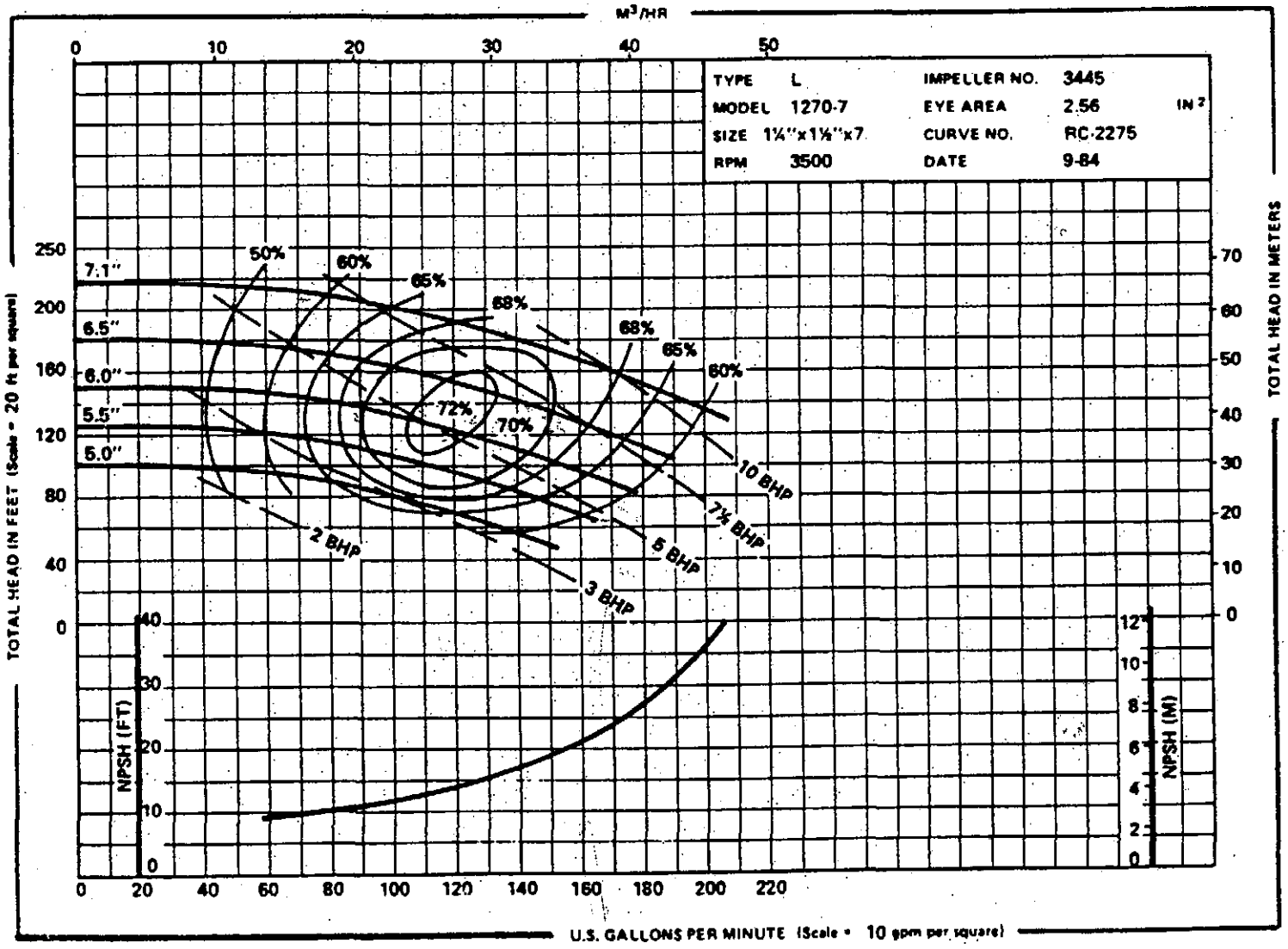
flow	0	120	170
head	180	155	120

PACO PUMPS®

PERFORMANCE CURVES — 3500 RPM






M³/HR
0
10
20
30
40
50
TYPE L
MODEL 1270-7
SIZE 1¼"x1½"x7
RPM 3500
IMPELLER NO. 3445
EYE AREA 2.56 IN²
CURVE NO. RC-2275
DATE 9-84
7.1"
6.5"
6.0"
5.5"
5.0"
50%
60%
65%
68%
68%
65%
60%
72%
70%
10 BHP
7½ BHP
5 BHP
3 BHP
2 BHP
TOTAL HEAD IN FEET (Scale = 20 ft per square)
250
200
160
120
80
40
0
TOTAL HEAD IN METERS
70
60
50
40
30
20
10
0
NPSH (FT)
40
30
20
10
0
NPSH (M)
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
180
200
220
U.S. GALLONS PER MINUTE (Scale = 10 gpm per square)

NETWORK ANALYSIS - COMPUTER PROGRAM DATA
Initial Input - Upgraded System

Program Input Codes:

0	1		0.001	0		
2	1	5	1	1	1	1
17	17					

Pipe Data:

Pipe No.	Between Nodes		Length (feet)	Diameter (inches)	H-W Coeff.
1	1	2	50	8	140
2	2	3	20	2.5	100
3	3	4	110	8	140
4	4	5	380	8	140
5	5	6	360	8	140
6	5	7	340	6	140
7	7	8	250	6	140
8	9	7	285	6	140
9	9	10	250	6	140
10	4	9	370	6	140
11	6	11	100	8	140
12	11	12	1000	6	140
13	11	13	1500	8	140
14	11	14	2600	8	140
15	14	15	600	8	140
16	15	16	3400	8	140
17	16	17	1000	8	140

Node Data:

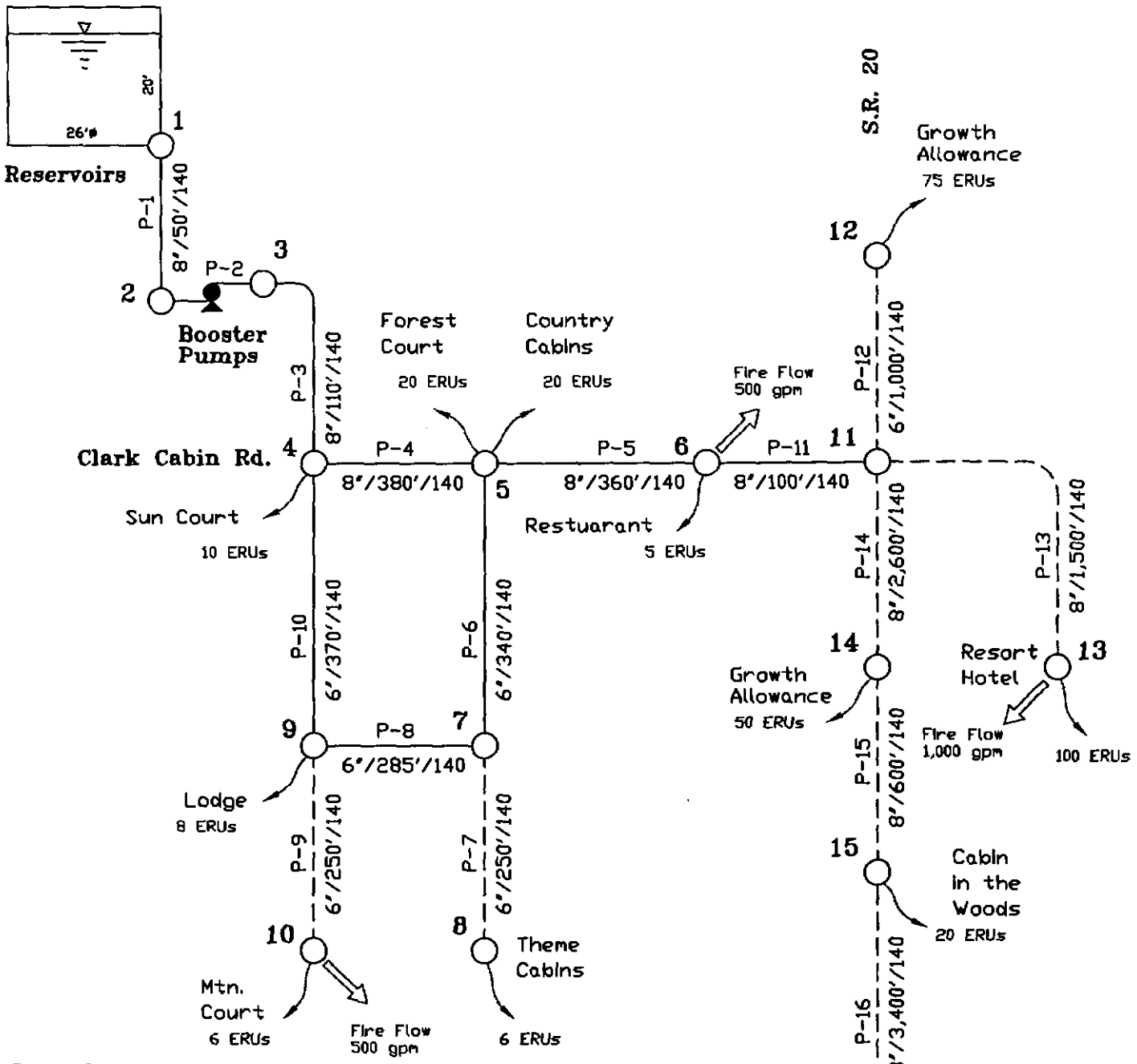
Node No.	Demand (gpm)	Elevation (feet)	Notes:
1	0	100	Reservoir
2	0	100	
3	0	100	
4	18	100	
5	73	100	
6	9	100	
7	0	100	
8	11	100	
9	14	100	
10	11	120	
11	0	100	
12	0	100	
13	0	100	
14	0	100	
15	0	100	
16	0	100	
17	0	100	

Program Input Codes:

1	1	0	0	0	
3					

Source Pump Data:

				Reservoir	
1	1	1		Node No.; No. of Pumps; Division of initial flow	
	0	*500*	*1000*	Flow (gpm)	
	19	19	19	Head (feet), height of water in reservoir	
				Booster pump	
2	1			Node No.; No. of Pumps	
	0	120	170	Flow (gpm)	7.5 hp PACO
	180	155	120	Head (feet)	model 1270-7



Legend:

INITIAL SYSTEM ————————

FUTURE EXTENSIONS — — — — —

Notes:

1) GROUND ELEVATION IS ESSENTIALLY FLAT
HIGHEST CUSTOMER ASSUMED 20 FEET ABOVE
BASE OF RESERVOIR & PUMP HOUSE

2) ASSUMED HAZEN-WILLIAMS COEFFICIENTS

140 CL. DUCTILE, PVC AND HDPE PIPE
120 ASBESTOS CEMENT PIPE
100 GALV. IRON, STEEL OR UNKNOWN PIPE

3) ASSUMED SYSTEM DEMAND, FROM REPORT BY EES
DATED FEBRUARY 14, 2003

75	CURRENT
130	FUTURE - WEST
175	FUTURE - EAST
380	

Latest revision 4/20/04

Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT COMPUTER SCHEMATIC	Dwg. # NETW
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

NETWORK ANALYSIS - COMPUTER PROGRAM OUTPUT

[a] PEAK HOUR DEMAND FOR 75 ERUs (initial system)

Source Reservoirs:

Node No.	No. of Pumps	Elev. of Pumps	Pumps Flows and Related Heads (height of water in reservoir)			
			0	500	1000	
1	1	100	19	19	19	Reservoirs full

Booster Pumps:

Pipe No.	No. of Pumps	Pumps Flows and Related Heads (pump curve)			
		0	120	170	7.5 hp PACO
1	1	180	155	120	model 1270-7

Pressure Reducing Valves:

PRV No.	Pipe No.	Ref. Node	Downstream HGL	K-value	CV feature
none					

Pipe Flows:

Pipe Dia. (inches)	Upstrm. Node	Dnstrm. Node	Pipe No.	Flow (gpm)	Head loss (feet)	Velocity (fps)	Upstrm. HGL (feet)
8	1	2	1	136.0	0.0	0.9	119.0
2.5	2	3	2	136.0	-139.5	8.9	119.0
8	3	4	3	136.0	0.0	0.9	258.5
8	4	5	4	81.2	0.1	0.5	258.5
8	5	6	5	9.0	0.0	0.1	258.4
6	5	7	6	-0.8	0.0	0.0	258.4
6	7	8	7	11.0	0.0	0.1	258.4
6	9	7	8	11.8	0.0	0.1	258.4
6	9	10	9	11.0	0.0	0.1	258.4
6	4	9	10	36.8	0.1	0.4	258.5
8	6	11	11	0.0	0.0	0.0	258.4
6	11	12	12	0.0	0.0	0.0	258.4
8	11	13	13	0.0	0.0	0.0	258.4
8	11	14	14	0.0	0.0	0.0	258.4
8	14	15	15	0.0	0.0	0.0	258.4
8	15	16	16	0.0	0.0	0.0	258.4
8	16	17	17	0.0	0.0	0.0	258.4

[a] Continued

Node Pressures:

Node No.	Elevation (feet)	Demand (gpm)	HGL (feet)	Pressure (psi)		Static Pressure (pump on) (psi)	Static Pressure (pump off) (psi)
1	100	-136	119.0	8.2	Reservoir	na	
2	100	0	119.0	8.2		54.0	74.0
3	100	0	258.5	68.6		54.0	74.0
4	100	18	258.5	68.6		54.0	74.0
5	100	73	258.4	68.6		54.0	74.0
6	100	9	258.4	68.6		54.0	74.0
7	100	0	258.4	68.6		54.0	74.0
8	100	11	258.4	68.6		54.0	74.0
9	100	14	258.4	68.6		54.0	74.0
10	120	11	258.4	59.9	Assumed	45.3	65.3
11	100	0	258.4	68.6	high point	54.0	74.0
12	100	0	258.4	68.6		54.0	74.0
13	100	0	258.4	68.6		54.0	74.0
14	100	0	258.4	68.6		54.0	74.0
15	100	0	258.4	68.6		54.0	74.0
16	100	0	258.4	68.6		54.0	74.0
17	100	0	258.4	68.6		54.0	74.0

Elevation of reservoir base assumed as 100 ft for calculations

Maximum unbalanced head in any loop 0.000 In loop # 1

NETWORK ANALYSIS - COMPUTER PROGRAM OUTPUT

[b] MAXIMUM DAY DEAMND FOR 75 ERUs PLUS 500 GPM FIRE FLOW AT NODE 10

Source Reservoirs:

Node No.	No. of Pumps	Elev. of Pumps	Pumps Flows and Related Heads (height of water in reservoir)			
			0	500	1000	
1	1	100	10	10	10	Reservoirs 1/2 full

Booster Pumps:

Pipe No.	No. of Pumps	Pumps Flows and Related Heads (pump curve)			
		0	120	170	Four 7.5 hp PACO
1	4	180	155	120	model 1270-7

Pressure Reducing Valves:

PRV No.	Pipe No.	Ref. Node	Downstream HGL	K-value	CV feature
none					

Pipe Flows:

Pipe Dia. (inches)	Upstrm. Node	Dnstrm. Node	Pipe No.	Flow (gpm)	Head loss (feet)	Velocity (fps)	Upstrm. HGL (feet)
8	1	2	1	541.2	0.3	3.5	110.0
6	2	3	2	541.2	-143.5	6.1	109.7
8	3	4	3	541.2	0.6	3.5	253.3
8	4	5	4	231.9	0.4	1.5	252.7
8	5	6	5	2.7	0.0	0.0	252.3
6	5	7	6	207.3	1.3	2.4	252.3
6	7	8	7	3.3	0.0	0.0	251.0
6	9	7	8	-204.0	-1.0	-2.3	250.0
6	9	10	9	503.7	4.6	5.7	250.0
6	4	9	10	303.9	2.7	3.5	252.7
8	6	11	11	0.0	0.0	0.0	252.3
6	11	12	12	0.0	0.0	0.0	252.3
8	11	13	13	0.0	0.0	0.0	252.3
8	11	14	14	0.0	0.0	0.0	252.3
8	14	15	15	0.0	0.0	0.0	252.3
8	15	16	16	0.0	0.0	0.0	252.3
8	16	17	17	0.0	0.0	0.0	252.3

[b] Continued

Node Pressures:

Node No.	Elevation (feet)	Demand (gpm)	HGL (feet)	Pressure (psi)	
1	100	-541.2	110.0	4.3	Reservoir
2	100	0	109.7	4.2	
3	100	0	253.3	66.3	
4	100	5.4	252.7	66.1	
5	100	21.9	252.3	65.9	
6	100	2.7	252.3	65.9	
7	100	0	251.0	65.4	
8	100	3.3	251.0	65.4	
9	100	4.2	250.0	65.0	
10	120	503.7	245.5	54.3	Fire flow location
11	100	0	252.3	65.9	
12	100	0	252.3	65.9	
13	100	0	252.3	65.9	
14	100	0	252.3	65.9	
15	100	0	252.3	65.9	
16	100	0	252.3	65.9	
17	100	0	252.3	65.9	

Maximum unbalanced head in any loop 0.000 In loop # 1

NETWORK ANALYSIS - COMPUTER PROGRAM OUTPUT

[c] MAXIMUM DAY DEAMND FOR 75 ERUs PLUS 1,000 GPM FIRE FLOW AT NODE 13 (resort site)

Source Reservoirs:

Node No.	No. of Pumps	Elev. of Pumps	Pumps Flows and Related Heads (height of water in reservoir)			
			0	500	1000	
1	1	100	19	19	19	Reservoirs 1/4 full

Booster Pumps:

Pipe No.	No. of Pumps	Pumps Flows and Related Heads (pump curve)			
		0	120	170	Six 7.5 hp PACO
1	6	180	155	120	model 1270-7

Pressure Reducing Valves:

PRV No.	Pipe No.	Ref. Node	Downstream HGL	K-value	CV feature
none					

Pipe Flows:

Pipe Dia. (inches)	Upstrm. Node	Dnstrm. Node	Pipe No.	Flow (gpm)	Head loss (feet)	Velocity (fps)	Upstrm. HGL (feet)
8	1	2	1	1041.0	0.9	6.7	105.0
6	2	3	2	1041.0	-117.4	11.8	104.1
8	3	4	3	1041.0	1.9	6.7	221.5
8	4	5	4	805.1	4.1	5.1	219.6
8	5	6	5	1002.9	5.8	6.4	215.6
6	5	7	6	-219.7	-1.3	-2.5	215.6
6	7	8	7	3.3	0.0	0.0	216.9
6	9	7	8	223.0	1.2	2.5	218.1
6	9	10	9	3.3	0.0	0.0	218.1
6	4	9	10	230.5	1.6	2.6	219.6
8	6	11	11	1000.2	1.6	6.4	209.8
6	11	12	12	0.0	0.0	0.0	208.2
8	11	13	13	1000.2	24.0	6.4	208.2
8	11	14	14	0.0	0.0	0.0	208.2
8	14	15	15	0.0	0.0	0.0	208.2
8	15	16	16	0.0	0.0	0.0	208.2
8	16	17	17	0.0	0.0	0.0	208.2

[c] Continued

Node Pressures:

Node No.	Elevation (feet)	Demand (gpm)	HGL (feet)	Pressure (psi)	
1	100	-1041	105.0	2.2	Reservoir
2	100	0	104.1	1.8	
3	100	0	221.5	52.6	
4	100	5.4	219.6	51.8	
5	100	21.9	215.6	50.0	
6	100	2.7	209.8	47.5	
7	100	0	216.9	50.6	
8	100	3.3	216.9	50.6	
9	100	4.2	218.1	51.1	
10	120	3.3	218.1	42.4	
11	100	0	208.2	46.8	
12	100	0	208.2	46.8	
13	100	1000.2	184.2	36.4	Fire flow location
14	100	0	208.2	46.8	
15	100	0	208.2	46.8	
16	100	0	208.2	46.8	
17	100	0	208.2	46.8	

Elevation of reservoir base assumed as 100 ft for calculations

Maximum unbalanced head in any loop 0.0006 In loop # 1

HYDROPNEUMATIC TANK SIZING

For four PACO 7.5 hp booster pumps, two alternating, two on standby for fire flow.

Horizontal Tank Formula:

$$Vt = \frac{[P1 + 14.7]}{[P1 - P2]} * \frac{15}{N} * Qp * Mf$$

Vertical Tank (non-bladder) Formula:

$$Vt = \frac{[P1 + 14.7]}{[P1 - P2]} * \frac{15}{N} * Qp * Mf. + 0.024\ D^2$$

Bladder Tank Formula:

$$Ts*Vb = \frac{15*(P1+14.7)*(P2+14.7)}{(P1-P2)*(P2+9.7)} * \frac{Qp}{N}$$

Vt	total volume of tank (gallons)
P1	pump off setting (psi)
P2	pump on setting (psi)
N	pump operating cycle of 6 per hour per pump
Qp	pump delivery capacity at midpoint of pressure range (gpm)
Mf	multiplying factor related to tank size
D	tank diameter (inches)
Vb	volume of individual bladder tank (gallons)
Ts	number of bladder tanks of size Vb

Design Parameters:

P1 = **74** psi P2 = **54** psi Qp = **140** gpm

N = **12** alternating Mf = **1.07** for tank diameter **54** inches

Required Capacity:

Horzontal
Vt : **830** gallons

Vertical
Vt : 836 gallons

Bladder
Ts*Vb : 837 gallons

Individual bladder tank volume not to exceed 120 gallons

Recommended tank:

Canal boiler, horizontal 54 " diameter 1,147 gallon
54 x 126, 113 psi 126 " long overall

With increased demand (future growth) rotate two remaining pumps

WELL PUMP SIZING - DISCHARGE TO RESERVOIRS

WELL DATA:

1	Wellhead elevation (assumed)		150	ft
2	Casing diameter (deisgn size)		8	inch
3	Depth (estimated)		110	ft
4	Screens (assumed)		100 to 110	ft
5	Static depth (assumed)		90	ft
6	Static elevation		60	ft
7	Pump intake depth (assumed)		90	ft
8	Specific Capacity (assumed)		10	gpm/ft
9	Column pipe diameter (design size)		2	inch

REQUIRED HEAD:

10	Capacity (design):			55	gpm
11	Static lift			90	ft
12	Drawdown			6	ft
13	Height difference to highest customer			NA	ft
14	Treatment system pressure loss (not installed)			0	ft
15	Pressure losses, pipe & fittings:			2	ft
	length	900	feet		
	diameter	4	inches		
	H-W coef.	140	PVC		
16	Water meter loss for 2" displ (allowance)			5	ft
17	Check valve loss - Val-Matic (allowance)			2	ft
18	Pressure loss of column pipe:			11	ft
	length	90	feet		
	diameter	2	inches		
	H-W coef.	100	Galv		
19	Reservoir height			20	ft
20	Contingency			10	ft
21	**Minimum head @**	55	gpm	**200**	ft
	Required motor	4.6	hp (assuming 60% eff.)		

RECOMMENDED PUMP:

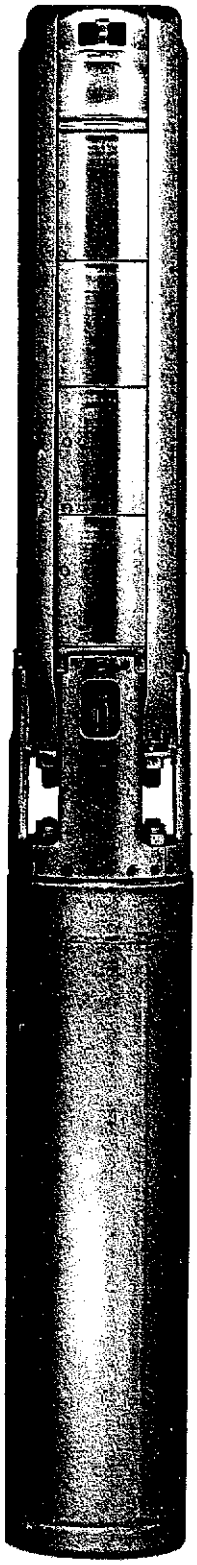
GRUNDFOS Model 60 S 50 - 9 stage, 5 hp

Flow	0	gpm	55	gpm
Head	290	feet	225	feet

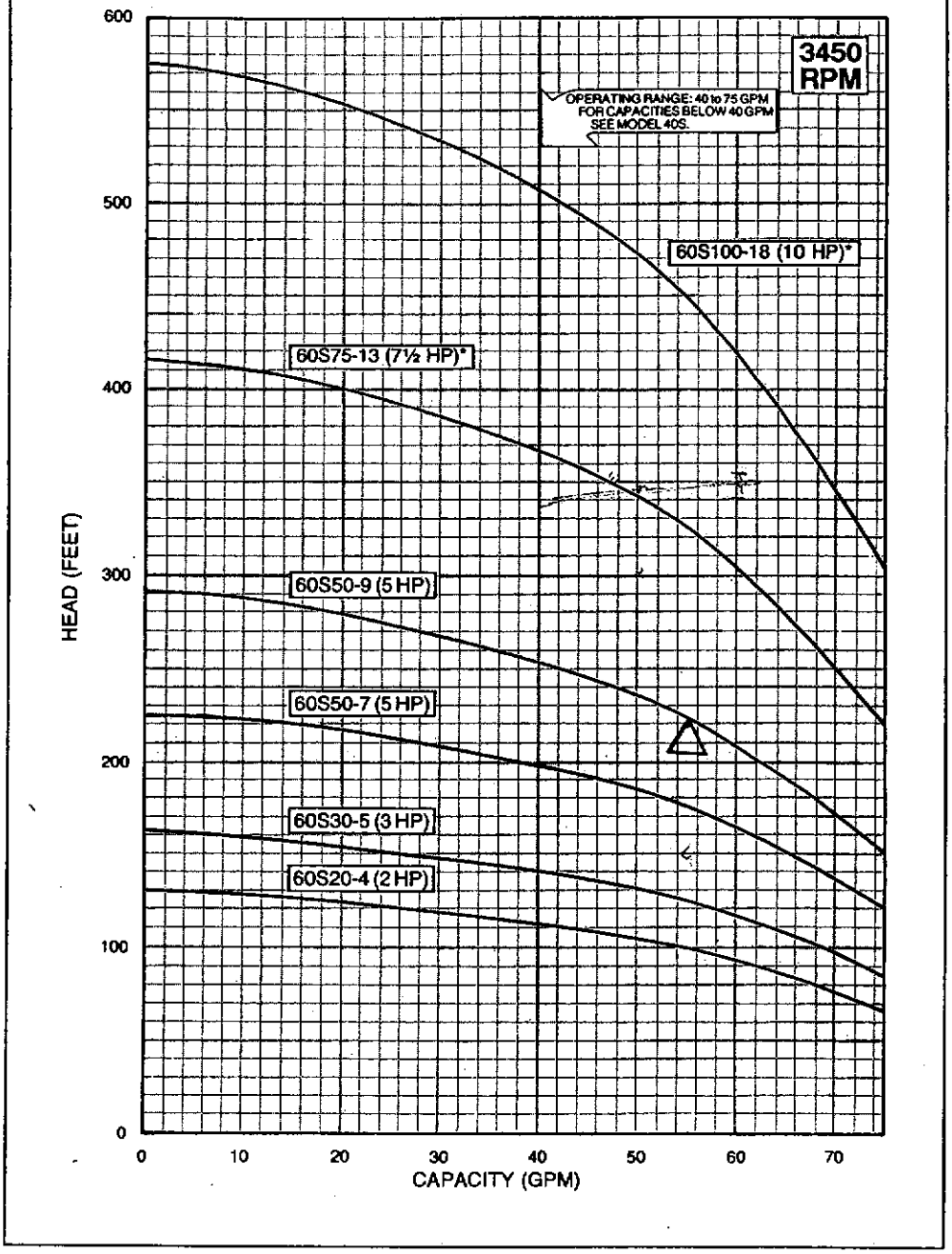
MODEL 60S — 60 GPM — GRUNDFOS

FLOW RANGE
40 to 75 GPM

PUMP OUTLET
2" NPT



PERFORMANCE CURVES



DIMENSIONS AND WEIGHTS

MODEL NO.	HP	LENGTH (INCHES)	WIDTH (INCHES)	APPROX. UNIT SHIPPING WT. (LBS.)
60S20-4	2	31 1/4	3 15/16	39
60S30-5	3	40 3/4	3 15/16	64
60S50-7	5	48 5/8	3 15/16	75
60S50-9	5	53 3/4	3 15/16	80
60S75-13	7 1/2*	70	3 15/16	105
60S100-18	10*	97 1/4	3 15/16	160

Specifications are subject to change without notice.

* A 4-inch motor is provided as standard on these models.

HYPOCHLORINATION

Hypochlorinator installed to provide precautionary residual in distribution system for one well operating. Second well used as redundant supply. No iron or manganese present in water in lead well to cause chlorine demand. Chlorine dose based on 10% strength, allowing for reduced shelf life of purchased 12.5% solution.

System operating data:

{p}	Max. operating pressure at injector:	40	psi
{Qa}	Average daily flow (75 ERUs x 800 gpd/ERU):	60,000	gal/day
{Qs}	Flow rate at injection point (from well):	55	gpm (PHD)
{Qo}	Max. flow rate from contact chamber (reser.):	136	gpm (PHD)

Required chlorine dose:

{Ct}	Target free chlorine residual	0.20	mg/L
{Cd}	Estimated chlorine demand (allowance)	0.10	mg/L
	{Cs} Required dose	**0.30**	mg/L

Chlorine feed pump requirements:

{Vf & Vt}	Solution tank volume:	50	50	gal
{Cc}	NaOCl strength:	10%	5%	
{Vc}	NaOCl added to tank:	1.0	2.0	gal
		8.0	16.0	cups

{Cf} Concentration of feed solution in tanks: **2,000** mg/L

{Qf}	**Design feed rate**	minimum	**0.50**	gal/hr
		maximum	**0.8**	gal/hr

Solution tank:

Time between tank refills (peak period):	**5.6**	days
Estimated shelf life of feed solution:	2	months

Chlorine contact time:

{Vs}	Available contact volume:		**138,710**	gal
	Reservoir volume:	158,800 gal		
	minus equalizing storage	12,150 gal		
	minus operating storage:	7,940 gal		
{n}	Assumed baffling efficiency:		0.1	
	{T} Contact time:		**102**	min.
	{CtT} Dose x contact time (target=6):		**20.4**	

Recommended hypochlorinator:

	Gal per hour			Max. pressure	
LMI Model A16	0.02	to	2.0	50	psi

SUMMARY OF BUDGET COSTS

Includes 15% contingencies and 8.3% sales tax

A.	TWIN RESERVOIRS		$ 111,470
B.	NEW BUILDING WITH BOOSTER PUMPS		$ 81,108
C.	ELECTRICAL GENERATOR		$ 20,036
D.	NEW WELLS		$ 44,758
E.	WATER MAIN INSTALLATION		$ 100,874
		TOTAL	$ 358,246

A. TWIN RESERVOIRS

Tanks installed on lot containing wells and pump house.

	ITEM	QUANTITY	UNIT COST	COST
1	Mt. Baker Silo, 26' diameter by 20' high * 79,400 gallon concrete tank	2 ea.	$ 38,000	$ 76,000
	Added cost for prevailing wage rates			$ 2,000
2	Under tank ' site piping	lump sum	$ 4,500	$ 4,500
3	Site grading	allowance		$ 1,000
4	Soil investigation	lump sum	$ 1,500	$ 1,500
5	EBAA Iron earthqauke couplings	2 ea	$ 4,500	$ 4,500
6	County & WA DOH fees	allowance		$ 500
		Sub-total		$ 90,000
		Tax	8.3%	$ 7,470
		Contingency	15%	$ 13,500
		Project Report		$ 500
				$ 111,470

Notes:

* From Mt. Baker, 2004

B. NEW BUILDING WITH BOOSTER PUMPS

Phase I, four booster pumps for domestic deamnd plus 500 gpm fire flow
Assumed future cost for increasing pumping capacity for 1,000 gpm fire flow to be borne by developer(s).

	ITEM	QUANTITY	UNIT COST	COST
1	Site preparation	allowance		$ 1,500
2	Wood frame building, 24' x 16'	384 s.f.	$ 60	$ 23,040
3	Piping within building	allowance		$ 5,000
4	Electrical within building	allowance		$ 5,000
5	Yard piping (in addition to "A", above)	allowance		$ 3,000
6	Puget Sound Energy service change	allowance		$ 3,000
7	7.5 hp booster pumps	4 ea	$ 2,000	$ 8,000
8	Hydropneumatic tank (ASME)	1 ea	$ 8,500	$ 8,500
9	Whitewater air-volume controller	1 ea.	$1,500	$ 1,500
10	LMI Hypochlorinator c/w soln. Tank	1 ea.	$750	$ 750
11	Water meter, 4-inch turbo	1 ea.	$700	$ 700
12	Auto-dialler alarm monitor	1 ea.	$1,000	$ 1,000
13	Security fence, 6' + 3 strand barded wire	290 lf	$12	$ 3,480
14	County, WA DOH, L&I fees	allowance		$ 500
		Sub-total		$ 64,970
		Tax	8.3%	$ 5,393
		Contingency	15%	$ 9,746
		Project Report		$ 1,000
				$ 81,108

Notes:

C. ELECTRICAL GENERATOR

Generator assumed for only one booster pump (domestic water demand only) plus building load.

	ITEM	QUANTITY	UNIT COST	COST
1	20 KW Kohler for one 7.5 hp pump single phase, building load, propane fuel	1 ea.	$ 12,000	$ 12,000
2	Generator concrete pad, fencing	allowance		$ 750
3	Automatic transfer switch	1 ea.	$ 2,500	$ 2,500
4	Propane gas tank	allowance		$ 1,000
			Sub-total	$ 16,250
			Tax 8.3%	$ 1,349
			Contingency 15%	$ 2,438
			Project Report	$ -
				$ 20,036

Notes:

D. NEW WELLS

	ITEM	QUANTITY	UNIT COST	COST
1	Well site development, access road	allowance		$1,000
2	Drill 8" Well No. 1	118 lf	$37.00	$ 4,366
3	Drill 8" Well No. 2	118 lf	$37.00	$ 4,366
4	Added bentoninte seal	2 ea	1000	$ 2,000
5	Drive shoe, 15' of casing screens, etc.	allowance		$5,000
6	WADOE casing seal	2 ea	$600	$ 1,200
7	Column pipe, 2" galv (both wells)	236 lf	$2.25	$ 531
8	Cable, probe tube, etc	236 lf	$1.30	$ 307
9	5 hp pump	2 ea	$925	$ 1,850
10	2" meter, CV, Ball Valve, etc.	allowance		$1,000
11	Hot Box enclosures	2 ea	$3,100	$ 6,200
12	2" PVC & conduit to Pump House	200 lf	$8.00	$ 1,600
13	Power supply	allowance		$3,000
14	24 hour well test & hydrogeologist report	allowance		$5,000
15	WQ, lab tests	allowance		$1,500
			Sub-total	$ 38,920
			Tax 8.30%	$ 5,838
			Contingency 15%	$ -
			Project Report	$ -
				$ 44,758

Notes:

Yard piping included with pump house

E. WATER MAIN INSTALLATION

Assumes mains are not under pavement or in shoulder; native sand backfill may be used.

	ITEM	QUANTITY	UNIT COST	COST
1	8-inch PVC pipe *	1280 lf	$16.00	$ 20,480
2	6-inch PVC pipe	1855 lf	$15.00	$ 27,825
3	Tracer tape over pipes or wire	3135 lf	$0.25	$ 784
4	8-inch gate valve w valve box	4 ea	$750	$ 3,000
5	6-inch gate valve w valve box	8 ea	$550	$ 4,400
6	Fire hydrants	5 ea	$2,200	$ 11,000
7	Ductile iron fittings (allowance)	800 lbs	$3.00	$ 2,400
8	Pavement cut and replace (allowance)	80 sf	$6.50	$ 520
9	CDF backfill for road cut (allowance)	10 cy	$76.00	$ 760
10	Connection to existing services (allowance)			$ 5,000
11	Blow-off assembly	2 ea	$850	$ 1,700
12	Air release vlave assembly (allowance)	1 ea	$1,000	$ 1,000
13	Pressure test & disifection	job		$ 1,000
	Sub-total			$ 79,869
	Tax		8.3%	$ 6,629
	Contingency		15%	$ 11,980
	Inspection		3%	$ 2,396
				$ 100,874

Notes:

* Installation and materials included. District has pre-purchased 8-inch pipe. This cost savings was not considered in unit price.

WATER SUPPLY AND DEMAND FORECAST

Supply:

	Current		2004-2009		2010-2023	
	gpm	acre-ft	gpm	acre-ft	gpm	acre-ft
Old well(s)	17	27.4	na	na	na	na
Well No. 1 200 gpm	0	0.0	55	88.7	80	129.0
Well No. 2 200 gpm	0	0.0	55	88.7	80	129.0
Total	17	27.4	110	177.4	160	258.1
Limit by treatment	na	na	na	na	na	na
Limited by water right * 160 gpm, 260 acre-ft	na	na	na	na	160	na
Minus treatment backwash waste 4%	na	na	na	na	na	na
Available for distribution	17	27.4	110	177.4	160	258.1
	24,480 gpd		158,400 gpd		230,400 gpd	

MDD SUPPLY MINUS DEMAND

Supply	24,480 gpd	158,400 gpd	230,400 gpd	
Demand, based on long-term conservation goal	45,000 gpd	45,000 gpd	228,600 gpd	
Surplus (Deficit)	(20,520) gpd	113,400 gpd **	1,800 gpd **	

ANNUAL SUPPLY MINUS DEMAND

Supply	27.4 acre-ft	177.4 acre-ft	258.1 acre-ft	
Demand, based on long-term conservation goal	25.2 acre-ft	25.2 acre-ft	128.0 acre-ft	
Surplus (Deficit)	2.2 acre-ft	152.2 acre-ft	130.1 acre-ft	

* Submitted application for change of water right claim to permit, assignment of WR to Bullerville U.D.

** Long-term water conservation goal.

WATER SUPPLY AND DEMAND FORECAST

Demand:

	Currrent ERUs	2004-2009 ERUs	2010-2023 ERUs
Present service area	75	75	75
Future - West	0	0	130
Future - East	0	0	176
Total	75	75	381
Maximum day demand (gpd), based on			
800 gpd/ERU	60,000	60,000	304,800
700 gpd/ERU *	52,500	52,500	266,700
600 gpd/ERU **	45,000	45,000	228,600
500 gpd/ERU	37,500	37,500	190,500
Annual demand (acre-feet), assuming ADD = 50% MDD			
400 gpd/ERU	34	34	171
350 gpd/ERU *	29	29	149
300 gpd/ERU **	25	25	128
250 gpd/ERU	21	21	107

* Short-term water conservation goal

** Long-term water conservation goal

Estimated Reduction in Water Demand Through Conservation

	2004-2009 (acre-feet)	2010-2023 (acre-feet)
{a} Without Conservation	34	171
{b} With Short-term Conservation Goal	29	149
Savings	4	21
{a} Without Conservation	34	171
{c} With Long-term Conservation Goal	25	128
Savings	8	43

WATER RIGHT SELF-ASSESSMENT

Permit, Claim or Certificate	Name of Rightholder or Claimant	Priority Date	Source Name & Number	Primary or Supplement	Existing Water Rights		Forecasted 20-Year Source Demand		Forecasted 20-Year Excess/Deficiency	
					Maximum Flow Rate Qi	Maximum Annual Qa	Maximum Flow Rate Qi	Maximum Annual Qa	Maximum Flow Rate Qi	Maximum Annual Qa
Permits & Certificates 1										
Claims 1 158491	Clarks Skagit River Resort	pre 1888			3,000	4,839	158.8	128	2,841	4,711
				TOTAL						

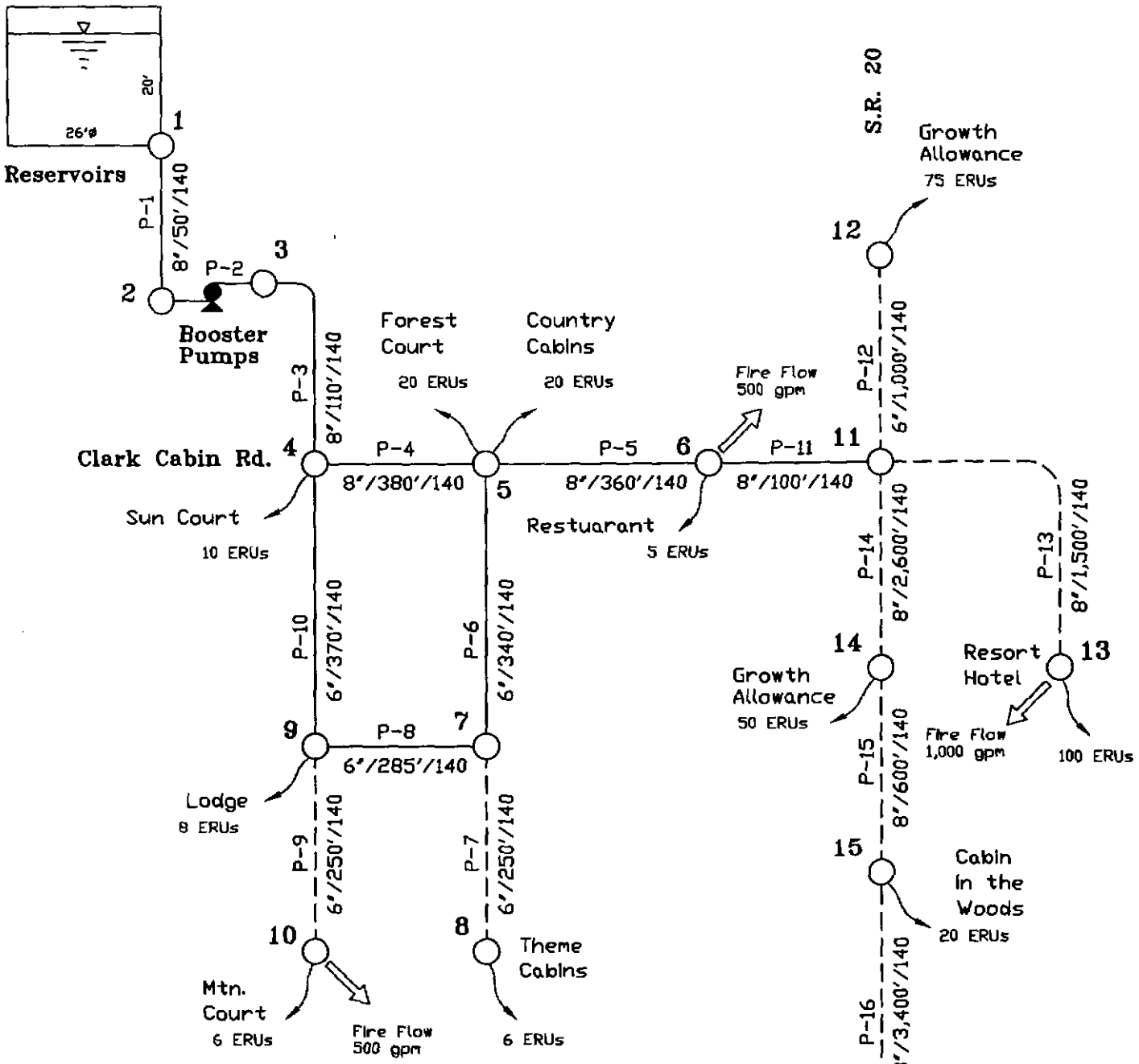
Intertie Name/Identifier	Name of Purveyor Providing Water	Existing Limits on Intertie Water Use		Existing Consumption Through Intertie		Intertie Supply Excess/Deficiency	
		Maximum Flow Rate Qi	Maximum Annual Qa	Maximum Flow Rate Qi	Maximum Annual Qa	Maximum Flow Rate Qi	Maximum Annual Qa
1							
	TOTAL						

Pending Water Right Applications	Name on Permit	Date Submitted	Primary or Supplement	Pending Water Rights	
				Maximum Flow Rate Qi	Maximum Annual Qa
1	Bullerville Utility District	12/3/03	P	160	260
		TOTAL		160	260

Demand based on estimate of ultimate number of customers in service area and long-term water conservation goal.

Pending water right is for transfer of Claim to BUD and issuing of Permit for Claim

DRAWINGS



Legend:

INITIAL SYSTEM ————————

FUTURE EXTENSIONS — — — — —

Notes:

1) GROUND ELEVATION IS ESSENTIALLY FLAT
HIGHEST CUSTOMER ASSUMED 20 FEET ABOVE
BASE OF RESERVOIR & PUMP HOUSE

2) ASSUMED HAZEN-WILLIAMS COEFFICIENTS

140 C.L. DUCTILE, PVC AND HDPE PIPE
120 ASBESTOS CEMENT PIPE
100 GALV. IRON, STEEL OR UNKNOWN PIPE

3) ASSUMED SYSTEM DEMAND, FROM REPORT BY EES
DATED FEBRUARY 14, 2003

75	CURRENT
130	FUTURE - WEST
175	FUTURE - EAST
380	

Latest revision 4/20/04

Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT COMPUTER SCHEMATIC	Dwg. # NETW
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

NOTES:

1) THE INFORMATION ON THIS PLAN IS PROVIDED FOR WATER SYSTEM PLANNING ONLY. FOR OTHER USES, INFORMATION SHOULD BE CONFIRMED BY LICENSED SURVEYOR OR FROM SKAGIT COUNTY RECORDS.

2) LOT INFORMATION OBTAINED FROM THE FOLLOWING SKAGIT COUNTY SECTION MAPS (IMPORTED FROM COUNTY WEB PAGE)
   SEC. 14, TWP. 35 N, R 10 E, WM
   SEC. 22, TWP. 35 N, R 10 E, WM
   SEC. 23 TWP. 35 N, R 10 E, WM

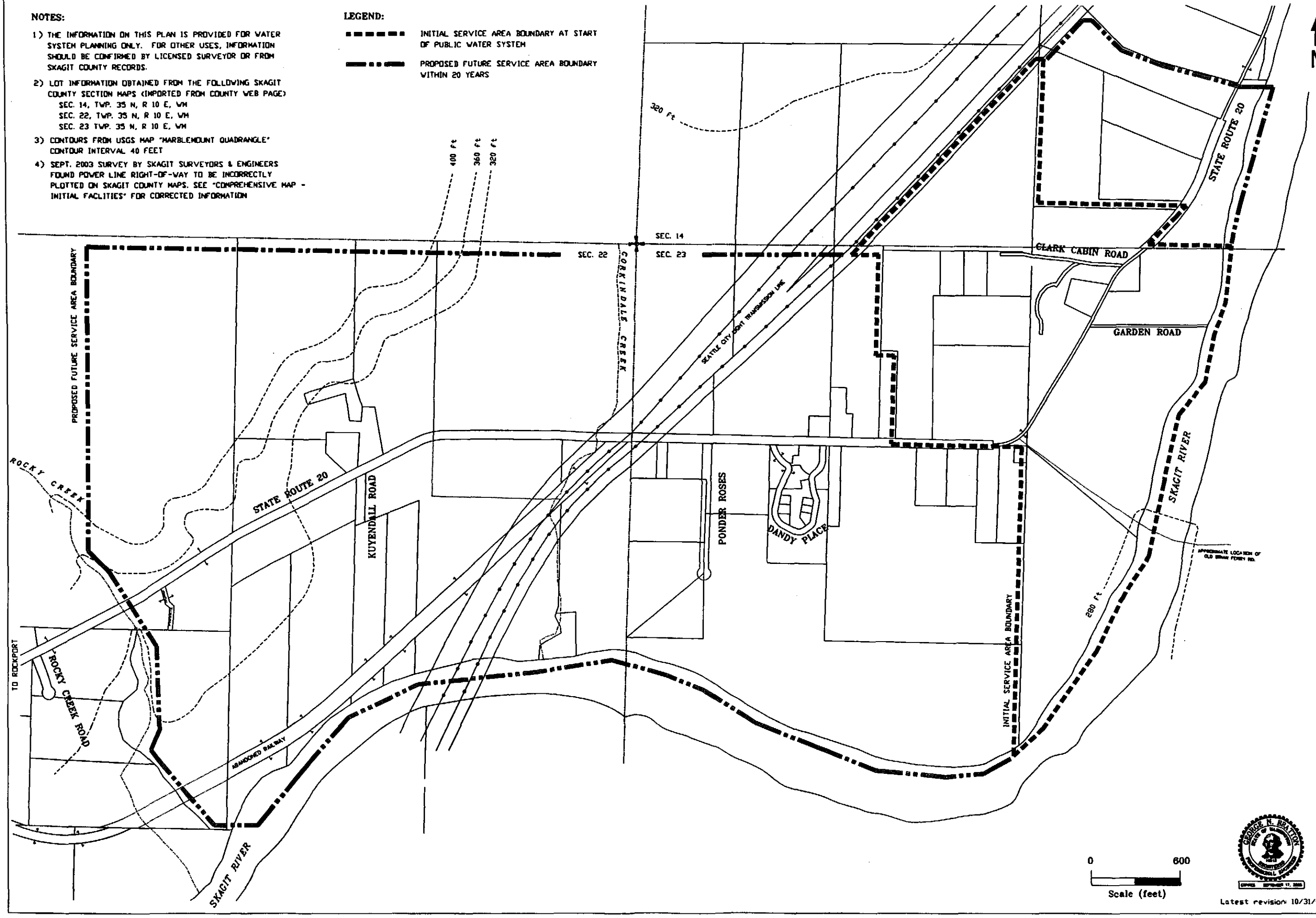
3) CONTOURS FROM USGS MAP "MARBLEMOUNT QUADRANGLE" CONTOUR INTERVAL 40 FEET

4) SEPT. 2003 SURVEY BY SKAGIT SURVEYORS & ENGINEERS FOUND POWER LINE RIGHT-OF-WAY TO BE INCORRECTLY PLOTTED ON SKAGIT COUNTY MAPS. SEE "COMPREHENSIVE MAP - INITIAL FACILITIES" FOR CORRECTED INFORMATION

LEGEND:

INITIAL SERVICE AREA BOUNDARY AT START OF PUBLIC WATER SYSTEM

PROPOSED FUTURE SERVICE AREA BOUNDARY WITHIN 20 YEARS



Latest revision 10/31/03

GEORGE BRATTON, CIVIL ENGINEER
1252 S. Farragut Drive
Coupeville, Washington 98239
Job 538 May 2003

WATER DISTRIBUTION SYSTEM
COMPREHENSIVE MAP
Service Area

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

Sht. 1 of 1

NOTES:

1) THE INFORMATION ON THIS PLAN IS PROVIDED FOR WATER SYSTEM PLANNING ONLY. FOR OTHER USES, INFORMATION SHOULD BE CONFIRMED BY LICENSED SURVEYOR OR FROM SKAGIT COUNTY RECORDS.

2) ZONING INFORMATION CODES ARE SHOWN BELOW FOR THE PARCEL NUMBERS OF THE LOTS IN THE INITIAL SERVICE AREA. THE FOLLOWING DESCIBES THE CODES:

Commercial/Industrial

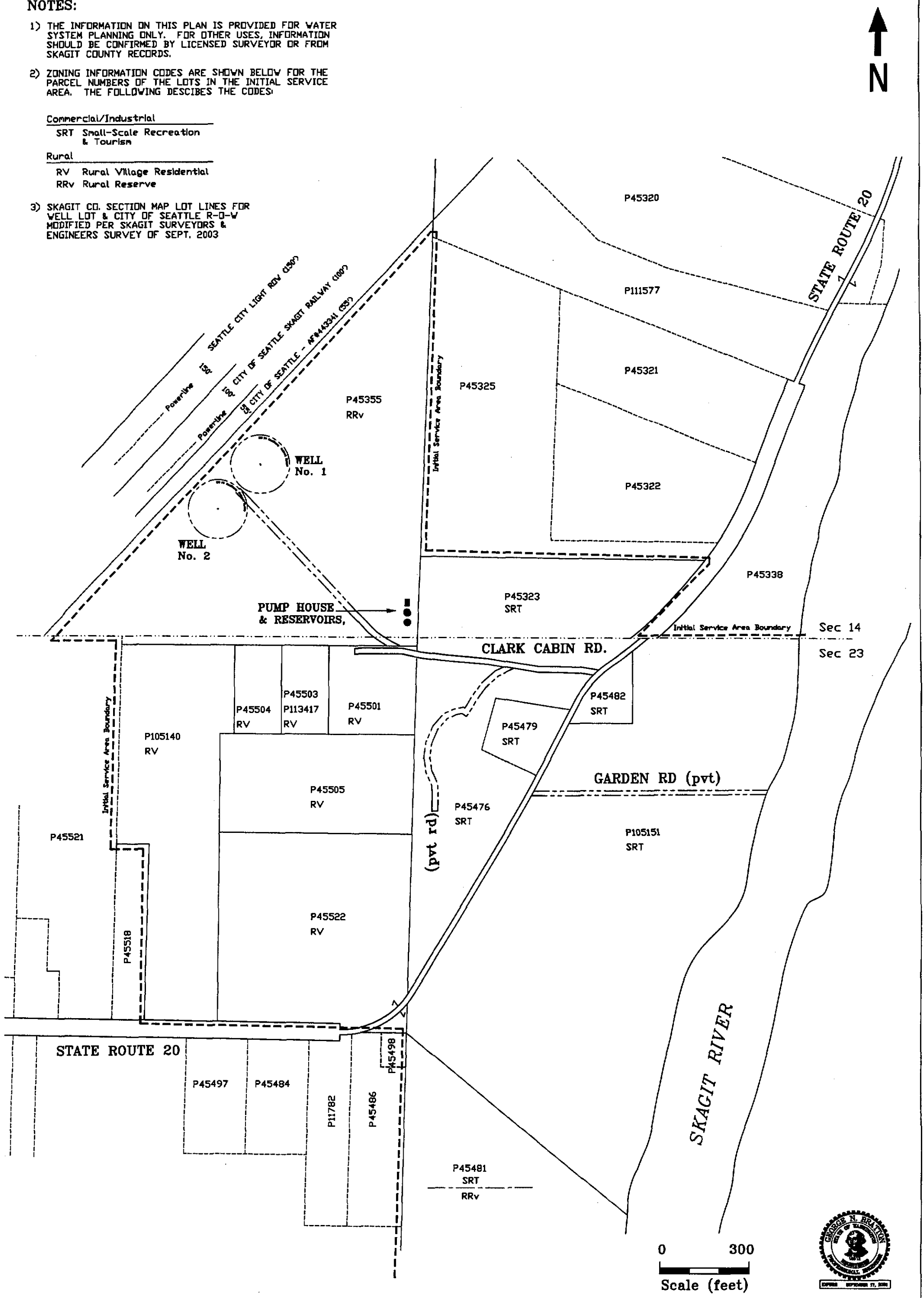
SRT Small-Scale Recreation & Tourism

Rural

RV Rural Village Residential

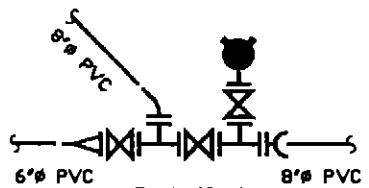
RRv Rural Reserve

3) SKAGIT CO. SECTION MAP LOT LINES FOR WELL LOT & CITY OF SEATTLE R-O-W MODIFIED PER SKAGIT SURVEYORS & ENGINEERS SURVEY OF SEPT. 2003



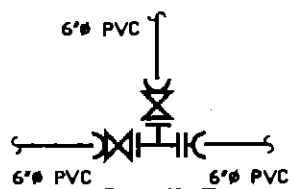
Latest revision: 4/19/04

Sht. 1 of 1	BULLERVILLE UTILITY DISTRICT 58468 Clark Cabin Road Rockport, WA 98283	WATER DISTRIBUTION SYSTEM COMPREHENSIVE MAP Initial Facilities	GEORGE BRATTON, CIVIL ENGINEER 1252 S. Farragut Drive Coupeville, Washington 98239 Job 538 May 2003



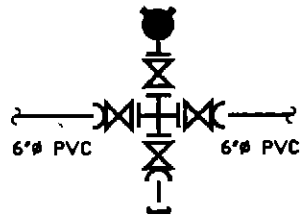
Detail A
n.t.s.

8"ø Flg. Tee
8"ø Flg. x PE 45° Bend
8"ø Flg. Gate Valve (2)
8" x 6"ø Flg. x PE Reducer
8" x 8" x 6"ø Flg. Tee
6"ø Flg. Gate Valve
Fire Hydrant
8"ø Flg. x MJ Adapter



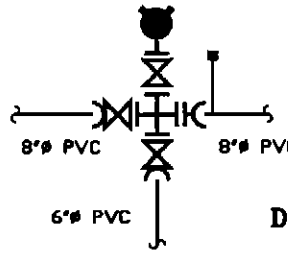
Detail B
n.t.s.

6"ø Flg. Tee
6"ø MJ x Flg. Gate Valve (2)
6"ø Flg. x MJ Adapter



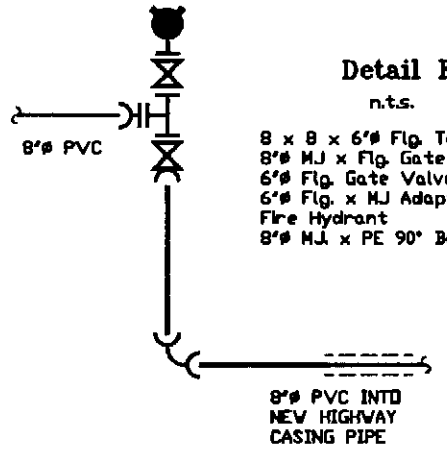
Detail C
n.t.s.

6"ø Flg. Cross
6"ø MJ x Flg. Gate Valve (2)
6"ø Flg. Gate Valve
Fire Hydrant
6"ø MJ x PE 45° Bend



Detail D
n.t.s.

8 x 8 x 6 x 6"ø Flg. Cross
8"ø MJ x Flg. Gate Valve
6"ø MJ x Flg. Gate Valve
6"ø Flg. Gate Valve
Fire Hydrant
6"ø Flg. x MJ Adapter
KUPFERLE 'Eclipse' No. 88
Water Sample Station
c/w Locked Weather Shield



Detail E
n.t.s.

8 x 8 x 6"ø Flg. Tee
8"ø MJ x Flg. Gate Valve
6"ø Flg. Gate Valve
6"ø Flg. x MJ Adapter
Fire Hydrant
8"ø MJ x PE 90° Bend

N

RESERVOIRS & PUMP HOUSE

110± ft, 8"ø PVC

900± ft, 4"ø PVC to Well Nos. 1 & 2

380± ft, 8"ø PVC

360± ft, 8"ø PVC

See Detail A

See Detail D

See Detail B

See Detail C

See Detail E and Std. Plan W-9

370± ft, 6"ø PVC

200± ft, 6"ø PVC

285± ft, 6"ø PVC

340± ft, 6"ø PVC

HYD

CLARK CABIN RD.

MOUNTAIN CRT. (pvt)

Possible future main extension

Possible future main extension

STATE ROUTE 20

0 100
Scale (feet)

PRELIMINARY
Running line of new main to be determined after topo and R-O-W survey and u/g utility locates

NOTES:

1) WATER MAINS AND APPURTENANCES SHOWN LARGER THAN SCALE FOR CLARITY
2) ALL MAINS TO BE INSTALLED IN EASEMENTS RUNNING PARALLEL TO COUNTY ROADS.
3) LOCATION OF HYDRANTS TO BE DETERMINED IN CONSULTATION WITH LOCAL FIRE DISTRICT.
4) SEE B.U.D. STANDARD PLANS AND SPECIFICATIONS FOR OTHER INSTALLATION DETAILS.
5) WHERE REQUIRED BY COUNTY ROAD PERMIT, INSTALL CASING PIPE PER STD. PLAN W-9
6) MINIMUM WATER UTILITY EASEMENT WIDTH:
   7.5 feet ADJACENT TO COUNTY ROAD R-O-W
   15.0 feet ALL OTHER EASEMENTS

LEGEND:

- Water main
- Water service c/w shutoff and meter setter
- GV — Gate valve
- BO — Standpipe / Blow-off
- AV — Air release valve
- HYD — Fire hydrant c/w isolating valves

Latest revision 4/19/04

GEORGE BRATTON, CIVIL ENGINEER
1252 S. Farragut Drive
Coupeville, Washington 98239
Job 538 March 2004

WATER DISTRIBUTION SYSTEM
COMPREHENSIVE MAP
Water Main Installation
Initial Water System

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

Sht. 1 of 1

Appendix A

Correspondence with

WA Department of Health
WA Department of Ecology
Skagit County Health Department

bratton

From: LornaParent [lornap@co.skagit.wa.us]
Sent: Wednesday, March 03, 2004 5:23 PM
To: Feagin, Nancy; Scott, Linda R
Cc: drc@northcascades.com; adun461@ecy.wa.gov; pwil461@ecy.wa.gov; bratton@coupeville.net; TedAnderson; PeterBrowning; CorinneStory
Subject: Skagit River Resort/Bullerville Utility District

Dear Nancy and Linda,

I just got off the phone with Don Clark, Commissioner of the Bullerville Utility District. I am wondering if Skagit River Resort is a candidate as a "public health priority" with your legal arrangement with Dept. of Ecology (DOE). I have spoken with Peggy Williams (DOE) and Don has one water right claim (WR Claim #158491) that Peggy says looks good to her. Also, George Bratton, the engineer, has been in contact with Andy Dunn at DOE. In January, Andy received the "Robinson and Noble Bullerville Utility District Production Wells 1 and 2 Construction and Testing Report." The report has all the water right information for the assessment. Andy suggested that a public health priority letter from State Health would be helpful to their expediting of the water right assessment. Don reminded me that some time ago, he received a "red operating permit" letter from State Dept. of Health stressing the urgency of upgrading this water system.

Do you need a copy of the "Robinson and Noble Bullerville Utility District Production Wells 1 and 2 Construction and Testing Report?" George advised Don that the Draft Water System Plan and Project Report will be to you by April first. We assume that you will accept these reports.

As you know, Skagit County will be financially assisting with this project and Don has deadline of December 31, 2004 to completely install the system. Commissioner Ted Anderson is committed to the completion of this project prior to the end of this year.

If there is anything else we can do to expedite, please advise.

Sincerely,

Lorna

Loma Parent
Skagit County Environmental Health
P. O. Box 91071
Mount Vernon, WA 98273
tel: 360-336-9380
fax: 360-336-9401
Always working for a safer and healthier Skagit County!

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

Date Updated: 08/22/2003
Date Printed: 10/02/2003

WATER FACILITIES INVENTORY (WFI) FORM

WFI Printed For: On-Demand

ONE FORM PER SYSTEM

RETURN TO:

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
[illegible] P	SKAGIT RIVER RESORT, LLC	SKAGIT	A	NC

6. PRIMARY CONTACT NAME & MAILING ADDRESS

DONALD R. CLARK TITLE: OWNER
58468 CLARK CABIN RD @ BULLERVILLE
ROCKPORT, WA 98283

7. OWNER NAME & MAILING ADDRESS — 8. Owner Number: [illegible]

CLARK, DONALD R
58468 CLARK CABIN RD @ BULLERVILLE
ROCKPORT, WA 98283

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION

Primary Contact Daytime Phone: (360) 873-2250
Primary Contact Mobile/Cell Phone:
Primary Contact Evening Phone: (360) 873-2250
Fax: E-mail:

10. OWNER CONTACT INFORMATION

Owner Daytime Phone:
Owner Mobile/Cell Phone:
Owner Evening Phone:
Fax: E-mail:

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

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
- [x] Industrial
- [ ] Licensed Residential Facility
- [x] Lodging
- [x] Recreational / RV Park
- [x] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.):

13. WATER SYSTEM OWNERSHIP (mark only one)

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

14. STORAGE CAPACITY (gallons): 186

15 Source Number	16 Source Name (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)	17 Intertie System ID Number	18 Source Category: Well	Well field	Well in a well field	Spring	Spring field	Spring in spring field	Sea water	Surface water	Ranney/Inf. Gallery	Other	19 Use: Permanent	Seasonal	Emergency	20 Source Meter	21 Treatment: None	Chlorination	Filtration	Fluoridation	Irradiation (UV)	Other	22 Depth: Depth to first open interval in feet	23 Capacity (gallons per minute)	24 Source Location: 1/4 1/4 Section	Section Number	Township	Range
	OLD WELL (WELL #1)		X											X			X						30	11	NE NW	23	35N	10E
	NEW WELL (WELL #2)		X										X				X						40	17	NW NE	23	35N	10E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
53447	SKAGIT RIVER RESORT, LLC	SKAGIT	A	TNC

	SOURCE SERVICE CONNECTIONS	PURCHASED OR PURCHASABLE WATER CONNECTIONS	NON-POTABLE WATER CONNECTIONS
A. SINGLE FAMILY RESIDENCES (How many of the following do you have?)			
1. Full Time Single Family Residences (Occupied 180 days or *more* per year)	8		
2. Part Time Single Family Residences (Occupied *less than* 180 days per year)	0		
B. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
Apartment Buildings, condos, duplexes, barracks, dorms	0		
Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied *more than* 180 days/year	0		
Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied *less than* 180 days/year	0		
C. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
Recreational Services (Campsites, RV Sites, Spigots, etc.)	5		
Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	28		
D. TOTAL SERVICE CONNECTIONS			0

E. FULL TIME RESIDENTIAL POPULATION

1. How many residents are served by this system 180 or *more* days per year? 18

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

G. TEMPORARY/TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	465	420	1500	600	2790	1800	1890	1890	1800	1860	620	465
2. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	31	31

H. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?												
2. How many days per month are they present?												

I. ROUTINE TOC FOR I SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

J. 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: _____

STATE OF WASHINGTON
Public Water System

Operating Permit

The Department of Health Division of Drinking Water issues a permit to operate
SKAGIT RIVER RESORT, LLC (ID# 13344 P)

CLARK, DONALD R COUNTY: SKAGIT

to owner:
CLARK, DONALD R

58468 CLARK CABIN RD @ BULLERVILLE
ROCKPORT WA 98283

This permit is valid through NOV 2004
**** RED ****

~~PERMIT CATEGORY:~~

The permit category may be modified or the permit revoked subject to water system compliance with applicable State of Washington drinking water rules and regulations and the following statements:
OBTAIN CONSTRUCTION DOCS APPROVAL PER WAC 246-290-120 OR WAC 246-290-140

Washington State Department of Health

Economic and Engineering Services, Inc.

February 14, 2003

Scott Spahr
Planning Engineer
Skagit PUD #1
PO Box 1436
Mount Vernon, WA 98273-1436

Subject: Bullerville Utility District Water System

Dear Scott:

The purpose of this letter report is to:

- Summarize and evaluate the Bullerville Utility District's water system,
- Outline the water system improvements necessary to comply with the Washington State Department of Health (DOH) regulations and standards, and
- Provide preliminary planning level cost estimates for these improvements.

The findings and recommendations of this letter are based on the information provided by the District in spring of 2001 and shall be considered preliminary and is intended to provide guidance for planning of needed improvements only. This letter should not be used to establish specific design criteria without a more thorough assessment of system requirements. Although the cost estimates were created using conservative assumptions relative to growth, water rights, and demand forecasting, more detailed design information will be required to more accurately determine the design and construction costs of the recommended tasks and improvements.

This letter report includes the following sections:

- Background Information,
- Water System Analysis,
- Recommendations, and
- Planning Level Cost Estimates.

10900 NE 4th Street, Suite 1110
Bellevue, Washington 98004
Telephone 425.452.8100
www.ees-1.com

Post Office Box 1989
Bellevue, Washington 98009-1989
Fax 425.454.4189

Bellevue • Mt. Vernon • Olympia • Portland • Tri-Cities

Background Information

The Bullerville Utility District (District) is situated on 125 acres along Highway 20 and the Skagit River at Bullerville, which is located between Marblemount and Rockport. Currently, the District consists of 34 cabins/lodge rooms, 7 permanent residences, 56 RV units/sites, two campgrounds, a restaurant and store, and a laundromat.

The Skagit County Board of Commissioners approved the formation of the Bullerville Sewer District on April 8, 1997. On December 17, 2001 the County Commissioners approved a grant from Rural Distressed County sales tax of $350,000 for Bullerville water system improvements. On November 5, 2002 voters approved the formation of the District and elected officers. The name was officially changed from Bullerville Sewer District to Bullerville Utility District on December 9, 2002.

The District's water system is untreated and classified as Group A Transient, Non-Community. The system consists of 3 wells, 1 primary well and 2 backup wells. Well #1 acts as the primary water supply well and pumps at a rate of 17 gallons per minute (gpm). Well #2 pumps at a rate of 11 gpm and Well #3 pumps at a rate of 10 gpm. Wells #1 and 2 are connected to a standby power generator to act as the emergency backup water supply. The District's distribution system consists of one 50 gallon and three 80 gallon pressure tanks, 2 inch diameter PVC piping, and 1¼ and ¾ inch diameter polyethylene piping. The entire distribution system constitutes one pressure zone, hence all sources of supply and storage tanks serve a single pressure zone. Exhibit 1 shows the approximate locations of the District's wells and distribution piping. None of the connections are metered.

All available water quality data indicate a clean water supply with no contaminants detected above regulatory limits. All coliform sample data have yielded non-detect results.

The primary customer for water from the current system is Skagit River Resort (a.k.a. Clark's Cabins). Although the Resort does not have a documented Water Right Certificate from the Washington State Department of Ecology (Ecology), it does have several Water Right Claims that were filed before 1975. On January 16, 1996, Ecology issued Order No. DE 96WR-004, which amended Claim No. 158489 to specify a water right of 2,250 gpm (instantaneous withdrawal) and 300 acre-ft/yr (annual withdrawal). Furthermore, on September 24, 1997, Ecology issued Order No. DE 97WR-263, which amended Claim No. 158491 to specify a water right of 3,000 gpm (instantaneous withdrawal) and 4,839 acre-ft/yr (annual withdrawal). The District should begin water right negotiations with Ecology to obtain the necessary Certificates.

DOH has red tagged the District's water system because it does not comply with DOH regulations and standards. The District must complete the following tasks to be in compliance with DOH standards:

- Complete a DOH approved Water System Plan,
- Submit a Project Report outlining the necessary water system improvements for current and future facilities,
- Submit detailed construction drawings and specifications for the improvements, and
- Construct the water system improvements.

The Resort is expecting to be zoned as a Master Planned Resort Community in the near future. Under this new zoning, the Resort will be able to expand, but only after the water system has been improved and approved by DOH. The improvements could be completed in two phases. Under Phase I, the District should design and construct the improvements necessary to meet its current water demands. Under Phase II, the District should design and construct the improvements required to meet its future water demands. Phase II includes additional expansion on the west side of Highway 20 (Phase IIa) and a new development on the east side of Highway 20 (Phase IIb). Phase II improvements could be completed during the construction of the Resort's expansion.

Water System Analysis

The following is a preliminary analysis of the District's water system sources, demands, storage tanks, and distribution piping in relation to the standards in DOH's *Water System Design Manual*.

Sources

The District has plans to drill two new wells to replace the existing wells. The new wells should be located at least 200 feet from any surface water sources to minimize the chances of the wells being classified as Groundwater Under the Direct Influence of Surface Water (GUI). Two wells will provide a level of redundancy with one well connected to an emergency power generator. Both wells will have larger pumping capacities to meet future water demands. The three existing wells can then be abandoned after the new wells are operational.

Water System Demands

The District's current and future average daily demand (ADD), maximum daily demand (MDD), and peak hour demand (PHD) calculations are summarized in Table 1 and shown in detail in Attachment A. These calculations were based on the assumption that each cabin, lodge room, and RV unit/site is occupied.

Table 1
District Water System Demands

	ADD (gpd)	# of ERUs	MDD (gpd)	PHD (gpm)
Current	29,850	75	44,775	106
Future West	51,850	130	77,775	157
Future East	70,300	176	105,450	175
Total	152,000	381	228,000	236*

** Total PHD is not the sum of the others because PHD is based on the formula below.*

The ADDs were calculated from water usage rates per camper of 50 gallons per day (gpd), as listed in Table 5-2 of DOH's *Water System Design Manual.* Table 5-2 also lists water usage rates for laundromats (50 gpd/user), stores (400 gpd/toilet room), and restaurants (10 gpd/patron). A best available engineering estimate was used for other water demands such as fishing ponds, swimming pools, and hot tubs. Equivalent Residence Units (ERUs) were calculated by dividing the ADD by 400 gpd/ERU. MDDs were calculated by multiplying the ADDs by a peaking factor of 1.5.

PHDs were calculated using Equation 5-3 and Table 5-1 of DOH's *Water System Design Manual.* The equation is:

$$PHD = (MDD/1440)[(C)(N)+F]+18$$

PHD = Peak Hourly Demand (gpm)
C = Coefficient Associated with Ranges of ERUs
N = Number of Service Connections (ERUs)
F = Factor Associated with Ranges of ERUs
MDD = Maximum Day Demand (gpd/ERU)

"C" ranges from 3.0 to 1.6 based on the value of "N".

"F" ranges from 0 to 225 based on the value of "N".

Storage Tanks

The District's current and future water storage requirements were calculated using the water system demands calculated above and Table 9-1 of DOH's *Water System Design Manual.* The following assumptions were used to calculate these storage requirements:

- Total source pumping rate of 38 gpm (maximum with all wells pumping),
- Current fire flow requirements of 500 gpm for 30 minutes, and
- Future fire flow requirements of 1,000 gpm for 60 minutes.

Table 2 summarizes the District's existing and future water storage requirements.

Table 2
Existing and Future Water Storage Requirements

	Existing Phase I	Future West Phase IIa	Future East Phase IIb
Operational Storage (gallons)[1]	5300	5300	5300
Equalizing Storage (gallons)	10,200	17,850	20,550
Fire Suppression Storage (gallons)[2]	15,000	15,000	30,000
Standby Storage (gallons)	29,460	73,460	110,360
Dead Storage (gallons)	3000	5600	8300
Total Storage (gallons)	62,560	117,200	174,520
Reservoir Size (Dia. x Height)	20 ft x 27 ft	26 ft x 30 ft	30 ft x 33 ft

(1) Assume approximately a 1 ft. variation (minimum) in a 30 ft. diameter tank.
(2) Total Future Fire Suppression Storage must total 60,000 gallons.
(3) Assume dead storage volume in an elevated tank is approximately 5% of total volume. If a standpipe is used, dead storage volumes will be significantly larger.

The District's service area is relatively flat with elevations varying less than 10 feet. Therefore, providing an adequate system service pressure (> 30 psi or 70 feet of water head) is a major consideration for the type of storage reservoirs, as well as considerations for utilizing booster pumping or not. To provide adequate system pressure for the system using only the static head available in storage tanks, the storage tanks will need to be either a standpipe or an elevated tank. To provide a minimum service pressure of 30 psi, the equalizing storage volume must be at least 68 feet above grade. Thus, if a standpipe is used it will have a large dead storage volume below this elevation, which would be roughly 60% of the total storage volume.

To reduce the static head needed from the storage tanks, and hence reduce the heights of the tanks, booster pumping can be used to maintain adequate system pressure when the pumps are equipped with a variable frequency drive (VFD) and a pressure tank to cope with varying demands throughout the day. This may be a feasible option for reducing the height of an elevated tank or the total volume of a standpipe.

Additional evaluations should be performed to more clearly establish the tank volumes and heights and, if applicable, the potential advantages of using a booster pumping system and the associated size and number of booster pumps, VFDs, and pressure tanks.

Distribution System

DOH's design standards require a minimum fire flow pipe size of 6 inches on looped pipelines and 8 inches on dead end pipelines. These requirements apply only to pipelines with fire hydrants connected to them. All pipe velocities should be kept to less than 3 feet per second (fps) during PHD and less than 10 fps during PHD plus fire flow. Based on the limited information known to date and preliminary calculations, Exhibit 2 shows the distribution system

improvements necessary to bring the current water system into compliance with DOH design standards (Phase I). A detailed layout (including topography) of the Resort's future expansion plans, along with other detailed design and survey information, will be necessary to accurately size the future (Phase IIa & IIb) distribution system piping.

Recommendations

The recommendations outlined below are preliminary only; further engineering evaluations should be performed to clearly establish the most efficient and cost effective approach for implementing the needed improvements. Based on the above evaluation of the District's water system, the identified water system improvements could be completed in phases. In Phase I, the District should design and construct the improvements necessary to meet its current water demands. In Phase II, the District would design and construct the improvements required to meet its future water demands. Phase II includes an additional expansion on the west side of Highway 20 (Phase IIa) and a new development on the east side of Highway 20 (Phase IIb). Phase II improvements could be completed during the construction of the Resort's expansion.

For planning purposes, Phase I improvements would include the following:

- Drill two new wells that are greater than 200 feet from any surface water,
- Construct a 65,000 gallon storage tank, including two booster pumps and two pressure tanks if needed, near the new wells, and
- Install new distribution system piping.

Phase IIa improvements would include the following:

- Construct a 120,000 gallon storage tank, including additional booster pumps and pressure tanks if needed, near the 70,000 gallon tank, and
- Install additional distribution system piping to accommodate the future development on the west side of Highway 20.

Phase IIb improvements would include the following:

- Construct a 175,000 gallon reservoir, including additional booster pumps and pressure tanks (if needed) on the east side of Highway 20, and
- Install additional distribution system piping to accommodate the future development on the east side of Highway 20.

Before any of the necessary improvements can be made to the water system, the following tasks must be successfully completed to bring the District into compliance with State drinking water regulations:

- Submit a Water System Plan prepared by a Licensed Professional Engineer in the State of Washington to DOH for approval,
- Prepare and submit a Project Report that clearly establishes the proposed water system improvements to DOH for approval, and
- Prepare and submit Construction Documents (drawings and specifications) of the proposed water system improvements to DOH for approval.

Although not required by DOH, it is recommended that the District retain qualified professional services to help perfect, negotiate, and secure final water rights. Permitting requirements are also likely to require some assistance from a consultant.

Planning Level Cost Estimates

Planning level cost estimates, as shown in Table 3, were developed for the improvements outlined above. These cost estimates are based on somewhat conservative assumptions relative to growth, water rights, and demand forecasting; they are preliminary only and should have an accuracy of not less than ± 30%.

Table 3
Cost Estimate

Engineering/Consulting Costs	
Water Rights Assistance	$15,000
Water Sampling and Analyses	$3,000
Surveying	$35,000
Water System Plan	$40,000
Project Report	$25,000
Design of Improvements	$200,000
Permitting Assistance	$10,000
Total Engineering/Consulting Services	***$328,000***
Construction Costs	
Extend Electrical Power	$10,000
Clear & Grub Reservoir Sites	$20,000
Drill/Install New Wells	$35,000
Standby Power Generator	$25,000
Storage Tanks	
65,000 gallon (Phase I)	$60,000
120,000 gallon (Phase IIa)	$100,000
175,000 gallon (Phase IIb)	$130,000
Booster Pumps	$25,000
VFDs	$15,000
Pressure Tanks	$15,000

Table 3 (continued)
Cost Estimate

Pipelines	
Phase I	
3,500 ft of 8" PVC	$220,000
Misc. Other Piping	$80,000
Phase IIa	$150,000
Phase IIb	$150,000
Electrical & Instrumentation	$150,000
Construction Subtotal	$1,185,000
20% Contingency	$237,000
8% Sales Tax	$95,000
Total Construction Cost	***$1,517,000***
Total Project Cost	***$1,845,000***

Note: Planning Level Cost Estimate accuracy is not less than ± 30%.

If you have any questions, please call me a (425) 452-8100. Thank you

Sincerely,

ECONOMIC AND ENGINEERING SERVICES, INC.

Greg Pierson, P.E.
Principal

cc: Don Clark, Clark's Skagit River Resort
John Maxwell, EES
Greg Pierson, EES

Skagit County
Comprehensive Economic Development Strategy (CEDS)

Prepared for:

Skagit Council of Governments
204 Montgomery
Mount Vernon, WA 98273
(360) 416-7875

Prepared by:

E.D. Hovee & Company
P.O. Box 225
951 Officers Row
Vancouver, Washington 98666
(360) 696-9870

July 2003

Name of Project	Goals(s) Addressed	Location	Description/Benefits	Priority	Estimated Cost	Potential Funding Sources
WSU Mount Vernon Research and Extension Unit Revitalization Project	BusDev Jobs	Mount Vernon, WA	To replace the obsolete campus building with a new office and laboratory structure.		$5,000,000	Public Facility Grant Funds, $500,000, U.S. Dept. of Housing, $1,000,000 WSU $3,000,000 private funding, $100,000 from Osberg donation to SPF
Skagit County Public Utilities District No. 1						
Marblemount Public Water System	BusDev	Marblemount, WA	Domestic water facility to serve the community of Marblemount. Project would provide an approved source of water to local businesses serving water and/or prepared food to the public.		$798,700	Public Facility Grant Funds, DOH $10,000; eligible for USDA loan $188,700
Water System Improvements	BusDev	Bullerville Water District	Construct a replacement water system for the Skagit River Resort at Bullerville, including a new groundwater well, a new storage reservoir, and a distribution pipeline to connect them to the lodgings, restaurant, and other adjacent facilities.		$360,000	Public Facility Grant Funds, Clark's Cabins
Similk Beach Sewer System	Conserv BusDev Jobs	Similk Beach LAMIRD, Fidalgo Island	Will provide a community sewage collection and treatment system to properties in the Similk Beach LAMIRD. This will correct the problem of failing septic tanks in the area, which have caused closure of shellfish activities in the adjacent Similk Bay and measurement of high amounts of fecal coliform bacteria in the area's drainage ditches.	Mid-term	$4,500,000	Local, STAG,USDA

Attachment 5 - Water System Plan and Small Water System Management Program Consistency Statement Checklist

Interim Guidance 11/06/2003

This consistency statement checklist is intended to ensure consistency of water system planning documents and adopted local comprehensive plans and development regulations. The expectation is that each local planning jurisdiction in which the water utility provides service will review the relevant water system planning information and provide a signed consistency statement to the utility for submittal to the Department of Health. If the local planning agency will not respond, the highest authority within the utility (chair of governing body, executive director of private companies, etc.) must sign to verify consistency of the plan information.

Water System Name: *BULLERVILLE UTILITY DIST.* **PWS ID:** *13344P*

Planning Document Title: *2004-09 Water System Plan* **Plan Date:** *Apr. 03*

Local Planning Jurisdiction: *Skagit County*

The service area and land use identified in the water system plan is consistent with the *adopted comprehensive plan and adopted development regulations and policies.*	*See Attached*	*Yes*
FOR WATER SYSTEM PLANS ONLY - The growth projection used to forecast water demand for the service area is consistent with the adopted city/county's population growth projections (and commercial development projection if applicable). If a different growth projection was used, the alternative growth projection and methodology proposed is acceptable based on explanation given.	*See Attached*	*Yes*
FOR WATER SYSTEM PLANS ONLY - New potential large water users (that may have a significant impact on the water system) that the city/county is aware of have been identified in the water system plan.	*See Attached*	*Yes*
FOR CITY-OWNED SYSTEMS ONLY- All policies regarding water service outside the corporate boundaries must be included in the water system plan. These policies are consistent with the adopted *comprehensive plan* and *development regulations.*	*NA*	*NA*
WHERE THE LOCAL PLANNING AGENCY IS UNABLE TO SIGN A CONSISTENCY STATEMENT - Provide documentation of efforts to coordinate with local agencies with a 60-day timeline for local agency to respond. Include: name of contact, date, type of effort attempted, and response from local agency.	*NA*	*NA*

I certify that the above statements are true to the best of my knowledge and that these statements support the conclusion that the subject planning document is consistent with adopted comprehensive plans, development regulations, and other policies.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

****For any issues of inconsistency, please provide comments on how they can be resolved.**

Appendix B

Water Right Permits

Letter of Intent

To: Bullerville Utility District Commissioners

From: Donald R. Clark

Subject: Transfer of Part of Water Right Claim #158491 to Bullerville Utility District

It is hereby understood and agreed:

1. The water supply approval process being followed for the Bullerville Utility District shall not diminish Don Clark's Water Right Claim #158491, as adjusted by the Washington State Department of Ecology's Order NO. DE 97WR-263 on September 24, 1997, until approval of the transfer is authorized by the Department of Ecology.
2. Upon issuance of authorization by the Department of Ecology for Bullerville Utility District to use 160 gallons per minute and 260 acre feet of water per year, continuously for municipal supply, I agree to assign my claim to that amount of water to the Bullerville Utility District.

Signature: _____ Date: _____

Donald R. Clark

Signature of Witness: _____ Date: _____

ROBINSON & NOBLE, INC.
and
Saltbush Environmental Services
GROUNDWATER & ENVIRONMENTAL SCIENTISTS
Established 1947

February 4, 2004

Andy Dunn, Water Resources
Department of Ecology
Northwest Regional Office
3190- 160th Avenue SE
Bellevue, WA 98008-5452

Subject: Application for Change of Water Right Claim Number 158491
Don Clark, Clarks Skagit River Resort
Bullerville Utility District

Dear Andy,

Robinson & Noble, Inc. is assisting Don Clark, Owner of Clarks Skagit River Resort, with development of two new public water supply wells and recognition of those wells as valid points of withdrawal under Water Right Claim Number 158491 (copy attached). The Washington State Department of Health (Health) red tagged Old Wells 1 and 2 (locations shown on the enclosed resort map) that are presently serving the resort. A copy of the current public water system operating permit and Water Facilities Inventory (WFI) Form are also enclosed along with the legal description for the Bullerville boundary area.

Several other marginal water systems are adjacent to Clark's property. Mr. Clark has worked with Health and Skagit County to create the Bullerville Utility District to serve the resort and neighboring community. We have enclosed a copy of the Skagit County Comprehensive Economic Development Strategy identifying Bullerville Utility District as a water system improvement project. A draft Agreement for Establishing Water Utility Service Area Boundaries is enclosed along with the proposed service area map developed by Bullerville's engineer, George Bratton, P.E.

The attached Water Right Claim Change Application is being filed by Don Clark to allow Bullerville Utility District to use part of his claim (158491) and change the purpose of use from domestic and commercial to municipal; the point of withdrawal from Section 23 to Section 14; and the place of use from Clarks Skagit River Resort to the area served by Bullerville Utility District as approved in the current Skagit County Service Area Agreement. Don Clark's letter of intent to Bullerville Utility District is enclosed.

Bullerville has completed construction of two new water wells detailed on the enclosed Water Well Report Forms and in the attached copy of Robinson & Noble's report, "Bullerville Utility District Production Wells 1 and 2 Construction and Testing Report" January 2004. The locations of the new wells are shown on the enclosed map provided by Skagit Surveyors. Also included with the report is a letter from Economic and Engineering Services describing the future water needs of the water system. The peak hour demand is estimated at 236 gallons per minute (gpm). The maximum daily demand (MDD) is estimated to be 228,000 gallons or 158 gpm. Each of the new wells (BUD-1 and BUD-

5320 Orchard Street West • Tacoma, Washington 98467 • (253) 475-7711 • Fax: (253) 472-5846
e-mail: mail@robinson-noble.com

2) can easily supply more than 200 gpm. We have recommended that they each be equipped with 160 gpm pumps to provide the MDD of 158 gpm from either the primary or backup well.

The Buller brothers homesteaded the property on which the wells are located and started using the water resources of the area in 1888 before Washington became a state. The water has been used for domestic, commercial, and industrial supply continuously since that time. The quantities used have varied greatly over the years and there are no documents to verify actual use for any one period of time. Water Right Claim Number 158491 claims 3,000 gpm and 4,839 acre feet per year (af/yr). The change application requests 160 gpm and 260 af/yr for use by Don Clark and Bullerville Utility District. The Clark family has several other water right claims (158489, 158490, and 086211) which are also attached to the application.

On behalf of Don Clark and Bullerville Utility District, we request the Washington State Department of Ecology approve the use of BUD-1 and -2 under Water Right Claim Number 158491 allowing the withdrawal of 160 gpm and 260 af/yr for municipal purposes. Please move expeditiously with your approval process because Health has set a project completion date for Bullerville at the end of this year (2004).

Please call if you have any questions or need additional information.

Sincerely,
Robinson & Noble, Inc.

Douglas C. Dow, L.HG.
Senior Associate Hydrogeologist

Cc: Don Clark, Bullerville Utility District
George Bratton, P.E.

enclosures

STATE OF WASHINGTON

APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF $10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)

- [x] Change purpose(s) of use
- [ ] Add purpose(s) of use
- [x] Change point(s) of diversion/withdrawal
- [ ] Add point(s) of diversion/withdrawal
- [x] Change/transfer place of use
- [ ] Other (i.e. consolidation, intertie, trust water)

Explain:_____

FOR OFFICE USE ONLY

CHANGE No._____ **WRIA**_____

DATE ACCEPTED____/____/____ **BY**_____

FEE $_____ **REC'D** ____/____/____

CHECK No. _____

SEPA: ❑ **Exempt** ❑ **Not exempt**

*****IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)*****

1. Applicant Information:

APPLICANT/BUSINESS NAME	PHONE NO.	FAX NO.
Don Clark	(360) 873-2250	(360) 873-4077
ADDRESS: 58468 Clark Cabin Road		
CITY: Rockport	STATE: WA	ZIP CODE: 98283

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Don Clark, Bullerville Utility District	( )	( )
ADDRESS		
CITY	STATE	ZIP CODE

FOR OFFICE USE ONLY

APP. NO._____ PERMIT NO. _____ CERT. NO._____ CERT. OF CHANGE NO._____

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
Claim Number 158491	Clarks Skagit River Resort, Don Clark

DO YOU OWN THE RIGHT TO BE CHANGED? ☒ YES ☐ NO

IF NO, PROVIDE OWNER(S) NAME:

HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? ☒ YES ☐ NO

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Old Well (S01)	1	NE	NW	23	35N	10E	P45501	AET026
Old Well (S02)	2	NW	NE	23	35N	10E	P45476	AET027

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Bullerville Well	1	SE	SW	14	35N	10E	P45355	AHG044
Bullerville Well	2	SE	SW	14	35N	10E	P45355	AHG045

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?

EXISTING: ☒ YES ☐ NO PROPOSED: ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Domestic Multiple			Continuous

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal	160	260	Continuous

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Bullerville community, including the Skagit River Resort. See attached site map and legal description.							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
			35N	10E	Skagit		
DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? ☒ YES ☐ NO – IF NO, PROVIDE OWNER(S) NAME:							

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
Area served by Bullerville Utility District as shown in its current water system plan.							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
			35N	10E	Skagit		
DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ☐ YES ☒ NO – IF NO, PROVIDE OWNER(S) NAME:							

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER?
☒ YES ☐ NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):
Claim Numbers 158489, 158490, 086211 (copies attached)

6. Remarks and Other Relevant Information:

IF FOR SEASONAL OR TEMPORARY, START DATE ____/____/____ END DATE ____/____/____

7. Signatures:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

Donald R Clar — 12/3/03
(Applicant) (Date)

Donald R Clar — 12/3/03
(Water Right Holder) (Date)

Donald R Clar
For Land Owners — 12/3/03
(Land Owner(s) of Existing Place of Use) (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

☐ APPLICATION FEE NOT ENCLOSED ☐ MAP NOT INCLUDED or INCOMPLETE

☐ ADDITIONAL SIGNATURES REQUIRED ☐ SECTION _____ IS INCOMPLETE

☐ OTHER/EXPLANATION:_____

STAFF: _____ ***DATE:*** ____/____/____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

JUN-3 74 177816
CASH ___ OTHER ___

1. NAME Clarks Skagit River Resort
% Rudy H. Clark
ADDRESS Star Route
Rockport Wn. ZIP CODE 98801

177816

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Ground water (SURFACE OR GROUND WATER)

W.R.I.A. 04 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS well

B. IF SURFACE WATER, THE SOURCE IS ___

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED ___ PRESENTLY USED ___ (CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED ___ PRESENTLY USED ___ (ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED ___ PRESENTLY IRRIGATED ___

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: ___

4. DATE OF FIRST PUTTING WATER TO USE: MONTH March YEAR 74

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: ___ FEET ___ AND ___ FEET ___ FROM THE ___ CORNER OF SECTION ___ BEING WITHIN ___ OF SECTION 23 T. 35 N., R. 10 (E.OR W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT ___ BLOCK ___ OF ___

(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: ___

COUNTY Skagit

7. PURPOSE(S) FOR WHICH WATER IS USED: Domestic Supply

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: ___

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED   THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

APR 10 75 158491

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X Madeline C. Clark

DATE May 24, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE.

DEPARTMENT OF ECOLOGY

IN THE MATTER OF FILING IN	)	Order No.
THE WATER RIGHT CLAIMS	)	DE 97WR-263
REGISTRY AN AMENDMENT BY	)	
CLARKS SKAGIT RIVER RESORT	)	
DON CLARK	)	

The Department of Ecology is responsible for the Water Rights Claims Registry, and amendments to the Water Rights Claims Registry, Chapter 90.14.RCW.

RCW 90.14.065 provides that any person or entity, or successor to such person or entity, having a statement of claim on file with the Water Rights Claims Registry on April 20, 1987, may submit to the Department of Ecology for filing, an amendment to such a statement of claim if the submitted amendment is based on:

1. An error in estimation of the quantity of the applicant's water claim prescribed in RCW 90.14.051 if the applicant provides reasons for the failure to claim such a right in the original claim;

2. A change in circumstances not foreseeable at the time the original claim was filed, if such a change in circumstances relates only to the manner of transportation or diversion of the water and not to the use or quantity of such water; or

3. The amendment is ministerial in nature.

The Department of Ecology shall accept any such submission and file the same in the registry unless the Department by written determination concludes that the requirements of subsections (1), (2), or (3) of RCW 90.14.065 have not been satisfied.

Don Clark submitted a request to file an amendment to Water Right Claim No. 158491 pursuant to RCW 90.14.065(1). The request was received by Ecology on May 19, 1997. No field investigation was conducted in association with this review, nor were other documents examined except those provided by the applicant.

The proposed amendments are to the quantity and annual quantity of water. This information on the original form was left blank. Mr. Clark would like to add 3000 gallons per minute and 4,839 acre feet per year to the claim. The reason for requesting to amend the claim is given as "Underestimation of amount of water used, and no instruments to accurately measure the amount of water."

It is the determination of the Department of Ecology that the alleged error in estimation of the quantity and annual quantity does satisfy RCW 90.14.065 (1).

In view of the foregoing and in accordance with the provisions of RCW 43.27A.190; IT IS ORDERED that Amended Claim for Water Right Claim No. 158491 be accepted for filing with the Claims Registry.

The decision to accept or deny the filing of the amendment to Water Right Claim No. 158491 does not constitute an adjudication of any claim to use water. The Department of Ecology recognizes that the final determination of the validity and extent associated with a claim registered in accordance with RCW 90.14 ultimately lies with the Superior Court through the general adjudication process provided for by Sections 90.03.110 through 90.03.240 RCW. However, Ecology has a statutory obligation under 90.14.065 to review requests for claim amendments.

This Order may be appealed. Your appeal must be filed with the Pollution Control Hearings Board, P.O. Box 40903, Olympia, Washington 98504-0903 within thirty (30) days of receipt of this order. At the same time, your appeal must also be sent to the Department of Ecology, c/o Appeals Coordinator, Water Resources Program, P O Box 47600, Olympia, Washington 98504-7600. Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320. These procedures are consistent with the provisions of Chapter 43.21B RCW.

SIGNED and DATED at Lacey, Washington

this 24th of September, 1997

Linda Pilkey-Jarvis

Linda Pilkey-Jarvis
Water Resources Program

I hereby concur with this determination. This constitutes a final Order and Decision in this matter.

Keith E. Phillips

Keith Phillips, Program Manager
Water Resources Program

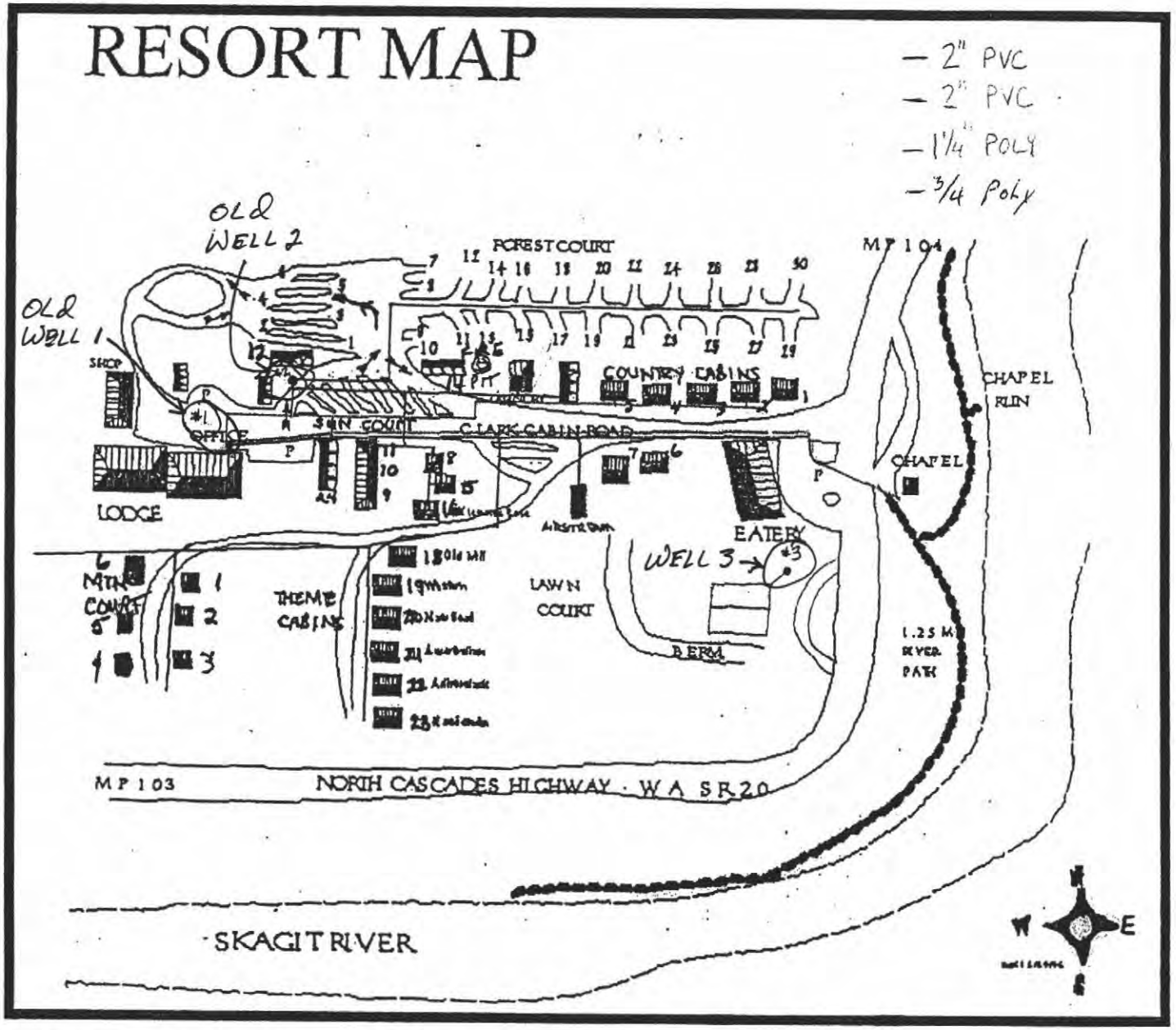
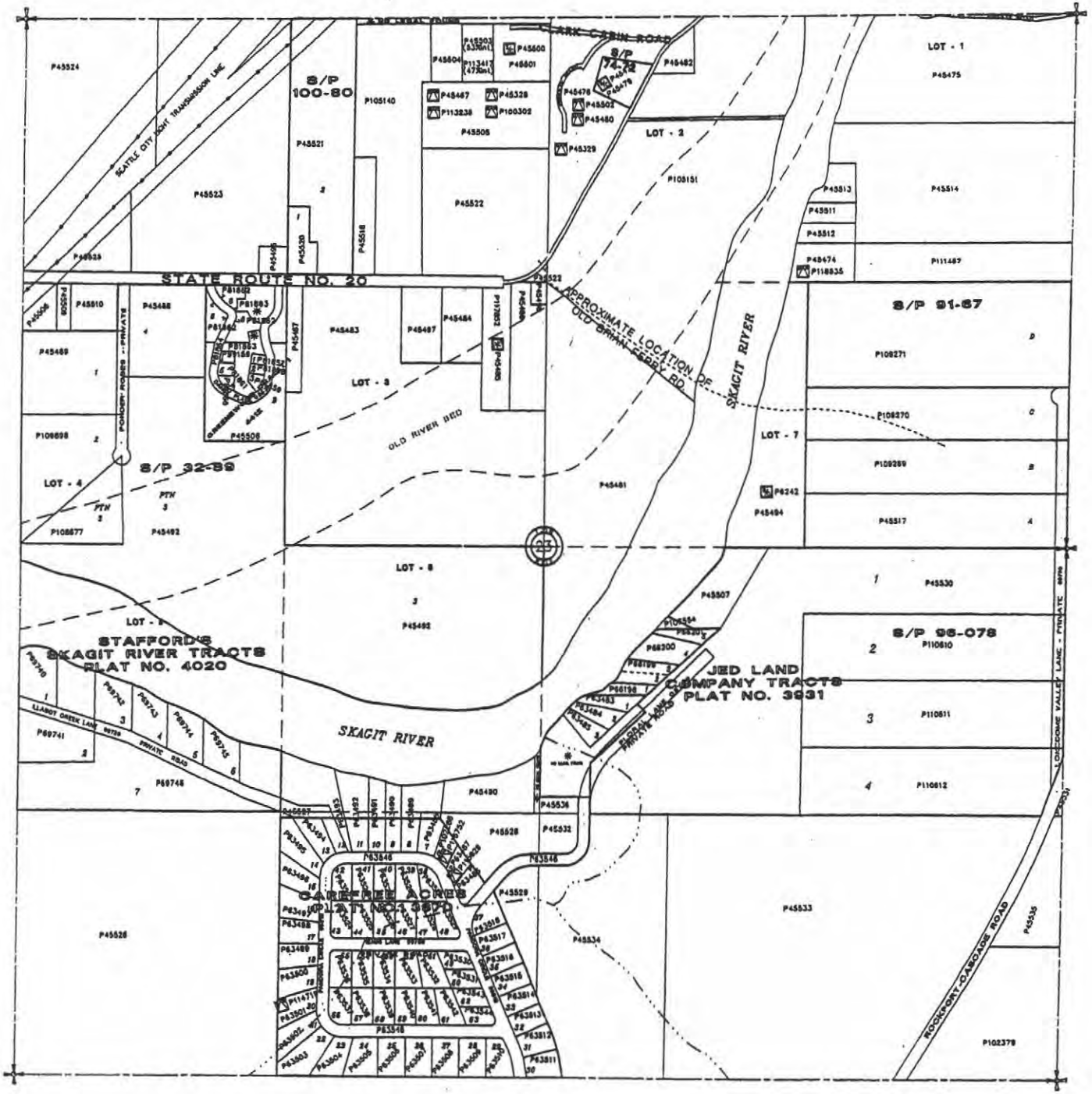


Exhibit 1. Clark's Skagit River Resort's Well and Distribution System Locations



SKAGIT COUNTY

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

T 35 N R 10 E

ATTENTION

THIS MAP CONTAINS A PARCEL ACCOUNT THAT HAS BEEN PLACED WITH THE BEST AVAILABLE INFORMATION. THE EXACT LOCATION OF THIS PARCEL IS UNKNOWN.

N NE E SE S SW W NW

0 400

Scale in feet

These maps were created from available public records and scaling map sources, not from field surveys. Map features from all sources have been adjusted to achieve a "best fit" registration to the Geographic Parcels maps. While great care was taken in this process, maps from different sources rarely agree as to the precise location of geographic features. The relative positioning of map features to one another results from combining different map sources without field "ground truthing".

* THIS MAP IS NOT A SUBSTITUTE FOR FIELD SURVEY *

	DATE	INIT.
DRAWN BY	01-25-99	JB
REVISED	08/30/02	RS
PLOTTED	08/30/02	RS

MAP PRODUCED BY SKAGIT COUNTY MAPPING SERVICES

Section 23
T 35 N R 10 E

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
JUN 3 1974
173989

1. NAME CLARKS SKAGIT RIVER RESORT
c/o Rudy H. Clark
ADDRESS STAR ROUTE
ROCKPORT WN. ZIP CODE [illegible]21

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: ~~BOTH~~ SURFACE
(SURFACE OR GROUND WATER)
~~AND/OR GROUND WATER~~ W.R.I.A. 04
(LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS ~~WELL~~

B. IF SURFACE WATER, THE SOURCE IS SKAGIT RIVER

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 625 GPM PRESENTLY USED NONE
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 30 ACRE-FEET PRESENTLY USED NONE
(ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED 30 PRESENTLY IRRIGATED NONE

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: CONSTANT 7?-4?

4. DATE OF FIRST PUTTING WATER TO USE: MONTH MARCH YEAR 74

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 250 FEET S AND 100
FEET E FROM THE NORTHWEST CORNER OF ~~SECTION~~ Lot 2
BEING WITHIN the NW¼ of the NE¼ OF SECTION 23 T. 35 N., R. 10E (E or W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT _____ BLOCK _____ OF
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: THAT PORTION OF GOVERNMENT LOT 2, SECTION 23, TOWNSHIP 35 NORTH, RANGE 10 EAST W.M. LYING EAST OF STATE HIGHWAY NO. 17-A, TO THE SKAGIT RIVER; TO INCLUDE THAT PORTION OF LOT 2 LYING SOUTH OF THE O'BRIAN FERRY ROAD RUNNING DUE SOUTH APPROXIMATELY ONE-HALF MILE BETWEEN LOT 2 AND LOT 3 TO ITS INTERSECTION WITH THE SKAGIT RIVER COUNTY SKAGIT

7. PURPOSE(S) FOR WHICH WATER IS USED: DOMESTIC SUPPLY & IRRIGATION & STOCKWATERING

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION AND/OR RIPARIAN

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED
WATER RIGHT CLAIM REGISTRY NO.
APP 35158489

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X Mrs Rudy Clark

DATE May 24 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE.

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH YOUR FEE TO:
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION
OLYMPIA, WASHINGTON 98504

©L

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47600 • Olympia, Washington 98504-7600
(206) 407-6000 • TDD Only (Hearing Impaired) (206) 407-6006

January 16, 1996

Certified Mail
P 371 314 246

Mr. Don Clark
Clark's Skagit River Resort
5675 Hwy. 20
Rockport, WA 98283

Dear Mr. Clark:

The Water Resources Program, Department of Ecology has reviewed the amendment submitted by you and has determined that your amendment does satisfy the criteria in RCW 90.14.065. The amendment will be included in the Water Right Claims Register.

Please be aware that this decision to accept the amendment to Water Right Claim No. 158489 has no bearing on the Department of Ecology in the regulation of water rights, and does not constitute an adjudication of a claim to the right to use of the water as between the claimant and the state, or as between one or more water use claimants and others.

This decision may be appealed. Appeal information can be found in the enclosed order. I encourage you to read the Questions & Answers sheet on Water Right Claims for important information pertaining your claim to a water right.

Sincerely,

Linda Pilkey-Jarvis

Linda Pilkey-Jarvis
Shorelands and Water Resources Program
Department of Ecology

LPJ:jm
Enclosures

Report of Examination To Amend
the Water Right Claims Registry

Clark's Skagit River Resort, through Mr. Don Clark, filed a request to Amend Water Right Claim No. 158489 pursuant to Revised Code of Washington (RCW) 90.14.065 (1). A letter request for an amendment was received on July 14, 1995. In consideration of the amendment request, a review was conducted. The following is reported:

The proposed amendment is to the quantity of water claimed on the original form. Water Right Claim No. 158489 lists the quantity of water claimed as 62.5 gallons per minute (gpm) and 30 acre-feet per year. The amendment request proposes to lists the quantity of water claimed as 2,250 gpm and 300 acre-feet per year. The amendment is being sought because, "Mrs. Rudy Clark underestimated the amount of water diverted, and at that time had no instruments to accurately measure the amount of water diverted."

RCW 90.14.065 (1) provides that a person may submit a request to amend a claim if there was an error in estimation of the quantity of the applicant's water claim prescribed in RCW 90.14.051 if the applicant provides reasons for the failure to claim such right in the original claim.

I spoke with Mr. Don Clark by telephone on January 11, 1996, requesting clarification on the reason for the failure to claim the 2,250 gpm on the original claim document. He provided me with the above reason.

As a result of this examination, I find the proposed amendment to the quantity of water does satisfy the intent of RCW 90.14.065 (1).

I hereby recommend an order be written which approves the proposed amendment. Water Right Claim No. 158489 will be amended to read quantity of water claimed 2,250 gpm and 300 acre-feet per year.

SIGNED and DATED at Lacey, Washington this January 16, 1996.

Linda Pilkey-Jarvis

Linda Pilkey-Jarvis
Water Resources Program
Department of Ecology

LPJ:jm

DEPARTMENT OF ECOLOGY

IN THE MATTER OF AMENDING THE WATER RIGHTS CLAIMS REGISTRY BY CLARK'S SKAGIT RIVER RESORT	))))	ORDER NO. DE 96WR-004

The Department of Ecology is responsible for the Water Rights Claims Registry, and amendments to the Water Rights Claims Registry, Chapter 90.14 Revised Code of Washington (RCW).

Clark's Skagit River Resort, through Don Clark, filed an Amended Water Right Claim for Water Right Claim No. 158489, pursuant to RCW 90.14.065 (1). The amendment was received by Ecology on July 14, 1995.

It is the determination of the Department of Ecology that this request represents an error in estimation of the quantity of the applicant's water claim prescribed in RCW 90.14.051. In view of the foregoing and in accordance with the provisions of RCW 43.27A.190 and RCW 90.14.065, IT IS ORDERED that Amended Claim for Water Right Claim No. 158489 be approved. Water Right Claim No. 158489 shall be amended to read quantity of water claimed 2,250 gpm and annual quantity as 300 acre-feet per year. No other information on the original claim will be amended by this order. 186 3rd

This Order may be appealed. Your appeal must be filed with the Pollution Control Hearings Board, P.O. Box 40903, Olympia, Washington 98504-0903 within thirty (30) days of your receipt of this Order. At the same time, your appeal must also be sent to the Department of Ecology, Shorelands and Water Resources Program, P.O. Box 47600, Olympia, Washington 98504-7600. Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320. These procedures are consistent with Ch. 43.21B RCW.

SIGNED and DATED at Lacey, Washington this 16th of January, 1996.

Carol L. Fleskes

Carol L. Fleskes
Program Manager
Shorelands and Water Resources
Department of Ecology

DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
DEPARTMENT OF ECOLOGY
JUN 3 1974
CASH OTHER NONE

1. NAME CLARK'S SKAGIT RIVER CABINS
% RUDY & CLARK
ADDRESS STAR ROUTE
ROCKPORT WASH ZIP CODE 98283

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: GROUND (SURFACE OR GROUND WATER)
WATER W.R.I.A. 04 (LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS WELL

B. IF SURFACE WATER, THE SOURCE IS —

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 130 G.P.M. PRESENTLY USED 100 G.P.M.
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 12 acre feet PRESENTLY USED 10 acre feet
7.5 g.p.m. (ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED PRESENTLY IRRIGATED

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: CONTINUOUSLY

4. DATE OF FIRST PUTTING WATER TO USE: MONTH YEAR 1938

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 165 FEET W AND 66
FEET S FROM THE Qtr post on the CORNER OF SECTION line between
Section 14 & 23
BEING WITHIN the NE1/4 of the NW1/4 OF SECTION 23 T. 35 N., R. 10 E (E. or W.) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT BLOCK OF
(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: Commencing at a point 30 ft South of the quarter Post on the Section line between Section 14 + 23, township 35, north range 10 east and approximately 990' West of that quarter post; thence South 660 ft, thence East 700 ft, then South 630 ft to State Highway, then East along state highway approx 890 ft to the corner there following the same State highway North-easterly approx 1630 ft to its intersection with the section line between section 14 and 23 then West following Section line to the quarter post on the section line of 14 & 23 then north 660 ft to the intersection of the South line of the City of Seattle right-of-way with the North & South center line of Section 14; thence SE along said CITY OF SEATTLE right of way to its intersection with section line between Section 14 + 23, Approx. 990 ft west of the quarter post on the section line between Section 14 & 23 at the place of beginning. (See Attached MAP)

7. PURPOSE(S) FOR WHICH WATER IS USED: DOMESTIC SUPPLY & IRRIGATION

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: APPROPRIATION AND/OR RIPARIAN

Skagit

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED THIS HAS BEEN ASSIGNED WATER RIGHT CLAIM REGISTRY NO.

APR 10 75 158490

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF

X Mrs Rudy Clark

DATE May 24 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW

☐ ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH YOUR FEE TO:
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION
OLYMPIA, WASHINGTON 98504

ORIGINAL DWR

State of Washington
Department of Ecology

RECEIVED
DEPARTMENT OF ECOLOGY
FEB 11 74 07 31 46
CASH OTHER NONE

Water Right Claims Registration

Water Right Claim

Name Roy M. Clark (Short Form) 04

Address Rockport, Wa.

Zip Code 98283 Phone No. 873-4013

1) Source from which the right to take and make use of water is claimed: ☐ Surface Water ☒ Ground Water

If surface water, please indicate source; give name if known:

(River, stream, lake, pond, spring, etc.)

2) Purpose(s) for which water is used:

☒ Domestic ☐ Stockwatering ☒ Irrigation (lawn and garden) ☐ Other Use (specify)

3) Legal description of lands on which water is used: That portion of Govt Lot 2, Section 23, Township 35 North, Range 10 East, W.M., being more particularly described as follows: Commencing at the Northwest corner of said Government Lot 2, said point also being the North one-quarter corner of said Section 23; thence South 1° 14'12" West, along the West line of said Government Lot 2, 207.00 feet; thence North 89° 46'56" East, parallel with the North line of said Government Lot 2, 270.00 feet to the TRUE POINT OF BEGINNING; thence South 15° 11'01" West 178.35 feet; thence South 64° 26'05" East 195 feet, more or less, to the Westerly margin of the Highway 17-A or Highway 20; thence Northerly, along said Westerly margin 247 feet, more or less, to a point that is South 81° 08'37" East from the TRUE POINT OF BEGINNING; thence North 81° 08'37" West, 248 feet, more or less, to the TRUE POINT OF BEGINNING.
Located in Short Plat No. 74-72 Approved 2 November 1972

If located within the limits of a recorded platted property:

Lot _____ Block _____ of _____
(Give name of plat or addition)

In addition, please indicate Sec. 23 T. 35 N., R. 10 E E/W, W.M.

County in which lands are located Skagit

DO NOT USE THIS SPACE

The filing of a statement of claim does not constitute an adjudication of any claim to the right to use of waters as between the water use claimant and the state or as between one or more use claimants and another or others. This acknowledgment constitutes receipt for the filing fee.

Date Registered

This has been assigned Water Right Claim Registry No.

R 74086211

Director, Department of Ecology

I hereby swear that the above information is true and accurate to the best of my knowledge and belief.

X Roy M. Clark

Date Feb. 8, 1974

If claim filed by designated representative print or type full name and mailing address of agent below.

☒ Additional information relating to water quality and/or well construction is available.

A FEE OF $2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

Return all three copies with carbons intact, along with your fee to:

Appendix C

Well site approval

PETER BROWNING, DIRECTOR
HOWARD LEIBRAND, HEALTH OFFICER

700 SOUTH SECOND STREET #301, P.O. BOX 91071, MOUNT VERNON, WA 98273-1071, TEL (360) 336-9387
FAX (360) 336-9401

June 10, 2003

Don Clark
58468 Clark Cabin Road
Rockport, Washington 98283

RE: Well Site Inspection for Bullerville Utility District
Skagit River Resort, LLC Group ATNC Water System ID # 13344P

Dear Don:

Thank you for meeting with me on June 5, 2003 to conduct two well site inspections at parcel #45355. The proposed wells will serve the future expansion of the Skagit River Resort. The proposed expansion includes an area that was used by an old mill. The site will be developed into a park dedicated to the old mill operation. In addition, cabins will be placed on the Southeast side of the Mill Pond. The following was found at the well site inspection:

Well site #1 (the well site located nearest the water reservoirs) is located in the SE ¼ of the SW ¼ in Township 35, Range 10E, Section 14.

- The well site is greater than 100 ft from any property lines.
- There are undeveloped roads within 100 ft protective radius of well. The roads will remain undeveloped and have limited access. Most of the traffic would be on the Southeast side of the Mill Pond, away from the well site.
- There are no existing buildings within the 100 ft protective radius of the wells.
- The landscape within the 100 ft of the proposed well site is primarily covered with tress and is generally level.

Well site #2 (the well site located closest to the power lines) is located in the SE ¼ of the SW ¼ in Township 35, Range 10E, Section 14

- The well site is located 110 ft from the Northwest property line.
- There are undeveloped roads within the 100 ft protective radius of the well. The roads will remain undeveloped and have limited access. Most of the traffic would be on the Southeast side of the Mill Pond, away from the well site.
- There are no existing buildings within the 100 ft protective radius of the wells.
- The landscape within the 100 ft of the proposed well site is primarily covered with tress and is generally level.

The proposed well site meets the requirements according to WAC 246-290 and WAC 173-160. The following conditions must be maintained for the well site to continue to be adequate:

- The undeveloped roads that are within the 100 ft protective radius of the well will not be paved or graveled and remain undeveloped.
- A Declaration of covenant that will secure the 100 ft protective radius around the wells must be recorded with the Skagit County Auditor.
- All future septic tanks, drainfields, buildings, structures, and other sources of contamination are kept outside of the 100 ft protective radius.
- The terrain around the well will be graded so that surface water is directed away from the well.

The well site inspection is one of the beginning steps to gaining water system approval. Since you are operating a Group ATNC water system, the water system review will be done by Nancy Feagin, Skagit County's Engineer at the Washington State Department of Health.

Nothing in this approval shall be construed as satisfying other applicable federal, state or local statutes, ordinances and regulations. If you have any questions please call me at 360-336-9380.

Sincerely,

Sarah Cierebiej

Sarah Cierebiej
Environmental Health Specialist

cc: Nancy Feagin -- Washington State Department of Health Division on Drinking Water
Scott Spar – Skagit County PUD No. 1
Ron Palmer – Skagit County Health Department

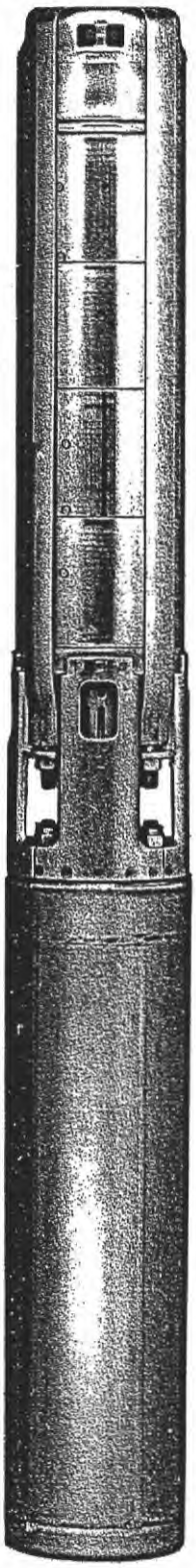
Appendix D

Well pump curves

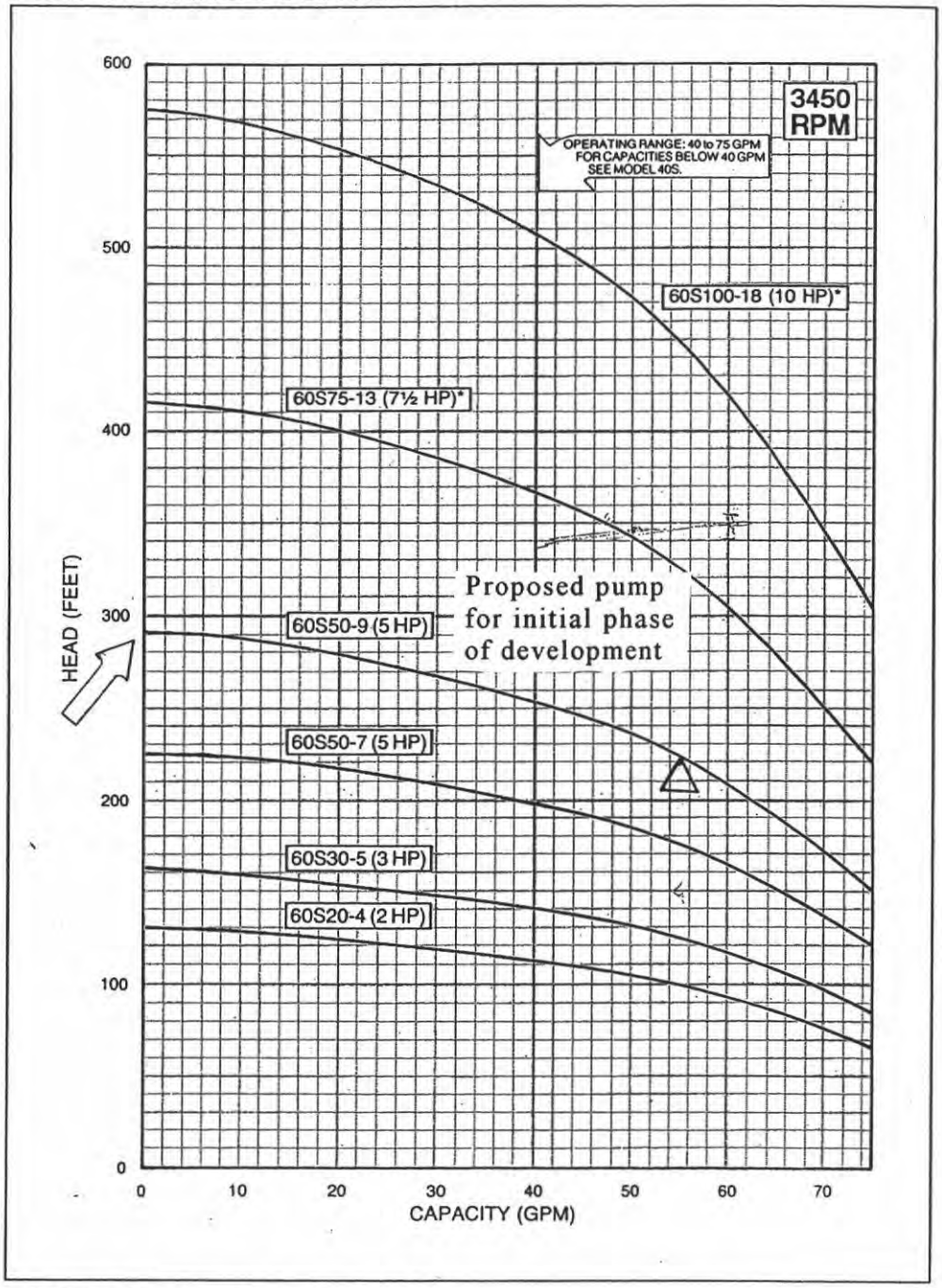
MODEL 60S — 60 GPM — GRUNDFOS

FLOW RANGE
40 to 75 GPM

PUMP OUTLET
2" NPT



PERFORMANCE CURVES



DIMENSIONS AND WEIGHTS

MODEL NO.	HP	LENGTH (INCHES)	WIDTH (INCHES)	APPROX. UNIT SHIPPING WT. (LBS.)
60S20-4	2	31 1/4	3 15/16	39
60S30-5	3	40 3/4	3 15/16	64
60S50-7	5	48 5/8	3 15/16	75
60S50-9	5	53 3/4	3 15/16	80
60S75-13	7 1/2*	70	3 15/16	105
60S100-18	10*	97 1/4	3 15/16	160

Specifications are subject to change without notice.

* A 4-inch motor is provided as standard on these models.

Appendix E

Well logs

Please print, sign and return to the Department of Ecology

Water Well Report

Original & 1st copy – Ecology, 2nd copy – owner 3rd copy – driller

Construction/Decommission

☑ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* WE 01164

Current
Notice of Intent No. WE 01164

Unique Ecology Well ID Tag No. AHG 045

Water Right Permit No. _____

Property Owner Name Bullerville Utility District

Well Street Address 58468 Clark Cabin Road

City Rockport County Skagit

Location SE 1/4-1/4 NW 1/4 Sec 14 Twn 35 R 10 EWM or WWM ☑ clc ☐ one

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. _____

PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☑ New well ☐ Reconditioned ☐ Deepened *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 116 ft. Depth of completed well 116 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded 8 " Diam. from +2 ft. to 101 ft.
☐ Liner installed _____ " Diam. from _____ ft. to _____ ft.
☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☑ No
Type of perforator used _____
SIZE of perfs _____ in. by ___ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☑ Yes ☐ No ☐ K-Pac Location _____
Manufacturer's Name _____
Type stainless steel Model No. telescope
Diam. 8 Slot size 10 from 101 ft. to 106 ft.
Diam. 8 Slot size 12 from 106 ft. to 116 ft.

Gravel/Filter packed: ☐ Yes ☑ No ☐ Size of gravel/sand _____
Materials paced from _____ ft. to _____ ft.

Surface Seal: ☑ Yes ☐ No To what depth? 18' ft
Material used in seal bentonite
Did any strata contain unusuable water? ☐ Yes ☑ No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft
Static level 29 ft. below top of well Date 6/27/03
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs
Airtest 300 gal./min. with stem set a 100 ft. for 1 hrs
Atesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMISSION PROCEDURE

Formations: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Topsoil & gravel	0	1
Brown clay sand & gravel	1	11
Gravel cobbles & brown silt	11	32
Water gravel & sand	32	83
Brown sand some gravel & water	83	117
Gray sand & water	117	118
Well located according to Skagit County		
Ordinance #12.48		

Start Date 6/26/03 Completed Date 6/27/03

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Ralph Riggles
Driller/Engineer/Trainee Signature Ralph W. Riggles
Driller or trainee License No. 2043

Drilling Company Dahlman Pump & Well Drilling Inc.
Address P O Box 422 800 277-4898
City, State, Zip Burlington WA 98233
Contractor's Registration No. DAHLMPW123LC Date 7/03/03

If TRAINEE,
Diller's Licensed No. _____
Diller's Signature _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03)

Please print, sign and return to the Department of Ecology

Water Well Report

Original & 1st copy – Ecology, 2nd copy – owner 3rd copy – driller

Construction/Decommission

☑ Construction
☐ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* WE 01163

Current Notice of Intent No. WE 01163

Unique Ecology Well ID Tag No. AHG 044

Water Right Permit No. _____

Property Owner Name Bullerville Utility District

Well Street Address 58468 Clark Cabin Rd

City Rockport County Skagit

Location SE 1/4-1/4 NW 1/4 Sec 14 Twn 35 R 10 EWM ☑ or WWM ☐ (circle one)

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg _____ Lat Min/Sec _____ Long Deg _____ Long Min/Sec _____

Tax Parcel No. _____

PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☑ New well ☐ Reconditioned ☐ Deepened *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Cable ☑ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 117.5 ft. Depth of completed well 117.5 ft.

CONSTRUCTION DETAILS

Casing Installed: ☑ Welded 8 " Diam. from +2 ft. to 103 ft. ☐ Liner installed _____ " Diam. from _____ ft. to _____ ft. ☐ Threaded _____ " Diam. from _____ ft. to _____ ft.

Perforations: ☐ Yes ☑ No

Type of perforator used _____

SIZE of perfs _____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☑ Yes ☐ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type stainless steel Model No. telescope

Diam. 8 Slot size 10 from 102.5 ft. to 107.5 ft.

Diam. 8 Slot size 12 from 107.5 ft. to 117.5 ft.

Gravel/Filter packed: ☐ Yes ☑ No ☐ Size of gravel/sand _____

Materials paced from _____ ft. to _____ ft.

Surface Seal: ☑ Yes ☐ No To what depth? 18 ft

Material used in seal bentonite

Did any strata contain unusuable water? ☐ Yes ☑ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft

Static level 26 ft. below top of well Date 6/26/03

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (Cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs

Airtest 300 gal./min. with stem set a 102 ft. for 1 hrs

Atesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CONSTRUCTION OR DECOMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Topsoil	0	1
Brown sandy clay & some gravel	1	10
Gravel cobbles & brown silt	10	30
Water gravel & sand	30	54
Coarse sand & water	54	63
Fine brown sand & some large gravel		
water	63	118
Well located according to Skagit County Ordinance #12.48		

Start Date 6/25/03 Completed Date 6/26/03

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller/Engineer/Trainee Name (Print) Ralph Riggles

Driller/Engineer/Trainee Signature _____

Driller or trainee License No. 2043

Drilling Company Dahlman Pump & Well Drilling, Inc.

Address P. O. Box 422 800 277-4898

City, State, Zip Burlington WA 98233

Contractor's Registration No. DAHLMPW123LC Date 7/03/03

If TRAINEE, Diller's Licensed No. _____

Diller's Signature _____

Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03

Appendix F

Declaration of Covenants

RETURN ORIGINAL DOCUMENT TO:

NAME (Print)_____

MAILING ADDRESS_____

_____

DECLARATION OF COVENANT

Know all men by these presents that I (we) the undersigned, owner(s) in fee simple of the land described herein, hereby declare this covenant and place same on record.

I (we), the grantor(s) herein, _____
am (are) the owner(s) in fee simple of (an interest in) the following described real estate situated in _____ County, State of Washington, to wit:

_____

_____

_____

on which the grantor(s) owns and operates a well and waterworks supplying water for public use located on said real estate, to wit:

_____

_____

and grantor(s) is (are) required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantor(s) land which might contaminate said water supply.

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that said grantor(s), his (her) (their) heirs, successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor(s) and within 100 (one hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: structures, residences, cesspools, sewers, privies, septic tanks, drainfields, manure piles, garbage of any kind or description, barns, chicken houses, rabbit hutches, pigpens, or other enclosures or structures for the keeping or maintenance of fowls or animals, or storage of liquid or dry chemicals, herbicides, or insecticides.

These covenants shall run with the land and shall be binding on all parties having or acquiring any right, title, or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS _____ hand_____ this_____day of _____, 20_____

_____(Seal)

_____(Seal)

Grantor(s)

State of Washington
County of _____) ss

I, the undersigned, a Notary Public in and for the above named County and State, do hereby certify that on this _____ day of _____, 20_____, personally appeared before me _____ to me known to be the individual _____ described in and who executed the within instrument, and acknowledge that he (they) signed and sealed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal the day and year last above written.

(SIGNATURE)_____

(NAME - PRINTED)_____

Notary Public in and for the
State of Washington residing at _____
My Commission Expires: _____

SHOW MAP HERE.
ALL TEXT MUST BE AT LEAST 8 POINT TYPE.

Please use this page for full legal descriptions of properties referenced on Page 1.

Appendix G

Well pump test results

ROBINSON & NOBLE, INC.
and
Saltbush Environmental Services
GROUNDWATER & ENVIRONMENTAL SCIENTISTS
Established 1947

BULLERVILLE UTILITY DISTRICT
PRODUCTION WELLS 1 AND 2
CONSTRUCTION AND TESTING REPORT

JANUARY 2004

by

Douglas C. Dow, L.HG.
Associate Hydrogeologist

DOUGLAS C. DOW

5320 Orchard Street West • Tacoma, Washington 98467 • (253) 475-7711 • Fax: (253) 472-5846
e-mail: mail@robinson-noble.com

BULLERVILLE UTILITY DISTRICT
PRODUCTION WELLS 1 AND 2
CONSTRUCTION AND TESTING REPORT
JANUARY 2004

Table of Contents

APPENDIX

EES LETTER OF FEBRUARY 14, 2003
WATER RIGHT CLAIM DOCUMENTS
WATER WELL REPORT FORMS
MANUAL WATER LEVEL DATA
WATER QUALITY ANALYSES
SUSCEPTIBILITY ASSESSMENT SURVEY FORMS

BULLERVILLE UTILITY DISTRICT
PRODUCTION WELLS 1 AND 2
CONSTRUCTION AND TESTING REPORT
JANUARY 2004

Introduction

Bullerville Utility District (District) contracted Robinson & Noble, Inc. to provide hydrogeologic services for the construction of Bullerville Utility District (BUD) Production Wells BUD-1 and BUD-2. The well sites are located as shown on **Figure 1** within the SE4, SW4 of Section 14, Township 35N, Range 10E of Skagit County, Washington. These new production wells are proposed replacements for two shallow wells that were red-tagged by the Washington State Health Department. Skagit County Health Department conducted a well-site evaluation and approved the location for BUD Wells 1 and 2. The site meets the requirements under WAC 246-290-135, Source Protection.

The future needs of the District are described in Economic and Engineering Services, Inc.'s February 14, 2003 letter (included in the **Appendix**) to the Skagit PUD #1 Planning Engineer. In that letter they estimate a peak hour demand of 236 gallons per minute (gpm). They estimate the maximum daily demand will be 228,000 gallons or 158 gpm. The District's Engineer, George Bratton P.E., is preparing the Water System Plan for the District. The District wells are designed to provide at least the 158 gpm required.

Water Right Claim

The Buller brothers homesteaded the property on which the wells are located and started using the water resources of the area in 1888 before Washington became a state. The water has been used for community domestic supply continuously since that time. In addition, groundwater was used to provide wash water, fill a log pond on the site (under restoration by Don Clark), and for boilers to provide steam power to the saw-mill. The quantities used have varied greatly over the years and there are no documents to verify actual use for any one period of time.

Don Clark (Don Clark and the Clark family are descendents of the Buller brothers and are the property owners) claims 3,000 gpm and 4,839 acre feet per year (af/yr) from groundwater under Water Right Claim number 158491. A copy of this claim document is included in the **Appendix**. Don Clark's intent is to allow the District to use a maximum instantaneous rate (Qi) of 160 gpm and annual quantity (Qa) of 260 af/yr from claim number 158491. Don Clark has requested the Washington State Department of Ecology to approve the transfer of this amount to the District and change the purpose of use of that water to municipal, points of withdrawal to the locations of the new wells, and location of use to the District's service area as determined by the current Skagit County Service Area Agreement.

Drilling

Dahlman Pump and Drilling Inc. of Burlington, Washington mobilized its air rotary drilling rig to the site on June 25, 2003. Although good water-bearing sediments were known to be located at shallower depths, the drilling plan required well completion in acceptable water-bearing sediments deeper than 100 feet below ground surface (bgs) to provide better protection from any possible surface sources of contamination.

Drilling of BUD-1 commenced with a 12-inch temporary hole to a depth of 18 feet below ground surface (bgs). Sediments between the surface and 30 feet bgs consisted of brown sandy clay with some gravel to a depth of 10 feet and coarse gravel and cobbles with brown silt to the top of the aquifer at 30 feet bgs. Eight-inch well casing was utilized for the well and after it was installed, the annulus between the 8-inch well casing and 12-inch hole was filled with bentonite chips. The 8-inch casing penetrated very productive water-bearing gravels with some sand between 30 and 54 feet. The aquifer graded finer with depth, changing to coarse sand from 54 to 63 feet bgs, where it became fine brown sand with some gravel to the bottom of the drilled hole at 118 feet.

BUD-2 is constructed 225 feet northeast from BUD-1 and penetrates the same brown sandy clay and gravel found in BUD-1 to a depth of 11 feet bgs. Silty gravel and cobbles overlie the aquifer between 11 and 32 feet bgs. The water-bearing gravel and sand unit is very productive from 32 to 83 feet bgs, where it grades finer to brown sand to a depth of 117 feet. At 117 feet the color of the water-bearing sand changes to gray.

Drilling did not continue to the bottom of the water-bearing sediments in either well. Well construction details are shown in **Figure 2**, and the Water Well Report forms are included in the **Appendix**. Well construction meets Ecology's requirements detailed in Chapter 173-160 WAC, Minimum Standards for Construction and Maintenance of Water Wells.

Construction and Development

During drilling of BUD-1, representative samples of aquifer material were collected approximately every ten feet and at formation changes. Grain-size analyses, completed by Dahlman Pump & Well Drilling and Robinson & Noble, showed the brown sand logged from 63 to 118 feet bgs to be about 20 percent retained by the 0.017-inch sieve and 70 percent by the 0.012-inch sieve. Based on these sieve analysis results, Robinson & Noble selected the well screen completion design shown in **Figure 2** for both wells. Each well is completed with 8-inch telescoping, Type 304 stainless-steel well screen with five feet of 0.010-inch slots above ten feet of 0.012-inch slots. Development consisted of surging with air and airlift pumping until the water discharged was clear and free of sand.

Testing

BUD-1

Dahlman Pump and Drilling installed a submersible pump capable of pumping approximately 290 gpm with a lift of 50 feet. Pumping rates were measured with a flow meter. The water was discharged approximately 400 feet northeast of the well where it flowed into an old log pond recently cleared of brush and small trees. The pump and two one-inch sounding tubes were set at a depth of about 85 feet bgs. A variable-rate step test was conducted on July 7 to determine

development completion and the pumping rate for the 24-hour, constant-rate test. Each step was run for one-quarter hour. The pumping rates were 63, 97, 150, and 240 gpm, as listed in **Table 1**. Pumping caused some fine sand to enter the well at each increase in rate. This is a normal part of final development, and the sand content diminished with time. The well's specific capacity ranged between 11 and 12.6 gallons per minute per foot (gpm/ft) of drawdown during the step test, as shown in **Table 1**. Based on the step test results, a 150-gpm rate was selected for the 24-hour test. The 24-hour test was conducted on July 7 and 8. Test results are shown on **Table 1** and **Figures 3, 4**, and **5**. Manual water level test data are included in the **Appendix**.

Table 1: BUD-1 Pumping Test Results

Date	Discharge Rate (gpm)	Elapsed Time (hrs)	Drawdown (feet)	Specific Capacity (gpm/ft)
7/7/03	63	.25	5.0	12.6
	97	.25	7.9	12.3
	150	.25	13.2	11.3
	240	.25	21.6	11
7/7-8/03	150	24	13.6	11

BUD-2

Dahlman Pump and Drilling moved its submersible pump to BUD-2 on July 9. The pump and two one-inch sounding tubes were set at a depth of about 85 bgs. A variable-rate step test was conducted on July 9 to determine development completion and the pumping rate for the 24-hour, constant-rate test. The water was discharged into an old log pond approximately 200 feet northeast of the well. Each step in the test was run for one-quarter hour. The pumping rates were 55, 100, 150, and 240 gpm, as listed in **Table 2**. Similar to testing of BUD-1, pumping caused some fine sand to enter the well at each increase in rate, which is normal for final development. However, the sand content diminished with time. The well's specific capacity was almost stable at 12.5 gpm/ft during the step test, as shown in **Table 2**. Based on the step test results, a 212-gpm rate was selected for the 24-hour test, which was conducted on July 9 and 10. Test results are shown on **Table 2** and **Figures 3, 6**, and **7**, and the manual water level test data are included in the **Appendix**.

Table 2: BUD-2 Pumping Test Results

Date	Discharge Rate (gpm)	Elapsed Time (hrs)	Drawdown (feet)	Specific Capacity (gpm/ft)
7/9/03	55	.25	4.4	12.5
	100	.25	7.7	13
	150	.25	12.4	12
	240	.25	19.2	12.5
7/9-10/03	212	24	16.9	12.5

Transmissivity

Aquifer transmissivity (T) is a measure of the amount of water that can be transmitted horizontally by the full saturated thickness of the aquifer under a hydraulic gradient of one. The transmissivity is calculated using the Jacob/Theis, modified, non-equilibrium formula from the pumping rate and the slope of the drawdown and recovery graphs. The drawdown and recovery data are represented in **Figures 4, 5, 6,** and **7**. The graphs show very quick drawdown and almost immediate stabilization. Analysis of BUD-1 test data yielded a transmissivity value of 762,000 gallons per day per foot (gpd/ft). Analysis of BUD-2 data yielded a value of 932,000 (gpd/ft). The presence of very productive gravels above the finer sand may account for transmissivity values much higher than would normally be expected from this fine to medium sand aquifer.

The transmissivity was also calculated using the aquifer response to each test shown in the observation wells on **Figures 8** and **9**. The observation wells show the delayed response of an unconfined aquifer. The cone of depression (drawdown) intercepted BUD-1 at about 1,000 minutes and BUD-2 after 800 minutes. The calculations made from these plots indicate more reasonable aquifer transmissivities of 165,000 gpd/ft at BUD-1 and 152,000 gpd/ft at BUD-2.

Storativity

Storativity (storage coefficient) is the volume of water taken into storage or released from storage by an aquifer per unit aquifer surface area per unit head change. Storage coefficients are dimensionless. In unconfined (water table) aquifers, the storage coefficient is a direct measure of the aquifer's storage capacity.

In confined (artesian) aquifers, the pore spaces are not drained away as they are in water table aquifers when water is removed. Water is slightly compressible. When it is removed from a confined aquifer, it expands, and the pore spaces contract, keeping the zone saturated. For confined aquifers, the storage coefficient is more an indicator of the degree of confinement than storage capability. Confined aquifers have a lower storage coefficient than unconfined aquifers.

Unconfined aquifers have storage coefficient values in the range of 0.01 to 0.35, which are directly related to porosity and therefore storage capacity. Confined aquifers have storage coefficient values in the range of 0.00001 to 0.001, which are inversely related to water/aquifer compression or confinement and have little to do with storage capability.

As shown on **Figures 8** and **9**, at a distance of 225 feet, BUD-1 caused about 0.15 foot of interference in BUD-2 after 24 hours of pumping at a rate of 150 gpm. Pumping BUD-2 at 212 gpm caused 0.10 feet of drawdown in BUD-1 after 24 hours of pumping. Storativity calculations require measured drawdowns in two observation wells to be accurate. However, storativity can also be estimated using calculations from a single observation wells response to pumping. The storage coefficients calculated for BUD-1 and -2 are 0.4 and 0.2 respectively indicating the aquifer is unconfined.

Hydrogeology

The hydrogeology of the Bullerville Utility District area is described in the June 8, 1998 report, *Hydrogologic Assessment Upper Skagit River Valley Marblemount, Washington*, prepared for the Public Utility District No. 1 of Skagit County. The area is dominated by the hydrogeology of the Skagit River, flowing generally from the northeast to the southwest. The Skagit River valley is bounded by steep mountains rising above the valley bottom (elevation approximately 300 feet) to elevations greater than 3,000 feet. Bedrock is seen in the mountainsides above valley level. The valley bottom is reported to be underlain by 200 to 300 feet of glaciofluvial deposits and recent Skagit River alluvium.

The regional aquifer is unconfined and located within the alluvium and glaciofluvial deposits. It consists of sand and gravel deposits interbedded with minor lenses of silt and clay. The aquifer is generally at least 100 feet thick with static water levels about 25 feet below the surface. The aquifer is presumed to be in hydraulic continuity with the Skagit River. Recharge is mainly from direct infiltration of precipitation and surface runoff. Annual recharge to the aquifer from the infiltration of precipitation was estimated in the report to be between 50 and 70 inches per year. Aquifer discharge is through underflow to the Skagit River.

Water Quality

Robinson & Noble's hydrogeologist collected water quality samples for laboratory analysis as required. Samples were taken to Edge Environmental Testing Laboratory in Bellingham, Washington for complete inorganic, volatile organic, and bacteriological analysis. Water samples were also sent to the State of Washington laboratory for radionuclide analysis. Water quality results are included in the **Appendix**.

Inorganic Test Results

Regular observations were made to determine the quantity of sand generated by the well during the constant-rate test. Sand production was very slight at first and then decreased to zero as the test progressed. The water temperature was 50 degrees Fahrenheit. The results of inorganic water quality analyses showed all measured parameters, with the exception of the manganese level in BUD-2, to be below the maximum contaminant levels (MCL) required for safe drinking water. BUD-2 showed a manganese result of 0.225 mg/L, exceeding the MCL of 0.05 mg/L. However, BUD-1's manganese result was 0.014 mg/L. Test results are included in the **Appendix**.

Volatile Organic Test Results

Analysis performed by Edge Analytical shows all measured parameters to be below the detection level for each compound.

Bacteriological Test Results

Bacteriological analysis results showed no coliform bacteria present in BUD-1. The sample from BUD-2 was labeled with the wrong collection date so was not tested by the laboratory.

Radionuclide Test Results

Radionuclide analysis results show the water meets Health standards.

Wellhead Protection Area Preliminary Delineation

Health requires a preliminary delineation of the Wellhead Protection Area (WHPA) for all new groundwater sources. Pertinent information detailing the new sources is contained in the "Ground Water Contamination Susceptibility Assessment Survey Form" (Version 2.2) completed for each well and included in the **Appendix**. BUD-1 is the primary source, and BUD-2 will be an identical backup source. Only one delineation is presented here, as both wells have identical capabilities and physical characteristics.

A WHPA is defined as the surrounding surface and subsurface area through which potential contaminants are likely to pass and eventually reach a well supplying public water. This area is known as the well's zone of contribution or capture zone. Data are usually insufficient to completely and accurately define the exact size and shape of the capture zone. For this reason, a series of approximation methods are used to delineate a WHPA.

These methods, in order of increasing complexity, are:

- Calculated Fixed Radius
- Analytical Models
- Hydrogeologic Mapping
- Numerical Flow/Transport Models

Sufficient hydrogeologic data are available from BUD-1 and 2 to allow use of an analytical model developed by the US Environmental Protection Agency (EPA). EPA WHPA (Code 2.2) model GPTRAC (general particle tracking) is used for the delineation illustrated in **Figure 10**. It is capable of delineating time-related capture zones for a system of pumping and injection wells and accounts for the effects of well interference, stream or barrier aquifer boundaries, and aquifer recharge.

The GPTRAC analytical model was calculated for the wells using the production and hydraulic data listed in **Table 3**. Where a range of values exists for a particular parameter, the value that was both reasonable and conservative was selected. Conservative values are those that result in the largest WHPA. Aquifer thickness is from the well logs.

Table 3: Model Parameters Input into EPA GPTRAC Model

Model Parameter	BUD-1
Aquifer Thickness (ft)	88
Estimated Porosity (%)	25
Transmissivity, ft^2/day (gpd/ft)	107,200 (800,000)
Hydraulic Gradient (ft/ft)	0.003
Ambient Flow Direction (degrees clockwise from east)	135 (SW)
Aquifer Type	Unconfined
Average Daily Discharge, ft^3/d (gpm)	21,176 (110)
Casing Diameter (ft)	0.67

Although each well is being designed to produce about 160 gpm, the model requires a constant pumping rate for the duration of the 6-month and 1-, 5-, and 10-year intervals shown. The constant rate needed for the model is determined by calculating the constant pumping rate required to produce the future estimated average daily demand quantity of 158,000 gallons per day. That constant rate is 110 gpm.

The capture zone shown on **Figure 10** for the 6-month time of travel is almost circular with a radius of about 250 feet. The 10-year time of travel capture zone extends up-gradient to the northeast about 5,000 feet from the wellhead. The wells are somewhat protected from surface sources of contamination by the clay logged from the surface to 10 feet below ground surface at each well site.

Findings

- BUD-1 and 2 are each capable of pumping more than 200 gpm.
- BUD-1 and 2 are completed in an unconfined sand aquifer logged between 63 and 118 feet below ground surface.
- The unconfined aquifer does not respond to changes in barometric pressure.
- Aquifer transmissivity is calculated for BUD-1 and 2 with results of 165,000 and 152,000 gpd/ft respectively.
- Aquifer storativity is estimated to be 0.4 at BUD-1 and 0.2 at BUD-2 indicating the aquifer is unconfined.
- Water quality samples collected from BUD-1 and 2 at the end of the 24-hour pumping periods showed all parameters measured meet water quality requirements with the exception of the 0.225 mg/L of manganese measured in the sample collected from BUD-2.

Recommendations

Bullerville Utility District should equip BUD-1 with a submersible pump capable of discharging the future estimated maximum daily demand of 160 gpm into the proposed water storage tank. The submersible pump should be installed with its intake at a depth of approximately 85 feet bgs. The pumping water level will be approximately 42 feet bgs at the 160 gpm pumping rate.

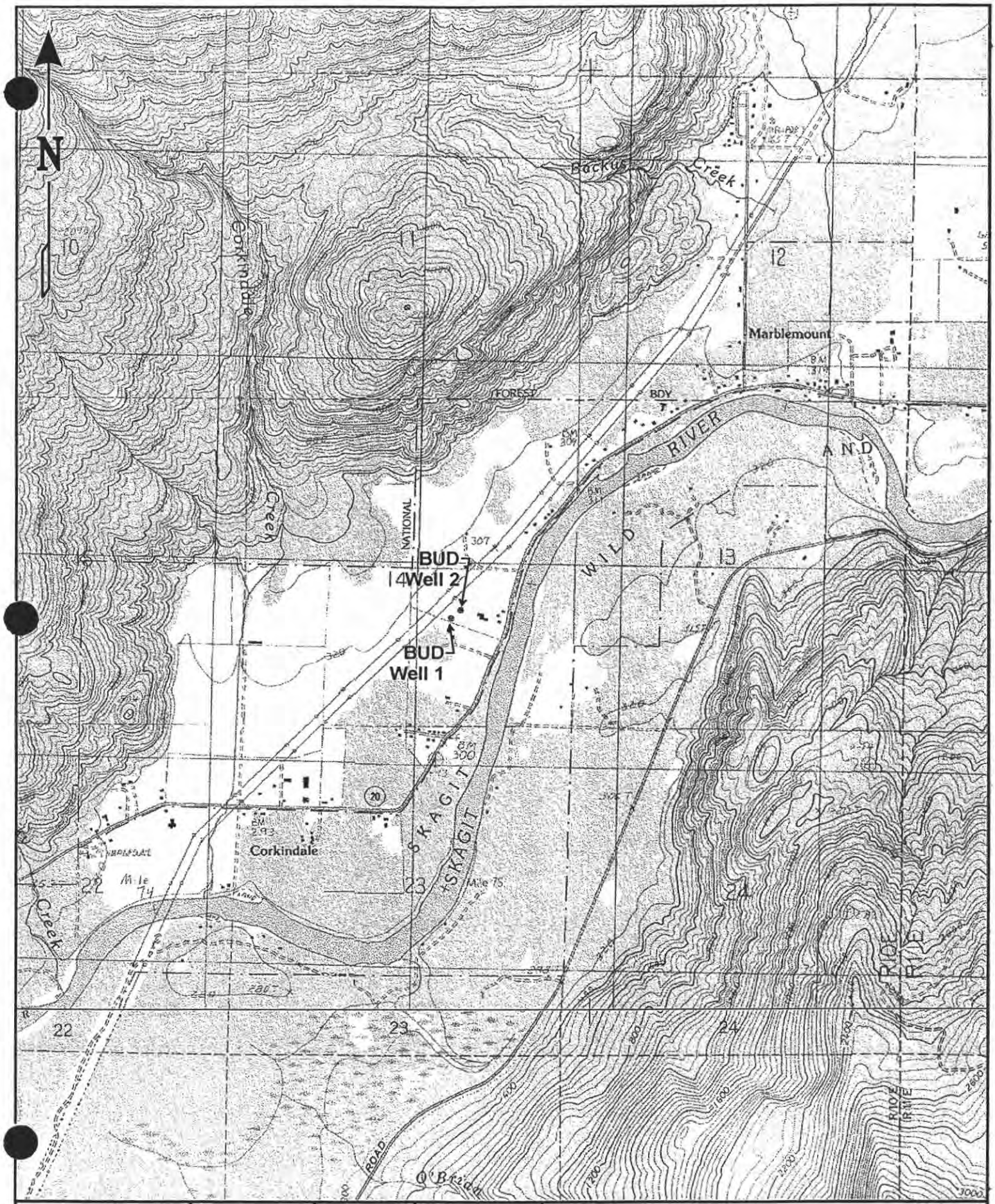
BUD-2 should also be equipped with a submersible pump capable of discharging the future estimated maximum daily demand of 160 gpm into the proposed water storage tank. The submersible pump should be installed with its intake at a depth of approximately 85 feet bgs. The pumping water level will be approximately 42 feet bgs at the 160 gpm pumping rate. BUD-2 should be retested for manganese and bacteria before it is put into service. It is possible that the high manganese level measured is a result of higher levels of turbidity and color than measured in the sample from BUD-1.

We also recommend installing two, 1-inch inside diameter, water-level sounding tubes with the pumps to allow use of common size transducers and control probes. Static and pumping water levels should be measured in the wells and recorded at least monthly along with total production and instantaneous pumping rate. Several years of record will be required to determine average seasonal variations in aquifer water levels.

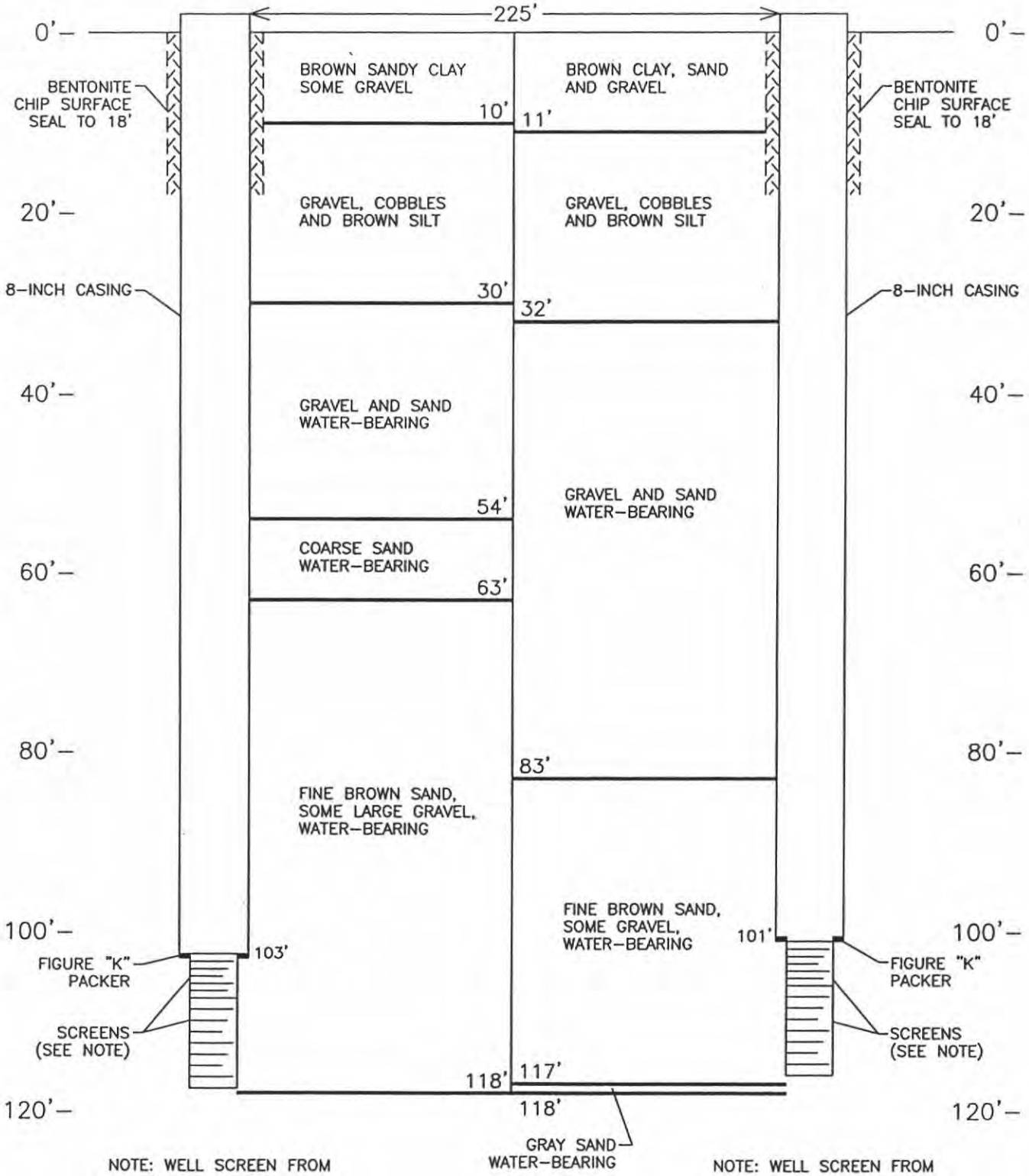
The District should discuss development of a joint wellhead protection plan with local water purveyors to help protect the groundwater resource area from potential contaminants.

We recommend that Don Clark allow the District to use a maximum instantaneous rate (Qi) of 160 gpm and annual quantity (Qa) of 260 af/yr from claim number 158491 if approved by the Washington State Department of Ecology.

The statements, conclusions, and recommendations provided in this report are to be exclusively used within the context of this document. They are based upon generally accepted hydrogeologic practices and are the result of analysis by Robinson & Noble, Inc. staff. This report, including any attachments to it, is for the exclusive use of Don Clark and the Bullerville Utility District. Unless specifically stated in the document, no warranty, expressed or implied, is made.



ROBINSON & NOBLE, INC.	Note: Basemap taken from USGS Marblemount Quad.	PM: DCD January 2004 2095-001A	Skagit County T 35 N/R 10 E-14 Scale 1" = 2000'	Figure 1 Well Location Map Bullerville Utility Dist: Develop/Construct 2 New Wells



NOTE: WELL SCREEN FROM 102.5'-107.5' IS 10-SLOT (0.010-INCH OPENING), SCREEN FROM 107.5'-117.5' IS 12-SLOT (0.012-INCH OPENING). BOTH 8-INCH TELESCOPE, TYPE 304, WIRE WRAP, ROSCOE MOSS, STAINLESS STEEL.

NOTE: WELL SCREEN FROM 101.-106' IS 10-SLOT (0.010-INCH OPENING), SCREEN FROM 106-116' IS 12-SLOT (0.012-INCH OPENING). BOTH 8-INCH TELESCOPE, TYPE 304, WIRE WRAP, ROSCOE MOSS, STAINLESS STEEL.

T 35 N/R 10 E - 14

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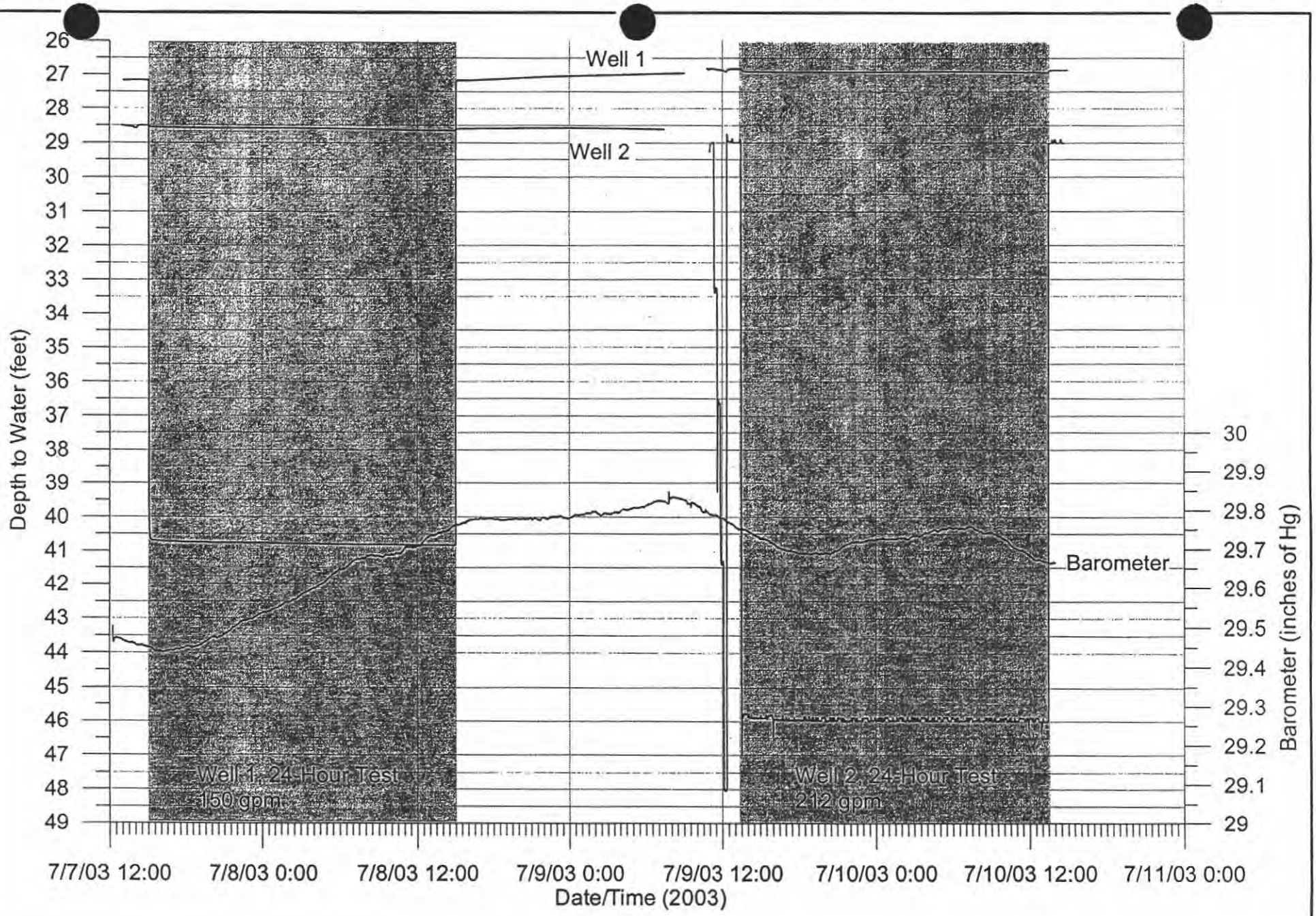
January 2004
2095-001A

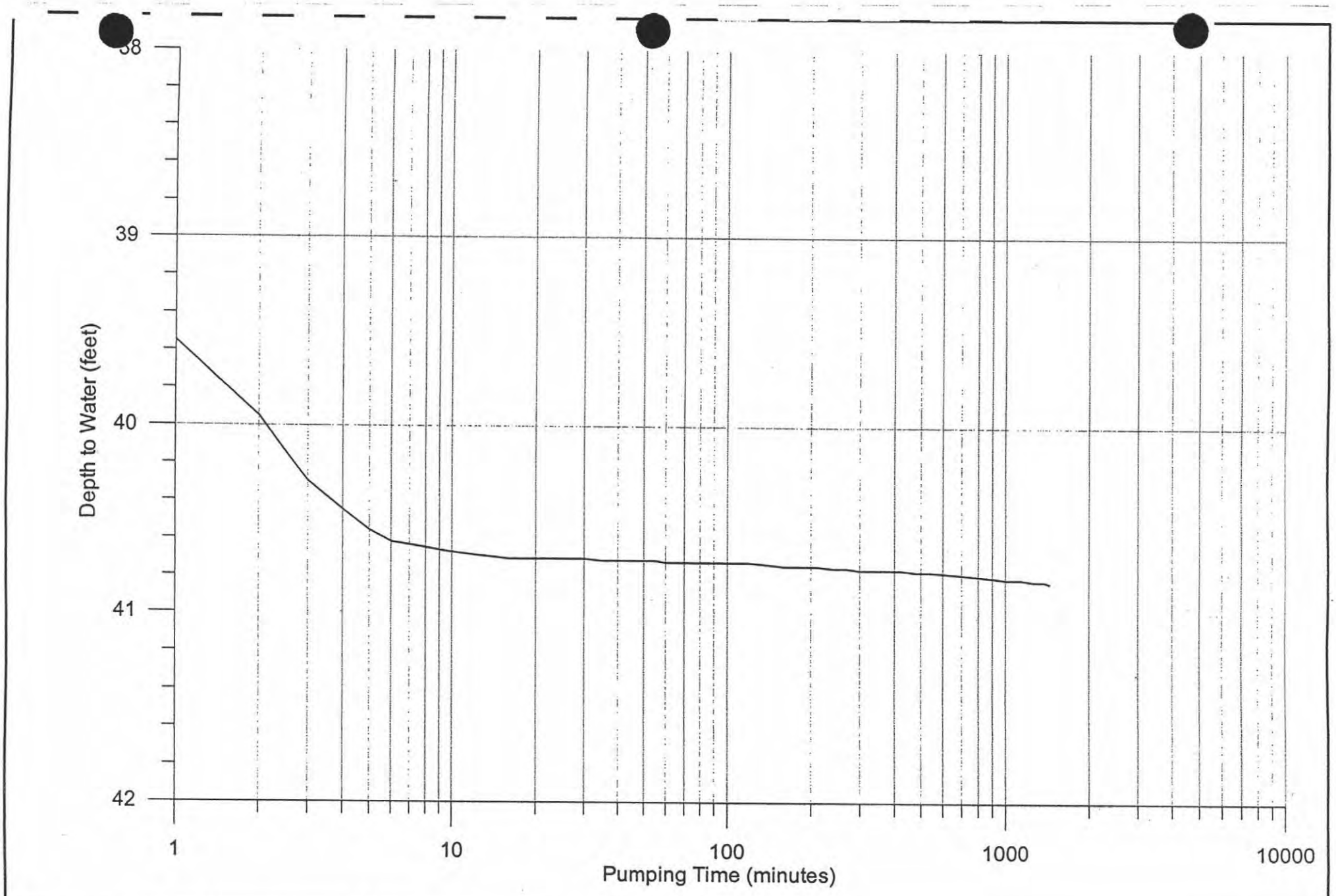
Figure 2

Contruction Detail and Geologic Log for BUD-1 and 2

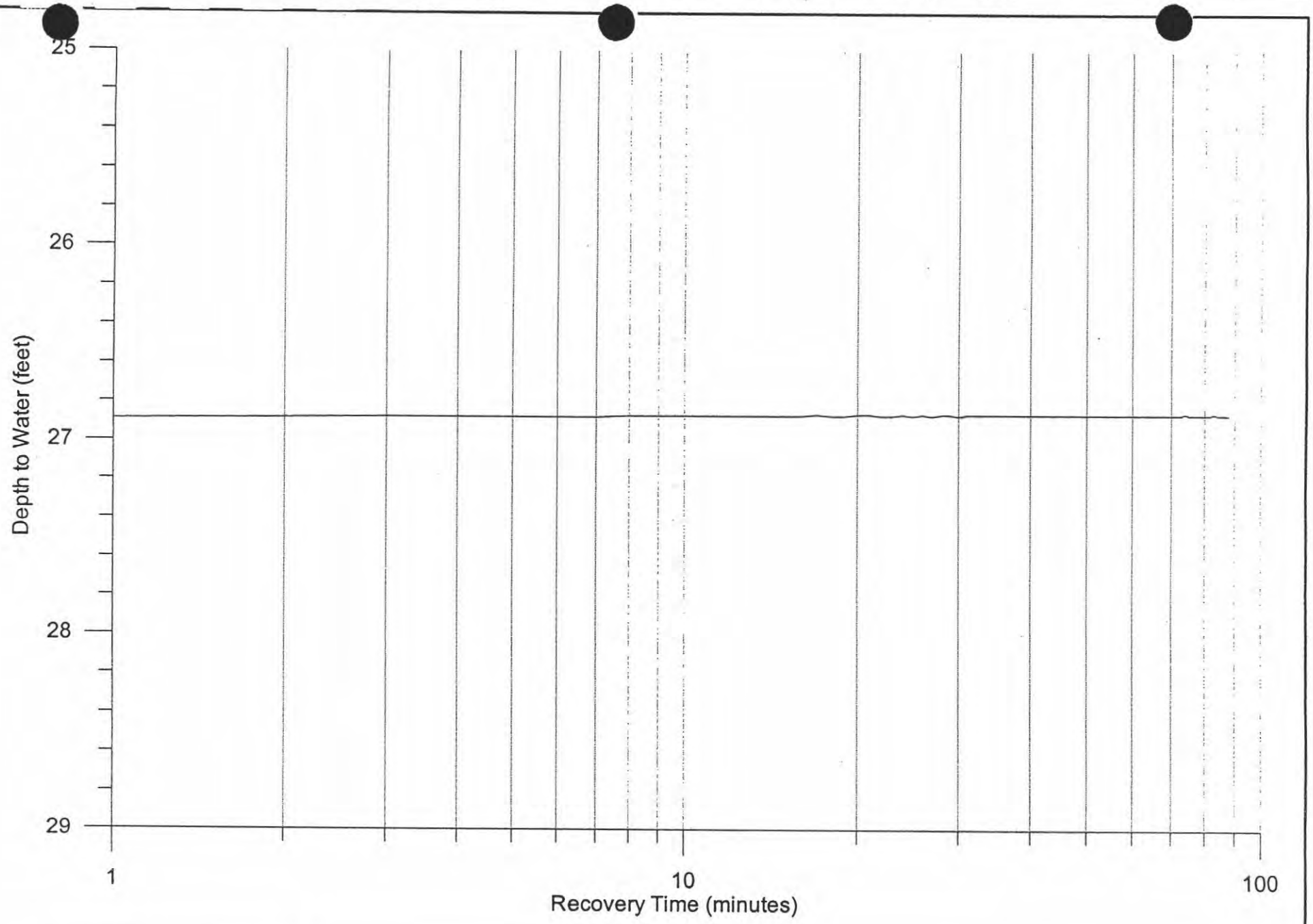
Bullerville Utility District:Develop/Construct 2 New Wells



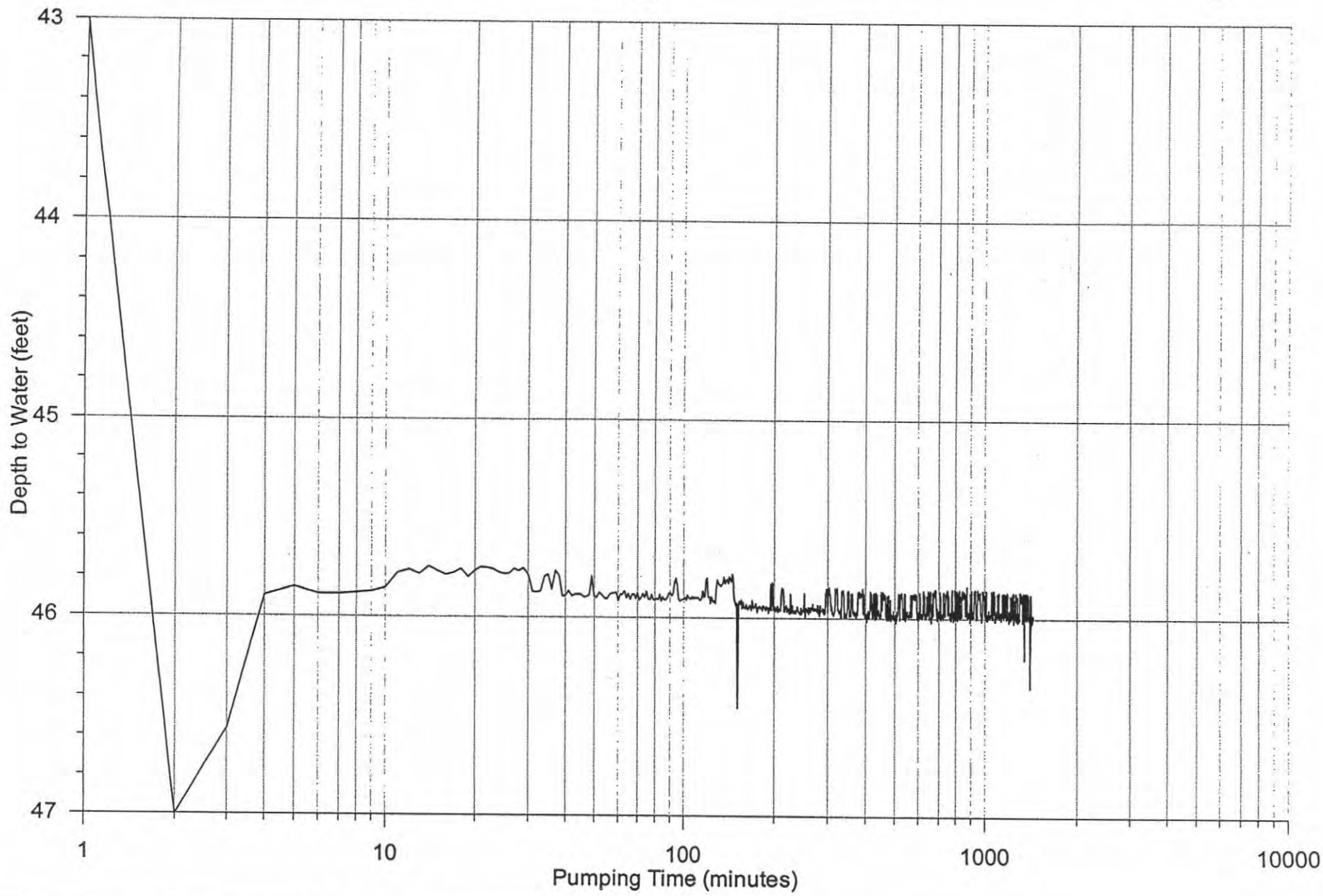
Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	T 35 N/R 10 E - 14	Figure 3 BUD 1 and 2, Hydrograph and Barograph 7/7-7/11 Bullerville Utility District: Develop/Construct 2 New Wells



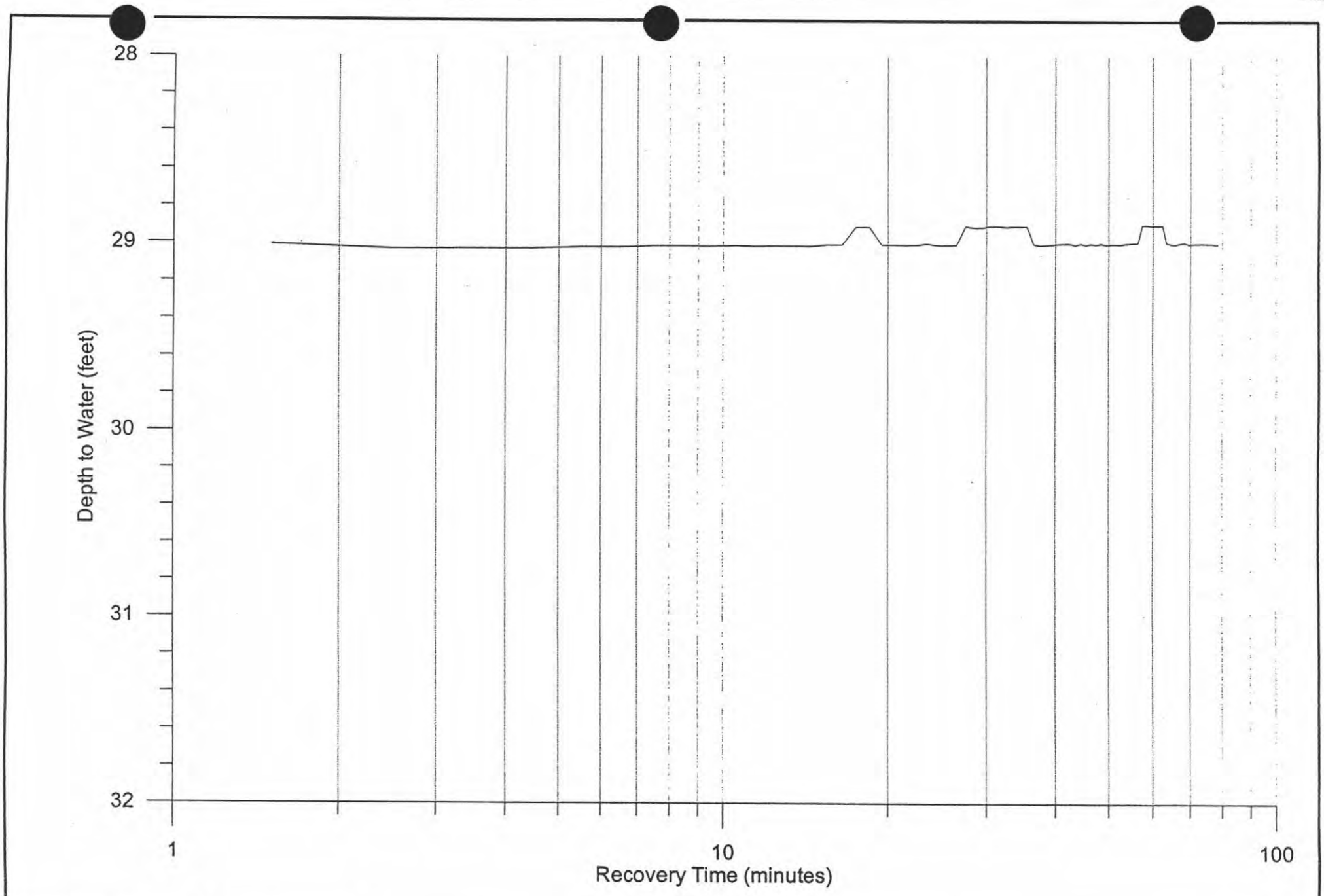
Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	Q = 150 gpm SWL = 27.17' T 35 N/R 10 E - 14	Figure 4 BUD 1, 24-Hour Pumping Test, Drawdown Data Bullerville Utility District: Develop/Construct 2 New Wells



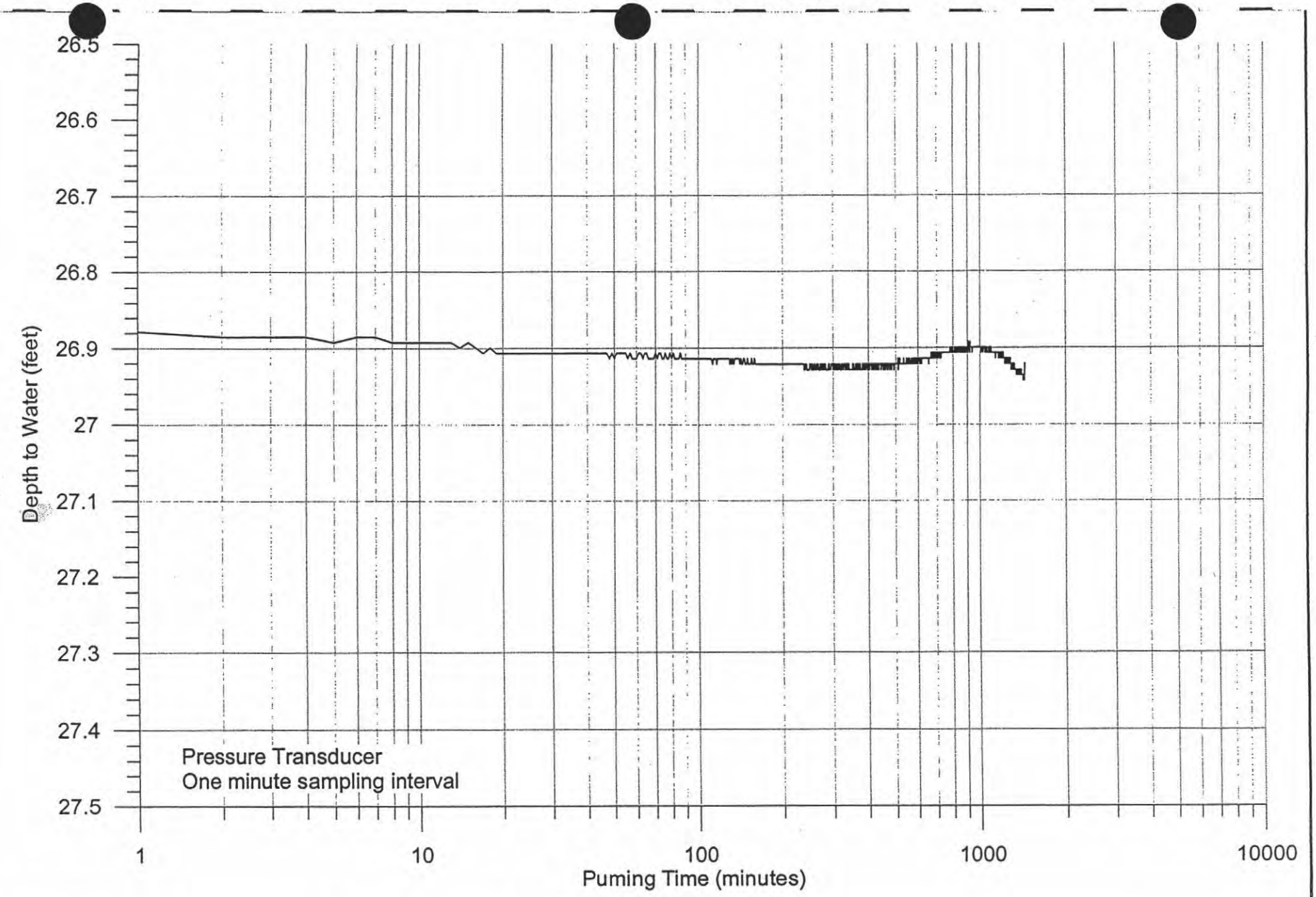
Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	SWL = 27.17' at 3:00 on 7/8/2003 T 35 N/R 10 E - 14	Figure 5 Bud 1, 24-Hour Pumping Test, Recovery Data Bullerville Utility District: Develop/Construct 2 New Wells



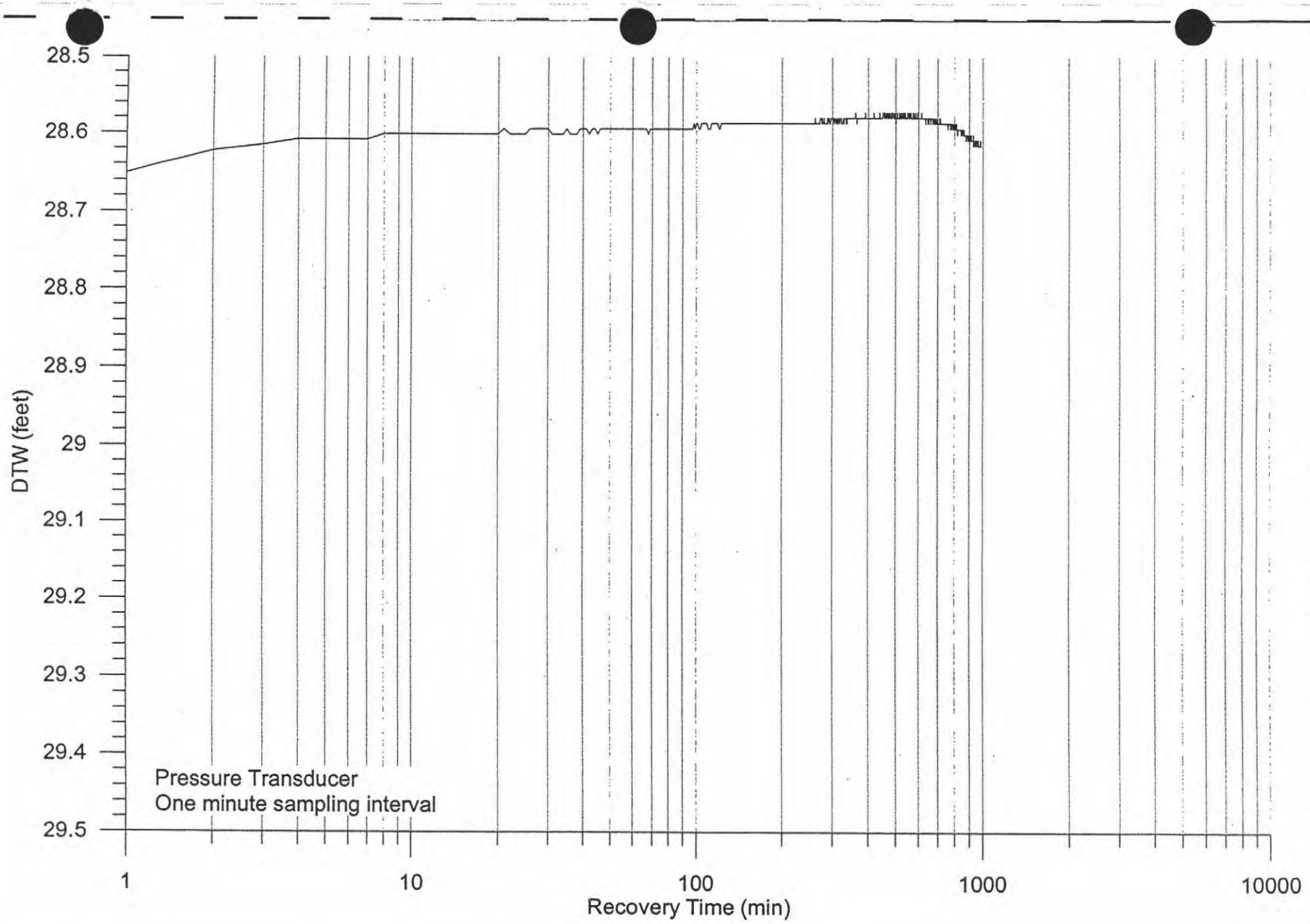
Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	Q = 212 gpm Pressure Transducer 1 min interval SWL = 29' T 35 N/R 10 E - 14	Figure 6 BUD 2, 24-Hour Pumping Test, Drawdown Data Bullerville Utility District: Develop/Construct 2 New Wells



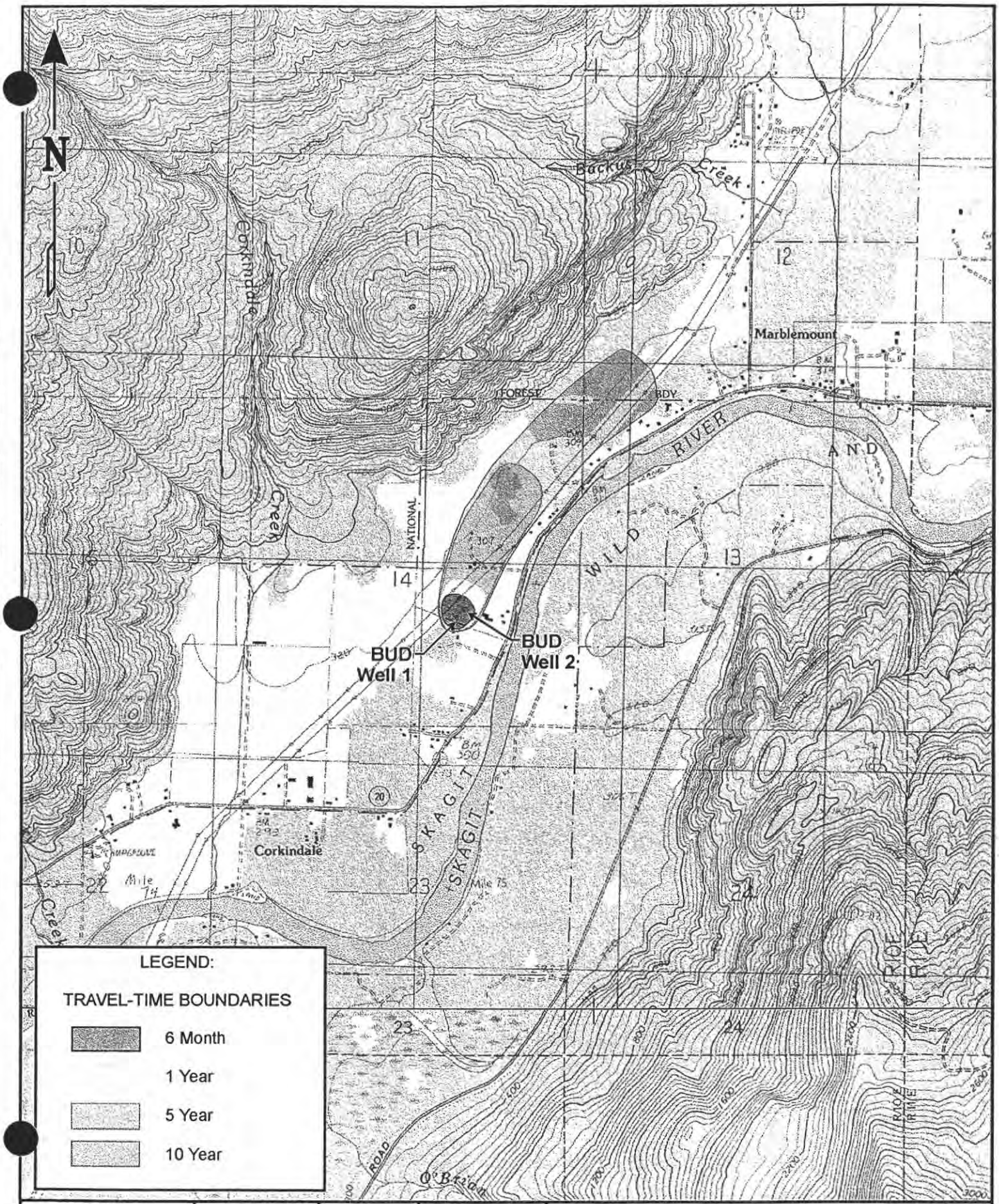
Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	SWL = 29' T 35 N/R 10 E - 14	Figure 7 BUD 2, 24-Hour Pumping Test, Recovery Data Bullerville Utility District: Develop/Construct 2 New Wells



Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	Q = 212 gpm SWL = 26.84' T 35 N/R 10 E - 14	Figure 8 BUD 1 Drawdown Data, BUD 2 24-Hour Pumping Test Bullerville Utility District: Develop/Construct 2 New Wells



Robinson & Noble, Inc.	PM: DCD January 2004 2095-001A	Q = 150 gpm SWL = 28.8' T 35 N/R 10 E - 14	Figure 9 BUD 2 Observation, BUD 1 24-Hour Pumping Test, Recovery Data Bullerville Utility District: Develop/Construct 2 New Wells



ROBINSON & NOBLE, INC.	Note: Basemap taken from USGS Marblemount Quad.	PM: DCD January 2004 2095-001A	Skagit County T 35 N/R 10 E-14 Scale 1" = 2000'	Figure 10 Wellhead Protection Area Map Bullerville Utility Dist: Develop/Construct 2 New Wells

Bullerville Well 1 Step Test
Manual Data

Time	ET	DTW	Q & Comments
1:03	1	32.4	63 gpm started at 150 gpm
	2	32.4	lower rate to 63 gpm
	3	32.2	cloudy
	4	32.2	
	9	32.2	clear some sand
1:18	15	32.2	
	1	34.75	96 gpm
	2	35.5	
	3	35	
	4	35.1	
	5	35.1	97 gpm
	8	35.05	clear some sand
	11	35.1	
1:33	15	35.1	clear sand free
	1	38	138 gpm
	2	40.2	150 gpm
	3	40.3	clear some sand
	5	40.4	
	7	40.4	clear some sand
	9	40.38	
1:48	15	40.4	clear sand free
	1	48.6	240
	2	48.8	clear some sand
	3	48.79	
	5	48.82	
	7	48.8	clear sand free
	10	48.78	
	12	48.8	
	13	48.8	
2:03	15	48.8	clear sand free

Bullerville 24-hour Pumping Test
Manual Data

Date	Time	Deci Date	ET	DTW PW	Q & Comments
7/7/2003	13:00	37809.54167		27.17	
7/7/2003	14:05	37809.58681		27.16	
7/7/2003	15:00	37809.625		27.17	Adj Q 130
7/7/2003	15:01	37809.62569	1	39.55	adj 140
7/7/2003	15:02	37809.62639	2	39.95	adj 140 clear very little sand
7/7/2003	15:03	37809.62708	3	40.3	adj 140
7/7/2003	15:04	37809.62778	4	40.45	148-150 gpm
7/7/2003	15:05	37809.62847	5	40.56	
7/7/2003	15:06	37809.62917	6	40.62	
7/7/2003	15:08	37809.63056	8	40.65	
7/7/2003	15:09:30	37809.6316	9.5	40.67	clear very little sand
7/7/2003	15:12	37809.63333	12	40.69	
7/7/2003	15:14	37809.63472	14	40.7	
7/7/2003	15:16	37809.63611	16	40.71	
7/7/2003	15:20	37809.63889	20	40.71	
7/7/2003	15:22	37809.64028	22	40.71	
7/7/2003	15:24	37809.64167	24	40.71	150 gpm clear no sand
7/7/2003	15:26	37809.64306	26	40.71	
7/7/2003	15:28	37809.64444	28	40.71	
7/7/2003	15:30	37809.64583	30	40.71	
7/7/2003	15:35	37809.64931	35	40.72	150 gpm clear no sand
7/7/2003	15:40	37809.65278	40	40.72	
7/7/2003	15:45	37809.65625	45	40.72	
7/7/2003	15:50	37809.65972	50	40.72	
7/7/2003	15:55	37809.66319	55	40.72	
7/7/2003	16:00	37809.66667	60	40.73	
7/7/2003	16:15	37809.67708	75	40.73	
7/7/2003	16:30	37809.6875	90	40.73	
7/7/2003	16:45	37809.69792	105	40.73	150 gpm clear no sand
7/7/2003	17:00	37809.70833	120	40.73	
7/7/2003	17:20	37809.72222	140	40.74	
7/7/2003	17:40	37809.73611	160	40.75	
7/7/2003	18:00	37809.75	180	40.75	
7/7/2003	18:30	37809.77083	210	40.75	
7/7/2003	19:00	37809.79167	240	40.76	
7/7/2003	19:30	37809.8125	270	40.76	
7/7/2003	20:00	37809.83333	300	40.77	150 gpm clear no sand
7/7/2003	20:30	37809.85417	330	40.77	
7/7/2003	21:00	37809.875	360	40.77	
7/7/2003	21:30	37809.89583	390	40.77	
7/7/2003	22:00	37809.91667	420	40.77	
7/7/2003	23:00	37809.95833	480	40.78	
7/8/2003	0:00:00	37810	540	40.78	
7/8/2003	2:00	37810.08333	660	40.79	150 gpm clear no sand
7/8/2003	4:00	37810.16667	780	40.8	
7/8/2003	6:00	37810.25	900	40.81	
7/8/2003	8:00	37810.33333	1020	40.82	150 gpm clear no sand

Bullerville 24-hour Pumping Test
Manual Data Continued

7/8/2003	10:00	37810.41667	1140		40.82	
7/8/2003	12:00	37810.5	1260		40.83	
7/8/2003	14:00	37810.58333	1380		40.83	collect samples for water quality o
7/8/2003	15:00	37810.625	1440		40.84	
7/8/2003	15:01	37810.62569		1	27.4	
7/8/2003	15:02	37810.62639		2	27.2	
7/8/2003	15:03	37810.62708		3	27.2	
7/8/2003	15:04	37810.62778		4	27.17	
7/8/2003	16:04	37810.66944		64	27.17	
7/8/2003	19:00	37810.79167		240	27.12	
7/8/2003	22:00	37810.91667		420	27.06	
7/9/2003	7:00	37811.29167		960	26.97	
7/9/2003	9:00	37811.375		1080	26.95	

Bullerville Well 2 Step Test
Manual Data

Well 2 Step Test

Time	ET	DTW	Q & Comments
11:21	0	29	55 gpm
11:22	1	33.5	turbid
	2	33.35	
	3.5	35	
	4	33.4	
	5	33.4	
	7	33.4	
	9	33.4	
11:32	11		
	13	33.4	
11:36	15	33.4	
	0.5	40	
	1	40.17	
	2	36.7	
	3	36.67	
	4	36.65	
	6	36.67	
	8	36.67	
	10	36.67	
	12	36.67	
11:51	15	36.67	
	0.5	40	
	1	41.1	
	2	41.37	
	3	41.4	
	5	41.4	
	8	41.4	
	11	41.4	
	13	41.4	
12:06	15	41.4	
	1	47.2	
	2	48.1	
	3	48.15	
	4	48.16	
	6	48.16	
	8	48.16	
	10	48.17	
	12	48.17	
12:21	15	48.17	
	Recovery		
	0.5	29.8	
	1	29.1	
	1.5	29	

Bullerville Well 2 24-hour pumping test
Manual data

Time	ET	DTW	Q & Comments
1:30	0	29	
1:31	1	44.5	
	2	46.9	
	3	46.1	
	4	45.62	
	5	45.6	
	6	45.65	
	7	45.68	
	8	45.7	
	9	45.72	
1:40	10	45.74	
	12	45.76	
	14	45.77	
	16	45.77	
	18	45.78	
1:50	20	45.79	
	22	45.79	
	24	45.78	
	26	45.79	
	28	45.79	
2:00	30	45.79	
	35	45.79	
	40	45.79	
	45	45.79	
	50	45.79	
2:30	60	45.79	
	70	45.8	
	80	45.8	
3:00	90	45.8	
	105	45.8	
	110	45.81	
	125	45.81	
	135	45.81	
4:00	150	45.82	
	156	45.82	
	170	45.83	
	190	45.83	
	210	45.84	
	230	45.84	
	250	45.85	
	270	45.85	
6:30	300	45.85	
	360	45.85	
	390	45.86	
	420	45.87	
	450	45.87	
10:00	510	45.88	
	570	45.89	

Recovery Time	DTW
0.5	29.5
1	29
2	29
10	29
20	29
60	29
90	29

Time	ET	DTW
	630	45.89
	750	45.89
	870	45.9
6:00	990	45.9
	1110	45.9
	1230	45.91
	1350	45.91
1:00	1410	45.91
1:30	1440	45.91

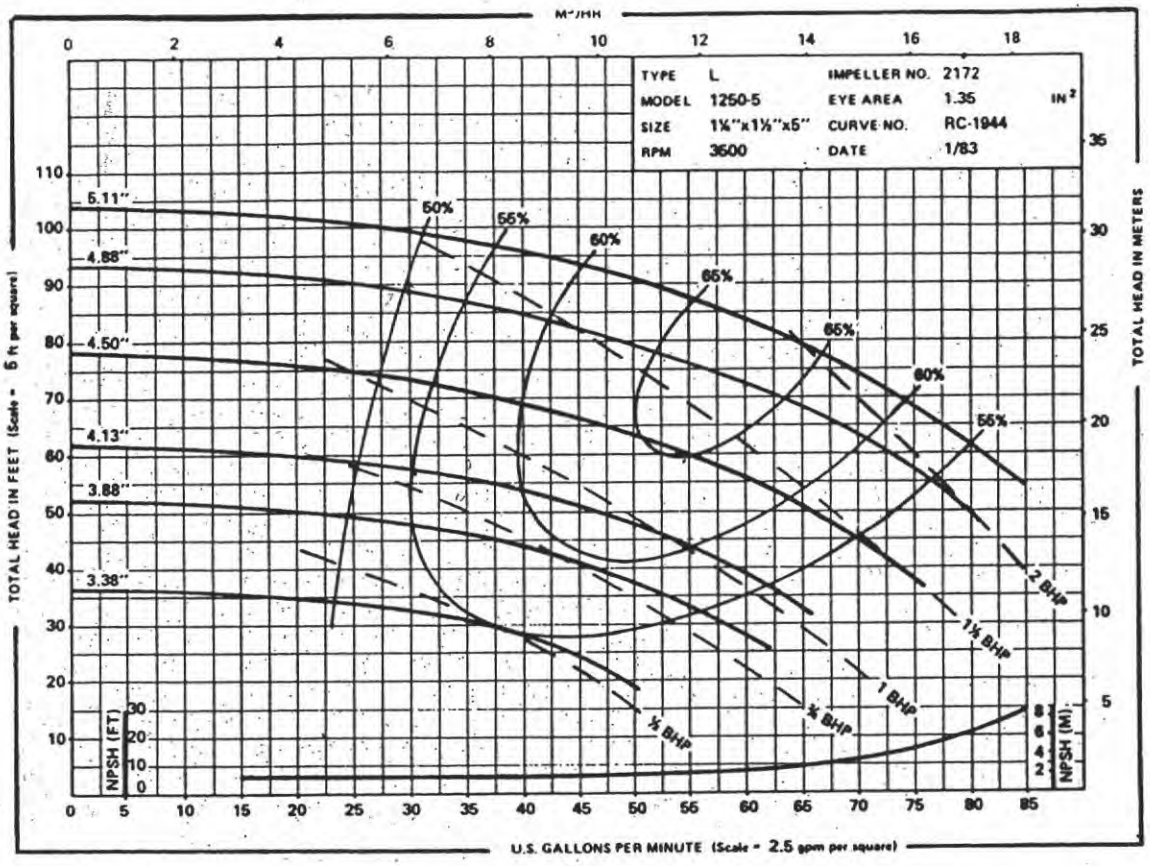
Bullerville 24-hour pumping test
Observation well data
manual measurements

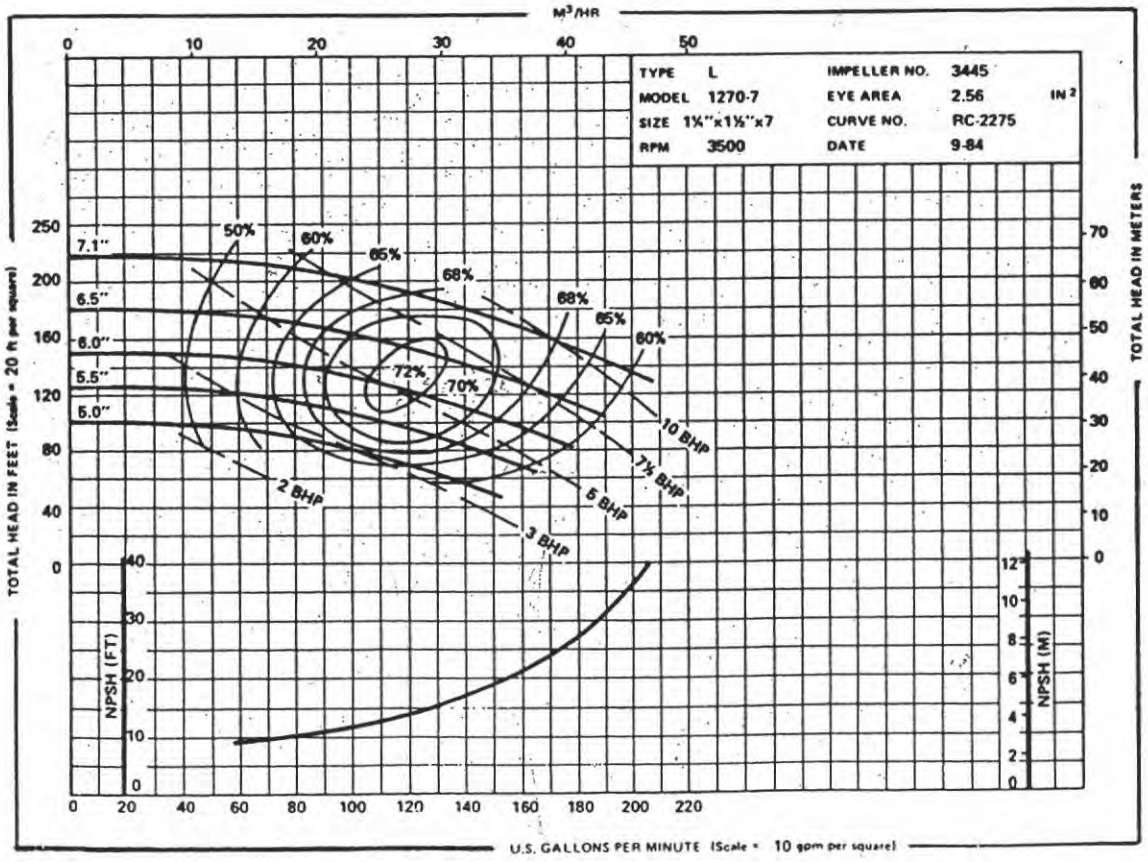
Well 2 obs		Well 1 obs	
Time	DTW	Time	DTW
8	28.56	10	26.89
12	28.56	14	26.89
18	28.56	20	26.89
40	28.57	25	26.89
105	28.58	60	26.9
160	28.58	120	26.9
180	28.58	180	26.9
240	28.58	300	26.9
270	28.58	360	26.9
300	28.58	630	26.9
360	28.58	870	26.9
540	28.59	990	26.9
660	28.59	1110	26.9
780	28.58	1230	26.9
900	28.58	1350	26.9
1140	28.6	1440	26.9
1320	28.6		

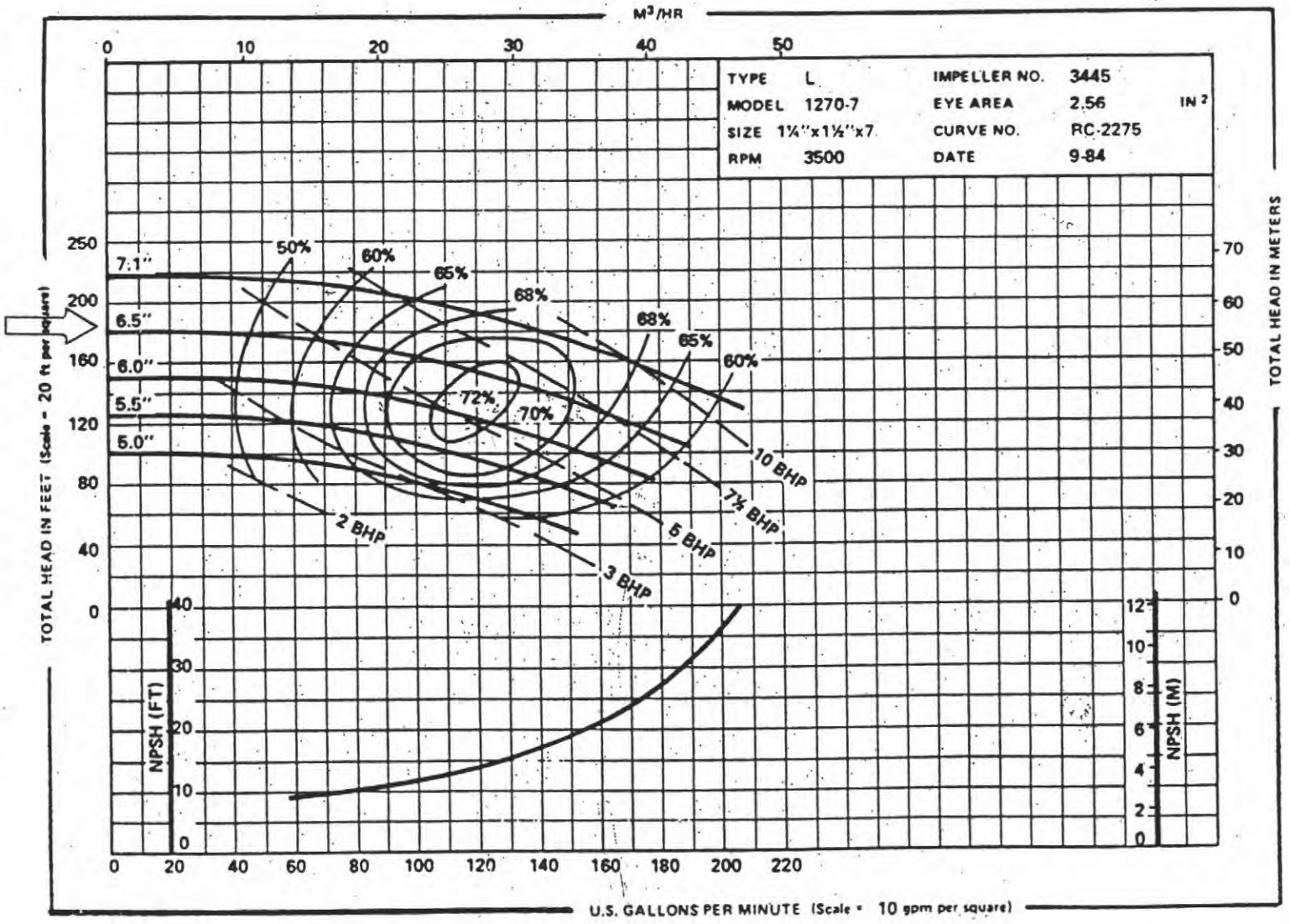
Appendix H

Booster Pump Curves

PERFORMANCE CURVES — 3500 RPM






M³/HR
0
10
20
30
40
50
TYPE L
MODEL 1270-7
SIZE 1¼"x1½"x7
RPM 3500
IMPELLER NO. 3445
EYE AREA 2.56 IN²
CURVE NO. RC-2275
DATE 9-84
7.1"
6.5"
6.0"
5.5"
5.0"
50%
60%
65%
68%
68%
65%
60%
72%
70%
10 BHP
7½ BHP
5 BHP
3 BHP
2 BHP
TOTAL HEAD IN FEET (Scale = 20 ft per square)
250
200
160
120
80
40
0
TOTAL HEAD IN METERS
70
60
50
40
30
20
10
0
NPSH (FT)
40
30
20
10
0
NPSH (M)
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
180
200
220
U.S. GALLONS PER MINUTE (Scale = 10 gpm per square)

Appendix I

County Franchise Agreement
WA DOT Permits

Appendix J

Easements and Deeds

Appendix K

County Service Area Agreement

PUBLIC UTILITY DISTRICT NO. 1
of
Skagit County
1415 FREEWAY DRIVE • MOUNT VERNON, WASHINGTON 98273-2492
P.O. BOX 1436 • MOUNT VERNON, WASHINGTON 98273-1436
PHONE (360) 424-7104 • FAX (360) 416-0352

April 8, 2004

Don Clark, Commissioner/President
Bullerville Utility District
58468 Clark Cabin Road
Rockport WA 98283

RE: Bullerville Utility District Service Area Boundary

Dear Mr. Clark:

Thank you for your discussions with Public Utility District No. 1 of Skagit County (Skagit PUD) concerning the creation of service area boundaries for the Bullerville Utility District (BUD).

Per the 2000 Skagit County Coordinated Water System Plan (CWSP), Skagit PUD was identified as the future service provider to the area where your utility district has been created. Therefore, as the utility affected by the boundary adjustment, were pleased to be able to work with you on the creation of an agreeable BUD service boundary.

Skagit PUD supports your most recent service area boundary delineation which indicates boundaries the same as those of the Bullerville Sewer District. Further, Skagit PUD supports the fact that the BUD service areas may expand per the methods outlined in the CWSP.

Please feel free to contact me with any questions on this subject.

Sincerely,

Ken K. Kukuk
General Manager

SDS/KKK/kac

cc: Scott Spahr, Planning Engineer
Nancy Feagin, State Department of Health
Lorna Parent, Skagit County Health Department

AGREEMENT FOR ESTABLISHING WATER UTILITY SERVICE AREA BOUNDARIES

PREAMBLE

This Agreement for water utility service area boundaries identifies and establishes between the undersigned parties the external boundary of the service area for which the designated water purveyor has assumed direct retail water service responsibility. The responsibilities accepted by the water purveyor are outlined in the Skagit County Coordinated Water System Plan (CWSP), and as defined by the adopted rules and regulations of the Washington State Department of Health (DOH). Except as specifically provided herein, this Agreement does not give new authorities or responsibilities to any water purveyor or to Skagit County or State regulatory agencies, but acknowledges the geographical area for these designated service responsibilities.

The terms used within this Agreement shall be as defined in the implementing regulations of Chapter 70.116 RCW, except as identified below.

1. Skagit County Critical Water Supply Service Area Map shall mean the map incorporated into this Agreement as Attachment A for the retail service area, except as amended in accordance with the CWSP procedures and with the concurrence of the affected water purveyors.

2. Retail Service Area shall mean the designated geographical area in which a purveyor shall supply water either by direct connection to the existing system, by a remote/detached system, or through interim service by an adjacent utility under agreement with the designated utility.

3. Wholesale Service Area shall mean the designated geographical area in which a purveyor, a group of purveyors, or another organization provides water to other water purveyors on a wholesale basis. A wholesale water supplier shall not provide water to individual customers in another purveyor's retail service area except with the written concurrence of the purveyor responsible for the geographical service area in question.

4. Lead Agency for administering the Agreement For Establishing Water Utility Service Area Boundaries shall be the Skagit County Department of Health, unless otherwise established by amendment to the CWSP.

The authority for this Agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

TERMS OF AGREEMENT

WHEREAS, Such an Agreement is required in WAC 246-293-250, Service Area Agreements-Requirement, of the Public Water System Coordination Act; and

WHEREAS, Designation of retail water service areas, together with the cooperation of utilities, will help assure that time, effort, and money are best used by avoiding unnecessary duplication of service; and

WHEREAS, Definite future service areas will facilitate efficient planning for, and provision of, water system improvements within Skagit County as growth occurs; and

WHEREAS, Responsibility for providing water service through ownership and/or management of water systems in a designated service area is vested in the designated utility; and

WHEREAS, Definite retail and wholesale service areas will help assure that water reserved for public water supply purposes within Skagit County will be utilized in the future in an efficiently planned manner,

NOW, THEREFORE, the undersigned parties, having entered into this Agreement by signature of its authorized representatives, concur with and will abide by the following provisions:

Section 1. Service Area Boundaries. The undersigned parties acknowledge that the Skagit County Critical Water Supply Service Area Map, included as Attachment A to this Agreement and as may be subsequently updated, identifies the purveyor's future water service area. The undersigned further acknowledge that there are no service area conflicts with adjacent water purveyors, or, where such conflicts exist, agrees that no new water service will be extended within disputed areas until such conflicts are resolved.

Section 2. Common Service Area Transfer. It is understood that purveyors may initially continue existing water service within the boundaries of neighboring purveyors, as defined in Attachment A. Such common service areas, if they exist, are described in Attachment B to this agreement. Also included in Attachment B are copies of, or a list of, all resolutions, ordinances, or agreements permitting these uncontested overlays. The undersigned parties agree that any water line for retail service extending outside of the retail service area boundary, as set forth in Attachment A, shall be phased out and service transferred to the designated adjacent purveyor on an economic basis or by mutual agreement.

Economic basis considerations shall include, but are not limited to:

(a) A determination by the present owner of service lines that maintenance, repair, and/or replacement costs exceed attributable income.

(b) Planned or imminent major street improvements or major improvements to either or both water systems which include an opportunity to transfer service.

The terms of the transfer of service area described in this Section shall be established in a separate agreement among the adjacent purveyors whose boundaries are affected.

Section 3. Boundary Streets. Unless separate agreements exist with adjacent purveyors concerning water services or other utility services, the parties agree that the water purveyor which is located to the north or east of boundary streets between this purveyor and adjacent purveyors shall be entitled to provide future water service on both sides of those streets. Depth of service on boundary streets shall be limited to one platted lot or as otherwise agreed by the utilities. Existing services on boundary streets shall remain as connected unless transfer of service is agreed to by both purveyors, as per Section 2. These provisions do not disallow the placement of mains in the same street by adjacent purveyors where geographic or economic constraints require such placement for the hydraulic benefit of both purveyors.

Section 4. Boundary Adjustments. If, at some time in the future it is deemed appropriate by one or both of the undersigned parties to make service area boundary adjustments, such modifications must receive written concurrence (which shall not be unreasonably withheld) of all purveyors that would be directly affected by such a boundary adjustment and the legislative authority(ies) having jurisdiction. These written modifications shall be noted and filed with the designated Skagit County lead agency and DOH. It is understood by the undersigned parties that if, as provided by RCW 70.116.040, the purveyor is unable to provide service within its designated service area boundary it may decline to do so. But, in that case, an applicant will first be referred to adjacent purveyors with an approved water system plan that provides for expansion. An existing system shall be considered "adjacent" to the proposed development if service can be provided with a waterline extension not to exceed one-half mile in length. If service will not be provided by an adjacent purveyor, the developer will be referred to the Skagit County PUD. The original service area boundary will be adjusted accordingly. This provision does not apply where boundary adjustments are made as a result of municipal annexations or incorporations, nor is it intended to modify the provisions of state law.

Section 5. Service Extension Policies. The undersigned parties agree that prior to expanding the purveyor's water service area, other than by addition of retail customers to existing water mains, the purveyor shall have adopted design standards

customers to existing water mains, the purveyor shall have adopted design standards and utility service extension policies. The design standards shall meet or exceed the Skagit County CWSP Minimum Design Standards.

Municipalities further agree that if an individual municipality identifies a service area outside of its existing municipal corporate boundaries, said municipality shall assume full responsibility for providing water service equivalent to (excluding rates and charges) the level of service provided for their inside-city customers. This shall be in conformance with applicable land use policies.

Section 6. Systems Placed in Receivership. RCW 43.70.195 enacted in the 1990 Regular Session of the Washington State Legislature provides that whenever an action is brought in superior court to place a public water system in receivership, the petition to the court shall name candidates for receiver who have consented to assume operation of the water system. The undersigned purveyor agrees to be named as receiver in such actions initiated for systems within its designated service area. By this consent, the undersigned does not waive its rights to appear and participate in the court proceedings to determine acceptable conditions of receivership.

This agreement by reference includes the following attachments:

Attachment A - Skagit County Critical Water Supply Service Area Map. (see Section 1)

Attachment B - Common Service Area Agreement - Optional - Utility may attach copies or list such agreements if relevant. (see Section 2)

IN WITNESS WHEREOF, the undersigned parties have executed this Agreement.

Board of County Commissioners Skagit County, Washington	_____ Water Purveyor
_____ Kenneth A. Dahlstedt, Chairman	_____ Representative
_____ Ted W. Anderson, Commissioner	_____ Title
_____ Don Munks, Commissioner	
_____ Date	_____ Date

LEGAL DESCRIPTION
for
BULLERVILLE BOUNDARY AREA

That portion of the South ½ of Section 14 and the North 3/4th of Section 23, all in Township 35 North, Range 10 East, W.M., described as follows:

Beginning at the intersection of the City of Seattle right-of-way with the North and South center line of said Section 14,
thence South, along said center section line to the Northwest corner of Tract 3, Short Plat No. 31-82, entitled Bosse Short Plat, approved December 10, 1982, recorded December 13, 1982 in Volume 6 of Short Plats, page 34, under Auditor's File No. 8212130001;
thence North 89° 46'47" East, along the north line of said Tract 3 a distance of 914.96 feet to the Northeast corner thereof;
thence Southwesterly, along the Easterly line of said Tract 3 to the Southeast corner thereof;
thence Easterly, along the North line of said Section 23 to the Westerly bank of the Skagit River;
thence Southwesterly, along the Westerly bank of the Skagit River to an intersection with the North-South center section line;
thence North, along said North-South center section line to the Southeast corner of the Northeast ¼, of the Northwest ¼ of said Section 23;
thence West, along the South line of said Northeast ¼ of the Northwest ¼ to a point which is 430 feet East of the West line of said Northeast ¼ of the Northwest ¼, said point also being a point of intersection with the Southerly extension of the East line of a tract conveyed to Wade E. Buller by deed recorded in Volume 199 of Deeds, page 413;
thence North a distance of 660 feet, more or less, to the Northeast corner of said Buller Tract;
thence West 100 feet to the East line of the West ½ of the West ½ of the Northeast ¼ of the Northwest ¼ of said Section 23;
thence North along the said East line a distance of 660 feet, more or less, to the North line of said Section 23;
thence West along said North line to an intersection with the Southeasterly line of the City of Seattle right-of-way;
thence Northeasterly, along said Southeasterly line, to the point of beginning.

Appendix L

Standard Construction Specifications

STANDARD SPECIFICATION FOR WATER MAIN INSTALLATION

1. General:

These specifications cover the minimum standards for the installation of 2 to 12-inch diameter water mains complete with valve, fittings, fire hydrants, appurtenances, etc. These specifications include minimum material specifications for bedding and backfill, pipe valves, fire hydrants and other associated items.

These specifications shall be used in conjunction with the contract documents provided by the Owner or Bidder, and with the other portions of the Project Report containing these specifications. These specifications and accompanying drawings were prepared assuming the work would be done by the system operator, or under the direct supervision of the system manager, this operator or manager having knowledge of the existing plant and equipment, and underground utilities.

Where American Water Works Association Standards (A.W.W.A.), American Society for Testing Materials Standards (ASTM), Washington State Department of Transportation Standard Specifications for Road, Bridges and Municipal Construction, 1991 (DOT Std. Specif.) or other standards are referenced within, any further statement of requirements is for the purpose of either highlighting important details of the Standards or to impose more stringent requirements.

No substitution for the material specified herein or in the engineering drawings shall be made without prior approval of the Owner. No change of the water main alignment, water main diameter, etc. shown on the engineering drawings may be made without the prior approval of the Owner and Engineer.

Where a manufacturer's product is specified by name and model, the intent is to

a) Establish a minimum standard where either a A.W.W.A. Standard is not available, or where the standard of performance exceeding A.W.W.A. Standards is desired,
b) Conform to existing products in the distribution system or to provide inventory uniformity for the purpose of maintenance.

The approval of alternate materials to those specified by manufacturer's name and model, as a "approved equal" shall be at the sole discretion of the Owner.

2. Materials:

Water Mains - Unless otherwise specified in the drawings, all water mains 4, 6 and 8-inch diameter shall be either ductile iron pipe (D.I.) or polyvinyl chloride (PVC) pressure pipe conforming to the following specifications. All "yard" piping at the reservoir site, or into or under a building or other structural foundation, shall be ductile iron.

All ductile iron pipe shall be class 50 single cement lined, with "Tyton" or mechanical joints, conforming to the following American Water Works Association (A.W.W.A.) Standards:

- C104-85 "Cement Mortar-Lining for Ductile-Iron Pipe and Fittings for Water"
- C111-85 "Rubber-Gasket Joints for Ductile-Iron and Grey-Iron Pressure Pipe and Fittings"
- C151-86 "Ductile-Iron Pipe Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids"

Ductile iron pipe with screwed flanges, welded restraining rings, or EBAA IRON or similar restraining glands and/or flange adapters shall be minimum thickness class 53, except that EBAA IRON "MEGALUG" and "MEGAFLANGE" restraint may be used on class 50 ductile iron.

Where its use is specified by the Engineer, polyethylene encasement installed on ductile iron pipe, valves and fittings shall conform to A.W.W.A. Standard:

- C105-88 "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids"

All polyvinyl chloride (PVC) pressure pipe shall be pressure class 150 conforming to A.W.W.A. Standard:

- C900-89 "Polyvinyl Chloride (PVC) Pressure Pipe, 4-Inch Through 12-Inch for Water"

All 2-inch through and including 3-inch mains (e.g., supply pipe from well), shall be polyvinyl chloride (PVC) pressure pipe, class 200, rubber-ring joint, Pacific Western Extruded Plastics Co. (P W Pipe), "Twin Seal" or Engineer approved equal.

Fittings - All fitting 4-inch and larger shall be single cement lined ductile iron or grey iron conforming to the following A.W.W.A. Standards:

- C104-90 "Cement Mortar-Lining for Ductile-Iron Pipe and Fittings for Water"
- C110-87 "Ductile-Iron and Grey-Iron Fittings, 3-Inch Through 48-Inch, for Water and Other Liquids"
- C111-90 "Rubber-Gasket Joints for Ductile-Iron and Grey-Iron Pressure Pipe and Fittings"

Valves - All valves 4 through 12-inch in diameter shall conform to the following A.W.W.A. Standards:

- C509-87 "Resilient-Seated Gate Valves for Water and Sewerage Systems"
- C111-90 "Rubber-Gasket Joints for Ductile-Iron and Grey-Iron Pressure Pipe and Fittings"

Fire Hydrants - All fire hydrants shall be dry barrel, compression type conforming to A.W.W.A Standard C502-85 "Dry-Barrel Fire Hydrants", with 4.5" pumper port and two 2.5" outlets, 6" inlet, and 1 3/16" pentagon operating nut.

Service Pipe - All 3/4 to 2-inch water service pipes shall be pressure class 200 psi, iron pipe size polyethylene, PE 3406 resin, conforming to the following A.W.W.A Standard:

- C901-88 "Polyethylene (PE) Pressure Pipe and Tubing, 1/2-Inch Through 3-Inch. for Water Service"

All water services larger than 2-inch shall conform to the standards for water mains in Section 2.1 above.

Brass Fittings - All miscellaneous fittings shall be brass conforming to the following A.W.W.A Standard:

- C800-89 "Underground Service Line Valves and Fittings"

No steel or galvanized fittings shall be used.

Fittings shall be of the compression type as manufactured by Mueller, Decatur, Illinois, series 110 Compression Connections; or by Ford Meter Box Co., Wabash, Indiana, Pack Joint Coupling series. The coupling shall be supplied with stainless steel tube liner where required by the manufacturer, and shall be compatible with polyethylene service pipe thickness and diameter (see par. 2.5, above).

Curb stops, where used for blow offs, air valves, etc., shall be o-ring type as manufactured by Mueller, Decatur, Illinois, series Mark II Oriseal c/w tee head, or Engineer approved equal.

Branch connections, where used on a dual service line (two customers supplied from one service connection) shall be 1 x 3/4 x 3/4 inch "Y" style c/w compression fittings (specified as above) as manufactured by Mueller, Decatur, Illinois, series Mark II Oriseal c/w tee head, or Engineer approved equal.

Meter setters shall incorporate compression inlet and outlet fittings, upstream angle ball valve as manufactured by Ford Meter Box Co., Wabash, Indiana, or Engineer approved equal, and outlet fitting with an angle pattern residential dual check valve backflow preventer, complying with ASSE Standard 1024, as manufactured by Watts Regulators Co., Lawrence, MA, Series 7A or Engineer approved equal.

Valve Boxes - All valve boxes shall be cast iron slip type with bottom flange and "WATER" cover as manufactured by VanRich Casting Corp., Portland, OR, Model 920 Standard or Engineer approved equal.

Backflow Prevention Assemblies - Backflow prevention assemblies shall be State Department of Health approved, and University of Southern California Foundation for Cross Connection Control and Hydraulic Research (USC FCCCHR) approved.

State and USC FCCCHR approval is not required where residential dual check valve backflow preventers are installed with water meters as a voluntary means (i.e., where backflow prevention is not a requirement) of providing premise isolation.

Marking Tape - Marking tape for PVC mains and polyethylene services shall be of the detectable type (with metallic foil laminate) with plastic jacket, 6-inch wide, blue color with wording "WATER LINE", as manufactured by Calpico, San Francisco, CA, or Engineer approved equal.

Air Release Valves - Unless otherwise specified in the Plans, all air valves shall be 3/4-inch simple lever air release type, as manufactured by Valve-Matic, Elmhurst, Illinois, Model 22, or Engineer approved equal.

Meter Boxes - Unless otherwise specified in the Plans, water meter boxes shall be plastic body and cover, as manufactured by Ametek, Sheboygan, Wisconsin, series 17014 and 190109 (corresponding to meter size). or Engineer approved equal. The meter box shall be of adequate size to accommodate both the meter and meter setter, also the dual check valve backflow preventer.

Water Meters - Water meters to single family residential customers shall be 3/4 x 3/4 inch displacement type, SENSUS SR II, with registration in gallons, as manufactured by Sensus Technologies, Uniontown, PA meeting A.W.W.A Standard C700, or Owner approved equal.

Service Saddles - Service saddles shall be furnished with a ductile iron body and IPS standard tapping, with a neoprene or Buna-N rubber gasket cemented in place. Saddles shall be double strap for PVC pipe (saddles required for all service sizes), as manufactured by Mueller, Decatur, Illinois, or Engineer approved equal. Services may be direct tapped into ductile iron pipe.

Control Cable - With the new water mains, should the Owner elect to install new control cable to a reservoirs or well site, the cable shall be 8 wire #14 Type PTN direct burial control cable, laid continuously, without buried splices, from the pump house to the reservoir site.

3. Installation:

General - Unless otherwise specified in the Plans or in these specifications, water mains shall be installed in accordance with the manufacturer's printed specifications, to American Water Works Association (A.W.W.A.) Standards and with *1994 Standard Specifications for Road, Bridge and Municipal Construction*, prepared by the Washington State Department of Transportation, or the latest edition thereof. References to *"Section"*, *"Paragraphs"*, or *"Divisions"* indicated by number hereinafter pertain to these D.O.T. *Standard Specifications*.

Trenching/Backfill - Trenching, foundation, bedding and backfilling for water mains and incidental piping shall conform to D.O.T. Std. Specif. *Section 7-10*, except that backfill for flexible pipe ("initial backfill" in the detail) shall be extended 12 inches over the crown of the pipe.

The requirements for bedding and backfill for ductile iron and PVC pipe are summarized in the Plans, attached hereto.

Unless otherwise specifically approved by the Engineer, only imported material conforming to *Section 9-03.16* shall be used for bedding (layer under the pipe), haunching (layer to spring line) and initial backfill. Native material may be approved by the Engineer if it fully complies with D.O.T. Std. Specif. *Section 9-03.15* and *Section 9-03.16*. PVC pipe shall be considered "Flexible pipe" with respect to this section. Where a request for use of native material is made by the Contractor, the material shall be evaluated prior to use by a qualified material testing lab. and certified that it meets the requirements of the above referenced D.O.T. Sections. The Engineer may require periodic testing to ensure continuing material conformance. The cost of all such testing shall be borne by the Contractor.

In Skagit County right of way, where water mains or services are laid under pavement or in the road shoulder backfill above the initial backfill shall conform to *Section 7-10.3(11)* and *Section 9-03.19*. In other areas native material may be used above the initial backfill. In ditches, the backfill shall comply with any additional requirements imposed by Skagit County, such as the use of quarry stone for erosion control.

Unless otherwise specified in the Plans all water main excavations shall be made by open cut. All trenches shall be excavated to true and smooth bottom grades in accordance with the lines given in the Plans. The trench bottom shall provide uniform bearing and support for each length of pipe.

Bell holes shall be excavated to the extent necessary to permit accurate work in making and inspecting the joints. The banks of the trenches shall be kept as nearly vertical as soil conditions will permit, and where required to control trench width or to protect adjacent structures, the trench shall be sheeted and braced.

Care shall be taken not to excavate below the depth specified, unless to remove unsuitable materials. Excavation below the grade of the pipe shall be backfilled with select backfill material and compacted as specified herein.

Pipe Laying - Except as noted below, water mains and services shall be laid in accordance with the procedures outlined in D.O.T. Std. Specif. *Section 7-11*.

Water mains shall be laid to provide minimum cover of three feet. The depth of the water main may be increased as necessary to pass under other utilities, culverts, etc. Whenever possible, grade changes for passing other utilities shall be made by gradually varying trench depth.

Unless otherwise approved by the Engineer, water mains shall be laid with at least 10 foot horizontal and 18 inch vertical separation from sanitary or storm sewer, and 3 foot horizontal and 12 inch vertical separation from all other utilities.

Where the water main crosses a sanitary or storm sewer, but cannot be laid within a minimum 18-inch vertical separation,

a) One 18 foot length of water pipe shall be laid so joints are equal distance from the sewer, and
b) The sewer pipe shall be either replaced with ductile iron pipe with joints equally spaced from the water pipe or encased in concrete.

here the water main must be installed below the sewer, the water main shall be installed with a minimum 18 inch vertical separation and the sewer pipe replaced with ductile iron pipe as detailed in (b), above.

Ductile iron water mains shall be installed in accordance with A.W.W.A Standard

- C600-87 "Installation of Ductile Iron Water Mains and Their Appurtenances"

PVC water mains shall be installed in accordance with the Uni-Bell Plastic Pipe Association's publication "Handbook of PVC Pipe", **except as noted below**, where more stringent requirements are specified.

All PVC pipe shall be installed without deflection at the pipe joint of more than 2 degrees, or 80 percent of the maximum allowable by the pipe manufacturer, whichever is the lesser. **All PVC pipe shall be installed without bending of the pipe lengths.** All additional changes in both horizontal and vertical alignment shall be made by the deflection of mechanical joints (M.J.) at fittings; additional M.J. sleeves shall be installed as necessary.

Ductile iron pipe joint deflection shall be limited to 4 degrees (80 percent of maximum allowable under A.W.W.A. C600).

On road curves, either short lengths of pipe or mechanical joint sleeves shall be used as needed to limit the pipe joint deflection to within the above noted values. Short lengths and/or fittings shall be utilized on curves of radius less than 280 feet for ductile iron pipe, and 570 feet for PVC pipe.

All PVC pipe and polyethylene services shall be installed with detectable marking (warning) tape installed one foot above the PVC pipe or PE service and brought up to the surface within all valve boxes and fire hydrants.

Unless otherwise specified in the Plans, all cast iron or ductile iron fittings used on A.W.W.A C-900 PVC pipe shall have mechanical joint ends.

Where more than one pipe is installed in a trench, special care shall be taken to provide adequate bedding at and below the spring of the larger pipe. Provide a minimum of 4-inch clearance between pipes. Where an electrical telemetry cable is also installed in the trench, the cable shall be installed at the spring line elevation of the largest pipe.

All buried galvanized steel pipe fittings, and all exposed steel pipe or ductile iron pipe threads shall be tightly wrapped with two layers of PVC tape.

Thrust Blocks - All thrust blocks shall be capable of resisting the thrust created from the application of a 225 psi hydrostatic test pressure (i.e., 1.5 times the rated working pressure of the water main material). The minimum bearing area and placement of thrust blocks shall conform to the Plans, attached hereto.

All concrete thrust blocks, fitting support, etc., shall be Class 3000 per D.O.T. Std. Specif. *Section 7-11.*

Fire Hydrants - Fire hydrants shall be installed in accordance with the Plans, attached hereto.

Blow-offs - Blow offs shall be installed in accordance with the Plans, attached hereto.

Service Tapping - The tapping of a water main under pressure ("wet" tapping) shall only be done by a Contractor approved by the Engineer. the "wet" tapping of PVC or Asbestos Cement pipe shall only be done after the Owner has partly closed the mains isolating valves to reduce flooding damage should the pipe rupture during tapping.

Service connections 3/4 to 2-inch in diameter shall be installed in accordance with the Plans, attached hereto. Services shorter than 60 feet in length shall be installed without splices.

Details of service connections over 2-inch in diameter shall be shown in the Plans for the water main installation or site servicing.

Water Meters - Meters 3/4 to 2-inch in diameter shall be installed in accordance with the Plans, attached hereto.

Installation details for meters larger than 2-inch in diameter shall be shown on the Plans for the water main installation or site servicing. Meters shall be installed with isolating valves and bypass in accordance with the Plans, attached hereto.

Backflow Prevention Assemblies - All backflow prevention assemblies shall be installed in accordance with the recommendations outlined in *Cross Connection Control Manual, Accepted Procedures and Practices,* December 1995 or latest edition thereof, published by the Pacific Northwest Section, American Water Works Association.

Installation details for backflow prevention assemblies larger than 2-inch in diameter shall be shown on the Plans for the water main installation or site servicing.

Air Release Valves - All air valves shall be vented above ground level to prevent the backflow of groundwater. The air valve shall be installed in accordance with the Plans, attached hereto.

4. Disinfection:

All new mains and repaired portions or, or extensions to, existing mains shall be disinfected in accordance with:

- A.W.W.A. Standard C651-86 "Disinfecting Water Mains"

The placing of calcium hypochlorite granules in each pipe section during laying, as outlined in Section 5.1 "Tablet Method" of A.W.W.A. Standard C651, without the additional placement of calcium hypochlorite tablets, shall be done only on mains and services less than 100 feet in length, unless otherwise approved by the Engineer.

Where water is encountered in the trench, care shall be taken to insure that no water or other deleterious materials enter the pipe at any time. Under all conditions, care shall be taken in handling pipe and appurtenances to insure to insure that no deleterious materials enter the pipe, fittings, valves, etc. Special care shall be taken during the installation to ensure that dirt or other foreign matter does not enter a push-on or mechanical joint of a pipe, valve, fitting, etc.

During the laying of a water main, should dirt or other foreign material enter any pipe, fitting, valve, etc., the main shall be removed, cleaned and relaid. Should sewage enter a main or portion thereof, the main or portion thereof, shall be rejected and all pipe, fittings, valves, etc. discarded.

All water supplied from the existing water system or other approved potable supply shall be connected to the new main through a State of Washington Department of Health "APPROVED" double check valve assembly (DCVA). Such DCVA shall be tested immediately prior to its use by a State Certified backflow prevention assembly tester to verify that it meets State performance requirements. The Contractor shall submit a copy of the tester's test report to the Engineer prior to use of DCVA.

Existing service shall not be transferred to a new water main until a satisfactory bacteriological test report is obtained for the new construction and approval is given by the Engineer.

The final connection to the existing system shall not be made until specifically authorized by the Engineer. Such authorization shall not be made until a satisfactory bacteriological test report is obtained by the Engineer.

All water main components used to make the final closure between the existing and new water main shall be disinfected immediately prior to the installation in accordance with Section 9.2 of A.W.W.A. Standard C651. All equipment used to supply water for water main flushing and disinfection, e.g., standpipe, portable pumps, hose, etc., shall disinfected immediately prior to use in accordance with Section 9.2 of A.W.W.A. Standard C651.

5. Leakage and Hydrostatic Pressure Test:

Except as noted below, all water mains (ductile iron or polyvinyl chloride (PVC) pressure pipe) shall be subject to a hydrostatic pressure test and leakage test in accordance with the following A.W.W.A. Standard:

- C600-87 "Installation of Ductile Iron Water Mains and Their Appurtenances"

All equipment used by the Contractor for the hydrostatic pressure test and leakage test shall have prior approval of the Engineer.

The test pressure shall be 225 psi (i.e., 1.5 times the rated working pressure of the water main material) applied at the lowest point in the pipeline. The duration of the hydrostatic pressure test shall be 2 hours, during which time the hydrostatic pressure shall not vary by more than 5 psi.

Where in the opinion of the Engineer a 2 hour pressure test is impractical, the duration of the test may be reduced to 15 minutes, as specified in D.O.T. Std. Specif. *Section 7-11.3 (11),* provided no leakage is detected, (i.e, no loss of pressure). Should leakage occur, the test duration shall be 2 hours.

The leakage test shall be performed only after the Engineer's acceptance of the hydrostatic pressure test. The completion of the pressure test without loss of pressure (i.e., without the need for makeup water), shall be considered as completion of the leakage test.

No water main installation shall be accepted if the leakage is greater than that determined by the formula:

$$L = \frac{SD\,[P]^{0.5}}{133{,}200}$$

where

L = allowable leakage, in gallons per hour
S = total length of main tested, in feet
D = nominal diameter of the main, in inches
P = average test pressure during leakage test, in psi

The leakage test pressure shall be applied at the location of the hydrostatic pressure test and shall be the same pressure and duration as the hydrostatic pressure test.

For acceptance of the new water main installation, any visible leakage detected shall be repaired regardless of the allowable leakage specified above.

6. Pavement Repair and Surface Restoration:

General - All existing asphalt and Portland cement concrete pavement, gravel or crushed rock surface treatments, sidewalks, curbs, gutters, and landscaped surfaces cut or damaged by the installation of sub-surface facilities shall be restored with like materials to original levels, flush, well bonded to adjacent sound material along neat, continuous straight or curved joint lines. Where indicated in the Plans or required by the Engineer for dust or erosion control, or reasons of safety, temporary surface treatments shall be provided.

Materials - Materials used and methods of construction shall be as shown in the plans and details as specified in D.O.T. Std. Specif. *Division 9.*

7. List of Standard Drawings

The following attached drawings shall be used in conjunction with these Standard Specifications:

W-1	Trench Details	W-2	Thrust Block Details
W-3	Fire Hydrant Details	W-4	Gate Valve Details
W-5	Disinfection & Flushing	W-6	Blow-off Details
W-7	Residential Service Details	W-8	Air Valve Details
W-9	Casing Pipe Road Crossing		
E-1 to 3	Erosion Control – Water Main Installation		

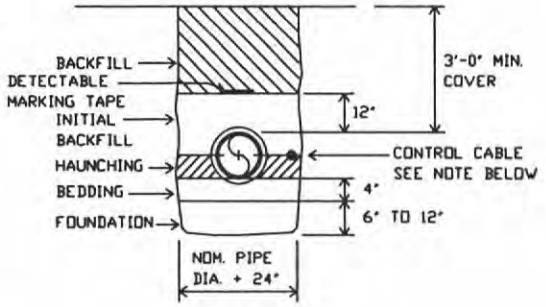
8. Engineer's Inspection

Pursuant to WAC 246-290-040, the Owner/Contractor shall be aware of the requirements for Engineer's inspection and certification of the work and completion of the Department of Health forms "Construction Report for Public Water System Projects" and "Pressure, Leakage and Bacteriological Test Results". Where a specific phase of the work is to be inspected by the Engineer, as noted in the attached specifications, the Owner/Contractor shall ensure that the work remains accessible until the Engineer's inspection is complete.

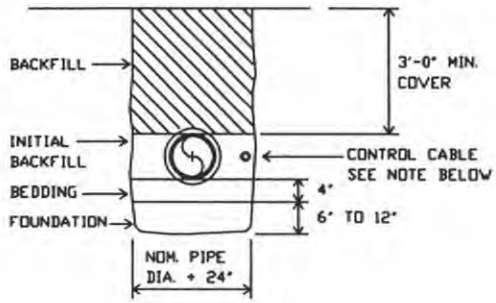
In general, the following engineer's inspections shall be scheduled:

- Start of construction to evaluate construction practice.
- During disinfection and pressure testing.

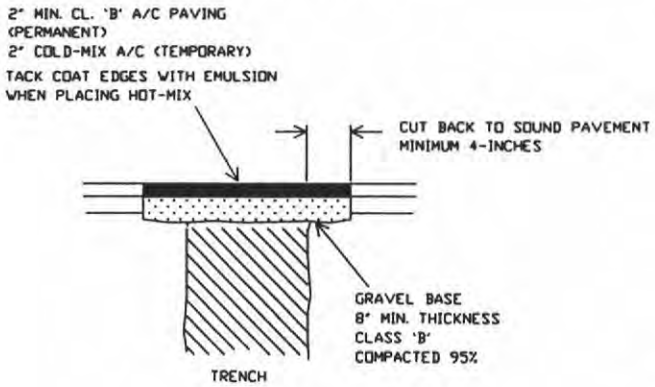
TRENCH DETAILS - P.V.C. PIPE



TRENCH DETAILS - DUCTILE IRON PIPE



PAVEMENT REPLACEMENT



NOTES:

1) Trenching, foundation, bedding and backfill shall conform to D.O.T. Std. Specif. 1991, Section 7-10. P.V.C. pipe shall be considered 'flexible pipe' with respect to this section.

2) Only imported material shall be used for bedding, haunching and initial backfill of P.V.C. pipe.

3) Native material may be used for bedding and initial backfill of D.I. pipe if it fully complies with D.O.T. Stds. and the prior approval of the Engineer is obtained.

4) Foundation material is intended only for overcut or unsuitable native material replacement.

5) If control cable is specified, lay at springline of pipe.

6) Trench width may be reduced to nom. pipe dia. plus 7" each side with prior approval of compaction method.

7) If two pipes are laid in same ditch, provide 6" min. separation for placing and compacting haunching and initial backfill.

8) Refer to the project's Technical Specifications for the complete material requirements.

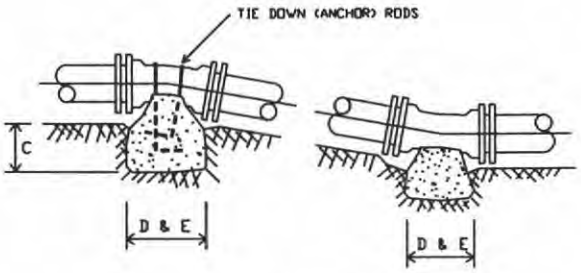
Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan – Water Mains Trench Details	Plan # W-1
By: George Bratton, P.E. Civil Engineer			

ALSO SEE SPECIFICATIONS

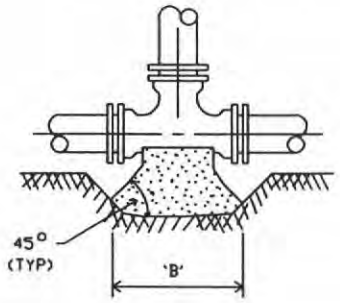
BEARING AREA (SQ. FT.) FOR HORIZONTAL THRUST 225 PSI TEST PRESSURE 2000 PSF SOIL BEARING	PIPE DIAMETER 2" & 3"	4"	6"	8"	10"	12"
TEE, CAP & PLUG A x B	1.5	2.5	5.0	8.5	13.5	19.0
90 DEGREE BEND	2.0	3.0	7.0	12.0	19.0	27.0
45 DEGREE BEND	1.0	2.0	4.0	6.5	10.5	15.0
22.5 DEGREE BEND	1.0	1.0	2.0	3.5	5.5	7.5
11.25 DEGREE BEND	1.0	1.0	1.0	2.0	3.0	4.0
VALVE (ON PVC PIPE)	1.5	2.5	5.0	8.5	13.5	19.0
FITTING WEIGHT SUPPORT (FOR PVC PIPE)	NA	1.0	1.0	1.0	1.0	1.0
VOLUME / WEIGHT (CU. YD.) FOR VERTICAL THRUST						
11.25 DEGREE BEND C x D x E	NA	2.0	4.0	7.0	11.0	15.0

NOTES:

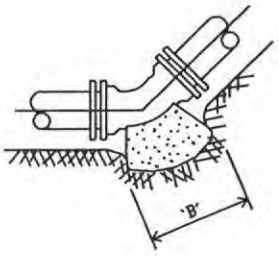
All concrete blocks shall be poured against dry, undisturbed subgrade. Keep concrete clear of joints and accessories. For tie down of vertical bends and valves, use 3/4" diameter steel rods (in corrosive soil , use 301 stainless steel), 2 per fitting or valve. Bearing area / volume in table includes 1.5 safety factor.



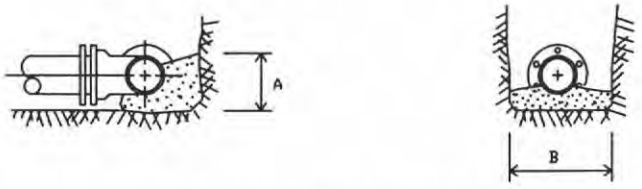
VERTICAL BENDS



TEES

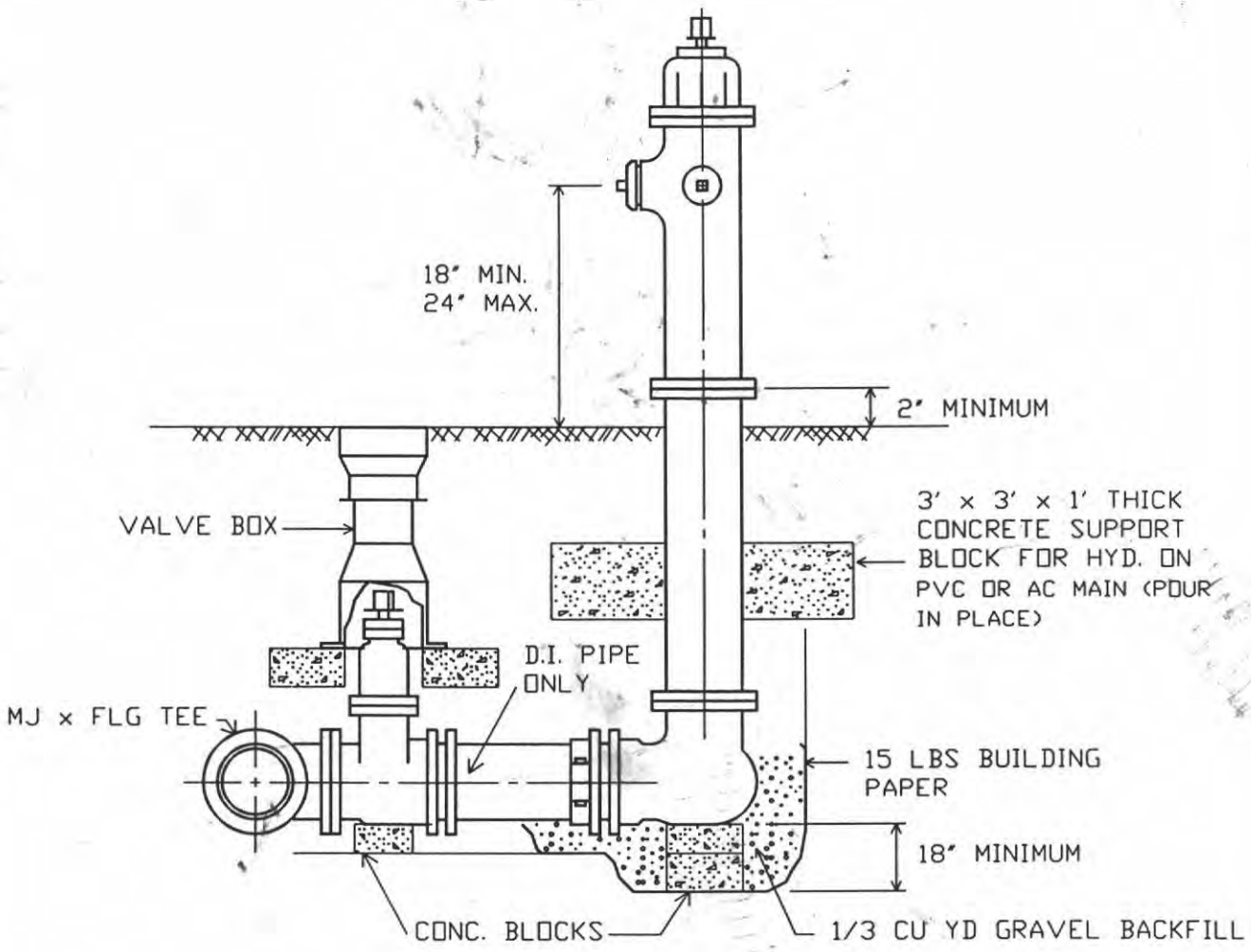


BENDS



SECTION (ALL FITTINGS)

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan - Water Mains Thrust Block Details	Plan # W-2
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

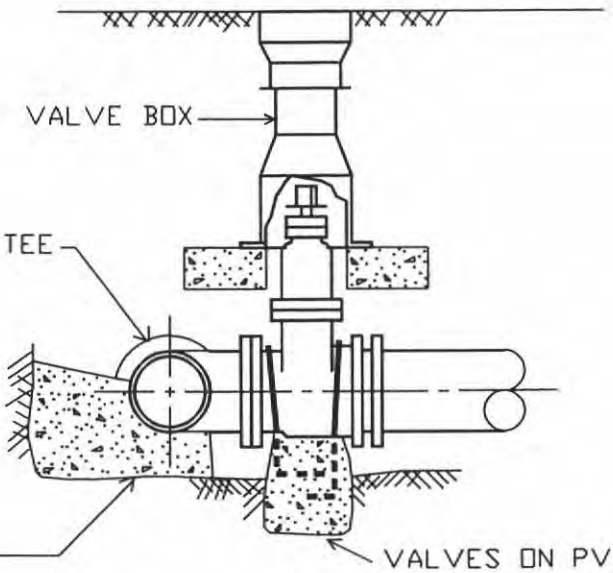


NOTES:

Hydrant restraint to be provided by ductile iron class 53 connecting piece with integrally cast MJ restraining glands or EBAA IRON thrust restrants, series 1000

Concrete support is to reduce shock to PVC or AC pipe if hydrant is struck by vehicle.

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan – Water Mains Fire Hydrant Details	Plan # W-3
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

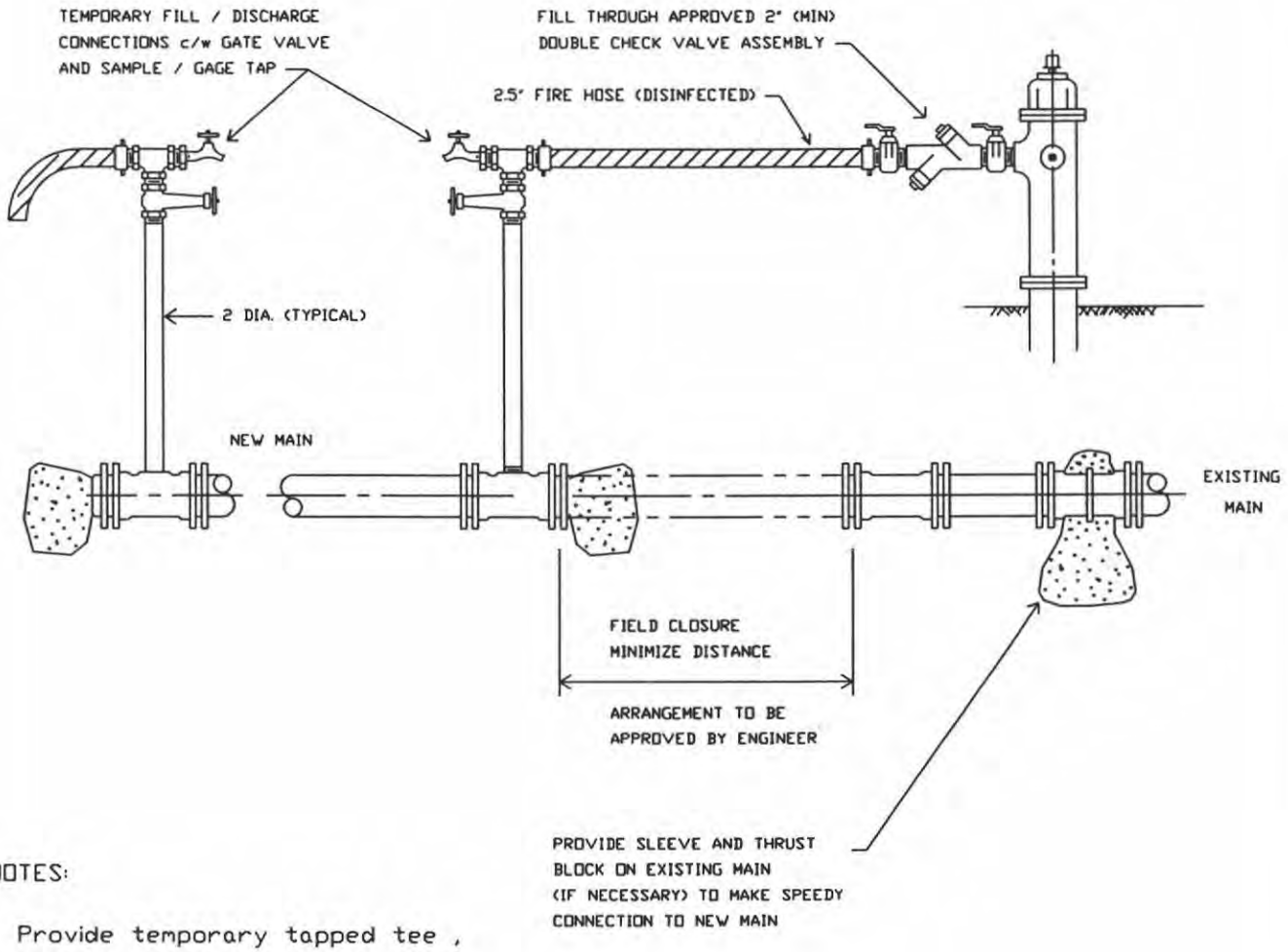


WEIGHT OF FITTING SHALL NOT BE CARRIED BY PVC PIPE. POUR CONCRETE UNDER ALL FITTINGS AND VALVES. KEEP CONCRETE CLEAR OF JOINTS AND ACCESSORIES

VALVES ON PVC PIPE SHALL BE ANCHORED BY 3/4" DIA. STEEL RODS TO PREVENT THRUST ONTO PIPE

NOTE:
VALVES TO BE ATTACHED AT TEES AND CROSSES UNLESS OTHERWISE STATED

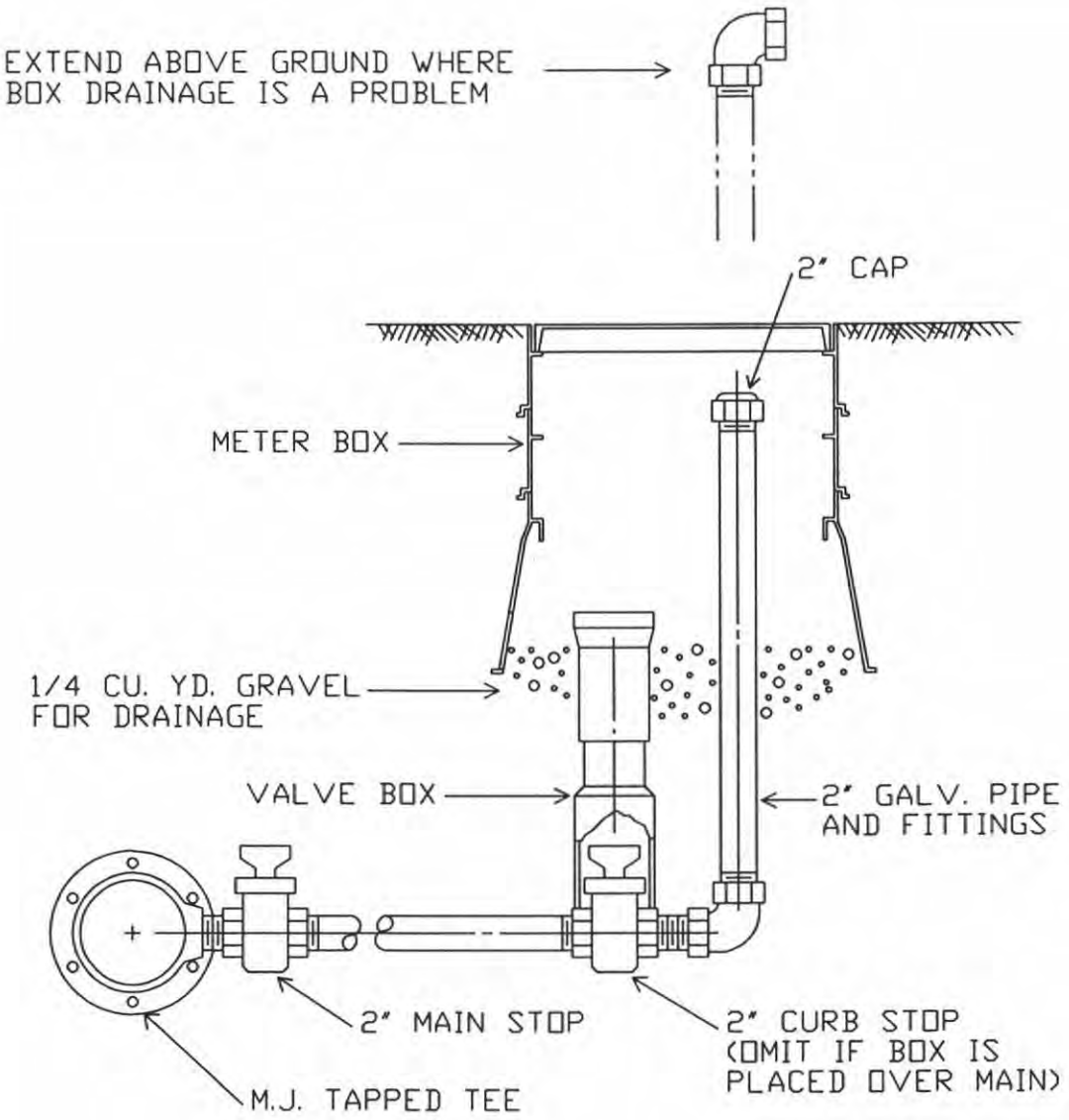
Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan – Water Mains Gate Valve Details	Plan # W–4
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



NOTES:

Provide temporary tapped tee , plug and thrust block. Excavate 1 foot below main (min.) and provide gravel working floor for field closure. Field closure shall not be installed until approved by Engineer (after a satisfactory bacteriological report)

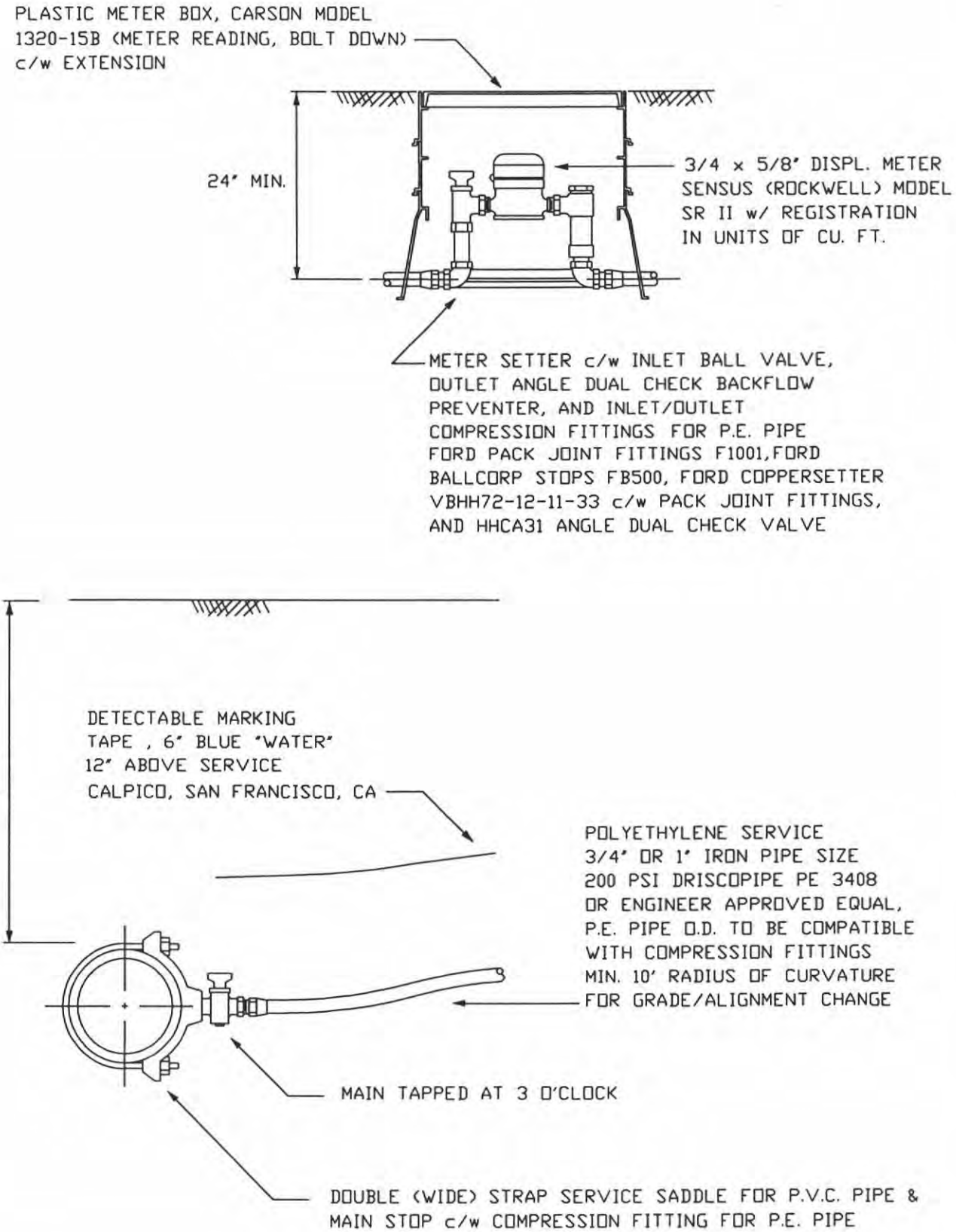
Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan – Water Mains Disinfection & Flushing	Plan # W–5
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



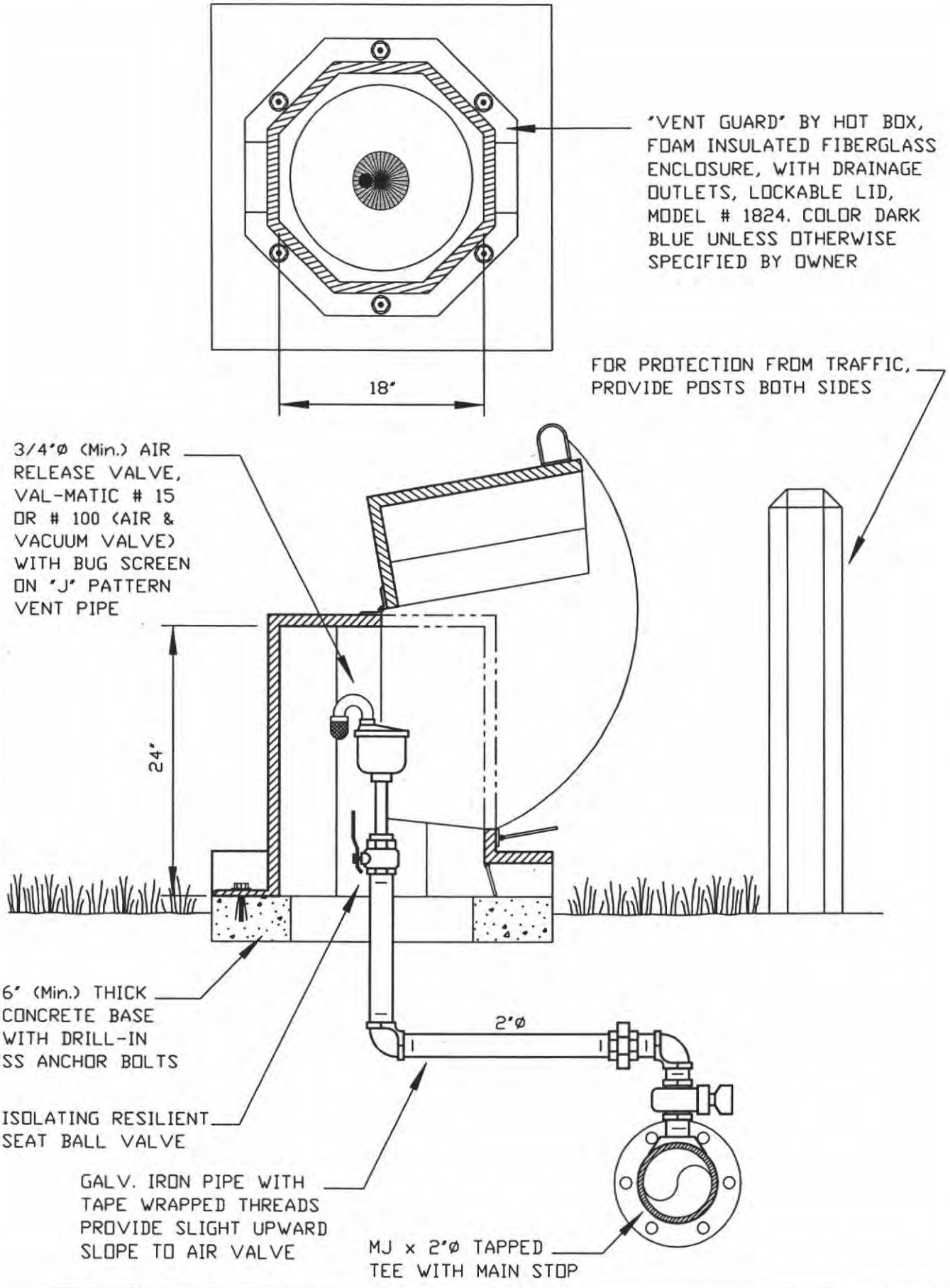
NOTES:

All underground galvanized pipe and fittings shall be tape wrapped for corrosion protection with a double wrapping of cold applied tape meeting A.W.W.A. Std. C209 or Engineer approved equal.

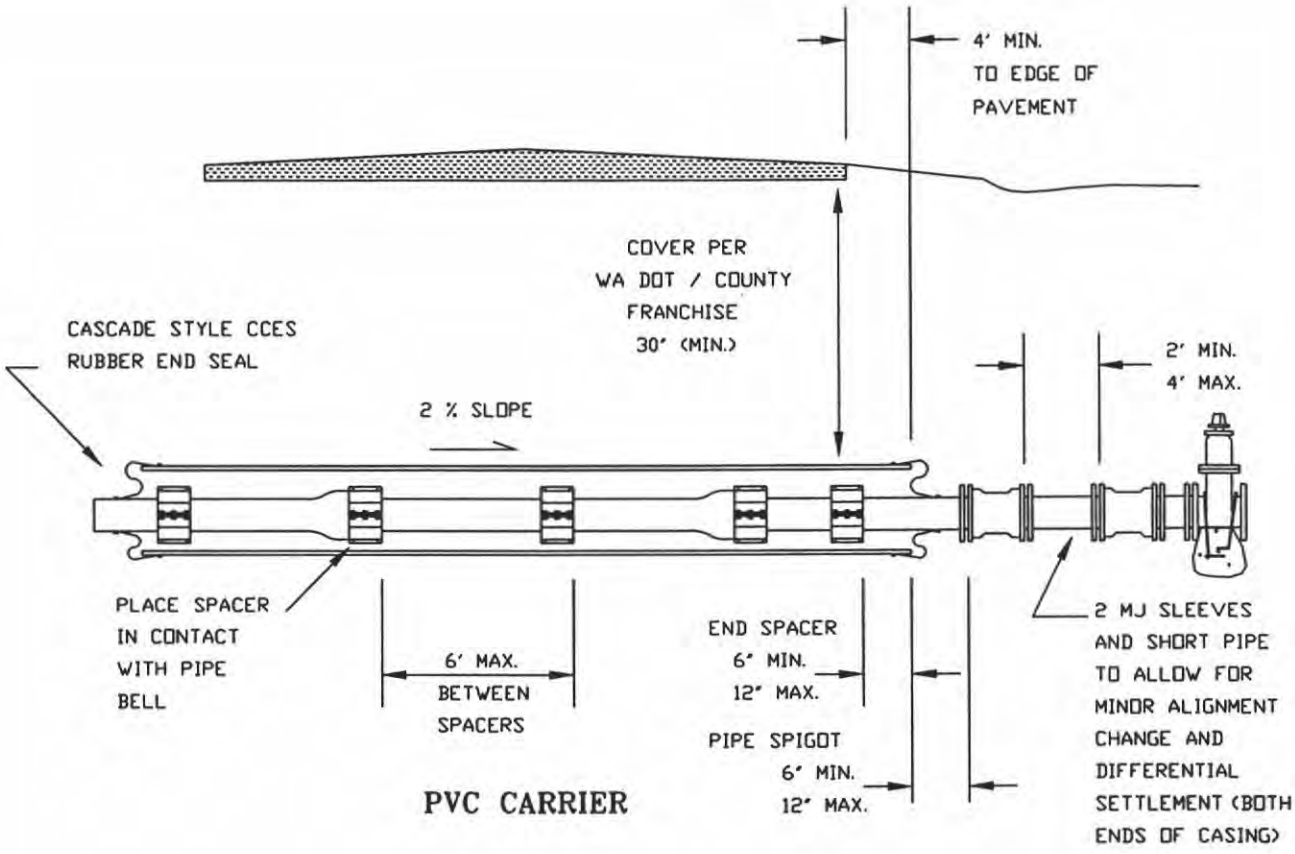
Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan - Water Mains Blow-Off Details	Plan # W-6
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



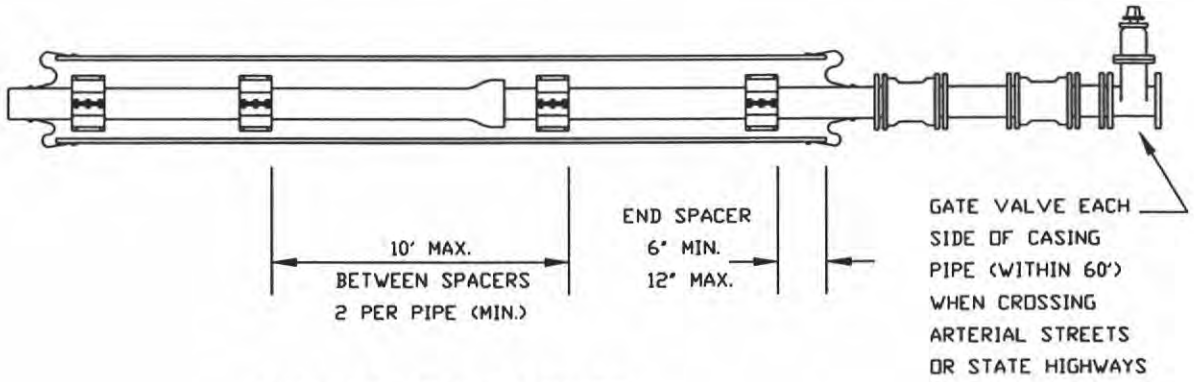
Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plan – Water Mains Residential Service Details	Plan # W–7
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



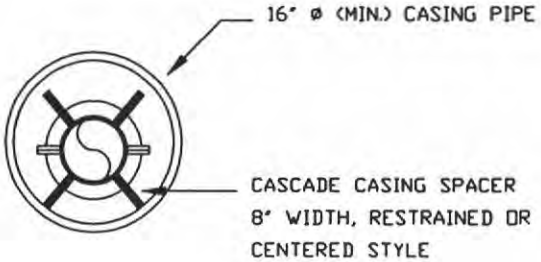
Date: Feb. 04	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT STANDARD PLAN Air Valve Detail – Freeze Protection	Plan # W-8
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



PVC CARRIER



DUCTILE IRON CARRIER

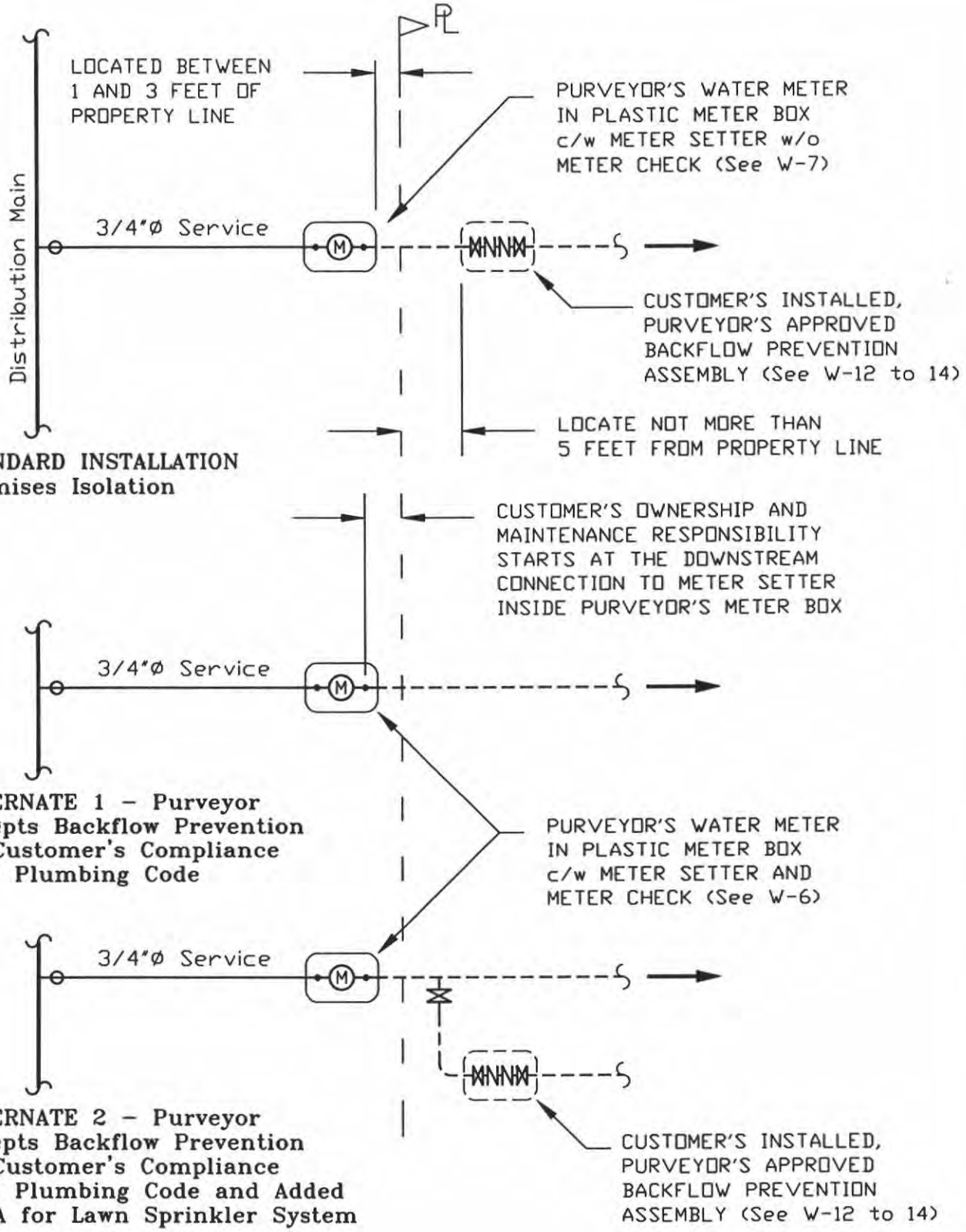


Notes:

FOR JACKED INSTALLATION, USE 1/4" MIN. WALL, 16" O.D., STRAIGHT SEAM, ASTM A-135 STEEL PIPE JOIN BY BUTT WELDING

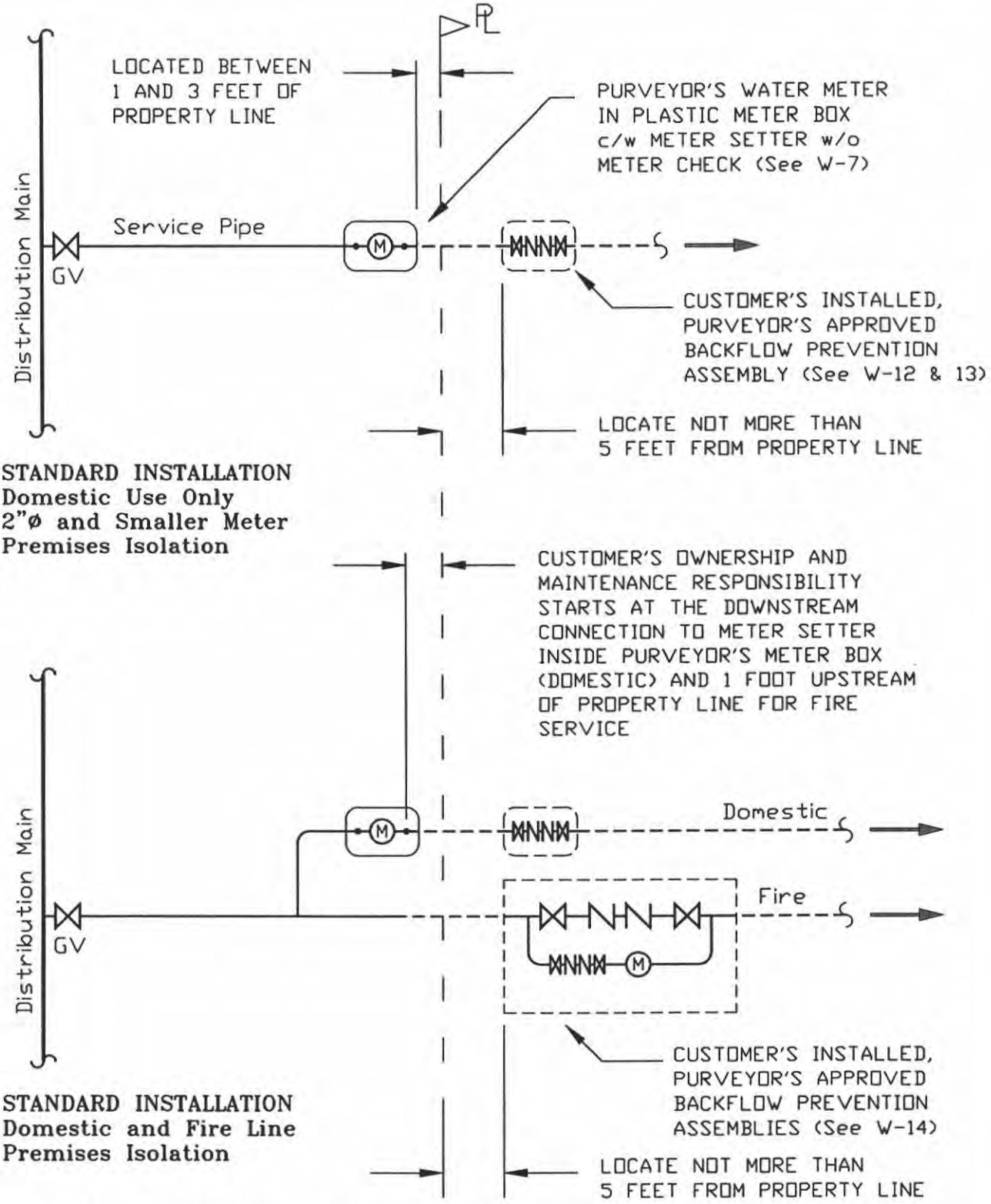
FOR OPEN CUT INSTALLATION, USE CORRUGATED STEEL PIPE OR OTHER COUNTY APPROVED CASING MATERIAL. BACKFILL WITH CONTROLLED DENSITY FILL

Date: Feb. 04	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains Casing Pipe for Road Crossings	Plan # W–9
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



Note: Purveyor's distribution main and service pipe shall not be used as ground for Customer's electrical system.

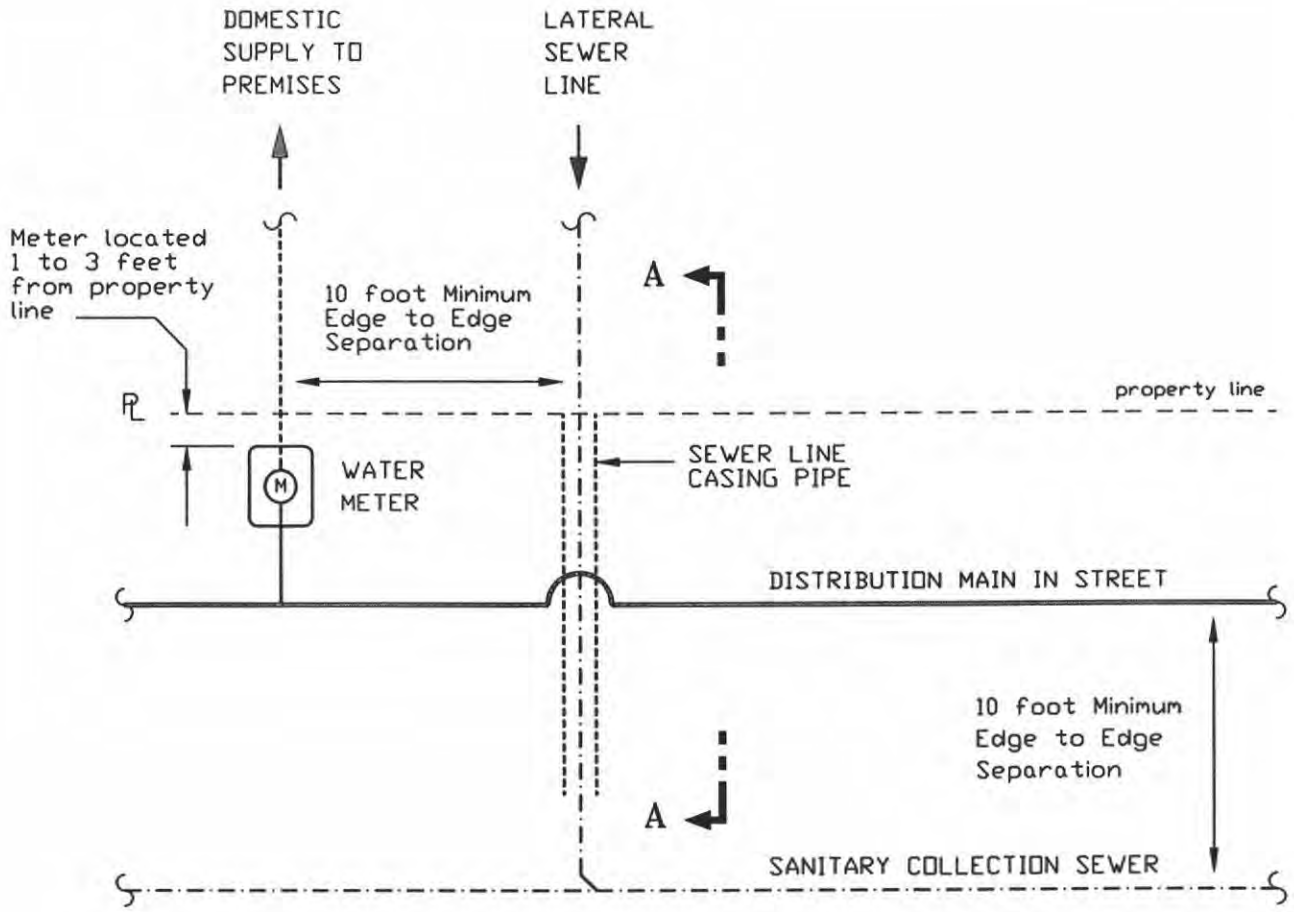
Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans - Water Mains Service Connections - Residential	Plan # W-10
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



Note: The category 'Commercial Customer' shall include all non-single family or duplex residential customers.

Domestic and fire line line backflow assemblies may be installed in building per Purveyor approved service agreement.

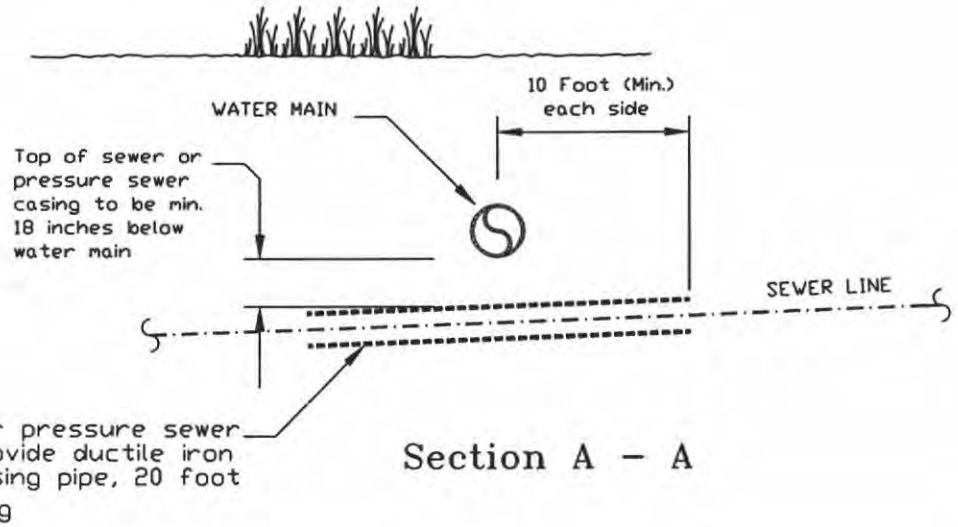
Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains Service Connections – Commercial	Plan # W-11
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



Notes:

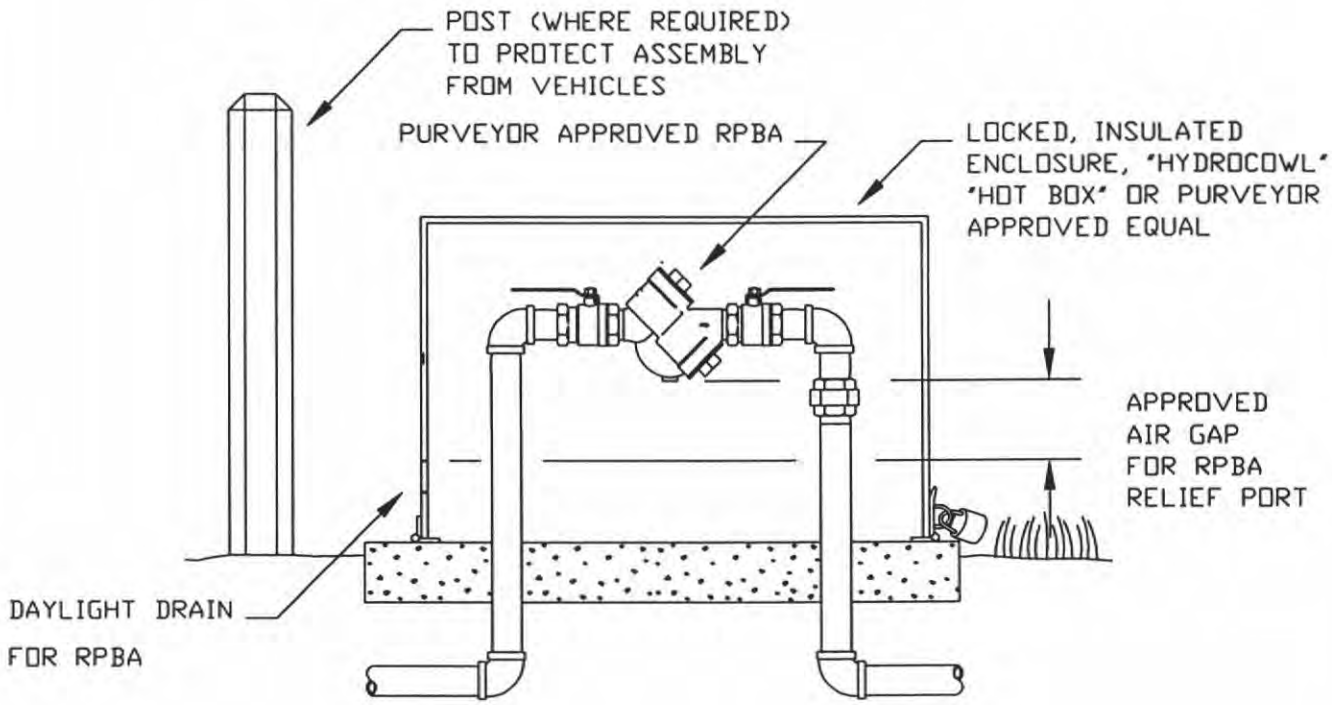
GRAVITY SEWER LATERAL SHALL BE INSTALLED 18-INCHES BELOW WATER MAIN UNESS OTHERWISE APPROVED BY PURVEYOR.

PRESSURE SEWER LATERAL AND PRESSURE COLLECTION SEWER SHALL BE INSTALLED IN DUCTILE IRON CASING PIPE 18-INCHES BELOW WATER MAIN.



Section A – A

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains Separation of Service Connections	Plan # W-12
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

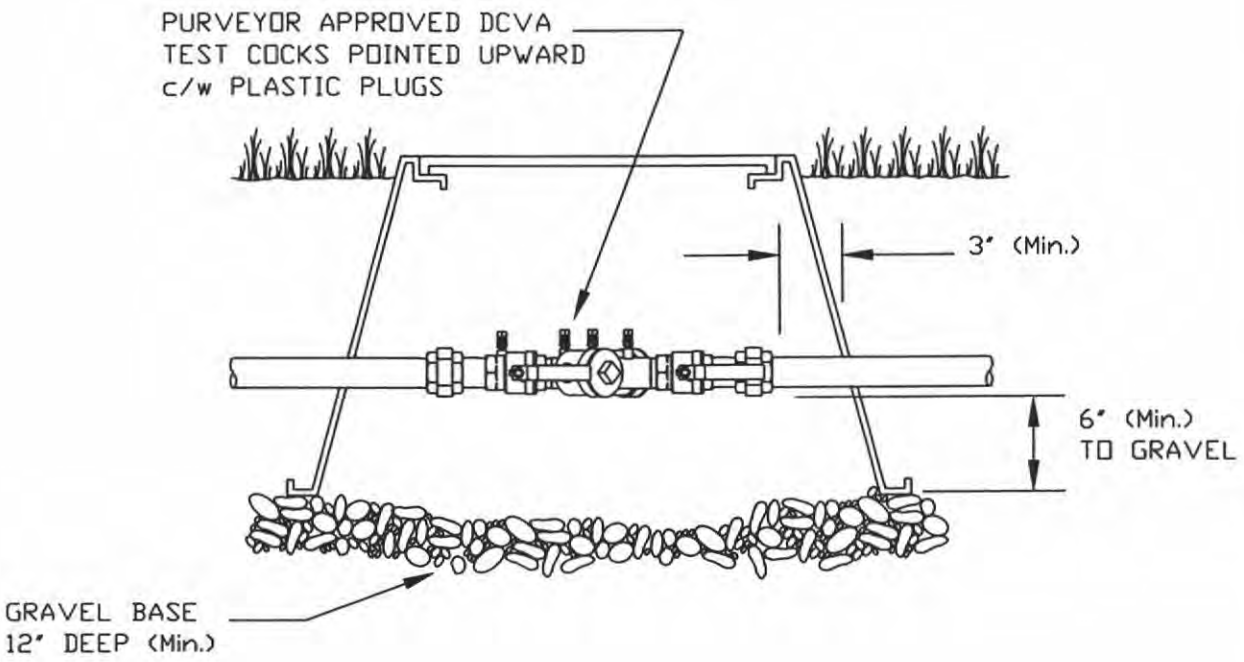


INSULATED ENCLOSURE INSTALLATION
REDUCED PRESSURE BACKFLOW ASSEMBLY

Note:

All installations to comply with assembly manufacturer's recommendations, AND the USC FCCCHR Assembly Approval, AND the 6th Edition of the PNWS-AWWA 'CROSS CONNECTION CONTROL MANUAL', whichever more stringent.

Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains Service Connection – RPBA	Plan # W–13
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



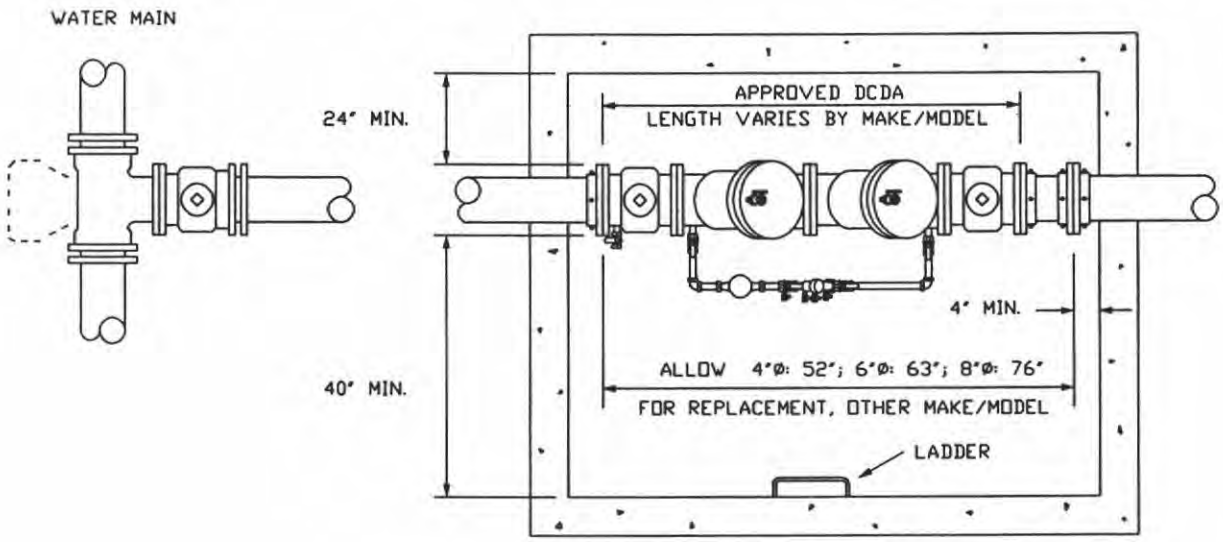
METER BOX ENCLOSURE INSTALLATION
DOUBLE CHECK VALVE ASSEMBLY

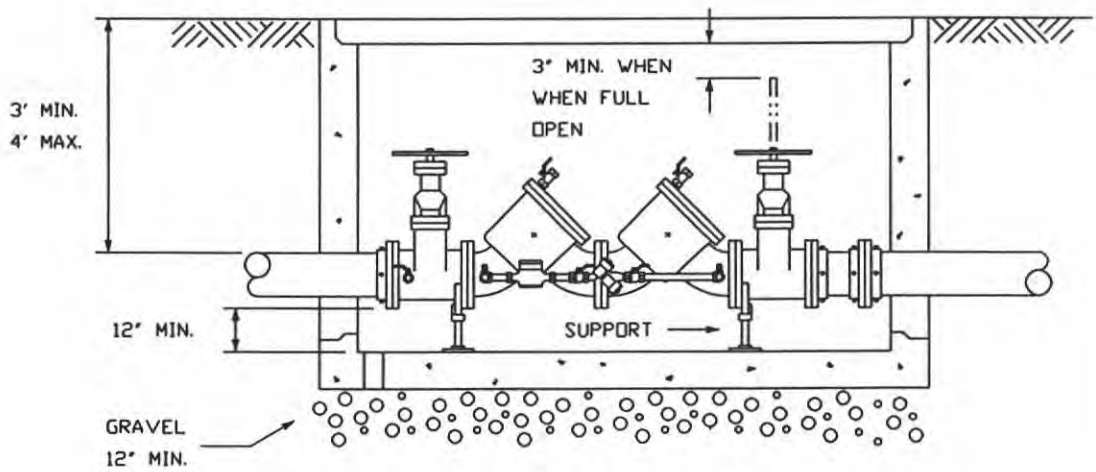
Note:

All installations to comply with assembly manufacturer's recommendations, AND the USC FCCCHR Assembly Approval, AND the 6th Edition of the PNWS-AWWA 'CROSS CONNECTION CONTROL MANUAL', whichever more stringent.

Double check valve assembly may be installed in above-ground "Hot Box" See Plan W-12

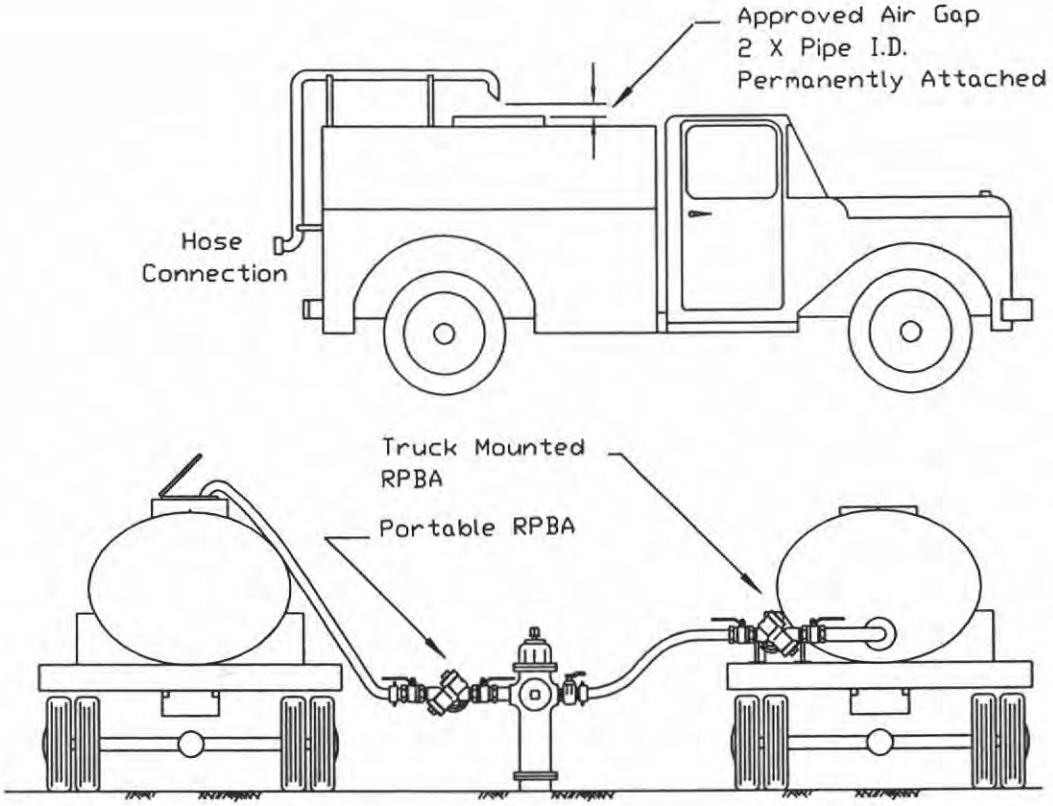
Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains Service Connection / Lawn Irrigation – DCVA	Plan # W–14
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



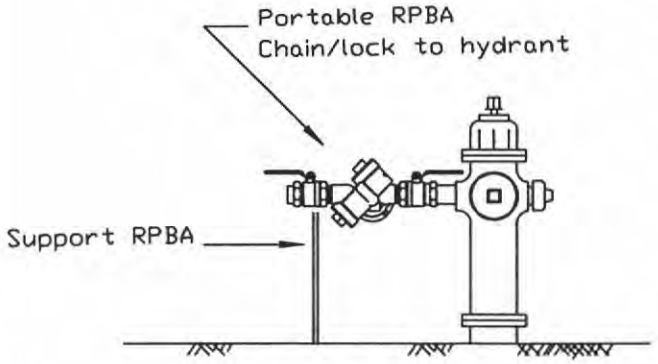


Vaults shall be UTILITY VAULT CO., Style 676 or approved equal.

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains 4" to 8" Double Check Detector Assembly	Plan # W-15
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



Water Tanker Trucks



NOTES:

Construction water is not allowed for sewer related work: all water to be supplied by water tank trucks (see above).

RPBA to be tested by BAT before installation, when moved, or every two months (minimum).

Hydrant to be full open to ensure drain port is closed tight.

RPBA to be Purveyor approved.

Construction hydrant meter may also be required.

Construction Work on Street R-O-W

Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT Standard Plans – Water Mains **Fire Hydrants Use – Construction Water**	**Plan #** **W-16**
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

BACKFLOW PREVENTER REQUIRED FOR PREMISES (SERVICE) ISOLATION

COMMERCIAL CUSTOMERS

CATERGORY OF PREMISES INCLUDES ALL CUSTOMERS OTHER THAN SINGLE-FAMILY AND DUPLEX RESIDENCES.

Category of Customer / Water Use	Assembly
AGRICULTURAL (FARMS AND DARIES)	RPBA
BEVERAGE BOTTLING PLANTS, BREWERIES	RPBA
CAR WASHES	RPBA
CHEMICAL PLANTS	RPBA
LAUNDRIES AND DRY CLEANERS	RPBA
PREMISES WHERE BOTH RECLAIMED WATER & POTABLE WATER ARE PROVIDED	RPBA
FILM PROCESSING FACILITIES	RPBA
FOOD PROCESSING PLANTS, CANNERIES, SLAUGHTER HOUSES, RENDERING PLANTS	RPBA
HOSPITALS, MEDICAL CENTERS, NURSING HOMES, VETERINARY, MEDICAL AND DENTAL CLINICS, AND BLOOD PLASMA CENTERS	RPBA
IRRIGATION SYSTEMS WITH CHEMICAL ADDITION	RPBA
LABORATORIES	RPBA
METAL PLATING INDUSTRIES	RPBA
MORTUARIES	RPBA
PETROLEUM PROCESSING OR STORAGE PLANTS	RPBA
PIERS AND DOCKS	RPBA
WASTEWATER OR STORMWATER PUMPING STATIONS, WASTEWATER TREATMENT PLANTS	RPBA + AG
PREMISES WITH AN AUXILIARY WATER SUPPLY (CONNECTED OR UNCONNECTED)	RPBA
FIRE SPRINKLER SYSTEMS OR DEDICATED FIRE LINES WITH CHEMICAL ADDITION	RPDA
FIRE SPRINKLER SYSTEMS OR DEDICATED FIRE LINES WITHOUT CHEMICAL ADDITION	DCDA
ALL OTHER COMMERCIAL SERVICES	DCVA

RESIDENTIAL CUSTOMERS

CATERGORY OF PREMISES INCLUDES SINGLE-FAMILY AND DUPLEX RESIDENCES.

Category of Water Use Includes	Assembly
UNDERGROUND LAWN SPRINKLER SYSTEM	DCVA
SOLAR HEATING SYSTEM	DCVA
FIRE SPRINKLER SYSTEM OTHER THAN FLOW-THROUGH TYPE	DCVA
PRIVATE WELL (CONNECTED OR NOT CONNECTED TO PLUMBING)	RPBA
GRAY WATER SYSTEM (CISTERNS) OR OTHER AUXILIARY SUPPLY	RPBA
LIVESTOCK WATERING	DCVA
WATER SUPPLY TO DOCK OR SMALL BOAT MOORAGE, SUBMERGED WATER LINES	RPBA
GRINDER PUMP (SEWAGE PUMPED TO OFF-SITE SEPTIC OR SEWER)	RPBA
WATER SOFTENER OR REVERSE OSMOSES TREAMENT SYSTEM	DCVA + AG

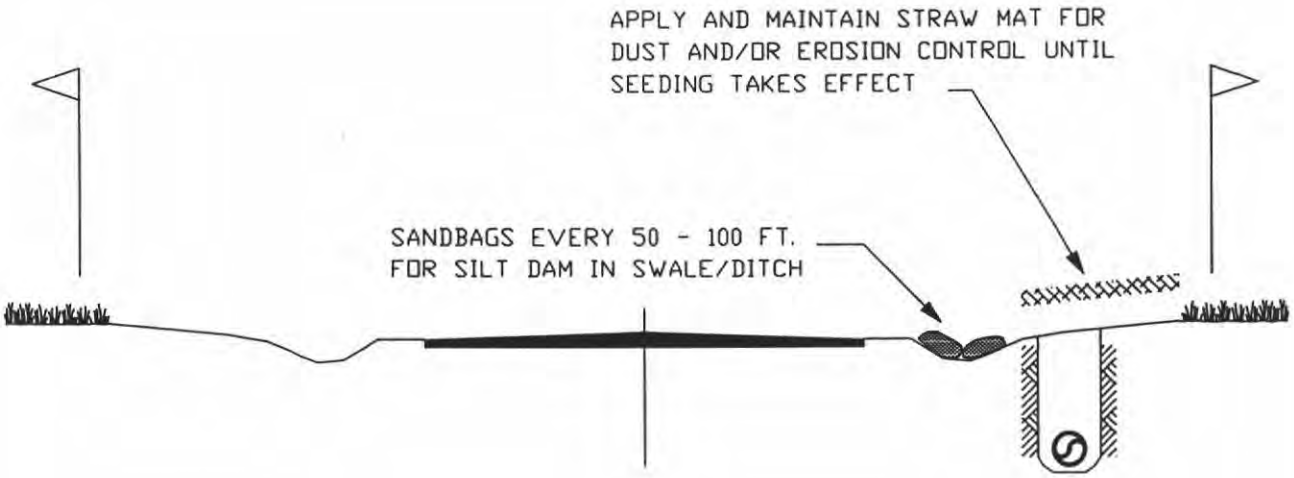
Abbrev.:

AG	Approved Air Gap per Plumbing Code in addition to RPBA/DCVA
RPBA	Reduced Pressure Backflow Assembly
RPDA	Reduced Pressure Detector Assembly
DCVA	Double Check Backflow Assembly
DCDA	Double Check Detector Assembly
DCV	Dual Check Valve device in purveyor's water meter setter.

Notes:

1) For explaination of premises categories see PNWS-AWWA 'CROSS CONNECTION CONTROL MAUNAUL', 1995 or latest edition thereof.
2) All assemblies, except DCV, are to be located as shown in SR-1 to SR-3, unless otherwise permitted in Service Agreement.

Date: Apr. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT STANDARD PLAN General Cross Connection Control Requirements	Plan # W-17
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



TYPICAL UTILITY CONSTRUCTION - STREET R-O-W

NOTES:

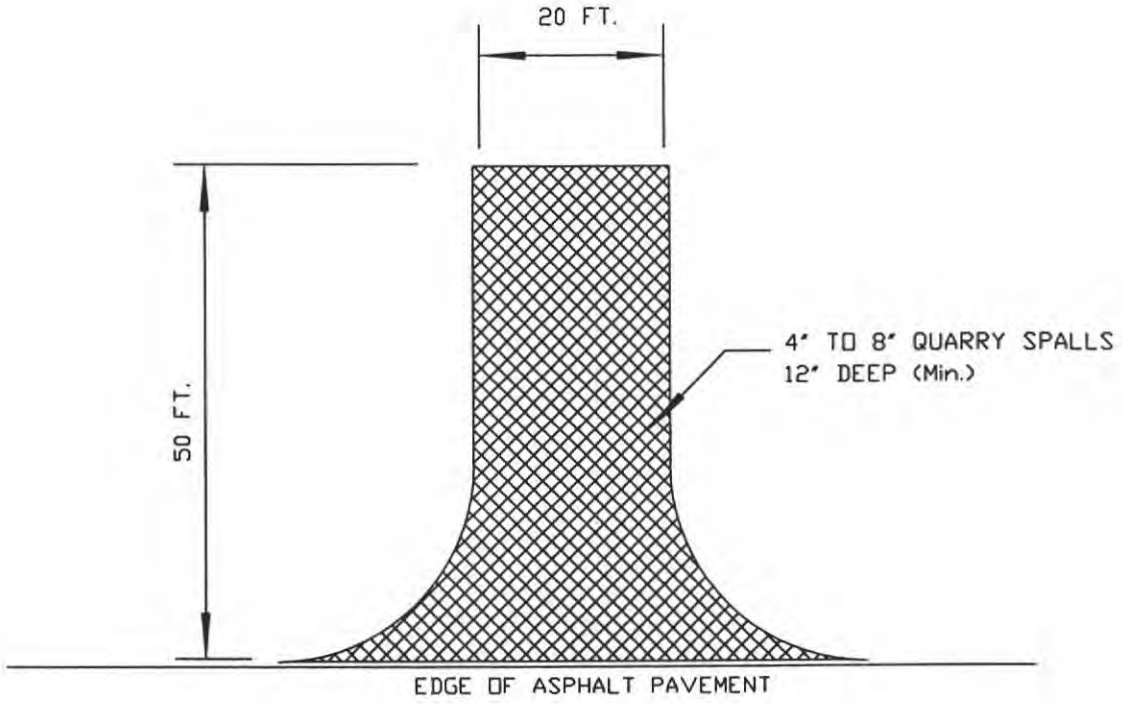
1) PROVIDE SANDBAGS IN SWALE/DITCH LINE FOR SILT DAM. IF NEEDED, PROVIDE STRAW BALES OR FILTER FABRIC FENCE TO PREVENT RUNOFF FROM BY-PASSING SILT DAMS.

   PROVIDE SANDBAGS IN DITCH LINE ON OPPOSITE SIDE OF ROAD IF NEEDED, FOR CONTAINMENT OF EXCAVATION MATERIALS WASHED OFF STREET SURFACE.

2) AT END OF EACH WORKING DAY, COMPLETE TRENCH BACKFILLING AND SURFACE RESTORATION TO EXTENT POSSIBLE, LEAVING ONLY PIPE END, FITTINGS FOR BLOCKING, ETC., EXPOSED.

3) SWEEP STREETS AT END OF EACH WORK DAY.

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT STANDARD PLAN Erosion Control - Water Main Installation	Plan # E-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



CONSTRUCTION ENTRANCE

NOTES:

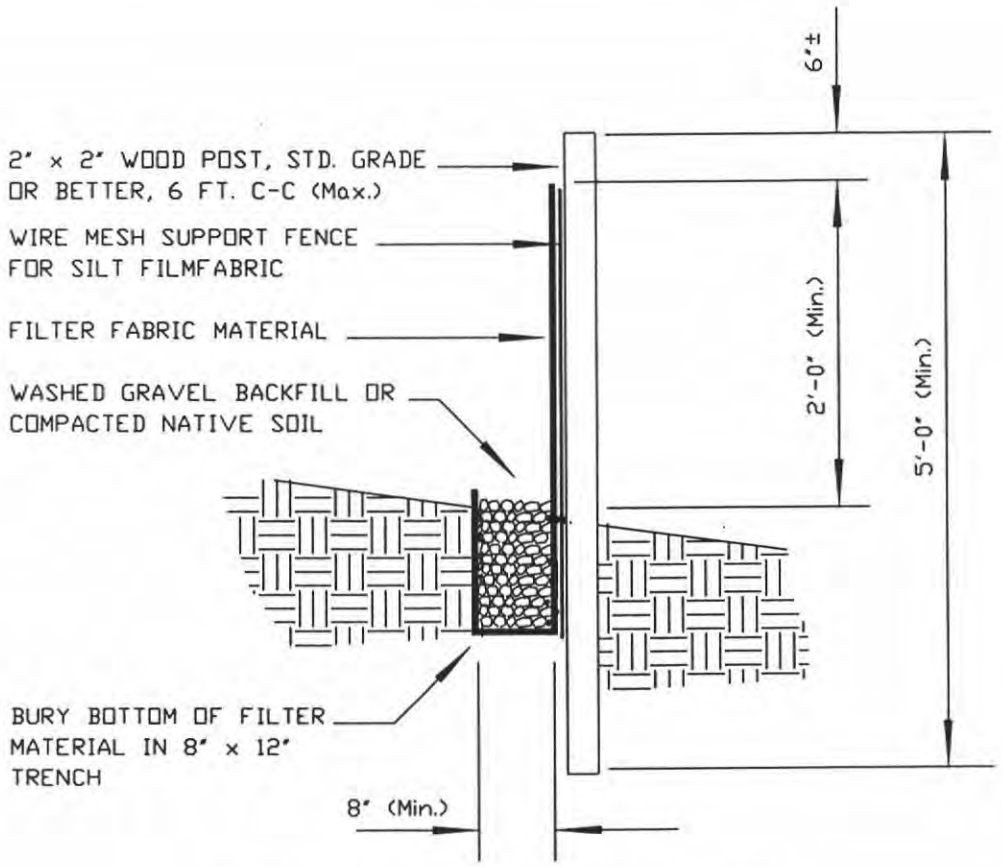
1) APPLY TO CONTRACTOR'S TEMPORARY WORKS YARD(S)

2) DELINEATE CONSTRUCTION AREA ON GROUND WITH READILY VISIBLE FLAGS, CONFINE EQUIPMENT, MATERIAL STORAGE AND OPERATIONS TO CONTRUCTION AREA.

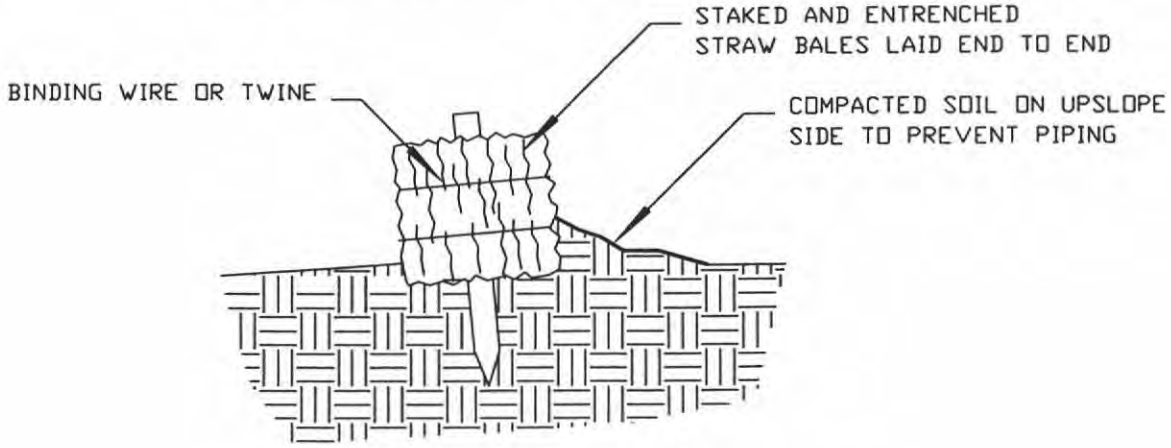
3) FIRST CONSTRUCT SWALE FOR SEDIMENT SUMP, WITH DITCHES AS NECESSARY TO CONVEY RUNOFF TO SUMP.

4) MAINTAIN SWALE (SUMP), DITCHES AND SILT BARRIERS DURING CONSTRUCTION PERIOD.

Date: Mar. 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT STANDARD PLAN **Erosion Control - Construction Entrance**	Plan # E-2
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



FILTER FABRIC FENCE DETAIL



TEMPORARY STRAW BALE BARRIER

FOR GENERAL NOTES, SEE DETAIL E-2

Date: Mar. 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT STANDARD PLAN Erosion Control – Filter Fence/Straw Bails	Plan # E-3
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

Appendix M

Water Conservation Plan

WATER CONSERVATION PLAN

A. OVERVIEW

The following water conservation plan is incorporated into the water system design and the operation and management of the system. Additional long-term water conservation measures may be required in the future. Such requirements will be framed in accordance with the Washington State Department of Ecology publication, Water Conservation Planning Handbook for Public Water Systems.

For short-term water conservation measures needed to respond to drought conditions, system operation problems, etc., refer to the Water Shortage Response Plan included herein (Appendix N)

Attached to this conservation plan are completed Washington Department of Health's "Water Use Data Collection Requirements Checklist", "Demand Forecasting Requirements Checklist", and "Water Conservation Program Requirements Checklist".

B. COMPONENTS OF PLAN

Metering:

To minimize unaccounted for water, the system has a meter at each well source, and has included in the Water System Plan a program of installing meters at each service connection.

Water Rate Structure:

Water rates, starting when installation of meters is complete, will include a surcharge for excess use to encourage conservation.

Water Audit:

Periodically, or at those billing periods when the surcharge for excess water use is applied, a comparison will be made between the source (well) meter and the sum of residential consumption, and fire hydrant usage. Should unaccounted for water exceed 9 percent of the source production, a cursory water audit should be performed to determine if the difference is due to an unusual occurrence, such as a water main break. If the unaccounted for water exceeds 9 percent of production in a subsequent comparison review, the water audit should be extended to include a check of meter calibration, and a leak detection survey. If the water loss cannot be accounted for by a cursory audit, a full audit should be conducted as outlined in the American Water Works Association publication, Water Resources Audit, 1988.

To permit the customers to assess individual water use, the water bills will be changed to show consumption history. Any abnormal increase in the customer's consumption should initiate an inquiry into a possible leak in the customer's plumbing system. Any major ongoing increase should initiate a check into the accuracy of the water meter.

To facilitate the water audit procedures, all meters will be tested or replaced at the interval recommended by the American Water Works Association standards C-700 Cold Water Meters - Displacement Type, and C-701 Cold Water Meters - Turbine Type. The source meter should be tested for accuracy at a maximum interval of four years, residential meters at a maximum interval of eight years.

Low Water Use Plumbing Fixtures:

For new construction, all plumbing and related fixtures shall comply with current state and local laws and regulations establishing water conservation performance standards, including the water efficiency standards established in Chapter 51-18 of the Washington Administrative Code and Chapter 19.27 of the Revised Code of Washington.

Water for Lawn Irrigation:

Customers are encouraged to adopt landscaping schemes with this end in view. The use of drip or mechanically-timed irrigation systems, drought tolerant plantings, and small lawn areas is encouraged.

Lawn Sprinkling and other Water Use Restrictions:

Through the insert of a notice with the water bill, and/or during periods of warm, dry weather, when needed, customers will be requested to comply voluntarily with restricting lawn irrigation and car washing to once per week, watering lawns to mornings and late evenings, etc. as outlined in public education materials described below.

Public Education:

One or more of the Washington State Department of Health, County and AWWA publications shall be distributed to all new customers at the time of application for water service and periodically thereafter with the water bills.

Watering Restrictions:

The water conservation program includes the following:

1. Promotion of voluntary conservation at community meetings.
2. Prohibition on lawn watering.
3. Odd-Even day schedule for plant watering.

Currently the purveyor promotes voluntary conservation.

CONSERVATION PLANNING REQUIREMENTS FOR PUBLIC WATER SYSTEMS WITH FEWER THAN 1,000 SERVICE CONNECTIONS LOCATED IN CRITICAL WATER SUPPLY SERVICE AREAS

The checklists below are for use by public water systems in their efforts to develop a water conservation plan in accordance with the Guidelines and Requirements for Public Water Systems regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs (Conservation Planning Requirements). These checklists will also be used by Ecology and Health staff in reviewing conservation plans required from public water systems. Conservation plans consist of three elements: data collection and reporting; demand forecasting for future water needs, and; conservation program development and implementation. THESE CHECKLISTS IDENTIFY THE REQUIREMENTS FOR EACH OF THESE THREE COMPONENTS OF A CONSERVATION PLAN FOR PUBLIC WATER SYSTEMS WITH FEWER THAN 1,000 SERVICES LOCATED IN AREAS COVERED BY A COORDINATED WATER SYSTEM PLAN DEVELOPED PURSUANT TO CHAPTER 70.116 RCW. Please refer to the Conservation Planning Requirements for additional details.

CONSERVATION PLANS ARE REQUIRED COMPONENTS OF WATER SYSTEM PLANS REQUIRED BY THE DEPARTMENT OF HEALTH (HEALTH), AND ARE REQUIRED BY THE DEPARTMENT OF ECOLOGY (ECOLOGY) PRIOR TO THE ISSUANCE OF WATER RIGHTS TO PUBLIC WATER SYSTEMS. Implementation of conservation plans may be conditions of approval of water system plans and for water right permits. Where water system plans are required, Health will be the lead agency in reviewing conservation plans. Health will coordinate review of conservation plans with Ecology. If you have any questions about the Conservation Planning Requirements contact the Health Regional Office Planner or Ecology regional office for your area.

For additional resources to assist in the development of your conservation plan please refer to the Water Conservation Handbook for Public Water Systems developed by Ecology and Health. Additionally, the Planning Handbook - A Guide for Preparing Water System Plans is available from Health to assist in the development of your overall water system plan. Finally, the Water Conservation Bibliography for Public Water Systems published by Health provides references to additional water conservation information and literature which can be obtained from the library and other sources. All of these documents are available from Ecology or Health.

NOTE: The information in this handout provides an overview of the specific requirements in the Conservation Planning Requirements. You should not rely on this handout exclusively to prepare your conservation plan. Please refer to the Conservation Planning Requirements to determine the specific guidelines and requirements for your conservation plan.

WATER USE DATA COLLECTION REQUIREMENTS CHECKLIST

This checklist summarizes the water use data reporting requirements in the Conservation Planning Requirements. Unless otherwise noted, data should be reported in cubic feet. The Conservation Planning Requirements establish 1991 as the initial year for water use data collection and reporting. If available, data should be shown for the past 5 years. Systems are encouraged to collect more than the minimum required data.

To meet the minimum requirements of the Conservation Planning Requirements, plans must contain currently available data on water usage for the categories of use listed below. If the data has not been collected for any of the categories below, you will be required to make a commitment in your conservation plan to begin collecting the data as required. This commitment must include a schedule for when the data will begin to be collected, and what improvements if any will be made to ensure the data is collectable. Systems which make this commitment to collect data, but do not follow through and collect the information may be unable to receive subsequent water system plan approval or approval for additional water rights, until data consistent with the checklist below is collected.

All data elements must be reported or a commitment must be made (for each data element not collected) to collect and report the data prior to the next water system plan update. Where available, daily, monthly and annual totals must be reported, not averages. Please read the footnotes to obtain additional important information.

A. Are you a new public water system which has not yet collected any water use data? __ Yes __ No

If yes skip to number 13

Water Use Data	Data Collected?
1. Source of Supply Meter (monthly totals from each source)	__ Yes __ No
2. Total Annual Use - Each source (annual totals)	__ Yes __ No
3. Emergency Interties - Amount Imported (monthly totals from each intertie)	__ Yes __ No __ None Imported
4. Wholesale - Amount Purchased (annual totals from each wholesaler)	__ Yes __ No __ None Purchased
5. Peak Month Usage (peak monthly totals)	__ Yes __ No

6. Unaccounted for Water (annual totals) — __ Yes __ No

7. Accounted for Non-Revenue Water (annual totals)[2] — __ Yes __ No __ None

8. Service Meter Usage (monthly totals)[3]

Single-Family	__ Yes	__ No	__ Not Served
Multi-Family	__ Yes	__ No	__ Not Served
Commercial/Governmental/Industrial	__ Yes	__ No	__ Not Served
Agricultural	__ Yes	__ No	__ Not Served

9. Emergency Interties - Amount Exported (monthly totals provided to each intertie) — __ Yes __ No __ None Exported

10. Wholesale - Amount Sold (monthly totals provided to each wholesale customer) — __ Yes __ No __ None Sold

11. Population Served (required to be reported - annual totals)[4] — __ Yes __ No

12. Conservation Data (report the type of measure, level of implementation, duration and date begun - to be included in conservation plan, not reported with other data)[5] — __ Yes __ No

13. Existing Rate Schedules — __ Yes __ No

Data Collection Commitment?

14. Unreported Data Elements (for all data elements where data was not collected, the system is required to make a commitment to initiate and continue to collect data)[6] — __ Yes __ No __ All Reported

1. Those systems which do not have source meters will be required to estimate source production.

2. Accounted for non-revenue water includes uses which can be accounted for, but where revenue is not collected. Examples include fire protection, system flushing and other designated uses.

3. Those systems required to collect data which do not have service meters will be required to estimate how much each of these users has consumed. Include the number of connections in each category of user. Data may be collected through normal billing procedures. Monthly data may be estimated if customers are billed less frequently.

4. Report the number of connections and customers in the residential class, and number of connections for the other customer classes. Population served must be reported, a commitment to include the information in the next water system plan update is inadequate. Data on population per household is available from the State Office of Financial Management.

5. If no previous conservation efforts have been undertaken, development of a conservation plan consistent with the Conservation Planning Requirements will be acceptable.

6. Systems must either have collected all data or made a written commitment to initiate and continue data collection or the conservation plan can not be approved.

DEMAND FORECASTING REQUIREMENTS CHECKLIST

This checklist summarizes the demand forecasting factors which must be considered when forecasting future water needs. Demand forecasts must include demands from wholesale customers. To meet the minimum requirements of the Conservation Planning Requirements demand forecasts must incorporate the four factors listed below. Other factors determined to be appropriate by the system may be included as is appropriate. Demand forecasts must show demand for 6 and 20 year projections for both average daily demand and peak day demand, which depict future usage with and without conservation savings obtained from the conservation program (i.e. that factor in target water saving projections identified in the conservation program).

Factors Required to be Included	Included?	
1. Projected Population (based on information from local government and/or Office of Financial Management)	__ Yes	__ No
2. Land Use/Zoning/Capacity (adopted land use and zoning regulations)	__ Yes	__ No
3. Conservation Savings (water projected to be saved through the water conservation program must be factored into demand projection)	__ Yes	__ No
4. Per Capita water use and Other Non-Residential Water Use (based on documented water usage - when available)	__ Yes	__ No

WATER CONSERVATION PROGRAM REQUIREMENTS CHECKLIST

Conservation programs must include conservation objectives, evaluation of conservation measures, identification of selected conservation activities, and target water saving projections as discussed below. Please refer to the Conservation Planning Requirements for additional details.

Conservation Objectives. Goals and objectives of the conservation program shall be identified. These objectives should be designed to meet the needs of the specific water system (e.g., attain maximum utilization of current supplies, reduce peak daily consumption, reduce peak monthly consumption, reduce total annual consumption, promote long term efficiency with accelerated conservation on a short term basis, reduce usage from a specific customer class, develop public education and awareness, etc.). EACH WATER SYSTEM WILL NEED TO DEVELOP CONSERVATION OBJECTIVES WHICH LOGICALLY MEET ITS NEEDS.

Evaluation of Conservation Measures. Public water systems must evaluate all recommended conservation measures identified in the Conservation Planning Requirements and implement those that are required and those that meet the public water systems' needs. The specific measures to be evaluated depend upon the size of the system. However, systems are encouraged to evaluate measures above the minimum requirements. The system must explain decisions not to implement measures it is required to evaluate.

Identification of Selected Conservation Activities

- **-Description.** Description of conservation measures being implemented (including required measures).
- **-Schedule.** Schedule of when the conservation measures will be implemented (emphasis on 6 year implementation schedule).
- **-Budget.** Projected budget for each selected conservation measure. Schedule and budget information should be shown together.
- **-Monitoring Requirements.** Description of how the system will monitor the success of its conservation measures (e.g., documented reduction in water usage, distribution of conservation materials, implementation of specific measures).

Target Water Savings Projections. Each system will identify a percentage savings goal, based on the measures chosen for implementation, which the entire water conservation program will attempt to save. Because different systems may have already implemented different levels of conservation, and the conservation needs of each system are different, no percentage savings goal has been established in the Conservation Planning Requirements. This percentage savings goal must be factored into the demand forecast.

To meet the minimum requirements of the Conservation Planning Requirements all <u>required measures must be planned to be implemented within six years</u>, and all recommended measures must be evaluated and implemented if cost effective.

The following checklist summarizes the water conservation measures which are required to be implemented, and measures which are required to be evaluated and implemented where cost effective. In the absence of clear evidence to the contrary, estimates on the costs and benefits of conservation measures (i.e. selection of non-mandatory measures for implementation) will not be challenged. Please refer to the footnotes for additional important information.

Required Conservation Measures[1]	Measure Implemented?
1. Program Promotion	_ Yes _ No
2. Install Source Meters	_ Yes _ No

All recommended measures listed below must be evaluated for implementation in the conservation plan to meet the minimum requirements in the Conservation Planning Requirements.

Recommended Conservation Measures	Measure Evaluated?
3. Install Service Meters	_ Yes _ No
4. Conservation Pricing	_ Yes _ No

1. Program promotion is required to be implemented for all public water systems. Source metering is required to be implemented by all systems prior to receiving additional water rights. If additional water rights are not being sought, this measure must be evaluated and implemented if cost effective. If unaccounted for water is greater than 20 percent a leak detection and repair program must be initiated.

OTHER REQUIREMENTS CONTAINED IN THE CONSERVATION PLANNING REQUIREMENTS

In addition to developing a conservation plan as delineated above, the Conservation Planning Requirements also require that all public water systems preparing a water system plan identify existing rate schedules (include schedules for various customers classes if they are different), and inventory major potential sources and uses for reclaimed water.

Other Requirements	Information Included?
1. Inventory of Sources and Uses for Reclaimed Water[1]	_ Yes _ No

1. A list of potential sources and uses of reclaimed water is contained in the Conservation Planning Requirements. Only those systems with more than 25,000 service connections will be required to evaluate water reuse as a conservation measure.

Appendix N

Water Shortage Response Plan

WATER SHORTAGE RESPONSE PLAN

A. PLAN OVERVIEW

This plan shall be used in conjunction with the Water Conservation Plan and Emergency Response Plan included herein (Appendix M and Appendix R, respectively).

B. IMPLEMENTATION

This plan shall be implemented based on the following two degrees of short-term water shortage: moderate (supply deficiency), and severe (operating emergency). With the present service area, well capacity, and pump operating characteristics, it is not anticipated that any additional steps to those included in the Water Conservation Plan would be implemented to address a minor shortage as defined in the Washington Department of Health publication, Guidelines for the Preparation of Water Shortage Response Plans, June 1988.

Moderate Supply Deficiency:

A supply deficiency shall be considered to exist when:

(1) The static water depth, as adjusted for barometric pressure changes in the well falls by more than 6-inches from the previous reading,

(2) The well supply is unable to meet fully the maximum day demand as indicated by the failure of the storage reservoir to recover to the "full" mark over a three day period, or

(3) The County declares the area to be under the influence of a prolonged drought and requests stringent water conservation measures.

The response to a supply deficiency shall be to implement a 2-stage water conservation program as outlined below. The Stage-1 program is assumed to be in place as part of an ongoing Water Conservation Program [when fully implemented in the future].

Severe Operating Emergency:

An operational emergency shall be defined by:

a) Multiple well pump failure, multiple booster pump failure, other major component failure, or

b) An extended period without availability of electrical power if the fuel supply for the emergency generator is less than one-third full, or

c) The depletion of stored water by more than 60 percent by high water use, water main break, or other occurrence.

The response to an operating emergency shall be to implement a Stage-3 water conservation program as outlined below. Portions or all of a Stage-3 water conservation program may be implemented if a Stage-2 program is ineffective.

STAGE-2 WATER CONSERVATION PROGRAM

1) Restrict lawn sprinkling and car washing to a maximum of one day per week. Special allowance may be made for new lawns or landscaping such as twice per week watering. Restrict lawn watering to early morning or late evening. If the duration of the supply deficiency is expected to be only a few days, ban lawn watering and car washing for a fixed period.

2) Restrict water main flushing to emergency purposes, e.g. a water quality problem.

3) Monitor lawn watering to prevent wastage, e.g. runoff into the street. Monitor use of automatic lawn sprinkler systems to ensure once per week operation and minimum application time.

4) Perform special water audit to detect system leaks.

5) Perform a cursory water use inspection of customer premises to determine if water is being wasted. Inspection may be initiated in response to the complaints of other customers about water wastage. Inspection may be limited to conversation with the homeowner about water use and conservation practices.

6) If a prolonged period of water shortage is anticipated or encountered, institute a temporary water rate surcharge to encourage conservation [after all meters are installed].

STAGE-3 WATER CONSERVATION PROGRAM

1) Ban all water use not required for public health: the ban would include all lawn sprinkling and car washing.

2) Suspend all water main flushing.

3) Suspend all filling of swimming pools, i.e., use of make-up water.

4) Reduce system pressure by adjusting booster pump on and off settings.

5) Perform a water use inspection of all customers to determine if water is being wasted. Inspection should be based on conversation with the resident and an observation of outdoor water use.

If necessary, operation of transient, non-community activities such as camping, motels and restaurants can be suspended. All available water would be allocated to full-time residential customers.

Public Notification:

Notification of the implementation of a Stage-2 Water Conservation Program shall be by mail. The letter shall include an explanation of the reason for the program, the anticipated duration of the program, and a list of conservation actions.

Notification of a Stage-3 Water Conservation Program shall be first by telephone or door-to-door contact with residents, followed by a hand-delivered or mailed letter that includes an explanation of the reason for the program, the anticipated duration of the program, a list of conservation actions, and the fine for wastage.

Enforcement:

Enforcement of the Stage-2 Water Conservation Program will be primarily through an appeal for voluntary compliance.

Enforcement of a Stage-3 Water Conservation Program will first be through an appeal for voluntary compliance, then through shut-off of the service. The decision to shut off service should consider the need to protect the system from potential contamination by preventing loss of water system pressure resulting from supply inadequacy.

Appendix O

Cross Connection Control Program

CROSS CONNECTION CONTROL PROGRAM

Table of Contents

Attachments

Resolution – Cross Connection Control

Application for Water Service

Hazard Assessment Forms
- Water Use Questionnaire – Residential Customers
- Survey Report – Commercial Customers

Record Forms
- BPA Test Report (see PNWS AWWA Manual)
- BPA File Record (see computer spreadsheet maintained by CCS)
- Backflow Incident Report (see PNWS AWWA Manual)

List of Purveyor Pre-approved BATs (list available from CCS)

WA DOH List of Approved Assemblies (list available from WA DOH or CCS)

BPA Installation – Standard Plans (see Water System Plan standard drawings)
- W-9 Service Connections - Residential
- W-10 Service Connections - Commercial
- W-11 Separation of Service Connections (with sewer)
- W-12 Service Connection - RPBA
- W-13 Service Connection / Lawn Irrigation - DCVA
- W-14 4" to 8" DCDA
- W-15 Fire Hydrant Use – Construction Water
- W-16 General Cross Connection Control Requirements

Backflow Incident Response Plan

Inventory of Assemblies (see computer spreadsheet maintained by CCS)

WA DOH Annual Summary Report forms (when available from WA DOH)

Sample Education Brochures (see PNWS-AWWA brochures)

CROSS CONNECTION CONTROL PROGRAM

A. OVERVIEW

The cross connection control program was prepared for this Group A public water system. The customers in the service area include single-family residential, commercial (e.g., restaurant), and transient non-community (e.g., resort cabins, mobile home parks). The policy of the District is to operate a premises isolation program for all customers.

B. REQUIREMENTS FOR PROGRAM

The *Bullerville Utility District*, hereinafter referred to as the Purveyor, has the responsibility to protect public water systems from contamination due to cross connections. A cross connection may be defined as "Any actual or potential physical connection between a potable water line and any pipe, vessel, or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow".

C. PROGRAM OBJECTIVES

The objectives of the cross connection control program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system, and

2. Reasonably reduce the Purveyor's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other customers.

D. REQUIRED ELEMENTS OF PROGRAM

The following are excerpts from the Washington Administrative Code (WAC) 246-290-490:

Element 1: The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:

a) Establishes the purveyor's legal authority to implement a cross-connection control program;

b) Describes the operating policies and technical provisions of the purveyor's cross-connection control program;

c) Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.

Element 2: The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notify the consumer within a reasonable time frame of the hazard evaluation results. At minimum, the program shall meet the following:

a) For new connections made on or after the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted before service is provided;

b) For existing connections made prior to the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department {WA DOH}; and

c) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

Element 3: The purveyor shall develop and implement procedures and schedules for ensuring that:

a) Cross-connections are eliminated whenever possible;

b) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and

c) Approved backflow preventers are installed in accordance with the requirements of subsection (6) of this section {of WAC 246-290}

Element 4: The purveyor shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the cross-connection control program.

Element 5: The purveyor shall develop and implement procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable) in accordance with subsection (7) of this section {of WAC 245-290}.

Element 6: The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program including, but not limited to documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports.

Element 7: The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.

Element 8: The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operations. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.

Element 9: The purveyor shall develop and maintain cross connection control records including, but not limited to, the following:

a) A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s);

b) Inventory information on:

i. Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections;

ii. Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and

iii. Approved AVBs used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspections, and person performing inspections.

A copy of the current WA DOH "Cross-Connection Program Summary Reports" and "Backflow" section {of WAC 246-290} are attached hereto.

Element 10: Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the department under a permit issued in accordance with chapter 90.46 RCW.

E. PROGRAM OPERATION

Authority - The attached resolution establishes the authority for the program. The attached service contract referred to in the resolution shall be the primary enforcement authority for all new customers.

For customers supplied prior to the adoption of the attached resolution, an implied service contract allows the Purveyor to protect the distribution system from contamination through a Purveyor installed backflow preventer on a customer's service.

The written and implied contract terms are discussed further hereinafter under the section "Policy".

Program Administration - The responsibility for administration rests with the board of directors, either as a body or to an individual director or employee, hereinafter referred to as the Director.

The administration of the program shall be periodically audited by a WA Department of Health certified cross connection control specialist (CCS) employed by the Purveyor. At a minimum, the audit will occur every six years. For systems required to update a water system plan, the audit should be part of water system plan update. When requested, the CCS shall also advise the Director on cross connection control matters.

The current CCS employed by the Purveyor is:

Kelly Wynn, Water/Wastewater Services (contract operator)

Policy - The following service policy shall apply to all new and existing customers:

Water services to all non-single family or duplex residential customers, hereinafter referred to as "commercial customers", shall be isolated at the meter by a Purveyor approved double check valve assembly (DCVA) or reduced pressure backflow assembly (RPBA). All customers described in Table 9 of WAC 246-290-490 shall be isolated with a RPBA. All other commercial customers shall be isolated with a DCVA.

Water services to all single family or duplex residential customers, hereafter referred to as "residential customers", shall be isolated at the meter by a Purveyor installed meter check valve (single or dual), except where the customer has special plumbing that increases the risk to the Purveyor's distribution system, such as, but not limited to, the following:

1) Lawn irrigation system
2) Solar heating system
3) Auxiliary source of supply, e.g., well
4) Piping for hobby farming, etc.
5) Residential fire sprinkler system
6) Property containing small boat moorage

All residential customers described in Table 9 of WAC 246-290-490 shall be isolated with a RPBA. All other residential customers with special plumbing as described in "2", above, shall be isolated with a DCVA. For all customers that have a written service contract with the Purveyor, the premises isolation DCVA or RPBA required above shall be:

1. Purchased and installed by the customer (at the customer's expense) immediately downstream of the water meter in accordance with the Purveyor's standards described hereinafter;

2. Maintained, repaired, tested, and inspected in accordance with the Purveyor's standards described hereinafter;

For new customers, water shall not be turned on at the meter until the customer complies with the above requirements.

The failure of the customer to comply with the above installation and maintenance requirements shall constitute the customer's breach of contract. The Purveyor may then proceed with corrective action provisions stipulated in the contract.

Customers without a written contract shall be considered to have an implied contract that requires the customer to bear all reasonable costs of service. The Purveyor shall install the required DCVA or RPBA on the service, upstream of the meter, and charge the customer for the cost of the initial installation, and all future maintenance, testing and repair, as set forth in the Purveyor's schedule of rates and charges. The failure of the customer to pay these costs shall constitute the customer's breach of contract, and the Purveyor shall proceed with the established delinquency of payment procedures. As an alternative, the customer may sign a service contract, and install the required backflow preventer downstream of the meter.

The Purveyor has no regulatory responsibility or authority over the installation and operation of the customer's plumbing system. The customer is solely responsible for compliance with all applicable regulations, and for prevention of contamination of his plumbing system from sources within his premises. Any action taken by the Purveyor to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation (installation of DCVA or RPBA on service) is solely for the purposes of reducing the risk of contamination of the Purveyor's distribution system.

No action by the Purveyor shall be construed by the customer to provide guidance to the customer on the safety or reliability of the plumbing system. Other than the general public education program discussed hereinafter, the Purveyor will provide no advice to the customer on the design and installation of plumbing.

Except for easements containing the Purveyor's distribution system, the Purveyor will not undertake work on the customer's premises.

Cross Connection Surveys - The procedures for evaluating the backflow prevention requirements for new and existing customers are:

1. For all new commercial services, the customer shall submit with the application for water service an evaluation by a purveyor pre-approved, WA Department of Health certified cross connection control specialist (CCS) of the hazard posed by the proposed plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA. The Purveyor, at the discretion of the Director, may accept the recommendation or submit the recommendations to a CCS employed by the Purveyor for peer review and concurrence, before acceptance.

2. For all new residential services, the customer shall submit with the application for water service a completed "Water Use Questionnaire", copy attached hereto. If the customer's reply indicate special plumbing, such as a lawn sprinkler system, the customer shall submit an evaluation by a purveyor pre-approved, WA Department of Health certified cross connection control specialist (CCS) of the hazard posed by the proposed special plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA.

As an alternative to the above requirement for a survey by a CCS, at the discretion of the Director, the Purveyor may specify the backflow preventer required to be installed as a condition of service.

For all existing commercial services, the customer shall be requested to submit within two years an evaluation by a purveyor pre-approved, WA Department of Health certified cross connection control specialist (CCS) of the hazard posed by the proposed plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA. The Purveyor, at the discretion of the Director, may accept the recommendation or submit the recommendations to a CCS employed by the Purveyor for peer review and concurrence, before acceptance.

For all existing residential services, the customer shall be requested to submit within four months a completed "Water Use Questionnaire". If the customer's reply indicate special plumbing, the customer shall submit an evaluation by a purveyor pre-approved, WA Department of Health certified cross connection control specialist (CCS) of the hazard posed by the proposed special plumbing system, with recommendations for the installation at the meter of either a DCVA or RPBA.

As an alternative to the above requirement for a survey by a CCS, at the discretion of the Director, the Purveyor may specify the backflow preventer required to be installed as a condition of service. Guidance on the type of backflow preventer shall be provided by the Purveyor's CCS.

For existing services, should the customer fail to supply the requested information for a hazard assessment, the Director may have the assessment made by a CCS employed by the Purveyor, require the installation of an RPBA, or take other such actions consistent with the previously stated policies.

For subsequent cross connection surveys, procedures for evaluating the backflow prevention requirements are:

1. For residential services not required to have a DCVA or RPBA, every two years and/or at the time of a change in ownership of the premises, the customer shall be requested to submit within two months a completed "Water Use Questionnaire". The procedure for evaluating the need to change the hazard assessment, and thus require a DCVA or RPBA shall be the same as the procedure for the initial assessment.

2. For residential services with a DCVA or RPBA, and for all commercial services, the customers shall be required to submit with the annual report on the testing of the DCVA or RPBA, a reevaluation of the hazard assessment. To facilitate the reevaluation, the customer should employ for testing the DCVA or RPBA a Purveyor pre-approved, WA DOH certified CCS (dual CCS and BAT certification). Alternatively, the customer may employ a CCS to accompany the BAT

Testing of Assemblies - The following requirements apply to all backflow prevention assemblies and air gaps relied upon by the Purveyor to protect its public water system.

The DCVA or RPBA installed on the service for premises isolation shall be inspected and tested by a WA DOH certified backflow assembly tester (BAT) upon installation and at least annually thereafter, after repair, replacement or relocation, and upon the specific request of the Purveyor as a spot quality assurance check. As previously noted, the BAT shall also retain WA DOH certification as a CCS.

For customer-owned assemblies, the customer shall employ a Purveyor pre-approved BAT to complete the inspection and test within 30 days of date of mailing by the Purveyor of a notification to test the assembly. The test report shall be completed and signed by the BAT, then countersigned and returned by the customer to the Purveyor within 45 days of the date of mailing of the notification to test the assembly. A request for an extension of the completion time for the return of a test report may be made in writing by the customer to the Purveyor. An extension up to 90 days may be granted at the discretion of the Director.

The DCVA, DCDA, RPBA and RPDA, shall be tested in accordance with the test performance criteria outlined in Chapter 8 "Assembly Test Procedures" in the PNWS-AWWA CROSS CONNECTION CONTROL MANUAL, Sixth Edition, 1995.

The test report form supplied by the Purveyor, copy attached hereto, shall be completed and returned.

Quality Assurance - The following requirements apply to all backflow prevention assemblies and air gaps relied upon by the Purveyor to protect its public water system.

The test report forms submitted by the customer shall be reviewed upon receipt by the Director, and periodically by a CCS employed by the Purveyor to audit the cross connection control program. Test reports should be reviewed by the CCS at least annually.

To ensure that the equipment used to test assemblies has been checked for calibration within the last year, the Purveyor shall list as pre-approved those BATs listed by another water utility with greater than 1,000 connections that has a quality assurance program. Alternatively, the BAT may submit with a test report a report on the verification of the calibration of his test equipment and current certification status.

Approved Backflow Assemblies - The Purveyor shall rely upon the Washington Department of Health's published list of "Approved" backflow prevention assemblies. This list shall be obtained from the State of Washington annually.

Records - The Director shall maintain copies of all records, including but not limited to, correspondence, survey results, and backflow assembly test reports. The record form "Record of Backflow Prevention Assemblies" (Form B-1), included herewith, shall be used to record the location of all backflow prevention assemblies required by the Purveyor.

List of Certified Testers - The list of local certified backflow assembly testers (BAT) and cross connection control specialists (CCS) approved by the Purveyor is included herewith. Others may be added to this list upon written request. A list of all certified testers may be obtained from the WA Department of Health.

Coordination with Plumbing Authority - A copy of this cross connection control program is provided to Skagit County Plumbing Inspector, hereinafter referred to as the local administrative authority, via a copy of the Purveyor's water system plan submitted to the Skagit County Health Department.

The Director shall provide information to the local administrative authority in a timely manner of:

1. Any requirement imposed on a residential customer for the installation of a DCVA or RPBA on the service, with a description of the cross-connection hazard identified,

2. Any upgrade of the premises isolation from a DCVA to a RPBA,

3. Any action taken to discontinue water supply, and

4. Any backflow incident.

The Purveyor's survey of a customer's premises, whether by a representative of the Purveyor or through the evaluation of a questionnaire completed by the customer, is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard. It shall not be assumed by the customer or any regulatory agencies that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by Purveyor personnel or agent constitutes an approval of the customer's plumbing system, or an assurance to the customer or any regulatory agency, of the absence of cross connections therein.

Backflow Incident Response - The Purveyor's emergency procedures (cross connection control section attached hereto) include a backflow incident response plan. The response plan is supplemented by the PNWS-AWWA BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996.

Public Education - The public education program for the Purveyor shall consist mainly of the distribution with water bills of information brochures describing the cross connection hazards in homes and the recommended devices that should be installed by the homeowner to reduce the hazard. The education program emphasizes the responsibility of the customer in preventing the contamination of his water supply. The information brochures may be obtained from Pacific Northwest Section, American Water Works Association, P. O. Box 19581, Portland, Oregon, 97280, telephone 877-767-2992 (toll free), other backflow prevention associations and other water utilities.

The information brochure on thermal expansion, published by the Spokane Region Cross Connection Control Committee shall be included as part of the education program.

Information brochures shall be periodically distributed to all customers; the period between distributions of a brochure on the topic of cross connection control shall not exceed three years.

Copies of all of the brochures distributed by the Purveyor within the last six years shall be provided to all new customers at the time the new customer signs a service agreement. Additional copies will be provided to customers upon request.

Installation Standards - All DCVA and RPBA on the customer's service shall be installed in accordance with the recommendations outlined in the PNWS-AWWA CROSS CONNECTION CONTROL MANUAL, Sixth Edition, 1995, and in the Purveyor's "standard detail" drawings.

F. PROGRAM SCHEDULE

The table on the following page shows the schedule for program implementation and operation.

Installation of backflow prevention assemblies on existing customers shall be required when the customer changes (i.e., change in ownership of property), or the customer's water use changes (e.g., change in plumbing, change in tenant, etc.).

G. PROGRAM REFERENCE DOCUMENTS

The following publications shall be utilized for the operation of the program:

PNWS-AWWA CROSS CONNECTION CONTROL MANUAL, Sixth Edition, 1995, or latest edition thereof.

PNWS-AWWA BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, or latest edition thereof.

WA DOH CROSS-CONNECTION CONTROL GUIDANCE MANUAL FOR SMALL WATER SYSTEMS, 2000, or latest edition thereof.

PNWS-AWWA BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, or latest edition thereof.

WA DOH CROSS-CONNECTION CONTROL GUIDANCE MANUAL FOR SMALL WATER SYSTEMS, 2000, or latest edition thereof.

SCHEDULE FOR PROGRAM IMPLEMENTATION AND OPERATION

TASK	SCHEDULE
Adoption of policy and administrative authority	2004
Assess purveyor's system hazards (e.g., air valves)	With system installation
BPAs installed in water distribution system	With system installation
New customer hazard assessment	Upon application
BPAs installed on new customers	Before service provided
Existing customer hazard assessment: Single family – questionnaire Commercial – survey	 2005
Notification of assessment: High hazard (table 9) All others	 Within 3 months of assessment
BPAs installed on existing customers: High hazard (table 9) Commercial Residential Commercial/residential fire systems	 Within 6 months of assessment
Re-assessment of hazard: Commercial Residential	 Every 2 years Every 2 years
Distribution of education brochures	July each year
Annual BPA testing notification	March each year
CCS review of program	April each year

DRAFT RESOLUTION
CROSS CONNECTION CONTROL POLICY

FINDING OF FACT:

Whereas it is the responsibility of a water purveyor to provide water to the customer that meet State water quality standards;

Whereas it is the water purveyor's responsibility to prevent the contamination of the public water supply system from the source of supply to the customer's connection to the service pipe or meter;

Whereas it is a requirement of the Washington Department of Health for the purveyor to establish a cross connection control program satisfactory to the Department of Health, and

Whereas cross connections within the customer's plumbing system pose a potential source for the contamination of the public water supply system;

Now be it resolved that the Bullerville Utility District, hereinafter referred to as the Purveyor, establishes the following service policy to protect the Purveyor owned water supply system from the risk of contamination. For public health and safety, this policy shall apply equally to all new and existing customers.

PREVENTION OF CONTAMINATION:

The customer's plumbing system, starting from the termination of the Purveyor's water service pipe, shall be considered a potential high health hazard requiring the isolation of the customer's premises by a Purveyor approved, customer installed and maintained reduced pressure backflow assembly (RPBA) or detector derivative thereof. The RPBA shall be located at the end of the Purveyor's water service pipe (i.e., immediately downstream of the meter). Water shall only be supplied to the customer through a Purveyor approved and customer installed and maintained RPBA.

Notwithstanding the aforesaid, the Purveyor, upon an assessment of the risk of contamination posed by the customer's plumbing system and use of water, may allow:

A) A single family or duplex residential customer to connect directly to the water service pipe, i.e., without a Purveyor approved DCVA or RPBA.

B) Any customer other than a single family or duplex residential customer, as a minimum, to be supplied through a Purveyor/WA DOH approved, customer installed and maintained double check valve assembly (DCVA) or double check detector assembly (DCDA).

CONDITIONS FOR PROVIDING SERVICE:

Water service is provided based on the following terms and limitations:

1) The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his premises and the Purveyor's distribution system that may occur from backflow through a cross connection. These measures shall include the prevention of backflow under any back pressure or backsiphonage condition, including the disruption of supply from the Purveyor's system that may occur by reason of routine system maintenance or during emergency conditions, such as a water main break.

2) The customer agrees to install, operate and maintain at all times his plumbing system in compliance with the current edition of the Plumbing Code having jurisdiction as it pertains to the prevention of contamination, and protection from thermal expansion due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.

3) For cross connection control or other public health related surveys, the customer agrees to provide free access for the employees or agents of the Purveyor to all parts of the premises during reasonable working hours of the day for routine surveys, and at all times during emergencies.

Where agreement for free access for the purveyor's survey is denied, water service may be supplied by the Purveyor, provided premises isolation is provided through a Purveyor/WA DOH approved reduced pressure backflow assembly (RPBA).

4) The customer agrees: (a) to have tested upon installation, annually thereafter or when requested by the Purveyor, after repair and after relocation his RPBA or DCVA installed to protect the Purveyor's distribution system, (b) to have all testing done by a Purveyor approved and State Department of Health currently certified Backflow Assembly Tester (BAT) with certification as a Cross Connection Control Specialist (CCS), (c) to have the RPBA or DCVA tested following the procedures approved by the WA DOH with the recommended additional procedures in the "Cross Connection Control Manual, Accepted Procedures and Practice", Sixth Edition, December 1995, or latest edition thereof, and (d) to submit to the Purveyor the results of the test(s) on the Purveyor supplied test report form within the time period specified by the Purveyor.

The customer agrees to bear all costs for the aforementioned installation, testing, repair, maintenance and replacement of the RPBA or DCVA or derivative thereof installed to protect the Purveyor's distribution system.

5) At the time of application for service, if required by the Purveyor, the customer agrees to submit plumbing plans and/or a cross connection control survey of the premises by a Purveyor approved and Washington Department of Health certified Cross Connection Control Specialist (CCS).

The survey shall assess the cross connection hazards and list the backflow prevention provided within the premises. The results of the survey shall be submitted prior to the Purveyor turning on water service to a new customer. The cost of the survey shall be borne by the customer.

6) For classes of customers other than single family residential, when required by the Purveyor, the customer agrees to submit a cross connection control re-survey of the premises by the persons described above. The Purveyor may require the re-survey to be performed in response to changes in customer's plumbing, or performed periodically (annual or less frequent) where the Purveyor considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.

7) Within 30 days of a request by the Purveyor, a residential customer shall agree to complete and submit to the Purveyor a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system on the Purveyor's distribution system. Further, the residential customer agrees to provide with 30 days of a request by the Purveyor a cross connection control survey of the premises by a Purveyor approved and Washington Department of Health certified Cross Connection Control Specialist (CCS).

8) The customer agrees to obtain the prior approval from the Purveyor for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the Purveyor for cross connection control.

9) The customer agrees to immediately notify the Purveyor and the local public health inspection jurisdiction of any backflow incident occurring within the premises, (i.e., entry into the potable water of any contaminant or pollutant) and shall cooperate fully with the Purveyor to determine the reason for the incident.

10) The customer acknowledges the right of the Purveyor to discontinue water supply within 72 hours of giving notice, or a lesser period of time if required to protect the public health, if the customers fails to cooperate with the Purveyor in the survey of premises, in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies or air gaps required by the Purveyor, or in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system.

Without limiting the generality of the foregoing, in lieu of discontinuing water service the Purveyor may install a reduced pressure backflow assembly (RPBA) on its service pipe to provide premises isolation, and recover all of its costs for the installation and subsequent maintenance and repair of the assembly, appurtenances and enclosure from the customer as fees and charges for water. The failure of the customer to pay these fees and charges may result in termination of service in accordance with the Purveyor's water billing policies.

11) The customer agrees to indemnify and hold harmless the Purveyor for all contamination of the customer's plumbing system or the Purveyor's distribution system that results from an unprotected or inadequately protected cross connection within his premises. This indemnification shall pertain to all backflow conditions that may arise from the Purveyor's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store and pump water for his premises.

12) The customer agrees that, in the event legal action is required and commenced between the Purveyor and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

13) The customer acknowledges that the Purveyor's survey of a customer's premises is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard.

It shall not be assumed by the customer or any regulatory agency that the Purveyor's survey, requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by Purveyor personnel constitutes an approval of the customer's plumbing system, or an assurance to the customer of the absence of cross connections therein.

14) The customer acknowledges the right of the Purveyor, in keeping with changes to State regulations, industry standards, or the Purveyor's risk management policies, to impose retroactive requirements for additional cross connection control measures.

The Purveyor shall record the customer's agreement to the above terms for service on an "Application for Water Service", "Application for Change of Water Service" or other such form prepared by the Purveyor and signed by the customer.

The definition of technical terms given in the "Cross Connection Control Manual, Accepted Procedures and Practice", Sixth Edition, December 1995 published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof, shall apply herein.

APPLICATION FOR WATER SERVICE

OWNER'S NAME: _____TELEPHONE: _____
MAILING ADDRESS: _____
LOCATION ADDRESS: _____
LEGAL DESCRIPTION: _____

The undersigned applicant hereby applies for a water connection to the above-described property. The applicant is the owner of the described property or the authorized agent of the owner. By signing this application, the property owner agrees, as a condition of the Bullerville Utility District, hereinafter referred to as the Purveyor, providing and continuing service to the above described property, to comply with all provisions of the attached Resolution or latest revision thereof, and other such attached rules and regulations now existing or which may be established from time to time governing the Purveyor's water system. The property owner specifically agrees:

a) To install and maintain at all times his plumbing system in compliance with the most current edition of the Skagit County Plumbing Code as it pertains to the prevention of potable water system contamination, prevention of pressure surges and thermal expansion in his water piping (for thermal expansion, it shall be assumed that a check valve is installed by the Purveyor on the water service pipe);

b) Within 30 days of the Purveyor's request, to install, test, maintain, and repair in accordance with the Purveyor's cross connection control standards a reduced pressure backflow assembly or double check backflow assembly, or detector derivative thereof, on the customer's service pipe immediately downstream of the Purveyor's meter, or other Purveyor approved location; and to report to the Purveyor within 30 days of obtaining the results of all tests and repairs to aforementioned backflow prevention assemblies, and of making any change to the plumbing system.

c) Not to make a claim against the Purveyor or its agents or employees for damages and/or loss of production, sales or service, in case of water pressure variations, or the disruption of the water supply for water system repair, routine maintenance, power outages, and other conditions normally expected in the operation of a water system.

d) To pay his water billing within thirty (30) days from the date of billing.

After thirty (30) days of the Purveyor mailing a written notice to the property owner of his breach of this agreement, the Purveyor may terminate water service. In the event legal action is required and commenced between the parties to this agreement to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all its costs and expenses including but not limited to reasonable attorney's fees as determined by the Court.

_____ _____
Applicant's Signature Date

Attachments received:

Water rates & charges
Water service connection information
Water Service Policy

Bratton {4/18/2003}

CROSS CONNECTION CONTROL
SURVEY REPORT – RESIDENTIAL QUESTIONAIRE

TO: _____ Date: _____
_____
_____

The attached brochure describes a "cross connection" and the potential for contamination of the water system through unprotected cross connections. The purpose of this questionnaire is to help determine if you have any special plumbing or activities that may pose an increased risk of contamination of the water distribution system. Please respond by checking the appropriate box below:

YES	NO	
☐	☐	Underground lawn sprinkler system
☐	☐	Water treatment system (e.g., water softener)
☐	☐	Solar heating system
☐	☐	Residential fire sprinkler system
☐	☐	Private well, including those not connected to your plumbing system
☐	☐	Grey water system or cistern for irrigation water
☐	☐	Piping for livestock watering
☐	☐	Water supply to dock or small boat moorage
☐	☐	Grinder pump and/or off-site septic field

BY: _____ Date: _____
Resident's signature

Please return the completed questionnaire to the address on the letterhead.

If you have checked any of the above, we will contact you to request further information. Your cooperation in completing this questionnaire is most appreciated.

If you have any questions, please contact the undersigned.

CROSS CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

Date of Survey: _____

CUSTOMER INFORMATION

Premises name: _____, Telephone: _____

Address: _____

_____ ZIP: _____

Contact person: _____ Title: _____

Description of customer: _____

Description of water use: _____

Water Service and Backflow Prevention Assembly (BPA) Size / Type:

	Service Size	Meter Size	BPA Size	BPA Type
Domestic				
Fire line				
Irrigation				
Other				

CROSS CONNECTION CONTROL SPECIALIST (CCS) INFORMATION

Name: _____, Telephone: _____

Company's name: _____

Address: _____

_____ ZIP: _____

WA DOH Certif. #: _____ Year certified: _____

CROSS CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

SURVEY RESULTS

Item	Location & Description of Cross Connection	Backflow Prevention Provided/Required

Attach additional sheets if needed

CROSS CONNECTION CONTROL
SURVEY REPORT – COMMERCIAL CUSTOMERS

SURVEYOR'S COMMENTS

SURVEYOR'S RECOMMENDATIONS

I certify that this survey accurately reflects the overall risk posed to the Purveyor's distribution system by the customer's plumbing system and that the backflow prevention assembly is properly installed. Based on the above survey, I find that (check one):

__ The present _____ (RPBA or DCVA) is commensurate with the degree of hazard.

__ The premises isolation assembly or assemblies should be changed for the reasons stated under "Surveyor's Comments", above.

_____ _____
Signature of CCS Date

This certifies receipt of this completed survey report and its submittal to the Bullerville Utility District.

_____ _____
Signature of the Customer or authorized agent Date

It shall not be assumed by the customer or any regulatory agencies that this requirement by the Purveyor for this survey, or for the installation of a specific backflow prevention assembly on a service pipe constitutes an approval of the customer's plumbing system, compliance with the customer's plumbing system with the plumbing code, or an assurance to the customer of the absence of cross connections therein.

The completed survey report shall be first signed by the CCS conducting the survey, then counter-signed by the owner of the premises surveyed or his agent.

The survey shall include the inspection of the assembly installed on a service for premises isolation to verify its correct installation and status as a currently listed Approved assembly by the WA DOH.

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

BACKFLOW ASSEMBLY TEST / AG INSPECTION REPORT

Name of Premise:		
Premise Address:		
Location of Assembly:		
Type of Hazard Isolated:		
Assembly Size: (inches)	Assembly Type:	
Make:	Model:	
Serial No.:	Line Pressure: (psi)	
RPBA / RPDA / DCVA / DCDA Horizontal?	yes___,	no___
Adequate Freeze Protection and/or Drainage?	yes___,	no___
Date of test or Date of retest after repairs:		
Tester's Name (print):		
Certification No.:	Issue Date:	
Company Name:		
Company Address: Company Telephone:		
Make/model of test equipment:		
Test procedures followed:		
Check of test equipment calibration accuracy: Date:	By:	

Assembly test procedures must comply with Chapter 8 in the PNWS-AWWA "CROSS CONNECTION CONTROL MANUAL", Sixth Edition **and** WAC 246-290-490.

The Customer (owner of the premises or his authorized agent) shall return the completed report to the above address.

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

RPBA/RPBA

Relief Valve [> 2.0 psid]	Dripped at: or failed to open? ____ (check) Continued to open?	__ __ . __ psi yes ____, no ____
Check Valve #1 [>1.0 psid]	Pressure drop: Valve Tight?	__ __ . __ psi yes ____, no ____
Check Valve #1 Buffer [>3.0 psi] minus relief valve psid	C V #1 pressure drop	__ __ . __ psi
Check Valve #2 [>1.0 psid]	Pressure drop: Valve Tight, Flow direction? Backpressure?	__ __ . __ psi yes ____, no ____ yes ____, no ____
Air Gap distance adequate?		yes ____, no ____
Test Cock # 4 opened, meter moved? Detector Meter Reading: _____		yes ____, no ____

DCVA/DCDA

Check Valve # 2 [>1.0 psid]	Pressure drop: Valve Tight Flow direction?	__ __ . __ psi yes ____, no ____
Check Valve # 1 [>1.0 psid]	Pressure drop: Valve Tight Flow direction?	__ __ . __ psi yes ____, no ____
Test Cock # 4 opened, metered moved? Detector Meter Reading: _____		yes ____, no ____

PVBA/SVBA

Check Valve # 1 [>1.0 psid]	Pressure drop: Valve Tight?	__ __ . __ psi yes ____, no ____
Air Inlet [>1.0 psid]	Opened at: Air Inlet opened?	__ __ . __ psi yes ____, no ____

This certifies that the above test results accurately reflect the performance of the assembly and/or condition of the air gap at the time of the test / inspection.

_____ _____
Signature of Tester Date

This certifies receipt of this completed test report and its submittal to Bullerville Utility District as required by the conditions of the purveyor for continuing to supply water service..

_____ _____
Signature of Owner (customer) or authorized agent Date

ASSEMBLY DATABASE

Summary pages (not all of spreadsheet information displayed).

CUSTOMER INFORMATION	ASSEMBLY LOCATION	HAZARD ASSESSMENT	ASSEMBLY INFORMATION	TESTER INFORMATION	TEST RESULTS		2003	2002
Code 1	Code 1	Code 1	Type: Make: Model: Ser. # Size: Code 1	Name: Company: Address: City: Tel. #: BAT #: CCS #	Date of test: RP drip point RP Openned #1 CV Drop: #2 CV Drop: Buffer: Air Inlet: Air Gap: Detector meter CCS Survey Pass/Fail:	 [psi] [Y/N] [psi] [psi] [psi] [psi] [in.] [moved} [Y/N] [Y/N]		
Code 1	Code 1	Code 1	Type: Make: Model: Ser. # Size: Code 1	Name: Company: Address: City: Tel. #: BAT #: CCS #	Date of test: RP drip point RP Openned #1 CV Drop: #2 CV Drop: Buffer: Air Inlet: Air Gap: Detector meter CCS Survey Pass/Fail:	 [psi] [Y/N] [psi] [psi] [psi] [psi] [in.] [moved} [Y/N] [Y/N]		
Code 1	Code 1	Code 1	Type: Make: Model: Ser. # Size: Code 1	Name: Company: Address: City: Tel. #: BAT #: CCS #	Date of test: RP drip point RP Openned #1 CV Drop: #2 CV Drop: Buffer: Air Inlet: Air Gap: Detector meter CCS Survey Pass/Fail:	 [psi] [Y/N] [psi] [psi] [psi] [psi] [in.] [moved} [Y/N] [Y/N]		

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

BACKFLOW INCIDENT REPORT FORM

This form is based on the Backflow Incident Report Form provided in the PNWS AWWA *Cross Connection Control Manual*, Sixth Edition.

WAC 246-290-490 states that the purveyor shall notify the WA Department of Health, local administrative authority, and local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known by the purveyor to have (i) Contaminated the public water system, or (ii) Occurred within the premises of a consumer served by the purveyor. The purveyor shall document details of backflow incidents on a form acceptable to the WA DOH.

Reporting Agency: _____ Report Date: _____

Reported By: _____ Title: _____

Mail Address: _____ City: _____

State: _____ Zip Code: _____ Telephone: _____

Date of Incident: _____ Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premise: _____

Street Address: _____ City: _____

Contact Person: _____ Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

_____

_____

Distribution of Contaminants:

Contained within customer's premise: Yes: _____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported : _____

Physical irritation reported: _____

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

Backflow Incident Report Form

Cross Connection Source of Contaminant
(boiler, chemical pump, irrigation system, etc.)

_____

_____

Cause of Backflow:
(main break, fire flow, etc.)

_____

_____

Corrective Action Taken to Restore Water Quality:
(main flushing, disinfection, etc.)

_____

_____

Corrective Action Ordered to Eliminate or Protect from Cross Connection:
(type of backflow preventer, location, etc.)

_____

_____

Previous Cross Connection Survey of Premise:

Date: _____ By: _____

Types of Backflow Preventer Isolating Premise:

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____ PVBA: _____ SVBA: _____

AVB: _____ Air Gap: _____ None: _____ Other Type: _____

Date of Latest Test of Assembly: _____

Notification of State [Provincial] Health Department:

Date: _____ Time: _____ Person Notified: _____

Attach sheets with additional information, sketches, and/or media information.

BACKFLOW INCIDENT RESPONSE PLAN
(supplement to the Emergency Plan)

A. General

This backflow incident response plan is a supplement to the Emergency Plan of the Bullerville Utility District, hereinafter referred to as the Purveyor.

Whenever the initial evaluation of a water quality complaint indicates that a backflow incident has occurred (potable water supply has been contaminated/polluted), may have occurred, or the reason for the complaint can not be explained as a "normal" aesthetic problem, a backflow incident investigation should be immediately initiated. Whenever a water main break or power outage (pumped systems) causes a widespread loss of water pressure (backsiphonage conditions) it is prudent to initiate a check of distribution water quality as a precursor to the need for a backflow incident investigation. It is wise to be conservative when dealing with public health matters.

Within 24 hours of knowledge of any incident of possible contamination of the potable water supply, both in the distribution system and/or in the customer's plumbing system, the state and local county personnel should be notified (see list of emergency telephone numbers at the beginning of the M. & O. Manual).

A backflow incident investigation is often a team effort. The investigation should be made or (initially) lead by the certified Cross Connection Control Specialist employed by the Purveyor. The investigation team should include local health and plumbing inspectors.

General guidance on how to respond to a backflow incident may be obtained from the manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, published by the Pacific Northwest Section, American Water Works Association, P. O. Box 19581, Portland, Oregon, 97280, telephone (877) 767-2992 (toll free).

B. Short-List of Tasks

The following points are included for initial guidance for dealing with a backflow incident; the above referenced manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES should be consulted as soon as possible.

1) As soon as possible, notify customers not to consume or use water. Start the notification with the customers nearest the assumed source of contamination (usually the customer(s) making the water quality complaint).

   The customer should be informed about the reason for the backflow incident investigation, and the Purveyor's efforts to restore water quality as soon as possible. State that the customer will be informed when he may use water, the need to boil water used for consumption until a satisfactory bacteriological test result is obtained from the lab, etc.

Where a customer cannot be contacted immediately, the Purveyor shall place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customer received notice about the break and possible contamination of the water supply.

2) Give consideration to the distribution system as a potential source of the contaminant (e.g., air valve inlet below ground).

3) Do not start flushing the distribution system until the source of contamination is identified. Flushing may aggravate the backflow situation, and will likely remove the contaminant before a water sample can be collected to fully identify the contaminant.

4) Conduct a house-to-house survey to search for the source of contamination and the extent that the contaminant has spread through the distribution system. A check of water meters may show a return of water (meter running backward).

5) Isolate the portions of the system that are suspected of being contaminated by closing isolating valves; leave one valve open to ensure that positive water pressure is maintained throughout the isolated system.

6) Be sure to notify all affected customers in the isolated area, then the other customers in the system.

7) The public health and plumbing authorities should deal with all customers that may have consumed the contaminant, or had their plumbing systems contaminated.

8) Develop and implement a program for cleaning the contaminated distribution system.

9) For the customer where a cross-connection responsible for the system contamination is located, the Purveyor should discontinue water service until the Purveyor ordered corrective action is completed by the customer.

Identification of the source and type of contaminant, and cleaning of a distribution system could take several days.

Most chemical or physical contaminants can be flushed from the water distribution system or customer's plumbing system with adequate flushing velocity. This may not be the case where scale and corrosion deposits (e.g., tuberculation on old cast iron mains) provides a restriction to obtaining adequate flushing velocity, or a chemical deposit or bacteriological slime (biofilm) on which the chemical contaminant may adhere.

To remove a chemical or physical contaminant, it may be necessary to provide a physical cleaning, using foam swabs (pigs), and/or to alter the form or the chemical contaminant, e.g., through oxidation using chlorination, or addition of detergents.

INVENTORY OF BACKFLOW ASSEMBLIES / RECORD OF TESTS

For year _____

Item		No. of Customers within Category	No. of Assemblies: Premise Isolation	No. of Assemblies: Relied upon Inside Premises	No. of Assemblies: Others Inside Premises **
1a	All categories - high health hazard per WAC 246-290-490 Table 9				
	Agricultural 1				
	Beverage bottling plants (e.g., brewery) 2				
	Car washes 3				
	Commercial laundries/dry cleaners 4				
	Premises with reclaimed water 5				
	Film processing 6				
	Food processing 7				
	Hospitals, medical clinics, etc. 8				
	Laboratories (commercial) 9				
	Metal plating, petroleum & chemical plants 10				
	Piers and docks 11				
	Wastewater lift stations 12				
	Wastewater treatment plants 13				
	Premises with unapproved auxiliary supply* 14				
	Exemptions granted to Table 9 isolation 15				
	Sub-total				
2a	Commercial, industrial & institutional categories other than above 16				
3a	Single-family & duplex residential category other than above 17				
4a	Fire lines 18				
	TOTAL NUMBER OF CUSTOMERS 19				

Item		No. of Assemblies by Type / No. of Tests: Approved Air Gap	RPBA or RPDA	DCVA or DCDA	PVBA or SVBA
1b	Premises isolation, table 9 (item 3,above)				
	No. of assemblies 20				
	No. of test reports (initial report counted) 21				
	No. of assemblies failing first test 22				
2b 3b	Commercial, industrial & institutional categories and single-family & duplex residential categories				
	No. of assemblies 23				
	No. of test reports (initial report counted) 24				
	No. of assemblies failing first test 25				
4a	Fire lines				
	No. of assemblies 26				
	No. of test reports (initial report counted) 27				
	No. of assemblies failing first test 28				
	TOTAL NUMBER OF ASSEMBLIES 29				
	TOTAL NUMBER OF BPA TESTS 30				
	NUMBER OF ASSEMBLIES FAILING 31				
	PERCENT ASSEMBLIES FAILING 32				

Notes * Includes customers with unconnected unapproved supplies per PNWS-AWWA Manual
** Assemblies not relied upon by purveyor, but data maintained for LAA (plumbing inspector)

When adding any chemical (including chlorine) to remove a contaminant, it is essential that the chemistry of the contaminant is fully understood. The wrong chemical reaction could make the contaminant more toxic, more difficult to remove, or both.

Where both a chemical and bacteriological contamination has occurred, disinfection should follow the removal of the chemical contaminant.

Where any bacteriological contamination is suspected, field disinfection should be done. To disinfect water mains using the "slug" or "continuous flow" method, a field unit should be used for chlorine injection, such as a chemical feed - metering or proportioning pump for sodium hypochlorite.

Protection from Thermal Expansion

Protection from thermal expansion is provided in a plumbing system by the installation of a ***thermal expansion tank*** in the hot water system piping downstream of the hot water tank and a ***temperature and pressure relief valve*** (T & P Valve) at the top of the tank.

The thermal expansion tank controls the increased pressure generated within the normal operating temperature range of the water heater. The small tank with a sealed compressible air cushion provides a space to store and hold the additional expanded water volume.

The T & P Valve is the primary safety feature for the water heater. The ***temperature*** portion of the T & P Valve is designed to open and vent water to the atmosphere whenever the water temperature within the tank reaches approximately 210° F (99° C). Venting allows cold water to enter the tank.

The ***pressure*** portion of a T & P Valve is designed to open and vent to the atmosphere whenever water pressure within the tank exceeds the pressure setting on the valve. The T & P Valve is normally pre-set at 125 psi or 150 psi.

Water heaters installed in compliance with the current plumbing code will have the required T & P Valve and thermal expansion tank. For public health protection, the water purveyor may require the installation of a check valve or backflow preventer downstream of the water meter. In these situations, it is essential that a T & P Valve and thermal expansion tank be properly installed and maintained in the plumbing system.

For further information contact your local water purveyor, City or County building department, licensed plumber or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992

Protect Your ***Water Heater*** *from*

Without a functioning Temperature & Pressure Relief Valve your water heater can

Explode

with the force of

Dynamite

American Water Works Association
Pacific Northwest Section

Thermal Expansion Danger

Most homes are supplied with hot water from an electric or gas heated tank. Until the heating element stops working, and one is faced with a cold shower, the water heater is usually taken for granted. However, if not properly maintained, a water heater may become a safety hazard.

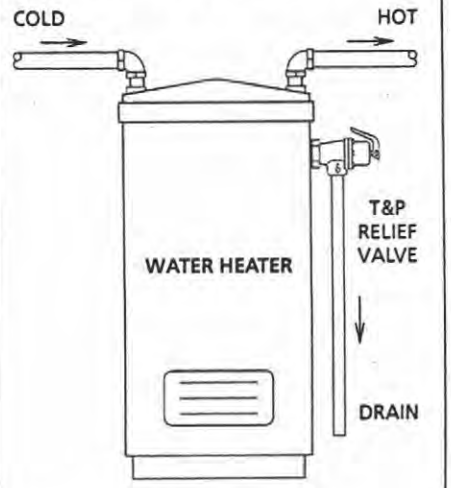
Water expands in volume as its temperature rises. The extra volume caused by thermal expansion must go somewhere. If not, the heated water creates an increase in pressure. This is the principle of a steam engine.

The temperature and pressure in the water heater is reduced when hot water is withdrawn from a faucet and cold water enters the tank. The increase in pressure from thermal expansion can also be reduced by water flowing back into the public water system. However, when a check valve, pressure-reducing valve or backflow preventer is installed in the service pipe a "closed system" is created. Provisions must be made for thermal expansion in these cases.

The thermostat of the water heater normally maintains the water temperature at about 130° F (54° C). However, if the thermostat fails to shut off the heater, the temperature of the water will continue to increase.

If the water temperature increases to more than 212° F (100° C), the water within the tank becomes "super heated". When this super heated water is suddenly exposed to the atmosphere when a faucet is opened, it instantly flas hes into steam and a violent reaction may result. As the pressure within the tank continues to build up under super heated conditions, the tank may explode.

T&P Valve Location



Why the Installation of a Backflow Preventer is Required on a Water Service

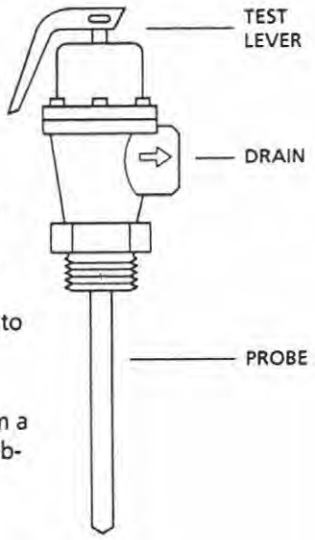
Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as ***backflow***. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and the hose was submerged in a wading pool were flowing during these conditions, the non-potable water in the pool would be siphoned into the house plumbing then back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, were accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

Typical T&P Valve



What the Homeowner Should Do to Ensure Protection from Thermal Expansion

- The homeowner should check to see that an expansion tank and T & P Valve are in place. If there is any doubt, the homeowner should contact a licensed plumber.
- The T & P Valve should be periodically inspected to ensure that is properly operating. Some T & P Valves are equipped with a test level. Manually lifting the lever unseats the valve, allowing water to discharge. If water continues to leak from the T & P Valve after closing, the valve may need to be replaced. A drain line must be installed to avoid water damage and scalding injury when the valve operates.
- The T & P Valve should be periodically removed and visually inspected for corrosion deposits and to insure it has not been improperly altered or repaired.
- The above work can best be done by a licensed plumber.

Common Household Hazards

Chemical Spray Applicators

The chemicals used on your lawn and garden can be toxic or fatal if ingested. These chemicals include pesticides, herbicides, and fertilizers. Even strong cleaning chemicals sprayed on cars, house siding, etc., may cause health problems if ingested.

Submerged Hoses

Water held in pools, ponds or other vats open to the air and exposed to humans or animals may contain microbiological contaminants. Hoses submerged in buckets or containers can act as a conduit for contaminants under backflow conditions.

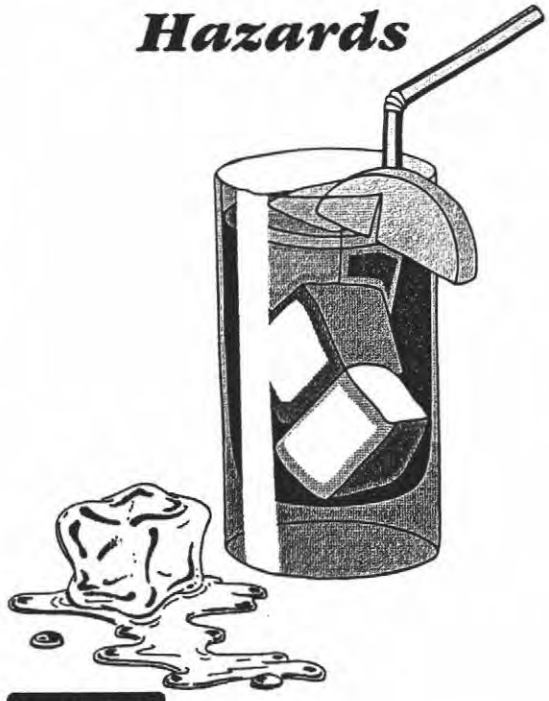
Underground Lawn Irrigation Systems

Underground irrigation systems often have puddles of standing water around the ground-level sprinkler heads. The sprinkler heads **are not** designed to be drip-tight under backflow conditions. The puddles of water may contain microbiological contaminants, such as excrement from animals or chemical residue from fertilizer and herbicides sprayed on the lawn.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992

Help protect your **Drinking Water** *from* ***Contamination***

Household Hazards



PNWS IDAHO · OREGON · WASHINGTON

American Water Works Association
Pacific Northwest Section

How Contamination Occurs

Water normally flows in one direction, from the public water system through the customer's cold or hot water plumbing to a sink tap or other plumbing fixture. The plumbing fixture is the end of the potable water system and the start of the waste disposal system.

Under certain conditions water can flow in the reverse direction. This is known as ***backflow***. Backflow occurs when a backsiphonage or backpressure condition is created in a water line.

Backsiphonage may occur due to a loss of pressure in the water distribution system during a high withdrawal of water for fire protection, a water main or plumbing system break, or a shutdown of a water main or plumbing system for repair. A reduction of pressure below atmospheric pressure creates a vacuum in the piping. If a hose bib was open and the hose was submerged in a wading pool during these conditions, the non-potable water in the pool would be siphoned into the house's plumbing and back into the public water system.

Backpressure may be created when a source of pressure, such as a pump, creates a pressure greater than that supplied from the distribution system. If a pump supplied from a non-potable source, such as a landscape pond, were accidentally connected to the plumbing system, the non-potable water could be pumped into the potable water supply.

How to Prevent Contamination of Your Drinking Water

Protect your drinking water by taking the following precautions:

Don't:

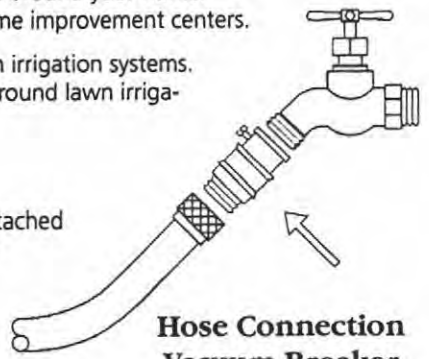
- Submerge hoses in buckets, pools, tubs, sinks, ponds, etc.
- Use spray attachments without a backflow prevention device.
- Connect waste pipes from water softeners or other treatment systems to the sewer, submerged drain pipe, etc.
- Use a hose to unplug blocked toilets, sewers, etc.

Do:

- ✔ Keep the ends of hoses clear of all possible contaminants.
- ✔ If not already equipped with an integral (built-in) vacuum breaker, buy and install hose bib type vacuum breakers (see reverse side of this pamphlet) on all threaded faucets around your home. These devices are inexpensive and are available at hardware stores and home improvement centers.
- ✔ Install an approved backflow prevention assembly on all underground lawn irrigation systems. Remember, a plumbing permit is required for the connection of an underground lawn irrigation system to your plumbing system.

Hose Connection Vacuum Breaker

Hose connection vacuum breakers are specifically made for portable hoses attached to hose thread faucets. Their purpose is to prevent the flow of contaminated water back into the drinking water. These devices screw directly to the faucet outlet. They can be used on a wide variety of installations, such as service sinks, hose faucets near a wading pool, laundry tub faucets, etc.



Hose Connection Vacuum Breaker

Some units are designed for manual draining for freezing conditions. Some are furnished with breakaway set screws as a tamper proof feature.

These device are not intended for operation under continuous pressure.

Protection of the Water Purveyor's Distribution System

In general, the installation of plumbing in compliance with the plumbing code will provide adequate protection for your plumbing system from contamination.

However, the water purveyor may require (as a condition of service) the installation of a backflow prevention assembly on the water service to provide additional protection for the public water system. A backflow prevention assembly will normally be required where a single-family residence has special plumbing that increases the hazard above the normal level found in residential homes, or where a hazard survey cannot be completed.

To help determine if a backflow prevention assembly is required, the water purveyor may send residential customers a Cross Connection Control Survey Questionnaire. The water purveyor will evaluate the returned questionnaires to assess the risk of contamination to the public water system. Based on the results of the evaluation, the installation of backflow prevention assemblies may be required on services to some customers.

What is a Cross Connection?

A cross connection is a point in a plumbing system where the potable water supply is connected to a non-potable source. Briefly, a cross connection exists whenever the drinking water system is or could be connected to any non-potable source (plumbing fixture, equipment used in any plumbing system). Pollutants or contaminants can enter the safe drinking water system through uncontrolled cross connections when backflow occurs.

Backflow is the unwanted flow of non-potable substances back into the consumer's plumbing system and/or public water system (i.e., drinking water).

There are two types of backflow: ***backsiphonage*** and ***backpressure***. ***Backsiphonage*** is caused by a negative pressure in the supply line to a facility or plumbing fixture. Backsiphonage may occur during waterline breaks, when repairs are made to the waterlines, when shutting off the water supply, etc.

Backpressure can occur when the potable water supply is connected to another system operated at a higher pressure or has the ability to create pressure, etc. Principal causes are booster pumps, pressure vessels, elevated plumbing, etc.

Backflow preventers are mechanical devices designed to prevent backflow through cross connections. However, for backflow preventers to protect as designed, they must meet stringent installation requirements.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992

Cross Connections can create Health Hazards

Drinking water systems may become

Polluted

or

Contaminated

through uncontrolled cross connections

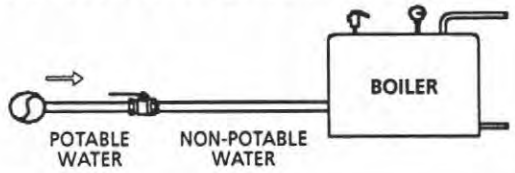
American Water Works Association
Pacific Northwest Section

Why Be Concerned?

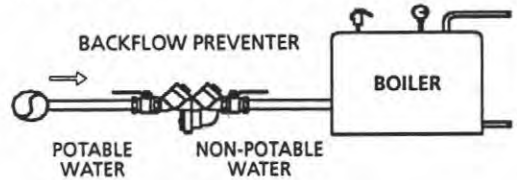
Most water systems in the United States and Canada have good sources of water and/or sophisticated treatment plants to convert impure water to meet drinking water standards. Millions of dollars are spent to make the water potable before it enters the distribution system so most water purveyors think that their supplies are not in jeopardy from this point on. Studies have proven this to be wrong. Drinking water systems may become polluted or contaminated in the distribution system through uncontrolled cross connections.

Cross connections are installed each day in the United States because people are unaware of the problems they can create. Death, illness, contaminated food products, industrial and chemical products rendered useless are some of the consequences of such connections. As a result, many hours and dollars are lost due to ***cross connections***.

Wrong:
Uncontrolled Cross Connection



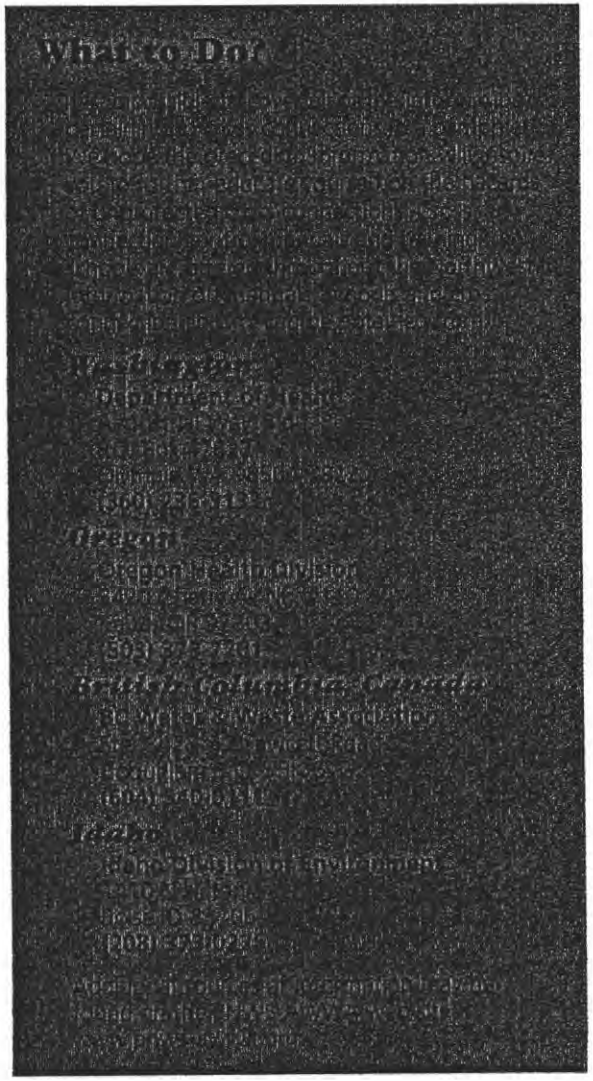
Right:
Controlled Cross Connection



Where are Cross Connections Found?

Cross connections are found in all plumbing systems. It is important that each cross connection be identified and evaluated as to the type of backflow protection required to protect the drinking water supply. Some plumbing fixtures have built-in backflow protection in the form of a physical air gap. However, most cross connections will need to be controlled through the installation of an approved mechanical backflow prevention device or assembly. Some common cross connections found in plumbing and water systems include:

1. Wash basins and service sinks.
2. Hose bibs.
3. Irrigation sprinkler systems.
4. Auxiliary water supplies.
5. Laboratory and aspirator equipment.
6. Photo developing equipment.
7. Processing tanks.
8. Boilers.
9. Water recirculating systems.
10. Swimming pools.
11. Solar heat systems.
12. Fire sprinkler systems.



Every water system has cross connections. Plumbing codes and State drinking water regulations require cross connections to be controlled by approved methods (physical air gap) or approved mechanical backflow prevention devices or assemblies. The various types of mechanical backflow preventers include: reduced pressure backflow assembly (RPBA), reduced pressure detector assembly (RPDA), double check valve assembly (DCDA), double check detector assembly (DCDA), pressure vacuum breaker assembly (PVBA), spill resistant vacuum breaker assembly (SVBA) and atmospheric vacuum breaker (AVB).

For a backflow preventer to provide proper protection, it must be approved for backflow protection, designed for the degree of hazard and backflow it is controlling, installed correctly, tested annually by a State certified tester, and repaired as necessary. Some States require mandatory backflow protection on certain facilities where high health-hazard-type cross connections are normally found. The following is a partial list of those facilities:

1. Hospitals, mortuaries, clinics.
2. Laboratories.
3. Food and beverage processing.
4. Metal plating and chemical plants.
5. Car washes.
6. Petroleum processing and storage plants.
7. Radioactive processing plants and nuclear reactors.
8. Piers and docks.
9. Sewage treatment plants.

Approved Backflow Assemblies

The water purveyor relies on approved backflow prevention assemblies to protect the public water system. Approved assemblies are manufactured with isolation valves and test cocks to permit field-testing to demonstrate that the assemblies are properly functioning to prevent backflow.

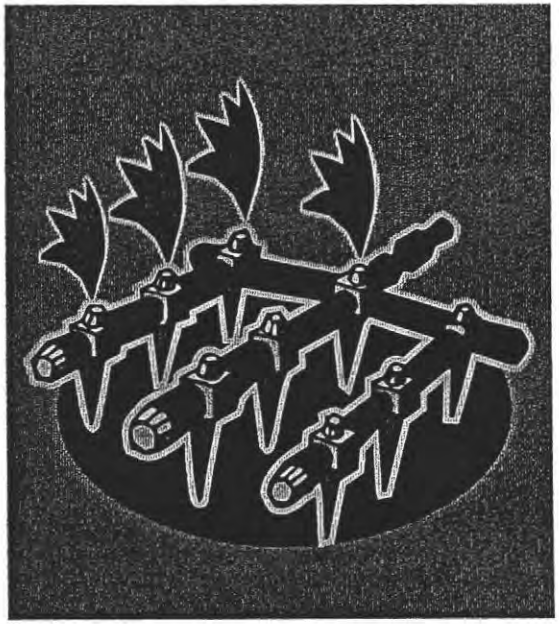
In addition to the above assemblies, plumbing codes also allow the use of atmospheric vacuum breakers (AVB) on lawn irrigation systems without chemical addition. Because an atmospheric vacuum breaker is not designed to be tested, some water purveyors require the installation of approved, testable assemblies. Contact your water purveyor regarding the requirements for isolation of your lawn irrigation system.

Note:

All irrigation piping should be considered as a non-potable water system due to an actual or potential health hazard.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992

Lawn Irrigation Systems and ***Backflow Prevention***



American Water Works Association
Pacific Northwest Section

Lawn (Turf) Irrigation Systems

For the protection of the water purveyor's distribution system, all irrigation systems must have an approved backflow prevention assembly that is commensurate with the degree of hazard. Irrigation systems are categorized as high health hazard or moderate health hazard as defined below.

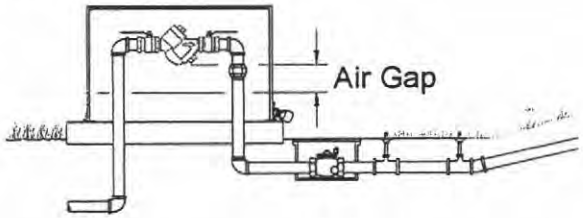
Any irrigation system that contains pumps or injectors for the addition of chemicals and/or fertilizers is considered a high hazard. This risk assessment is also based on the additional hazard posed by bacterial contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved reduced pressure backflow assembly (RPBA), or an approved air gap separation, should be required in all cases where chemicals or herbicides may be injected into the irrigation system, or where an auxiliary water supply is also provided for irrigation water.

All irrigation systems that are not classified as high health hazard are considered to be moderate health hazards. This risk assessment is based on the hazard posed by bacterial and chemical contaminants found on lawns, and on the possibility of changes being made to the irrigation system by the customer. An approved double check valve assembly (DCVA), or pressure vacuum breaker assembly (PVBA), should be required.

However, an approved PVBA does not provide adequate protection if it is subjected to flooding, backpressure, elevated piping, or if compressed air is used to winterize the irrigation systems. In these situations, an approved DCVA should be required as a minimum level of protection.

Reduced Pressure Backflow Assembly for Isolation of Lawn Irrigation System

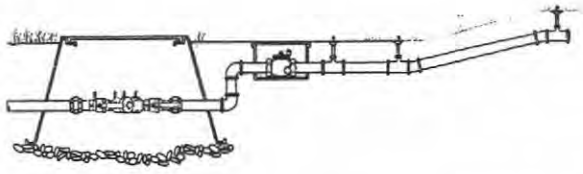
- The reduced pressure backflow assembly (RPBA) should be installed to isolate irrigation systems using injectors or pumps to apply fertilizer and other agricultural chemicals.
- The RPBA must be installed above ground to prevent the relief valve opening from becoming submerged.
- The RPBA should be installed in an insulated enclosure to provide freeze protection.
- The RPBA should be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Reduced Pressure Backflow Assembly in Above-Ground Enclosure

Double Check Valve Assembly for Isolation of Lawn Irrigation System

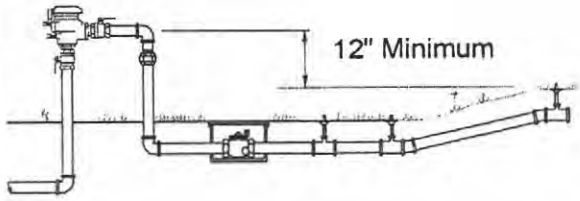
- The double check valve assembly (DCVA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The DCVA may be installed in a below ground enclosure provided the assembly test cocks are plugged; the test cocks are pointed up; adequate space is provided for maintenance and testing, and any compressed air connections are installed only downstream of the DCVA.
- The DCVA shall be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Double Check Valve Assembly in Below-Ground Box

Pressure Vacuum Breaker Assembly for Isolation of Lawn Irrigation Systems

- The pressure vacuum breaker assembly (PVBA) may be installed to isolate all irrigation systems that do not use injectors or pumps to apply fertilizer and other agricultural chemicals.
- The PVBA shall be installed at least 12 inches above the highest point in the irrigation piping.
- The PVBA shall be tested by a certified backflow assembly tester upon installation, after repair of relocation, and at least annually.



Pressure Vacuum Breaker Assembly

Flow-through protection systems are those systems that do not have fire department pumper connections. They are constructed of approved potable water piping and materials to which sprinkler heads are attached. The system terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

Combination protection systems also do not have fire department pumper connections and are constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

Both of the above two systems do not require backflow preventers because they are connected directly to the potable water and the inherently designed to potable water standards.

Closed fire protection systems are separated from the potable water system by the minimum use of a Double Check Valve Assembly (DCVA) as long as no chemicals are used and a Reduced Pressure Backflow Assembly (RPBA) if chemicals are used. Closed system may have a fire department pumper connection.

Note:

1. The water purveyor must be consulted for proper backflow prevention requirements.
2. It is important to have the system engineered hydraulically. The NFPA standards 13 and/or 13D must be considered when designing the fire system.
3. Flow and pressure may not be adequate for fire protection.
4. A plumbing and/or fire permit may be required prior to starting the project.
5. A system is less expensive to install at initial house construction.
6. Some water purveyor's requirements may be more stringent than others – consult you local purveyor for requirements.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992

Residential and

PNWS IDAHO-OREGON-WASHINGTON

American Water Works Association
Pacific Northwest Section

Residential Fire Sprinkler Systems

Residential fire sprinklers are in greater demand today than ever before. Personal fire safety is such a trend that in many areas ordinances or resolutions require fire sprinklers on all new residential construction.

Residential fire sprinkler systems help save lives and reduce property damage. However, from the water purveyor's point of view, the residential fire sprinkler system presents a potential pollutant and/or contaminant source to the potable water system from cross-connections. Both homeowners and the public may be exposed to health hazards from residential fire sprinkler systems. Such hazards include stagnant water, non-potable piping, heterotrophic bacteria, and chemicals. Therefore these systems must be evaluated for health and system hazards.

The following minimal information should be considered in the selection of backflow protection on residential fire sprinkler systems.

Residential fire sprinkler systems are categorized as ***flow-through***, ***combination***, and ***closed*** fire protection systems. Each of these systems has their advantages and disadvantages. It should also be noted that what the local fire departments, local administrative authorities and water purveyors allow will determine which of these systems can be found in any particular jurisdiction. It is imperative that the water purveyor, local administrative authority, fire department, and other agencies coordinate their efforts in the design and operation of these systems.

Flow-Through Fire Protection Systems

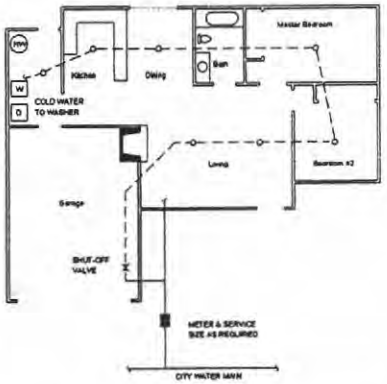
Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.

Disadvantages

1. Service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.

Sprinkler system must have connection at the end to a clothes washer, dishwasher, toilet or other fixture to prevent water from becoming stagnant.



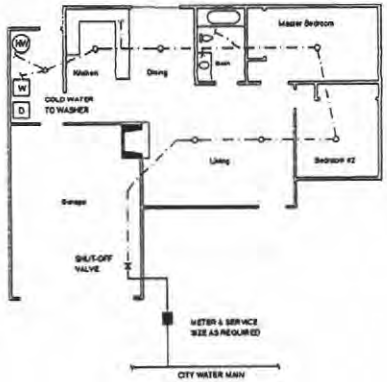
Combination Protection Systems

Advantages

1. Contains no standing or stagnant water.
2. No backflow protection is required.
3. Usually requires a single meter.
4. Water use throughout the potable water system eliminates need for water use at the end of the system.

Disadvantages

The service line, meter and plumbing system must be designed hydraulically to supply both domestic and fire flow requirements.



Closed Fire Protection Systems

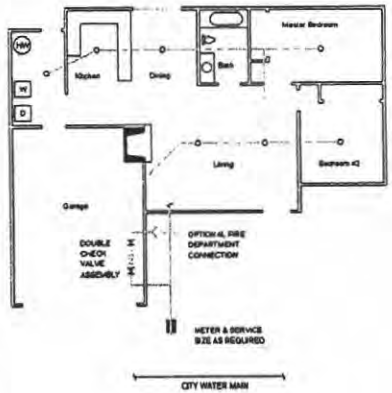
Advantages

1. Installing a separately metered service line may be cheaper than upgrading an existing service.
2. A fire service rate is usually cheaper than a residential service rate.

Disadvantages

1. Approved backflow preventers must be installed, thereby increasing the homeowner's cost by its initial installation, and thereafter for annual testing and maintenance.
2. When chemicals are added to the fire sprinkler system to prevent freezing, a high health hazard exists. This requires a higher, more expensive, level of protection, i.e., a Reduced Pressure Backflow Assembly (RPBA).

If the fire service and domestic service are combined, the fire service may not be turned off because of safety reasons.



Appendix P

Wellhead Protection Plan
&
Ground Water Contamination
Susceptibility Assessment Survey Form

WELLHEAD PROTECTION PLAN

A. REQUIREMENT FOR PROGRAM

Section 1428 of the 1986 Amendments to the Federal Safe Drinking water Act mandates that every state develop a wellhead protection program. The Washington Department of Health is designated lead agency for wellhead protection program development and administration. The Safe Drinking Water Act requires that all federally defined public water systems (Group A systems) using ground water as their source implement a wellhead protection program. The minimum elements of a program required by the Washington Department of Health are:

- A delineated wellhead protection area for each well, well field, or spring.
- An inventory within the wellhead protection area of all potential sources of ground water contamination.
- A management plan to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.
- Contingency plans for providing alternate sources of drinking water in the event that contamination does occur.
- Inclusion of public participation while the program is developing.

B. DESCRIPTION OF GROUNDWATER SOURCES

The Bullerville Utility District, hereinafter referred to as the Purveyor, has two wells located on Purveyor's owned lot. The wells can be described as follows:

DESCRIPTION	UNITS	WELL # 1	WELL # 2
Casing	inches	8	8
Depth	feet	118	118
Screened Interval	feet	101 to 116	103 to 118
Operating priority	-	1	2
Pumping rate	gpm	55	55
Pump motor	hp	5	5

The 100-foot sanitary control radius for the wells are within the District's owned or controller property.

C. PROGRAM OBJECTIVE

The objectives of the wellhead protection program are:

1) To reasonably reduce the risk of contamination of the ground water supplying the Purveyor's well sources, and

2) With other utilities, cooperated and support the County's aquifer protection program.

D. RELATED PROGRAMS

The disposal of hazardous chemicals in general, is regulated by the County through the exercise of the Board of Health function established through Chapter 70.05 of the Revised Code of Washington. The regulations include collection and storage household hazardous waste and moderate-risk waste.

The County regulates on-site sewerage disposal systems.

Transportation of hazardous waste is overseen by the local fire department.

E. PROGRAM OPERATION

The Commissioners have responsibility for program administration. The Commissioners will undertake, or will employ qualified persons to undertake the elements of the program described hereafter.

F. ELEMENTS OF PROGRAM

The standard elements of a wellhead protection program are incorporated as follows:

1. Wellhead Protection Area

Robinson and Noble, Inc delineated the wellhead protection areas using an analytical model developed by the US EPA (GPTRAC). The capture zone are shown in the attached figure.

2. Potential Sources of Contamination

The initial inventory of potential sources of ground water contamination in and around the delineated wellhead protection areas was made using the DOH "Ground Water Contamination Susceptibility Assessment Survey Forms", attached herewith.

The "other" potential sources (Part V of the form) within the ten-year time of travel were identified based on the lists included in the Washington State publication "Wellhead Protection Program", December 1993, Tables 2 and 3.

3. Management Plan

The Purveyor does not have regulatory authority over land use. Such regulatory authority rests with the County.

The inventory of potential sources of contamination indicates a relatively low risk for potential groundwater contamination. Therefore, the utility's management plan shall consist of:

a) Notification of the County Health Department and/or Solid Waste Department of any potential sources of contamination in the "high risk" category, identified Washington State publication "Wellhead Protection program", December 1993, Tables 2, except those activities related to residential land use.

b) Public education, as described hereafter.

c) Monitoring of water quality, to give a warning of ground water contamination.

e) Encourage voluntary water conservation, to reduce the radius of influence of the drawdown curve, and thus, to reduce the potential for drawing in contaminated ground water.

4. Contingency Plan

All wells withdraw water from the same aquifer.

If an operating source becomes contaminated, the Purveyor will:

a) If necessary, implement the Purveyor's Water Shortage Response Plan to reduce water demand:

b) Assess the impact of the contaminant on water quality; determine if water treatment will allow the continued use of the contaminated well, and if necessary;

c) Proceed with the acquisition of a replacement well, utilizing condemnation procedures if required.

The aquifer in the service area has ample recharge for additional sources of withdrawal to replace either or both wells. The District has the resources to obtain short-term financing for the acquisition of land, and drilling and connection of replacement wells.

5. Public Participation and Education

A small community of permanent residents is supplied by the system. The opportunity for direct public involvement is provided in the monthly meeting of the District.

Public education will be divided into the following tasks:

- Distribution of Notification Letters - All property owners in the wellhead protection area boundaries and all property owners in the subdivision will receive a letter notifying them of the presence of the wells and the need to prevent groundwater contamination. (see sample letter, Attachment 'A'). The County Health Department, and the local fire department will be notified at the same time.

- Consumers Confidence Report - Include information in the annual consumers confidence report about wellhead protection and disposal of hazardous waste products.

6. Spill Response Plan

The Purveyor relies upon the local fire department, and the County Solid Waste Department (hazardous material coordinator) to be the lead agencies in spill response. It is assumed that the qualifications of these agencies incident and spill response plans will be suitable for the protection of the wells.

G. REFERENCE MATERIAL

The following publications should be retained by the utility as references for its wellhead protection program:

- "Wellhead Protection Program", December 1993, Washington Department of Health

- "Protecting Local Ground-Water Supplies Through Wellhead Protection", May 1991, US Environmental Protection Agency (publication EPA 570/9-91-007)

H. PROGRAM SCHEDULE

Task	Scheduled Completion
Public participation	2004 (a)
Susceptibility assessment	completed
Initial delineation of WHPA	not required (b)
Refined delineation of WHPA	completed
Initial vulnerability assessment	completed
Detailed vulnerability assessment	completed
Education program development and notification letters	with 2004 CCR
Monitoring	ongoing
Contingency plan	completed
Development of regulations	na
Spill response	completed

(a) Public participation is provided at the regularly scheduled meeting of the Commissioners to review and adoption of the Water System Plan.

(b) Initial assessment was made using GPTRAC model

A

... sample form letter ...

Dear Water Customer,

PROTECTION OF WELLS

The Bullerville Utility District is dependent upon the wells within this community for your water supply. To prevent contamination of the groundwater supplying the wells, it is important that residents take care to properly dispose of all hazardous wastes. Hazardous wastes include household cleaning products, paint, anti-freeze, weed and bug killers, old batteries, to name a few.

To reduce the risk of chemicals contaminating groundwater:

Avoid applying hazardous chemicals outside during rainy weather,

Follow the instructions on the use of chemicals, and use only enough to get the job done,

Try to use non-toxic alternatives whenever possible,

Properly store all chemicals to prevent spillage, and

Properly dispose of all containers and unused portions.

Your care in the use and disposal of household chemicals will help protect the water you drink, and will also help reduce the pollution of the stormwater runoff into Puget Sound.

For more information about our wellhead protection program, please feel free to call the undersigned at (360) 873-2250.

Your cooperation will be most appreciated.

_____

Mr. Don Clark

Bratton {3/9/2004}

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Bullerville Utility District/Don Clark

Water system name : Bullerville Utility District

County: Skagit

Water system number: 13344P Source number: New Source

Well depth: 118 (ft.) (From WFI form)

Source name: BUD-1

WA well identification tag number: A H G - 0 4 4

_____ well not tagged

Number of connections: 41 Population served: 15 to 100

Township: 35 N Range: 10 E

Section: 14 1/4 1/4 Section: SE, SW

Latitude/longitude (if available): _____ / _____

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map
_____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 6 / 26 / 03 month/day/year

last reconstruction: __ / __ / __ month/day/year

_____ information unavailable

2) Well driller: Dahlman Pump & Well Drilling, Inc.

_____ well driller unknown

3) Type of well:

x Drilled: x rotary __ bored __ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other:

Additional comments: _____

4) Well report available? x YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 150 (gallons/min)

Source of information: Well test by Robinson & Noble, Inc.

If not documented, how was pumping rate determined? _____

_____ Pumping rate unknown

6) Is this source treated? New Source

If so, what type of treatment:

__ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: __ YES __ NO

Residual level: _____ (At the point closest to the source.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

__ < 20 ft __ 20—50 ft __ 50—100 ft _x_ 100—200 ft __ >200 ft

__ information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

__ < 20 ft _x_ 20—50 ft __ 50—100 ft __ >100 ft

__ flowing well/spring (artesian)

How was water level determined?

__ well log _x_ other: measured during testing

_ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES __ NO

5) Wellhead elevation (height above mean sea level): 310 (ft)

How was elevation determined? _x_ topographic map __ Drilling/Well Log __ altimeter

__ other: _____

__ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_x_ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? __ YES _x_ NO

_____ information unavailable

7) Sanitary setback:

__ < 100 ft* x 100—120 ft __ 120—200 ft __ > 200 ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

__ wellhead enclosed in a wellhouse

x controlled access (describe): New source, proposed to be within a fenced area.

__ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

x 18 ft

__ < 18 ft (no Department of Ecology approval) ('<' means less than)

__ < 18 ft (Approved by Ecology, include documentation) ('<' means less than)

__ > 18 ft ('>' means greater than)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr __ 10—25 in/yr x > 25 in/yr

PART IV: **Mapping Your Ground Water Resource**

1) Annual volume of water pumped: 55,500,000 (gallons)

How was this determined?

__ meter

__ estimated: __ pumping rate (_____)

__ pump capacity (_____)

x other: Future estimate of 152,000 gallon average daily demand.

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 700 (ft)

1 year ground water travel time : 980 (ft)

5 year ground water travel time: 2,200 (ft)

10 year ground water travel time: 3,110 (ft)

Information available on length of screened/open interval?

x YES __ NO

Length of screened/open interval: 15 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES x NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES x NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application				x
stormwater injection wells				x
other injection wells				x
abandoned ground water well				x
landfills, dumps, disposal areas				x
known hazardous materials clean-up site				x
water system(s) with known quality problems				x
population density > 1 house/acre	x			
residences commonly have septic tanks	x			
Wastewater treatment lagoons				x
sites used for land application of waste				x

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)	YES
Results greater than MCL	
< 2 mg/liter nitrate	x
2—5 mg/liter nitrate	
> 5 mg/liter nitrate	
Nitrate sampling records unavailable	

B. **VOCs:** (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES
Results greater than MCL or SAL	
VOCs detected at least once	
VOCs never detected	x
VOC sampling records unavailable	

C. **EDB/DBCP:**	YES
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP tests required but not yet completed	
EDB/DBCP tests not required	x

D. Other SOCs (Pesticides):	YES
Other SOCs detected (pesticides and other synthetic organic chemicals)	
Other SOC tests performed but none detected (list test methods in comments)	
Other SOC tests not performed	x

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records). No

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source. _____

Source sampling records for bacteria unavailable _____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

x YES __ NO

Describe with references to map produced in Part IV:

Skagit River approximately 2,000 feet east.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

__ YES x NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

x YES __ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

_x_ YES ___ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	____	x	____
6 month—1 year travel time	____	x	____
1—5 year travel time	____	x	____
5—10 year travel time	____	x	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	____	x	____
1—5 year travel time	____	x	____
5—10 year travel time	____	x	____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Bullerville Utility District/Don Clark

Water system name : Bullerville Utility District

County: Skagit

Water system number: 13344P Source number: New Source

Well depth: 116 (ft.) (From WFI form)

Source name: BUD-2

WA well identification tag number: A H G - 0 4 5

_____ well not tagged

Number of connections: 41 Population served: 15 to 100

Township: 35N Range: 10E

Section: 14 1/4 1/4 Section: SE, SW

Latitude/longitude (if available): _____ / _____

How was lat./long. determined?

____ global positioning device _____ survey ____ topographic map
____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 6 /27 /03 month/day/year

last reconstruction: __ / __ / __ month/day/year

____ information unavailable

2) Well driller: Dahlman Pump & Well Drilling, Inc.

_____ well driller unknown

3) Type of well:

x Drilled: x rotary __ bored __ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other:

Additional comments: _____

4) Well report available? x YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 150 (gallons/min)

Source of information: Well Test by Robinson & Noble, Inc.

If not documented, how was pumping rate determined? _____

_____ Pumping rate unknown

6) Is this source treated? New Source

If so, what type of treatment:

__ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: __ YES __ NO

Residual level: _____ (At the point closest to the source.)

PART III: **Hydrogeologic Information**

1) Depth to top of open interval: [check one]

__ < 20 ft __ 20—50 ft __ 50—100 ft x 100—200 ft __ >200 ft

__ information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

__ < 20 ft x 20—50 ft __ 50—100 ft __ >100 ft

__ flowing well/spring (artesian)

How was water level determined?

__ well log x other: measured during testing

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES __ NO

5) Wellhead elevation (height above mean sea level): 310 (ft)

How was elevation determined? x topographic map __ Drilling/Well Log __ altimeter

__ other: _____

__ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

x evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? __ YES x NO

_____ information unavailable

7) Sanitary setback:

__ < 100 ft* x 100—120 ft __ 120—200 ft __ > 200 ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

__ wellhead enclosed in a wellhouse

x controlled access (describe): New source, proposed to be within a fenced area.

__ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

x 18 ft

__ < 18 ft (no Department of Ecology approval) ('<' means less than)

__ < 18 ft (Approved by Ecology, include documentation) ('<' means less than)

__ > 18 ft ('>' means greater than)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr __ 10—25 in/yr x > 25 in/yr

PART IV: **Mapping Your Ground Water Resource**

1) Annual volume of water pumped: 55,500,000 (gallons)

How was this determined?

__ meter

__ estimated: __ pumping rate (_____)

__ pump capacity (_____)

x other: Future estimate of 152,000 gpd average daily demand.

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 700 (ft)

1 year ground water travel time : 980 (ft)

5 year ground water travel time: 2,200 (ft)

10 year ground water travel time: 3,110 (ft)

Information available on length of screened/open interval?

x YES __ NO

Length of screened/open interval: 15 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES x NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES x NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	x
stormwater injection wells	____	____	____	x
other injection wells	____	____	____	x
abandoned ground water well	____	____	____	x
landfills, dumps, disposal areas	____	____	____	x
known hazardous materials clean-up site	____	____	____	x
water system(s) with known quality problems	____	____	____	x
population density > 1 house/acre	x	____	____	____
residences commonly have septic tanks	x	____	____	____
Wastewater treatment lagoons	____	____	____	x
sites used for land application of waste	____	____	____	x

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)	YES
Results greater than MCL	
< 2 mg/liter nitrate	x
2—5 mg/liter nitrate	
> 5 mg/liter nitrate	
Nitrate sampling records unavailable	

B. **VOCs:** (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES
Results greater than MCL or SAL	
VOCs detected at least once	
VOCs never detected	x
VOC sampling records unavailable	

C. **EDB/DBCP:**	YES
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP tests required but not yet completed	
EDB/DBCP tests not required	x

D. Other SOCs (Pesticides):	YES
Other SOCs detected (pesticides and other synthetic organic chemicals)	
Other SOC tests performed but none detected (list test methods in comments)	
Other SOC tests not performed	x

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records). No

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source. _____

Source sampling records for bacteria unavailable _____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

x YES __ NO

Describe with references to map produced in Part IV:

Skagit River approximately 2,000 feet east.

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

__ YES x NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

x YES __ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

x YES ___ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

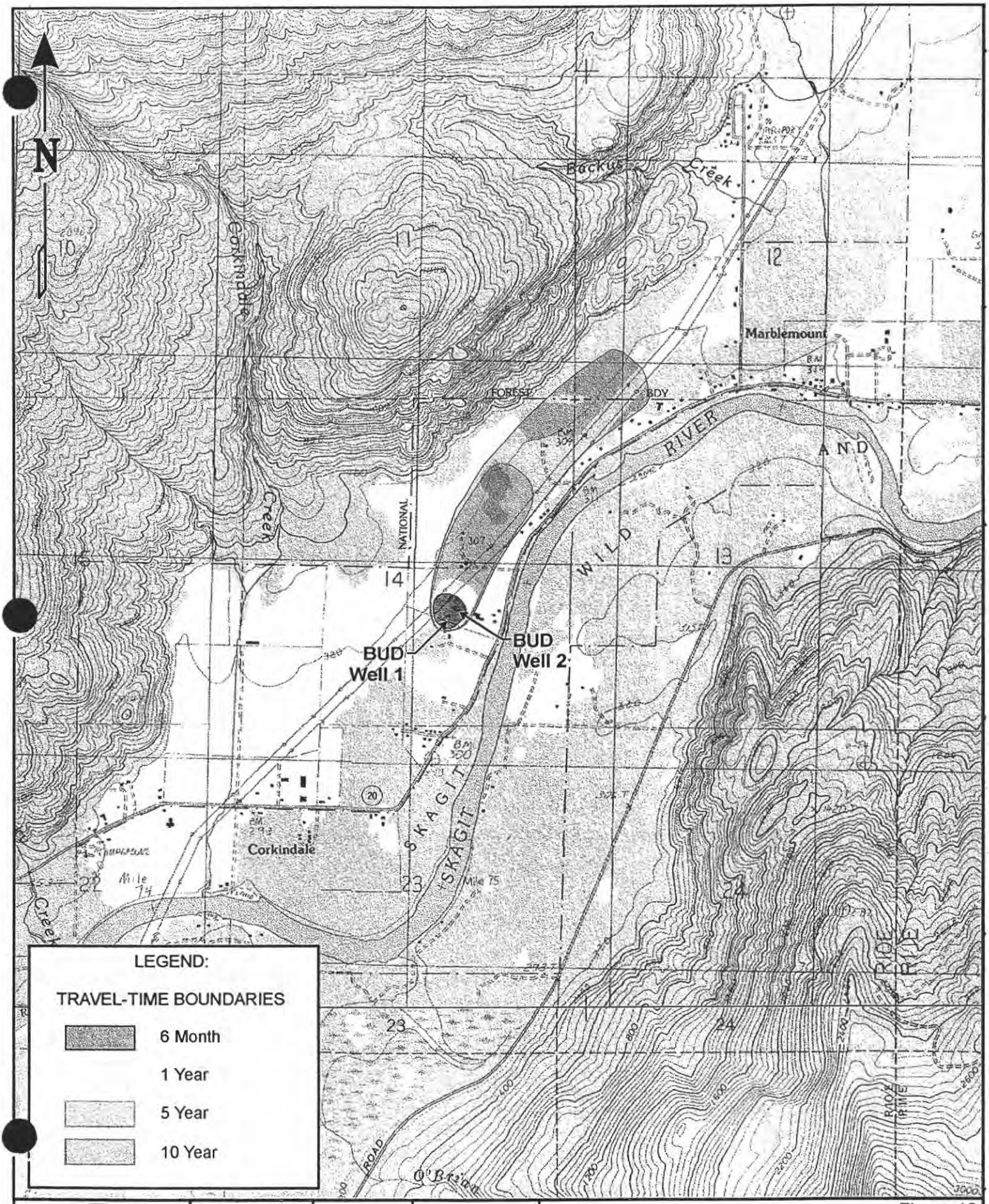
a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	____	x	____
6 month—1 year travel time	____	x	____
1—5 year travel time	____	x	____
5—10 year travel time	____	x	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	____	x	____
1—5 year travel time	____	x	____
5—10 year travel time	____	x	____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.



ROBINSON & NOBLE, INC.	Note: Basemap taken from USGS Marblemount Quad.	PM: DCD January 2004 2095-001A	Skagit County T 35 N/R 10 E-14 Scale 1" = 2000'	Figure 10 Wellhead Protection Area Map Bullerville Utility Dist: Develop/Construct 2 New Wells

Appendix Q

Water Quality Monitoring Plan

WATER QUALITY MONITORING - SCHEDULE

The following table summarizes the monitoring tasks and schedule.

TASK	DESCRIPTION	FREQUENCY
1	Bacteriological samples (See section on coliform monitoring plan)	1 / month
2	Inorganic chemicals, sample from each well field	Every 3 years
3	Nitrate from each well field source, after treatment	Every year
4	Volatile Organic chemicals, sample from each operating well field	Every 3 years or per monitoring waiver
5	Synthetic organic chemicals, (See task 4, above)	Every 3 years or per monitoring waiver
6	Lead and copper (See section on Pb/Cu monitoring plan)	2 / year at start, then per monitoring plan
7	Chlorine residual	Daily monitoring, monthly report
8	Asbestos (See section on asbestos monitoring plan)	Once
9	Radionuclides	Once per source (completed)
10	Trihalomethanes, disinfection by-products	Once per year, starting in 2004

The WA DOH requirements for water quality monitoring are set forth in WAC 246-290-300 "Monitoring requirements", WAC 246-290-310 "Maximum contaminant levels", and WAC 246-290-320 "Follow-up action" (copies attached).

WATER QUALITY MONITORING - COLIFORM

Based on system design. System construction not completed at this time.

A. SUMMARY OF SYSTEM INFORMATION

Sources:

The system is supplied from a well field consisting of two wells, one operating well and one standby well. The two wells are periodically switch to operate as the lead source.

Storage:

Water storage consists of two 79,400 gallon Mt. Baker Silo concrete reservoirs.

Treatment:

None

Pumping Stations:

One pumping station is located at the reservoir site. Booster pumps supply both domestic and fire flow.

Pressure Zones:

None

Population:

The population currently supplied is primarily transient, non-community. The customers consists of:

34	cabins/lodge rooms
7	permanent single-family residential units (ERUs)
56	mobile home and recreational vehicle units/sites
2	campgrounds
1	restaurant and store
1	laundromat

The year-round population is greater than 25 persons. The summer population is assessed as 75 ERUs. The ultimate population is assessed as 381 ERUs.

B. SAMPLING INFORMATION

Sampling Requirements:

The minimum number of routine samples required each month is a function of the number of people supplied by the system. If a sample shows the presence of coliform, the number of repeat samples required to be collected in the month the presence was detected and in the following month is also a function of the number of people supplied by the system. Both requirements for small systems are summarized below.

Population	No. of Routine Samples Each Month	No. of Repeat Samples in the Same Month	No. of Samples In the Next Month
25 to 1,000	1	4	5
1,001 to 2,500	2	3	5

In the month the presence of coliform was detected, the four repeat samples shall be collected from the following locations:

First Repeat: from the sample location of the previous "routine" sample.

Second Repeat: from a customer within 5 service connections either side of the "routine" sample location (e.g., upstream).

Third Repeat: from a customer within 5 service connections on the opposite side of the "routine" sample location as the second repeat sample location (e.g., downstream).

Fourth Repeat: from the source or right after storage that will provide useful information for determining a source of contamination.

For a system collecting two routine samples per month, the Fourth repeat sample may be omitted.

The month following the reported presence of coliform, five samples must be collected from the distribution system. The sample locations should include the "routine" sites scheduled for the current and previous month. The remaining sample sites should be chosen to represent an overall sampling of water quality in the distribution system.

Additional Sampling:

The above sampling schedule states the minimum requirements. The Purveyor may choose to collected additional samples.

When the presence of coliform occurs more than one time in a six-month period, additional samples should be collected from the sources of supply, other areas of distribution system, and from the storage reservoirs to determine extent of the coliform problem. Additional sampling will likely be required by the WA DOH if the repeat sampling shows the presence of coliform.

For the procedures to be followed if repeat samples show the presence of coliform, consult the Purveyor's "Emergency Procedures" herein and in the MANAGEMENT AND OPERATIONS MANUAL.

Identified Sample Locations:

The routine sample sites should be selected based on:

a) Alternating the sites within the service area.

b) To detect bacteria regrowth or system contamination, selecting sites near the end of the distribution system and/or that will be representative of a long retention time of water in the system.

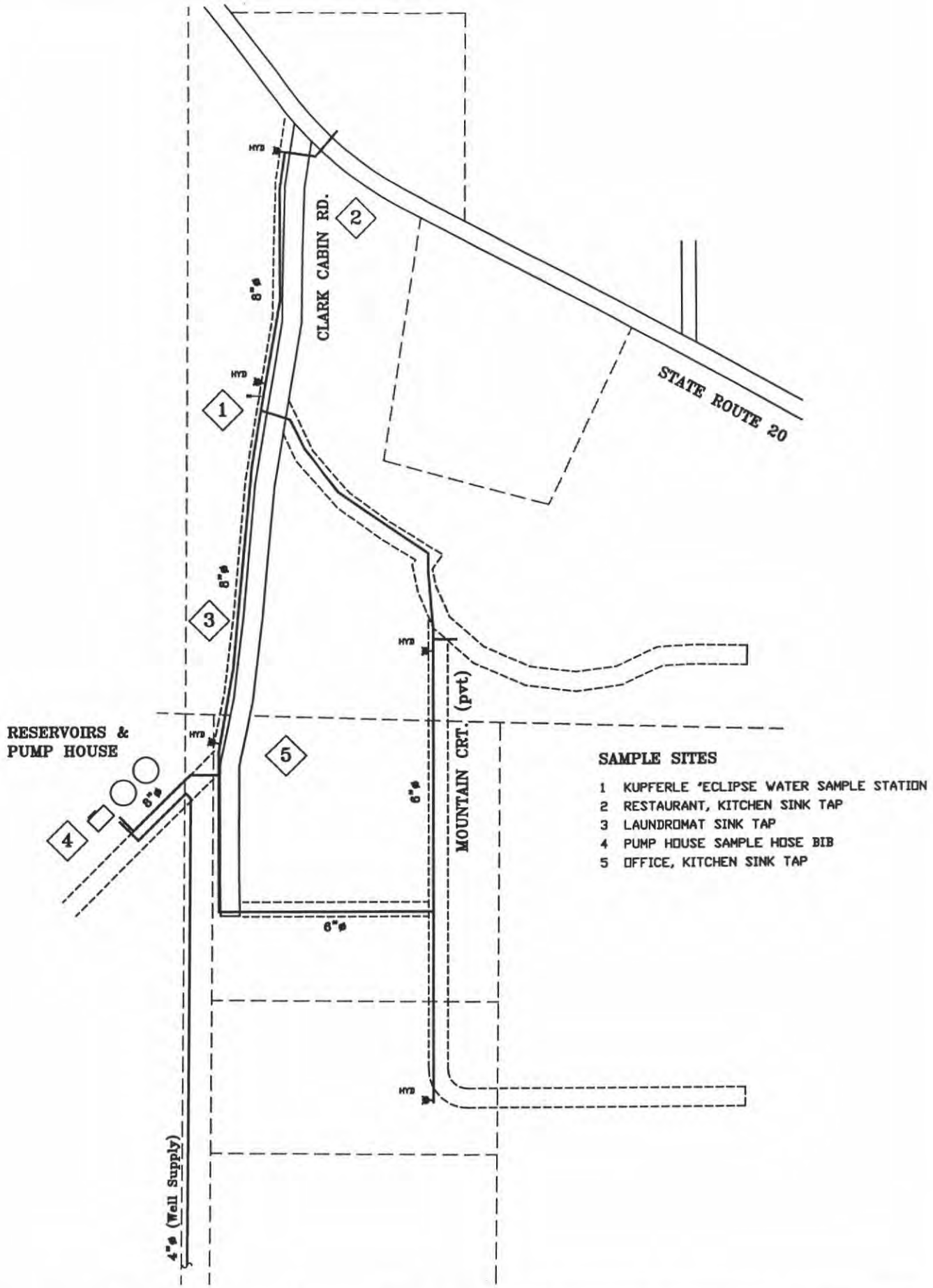
One curbside water sample stations (Kupferle "Eclipse" type) will be installed in the distribution system for the purposes collecting routine samples. The upstream and downstream repeat sample locations will be collected from customer premises.

Until the District's distribution system is extended to supply new customers, only one site will be used for collecting a routine sample.

The current sample sites are:

Routine Sample	Repeat Samples
1) KUPFERLE, sampling sta.	1) KUPFERLE, sampling sta. 2) Restaurant 3) Laundromat 4) Pump House sample HB

These sites are shown in the accompanying plan.



Date: Apr. 04	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT COLIFOM MONITORING PLAN Sampling Sites	Plan # WQ-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

WATER QUALITY MONITORING – COPPER/LEAD

A. REQUIREMENT FOR PROGRAM

The US EPA requirement to sample lead and copper levels in drinking water is intended to determine the need for water treatment to provide corrosion control. Most of the lead and copper that occurs in the drinking water is the result of corrosive water. The "action levels" to trigger the need for treatment are 0.015 mg/L and 1.3 mg/L for lead and copper, respectively. These criteria are conservative. For example, the State's maximum contamination levels for lead is 0.050 mg/L.

The population currently supplied is primarily transient, non-community. The customers consists of:

34	cabins/lodge rooms
7	permanent single-family residential units (ERUs)
56	mobile home and recreational vehicle units/sites
2	campgrounds
1	restaurant and store
1	laundromat

The year-round population is greater than 25 persons. The summer population is assessed as 75 ERUs. The ultimate population is assessed as 381 ERUs.

Under the US EPA "Lead and Copper Monitoring Guidance" criteria, the Purveyor is required to collect 5 initial tap samples once, following the procedures summarized below:

1. Sampling locations:

   a) Single family structures [1] containing copper pipes with lead solder installed before 1986 (date of lead solder ban in Washington), and before 1983 if possible

   b) Customers with water softeners should not be selected (softened water is corrosive)

2. Sampling protocol:

   a) Use one-liter sample bottles (supplied by lab)

   b) Sample should be obtained from a cold water kitchen or bathroom tap; first draw of water after water stands at least 6-hours in plumbing system; the customer may collect the sample

---

([1]) No lead piping could be found within the distribution or plumbing systems. The locations for sampling, therefore, meet the "Tier 3" criterion.

The complete sample procedure and discussion of the regulatory requirements may be found in the US EPA publication "Lead and Copper Monitoring Guidance for Water Systems Serving <100 Persons".

B. SAMPLING FREQUENCY AND LIST OF SAMPLE SITES

The utility is required to collect samples as described below:

POPULATIION	< 100	101 TO 500	500 TO 3,300
INITIAL AND 6 MONTHS	5	10	20
ANNUALLY FOR THREE YEARS	5	10	10
EVERY THIRD YEAR THEREAFTER	5	10	10
90^{th} PERCENTILE FOR INITIAL SAMPLES	Average of 2 highest	Second highest	Third highest

The above table assumes that each sampling period, an action level is not exceeded. Because repeat samples are required, more sites than the number above meeting the location selection criterion should be identified.

Attached is the list of addresses of the single-family residential homes proposed for the collection of samples.

The age of buildings and the age and type of plumbing therein were determined by the Purveyor based on discussion with the property owners, review of Island County files, and/or Purveyor's files.

C. COMPLIANCE WITH STANDARDS

The "action levels" to trigger the need for corrosion treatment is 0.015 mg/L and 1.3 mg/L for lead and copper, respectively. If the 90th percentile level of lead or copper exceed 0.015 or 1.3 mg/L, the "action level" is considered exceeded.

The first set of samples will be collected six months after the new well sources of supply are placed into service.

WATER QUALITY MONITORING
DISINFECTANTS AND DISINFECTION BYPRODUCTS

A. REQUIREMENT FOR PROGRAM

The federal Stage I Disinfectants and Disinfection Byproducts Rule (DDBPR) requirements were incorporated into Department of Health drinking water regulations on April 27, 2003 and became effective for most systems on January 1, 2004. The Stage I DDBPR specifically applies to systems that continuously use chlorine or ozone for groundwater not under the influence of surface water, either as a disinfectant or an oxidant (e.g. for water treatment). The purpose of the monitoring is to detect harmful disinfection or oxidation byproducts (e.g., chemicals if consumed over a long period of time may be carcinogenic). These chemicals may be formed in water containing natural substances that will react with chlorine or ozone.

There are no waivers allowed for this rule. A reduced monitoring schedule may be approved if the first or subsequent year sample results meet the criteria.

B. MONITORING REQUIREMENTS

General

- All monitoring must be done during normal operating conditions. Certified operators or persons trained by the system-certified operator must do the residual chlorine monitoring and a certified laboratory must do the disinfection byproduct analysis.

Disinfectant Monitoring

- Field residual measurement of chlorine (free and total) may be done with a DPD test kit.

- Residual chlorine measurements shall be taken at the same time and place as routine or repeat coliform samples. Systems have the options of including or excluding daily monitoring of chlorine residuals at the point of disinfection. Residual measurements are recorded on the coliform sample form.

  Note: Residual measurements of ozone residual cannot be made due to the rapid decomposition rate of ozone to oxygen.

- The residual disinfectant is calculated at the end of each calendar quarter based on the previous 12 consecutive months of data.

Disinfection Byproducts

- For each chlorination or oxidation source collect each year one sample for Total Trihalomethanes and one for Haloacetic Acids.

- Samples must be taken at the location in the distribution system representing the estimated maximum residence time to each source of disinfectant or oxidant. Samples should be collected in July, August or September.

- Samples are collected using special sample kits supplied by the laboratory. Directions are provided with the kits for the sampling procedures. The following samples shall be collected at each site:

    - For Total Trihalomethanes, collect two 40-ml samples.
    - For Haloacetic Acids, one 50-ml or one 250-ml sample.

Note: The following brochures are available from the WA DOH for guidance on sampling: *Haloacetic Acid (HAA5) Sampling Procedure*, Publication #331-223; *Total Trihalomethance (TTHM) Sampling Procedure*, Publication # 331-226

C. SOURCES

The system is currently supplied by two well located on a purveyor owned lot containing the storage reservoir.

No water treatment is provided.

The source is chlorinated as a precautionary measure.

D. SELECTED SAMPLE COLLECTION SITES

The recommended sample for collection of the sample for monitoring disinfection byproducts is at the customer on Mountain Court.

E. COMPLIANCE

The maximum residual disinfectant level for chlorine is 4.0 mg/L. The source chlorination level is less than 0.5 mg/L, significantly less than the maximum residual disinfectant level.

The maximum contaminant level for Total Trihalomethanes is 0.080 mg/L.

The maximum contaminant level for Haloacetic Acids is 0.060 mg/L.

EDGE ANALYTICAL
11525 Knudson Rd.
Burlington, WA 98233
(800) 755-9295
(360) 757-1400 - FAX (360) 757-1402

INORGANIC COMPOUNDS (IOC) REPORT

Client Name: Robinson & Noble
5320 Orchard Street West
Tacoma, WA 98467

Reference Number: 03-3971
Project: Bullerville Util. District

System Name: Bullerville Utility District
System ID Number: 13344P
DOH Source Number:
Multiple Sources:
Sample Type: B
Sample Purpose: B
Sample Location: Well #1 @ well head
County: Skagit

Sample Number: 1
Lab Number: 04607369
Collect Date: 7/8/2003
Date Received: 7/9/2003
Report Date: 7/17/2003

Supervisor:

DOH#	ANALYTES	RESULTS	UNITS	SRL	Trigger	MCL	Analyst	METHOD	COMMENT
	EPA Regulated								
4	ARSENIC	ND	mg/L	0.002	0.05	0.05	mvp	200.8	
5	BARIUM	ND	mg/L	0.100	2	2	mvp	200.8	
6	CADMIUM	ND	mg/L	0.001	0.005	0.005	mvp	200.8	
7	CHROMIUM	ND	mg/L	0.010	0.1	0.1	mvp	200.8	
11	MERCURY	ND	mg/L	0.0005	0.002	0.002	sv	245.1	
12	SELENIUM	ND	mg/L	0.005	0.05	0.05	mvp	200.8	
110	BERYLLIUM	ND	mg/L	0.001	0.004	0.004	mvp	200.8	
111	NICKEL	ND	mg/L	0.040	0.1	0.1	mvp	200.8	
112	ANTIMONY	ND	mg/L	0.001	0.006	0.006	mvp	200.8	
113	THALLIUM	ND	mg/L	0.001	0.002	0.002	mvp	200.8	
116	CYANIDE, FREE	ND	mg/L	0.040	0.2	0.2	sv	SM4500-CN F	
19	FLUORIDE	ND	mg/L	0.10	2	4	mvp	300.0	
114	NITRITE-N	ND	mg/L	0.10	0.5	1.0	mvp	300.0	
20	NITRATE-N	ND	mg/L	0.10	5	10	mvp	300.0	
161	TOTAL NITRATE/NITRITE	ND	mg/L	0.10	5	10	mvp	300.0	
	EPA Regulated (Secondary)								
8	IRON	ND	mg/L	0.050	0.3	0.3	jn	200.7	
10	MANGANESE	0.014	mg/L	0.001	0.05	0.05	mvp	200.8	
13	SILVER	ND	mg/L	0.010	0.05	0.05	mvp	200.8	
24	ZINC	0.005	mg/L	0.005	5	5	mvp	200.8	
21	CHLORIDE	ND	mg/L	20	250	250	mvp	300.0	
22	SULFATE	ND	mg/L	10	250	250	mvp	300.0	
	State Regulated								
17	TURBIDITY	0.38	NTU	0.02	1.0	1.0	mvp	SM2130 B	
14	SODIUM	2.0	mg/L	1.0			jn	200.7	
15	HARDNESS	49.1	mg/L	3.30			jn	200.7	
16	ELECTRICAL CONDUCTIVITY	97	uS/cm	10	700	700	mvp	SM2510 B	
18	COLOR	ND	Color Units	5	15	15	mvp	SM2120 B	
	State Unregulated								
9	LEAD	ND	mg/L	0.002		0.015	mvp	200.8	
23	COPPER	ND	mg/L	0.005		1.3	mvp	200.8	

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH).

MCL (Maximum Contaminant Level) maximum permissible level of a contaminant in water established by EPA; Federal Action Levels are 0.015 mg/L for Lead and 1.3 mg/L for Copper. Sodium has a recommended limit of 20 mg/L. blank MCL value indicates a level is not currently established.

Trigger Level: DOH Drinking Water Response level. Systems with compounds detected in excess of this level are required to take additional samples. Contact your regional DOH office.

ND (Not Detected): indicates that the compound was not detected above the Specified Reporting Limit (SRL).

NA (Not Analyzed): indicates that this compound was not analyzed.

Comments:

FORM: IOC_ST

EDGE ANALYTICAL
11525 Knudson Rd.
Burlington, WA 98233
(800) 755-9295
(360) 757-1400 - FAX (360) 757-1402

VOLATILE ORGANIC COMPOUNDS (VOC) REPORT

Client Name: Robinson & Noble
5320 Orchard Street West
Tacoma, WA 98467

Reference Number: 03-3971

Project: Bullerville Util. District

System Name: Bullerville Utility District
System ID Number: 13344P
DOH Source Number:
Multiple Sources:
Sample Type: B
Sample Purpose: B
Sample Location: Well #1 @ well head
County: Skagit

Field ID: 1
Lab Number: 04607369
Date Collected: 7/8/2003
Date Extracted: 524_030714
Date Analyzed: 7/14/2003
Report Date: 7/17/2003
Analyst: CO
Supervisor: TW

EPA Method 524.2 For State Drinking Water Compliance

DOH#	COMPOUNDS	RESULTS	Units	SRL	Trigger	MCL	COMMENT
	EPA Regulated Monitoring Required						
45	VINYL CHLORIDE	ND	ug/L	0.5	0.5	2	
46	1,1 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	7	
47	1,1,1 - TRICHLOROETHANE	ND	ug/L	0.5	0.5	200	
48	CARBON TETRACHLORIDE	ND	ug/L	0.5	0.5	5	
49	BENZENE	ND	ug/L	0.5	0.5	5	
50	1,2 - DICHLOROETHANE	ND	ug/L	0.5	0.5	5	
51	TRICHLOROETHYLENE	ND	ug/L	0.5	0.5	5	
52	P - DICHLOROBENZENE	ND	ug/L	0.5	0.5	75	
56	METHYLENE CHLORIDE	ND	ug/L	0.5	0.5	5	
57	T - 1,2 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	100	
60	CIS - 1,2 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	70	
63	1,2 - DICHLOROPROPANE	ND	ug/L	0.5	0.5	5	
66	TOLUENE	ND	ug/L	0.5	0.5	1000	
67	1,1,2 - TRICHLOROETHANE	ND	ug/L	0.5	0.5	5	
68	TETRACHLOROETHYLENE	ND	ug/L	0.5	0.5	5	
71	CHLOROBENZENE	ND	ug/L	0.5	0.5	100	
73	ETHYLBENZENE	ND	ug/L	0.5	0.5	700	
76	STYRENE	ND	ug/L	0.5	0.5	100	
84	O - DICHLOROBENZENE	ND	ug/L	0.5	0.5	600	
95	1,2,4, - TRICHLOROBENZENE	ND	ug/L	0.5	0.5	70	
158	M/P - XYLENE	ND	ug/L	0.5	0.5		
159	O - XYLENE	ND	ug/L	0.5	0.5		
160	TOTAL XYLENES	ND	ug/L	0.5	0.5	10000	
	EPA Unregulated Monitoring Required						
53	CHLOROMETHANE	ND	ug/L	0.5	0.5		
54	BROMOMETHANE	ND	ug/L	0.5	0.5		
55	CHLOROETHANE	ND	ug/L	0.5	0.5		
58	1,1 - DICHLOROETHANE	ND	ug/L	0.5	0.5		
59	2,2 - DICHLOROPROPANE	ND	ug/L	0.5	0.5		
62	1,1 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		

A Result of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL.
Maximum Contaminant Level, maximum permissible level of a contaminant in water established by EPA, NPDWR. State Advisory Level (SAL) for Unregulated compounds.
A blank MCL or SAL value indicates a level is not currently established.
If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.
Method Detection Limit is the lab's minimum concentration a compound can be measured and reported with 99% confidence that the compound concentration is greater than zero.
J - Estimated value.

VOLATILE ORGANIC COMPOUNDS (VOC) REPORT

DOH#	COMPOUNDS	RESULTS	Units	SRL	Trigger	MCL	COMMENT
64	DIBROMOMETHANE	ND	ug/L	0.5	0.5		
65	CIS - 1,3 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		
69	TRANS- 1,3 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		
70	1,3 - DICHLOROPROPANE	ND	ug/L	0.5	0.5		
72	1,1,1,2 - TETRACHLOROETHANE	ND	ug/L	0.5	0.5		
78	BROMOBENZENE	ND	ug/L	0.5	0.5		
79	1,2,3 - TRICHLOROPROPANE	ND	ug/L	0.5	0.5		
80	1,1,2,2 - TETRACHLOROETHANE	ND	ug/L	0.5	0.5		
81	O - CHLOROTOLUENE	ND	ug/L	0.5	0.5		
82	P - CHLOROTOLUENE	ND	ug/L	0.5	0.5		
83	M - DICHLOROBENZENE	ND	ug/L	0.5	0.5		
85	TRICHLOROFLUOROMETHANE	ND	ug/L	0.5	0.5		
86	BROMOCHLOROMETHANE	ND	ug/L	0.5	0.5		
87	ISOPROPYLBENZENE	ND	ug/L	0.5	0.5		
88	N - PROPYLBENZENE	ND	ug/L	0.5	0.5		
89	1,3,5 - TRIMETHYLBENZENE	ND	ug/L	0.5	0.5		
90	TERT - BUTYLBENZENE	ND	ug/L	0.5	0.5		
91	1,2,4 - TRIMETHYLBENZENE	ND	ug/L	0.5	0.5		
92	SEC - BUTYLBENZENE	ND	ug/L	0.5	0.5		
93	P - ISOPROPYLTOLUENE	ND	ug/L	0.5	0.5		
94	N - BUTYLBENZENE	ND	ug/L	0.5	0.5		
96	NAPHTHALENE	ND	ug/L	0.5	0.5		
97	HEXACHLOROBUTADIENE	ND	ug/L	0.5	0.5		
98	1,2,3 - TRICHLOROBENZENE	ND	ug/L	0.5	0.5		
162	DICHLORODIFLUOROMETHANE	ND	ug/L	0.5	0.5		
	EPA Regulated - Under Trihalomethanes Program						
27	CHLOROFORM	ND	ug/L				
28	BROMODICHLOROMETHANE	ND	ug/L				
29	CHLORODIBROMOMETHANE	ND	ug/L				
30	BROMOFORM	ND	ug/L				
31	TOTAL TRIHALOMETHANE	ND	ug/L			80	
	State Unregulated - Other						
0	METHYL TERT-BUTYL ETHER	ND	ug/L				

A Result of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL.

Maximum Contaminant Level, maximum permissible level of a contaminant in water established by EPA, NPDWR. State Advisory Level (SAL) for Unregulated compounds.
A blank MCL or SAL value indicates a level is not currently established.

If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.

Method Detection Limit is the lab's minimum concentration a compound can be measured and reported with 99% confidence that the compound concentration is greater than zero.

J - Estimated value.

Washington State Public Health Laboratory
1610 NE 150th Street, Shoreline WA. 98155-9701
Phone (206) 361-2896 FAX (206) 361-2899

RADIONUCLIDE ANALYSES REPORT

System ID No.:	System Name: Bullerville Utility District		
Lab/Sample No: 023610213	Date Collected: 7/8/03 14:00		DOH Source No:
Multiple Source Nos:	Sample Type: U		Sample Purpose: I
Date Received: 7/10/03	Date Reported: 10/16/03		Supervisor: JFR/JCM
	Date Analyzed: 09/29/03		Analyst: JFR
County: Skagit		Group: A	
Sample Location: Well #1			
Send Report To: Bullerville Utility District, Attn: Don Clark 58468 Clark Cabin Road Rockport, WA 98283		Bill To: Bullerville Utility District, Attn: Don Clark 58468 Clark Cabin Road Rockport, WA 98283	

DOH #	ANALYTES	LAB MDA	RESULTS	UNITS	DATE ANALYZED	MCL	ANALYST/METHOD
	EPA REGULATED						
39	Radium 226			pCi/l		3	
40	Radium 226 + 228			pCi/l		5	
41	Gross Alpha	1	ND	pCi/l	09/29/03	15*	JFR/EPA 900.0
42	Gross Beta	3	ND	pCi/l	09/29/03	50	JFR/EPA 900.0
43	Tritium			pCi/l		20000	
44	Strontium 90			pCi/l		8	
107	Cesium 134			pCi/l		**	
108	Iodine 131			pCi/l		**	
	EPA UNREGULATED						
105	Uranium			pCi/l			
109	Radon			pCi/l			

NOTES:
MCL: Maximum Contaminant Level. If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.
MDA: Minimum Detectable Amount.
NA (Not Analyzed) indicates this analyte was not included in the current analysis.
ND (Not Detected) indicates this analyte was analyzed and not detected at a level greater than or equal to the MDA.
* Excluding Uranium
** The MCL for beta particle and photon radioactivity from man-made radionuclides is the average annual concentration which shall not produce an annual dose equivalent to the total body or any internal organ greater than four milli-rem/yr.

Comments

Charge Amount: $73.00

EDGE ANALYTICAL
11525 Knudson Rd.
Burlington, WA 98233
(800) 755-9295
(360) 757-1400 - FAX (360) 757-1402

INORGANIC COMPOUNDS (IOC) REPORT

Client Name: Robinson & Noble
5320 Orchard Street West
Tacoma, WA 98467

Reference Number: 03-4003
Project:

System Name: Bullervile Utility District
System ID Number: 13344P
DOH Source Number:
Multiple Sources:
Sample Type: B
Sample Purpose: B
Sample Location: well #2
County: Skagit

Sample Number: Bullerville Utility Dist.
Lab Number: 04607421
Collect Date: 7/11/2003
Date Received: 7/11/2003
Report Date: 7/17/2003

Supervisor

DOH#	ANALYTES	RESULTS	UNITS	SRL	Trigger	MCL	Analyst	METHOD	COMMENT
	EPA Regulated								
4	ARSENIC	**ND**	mg/L	0.002	0.05	0.05	mvp	200.8	
5	BARIUM	**ND**	mg/L	0.100	2	2	mvp	200.8	
6	CADMIUM	**ND**	mg/L	0.001	0.005	0.005	mvp	200.8	
7	CHROMIUM	**ND**	mg/L	0.010	0.1	0.1	mvp	200.8	
11	MERCURY	**ND**	mg/L	0.0005	0.002	0.002	sv	245.1	
12	SELENIUM	**ND**	mg/L	0.005	0.05	0.05	mvp	200.8	
110	BERYLLIUM	**ND**	mg/L	0.001	0.004	0.004	mvp	200.8	
111	NICKEL	**ND**	mg/L	0.040	0.1	0.1	mvp	200.8	
112	ANTIMONY	**ND**	mg/L	0.001	0.006	0.006	mvp	200.8	
113	THALLIUM	**ND**	mg/L	0.001	0.002	0.002	mvp	200.8	
116	CYANIDE, FREE	**ND**	mg/L	0.040	0.2	0.2	sv	SM4500-CN F	
19	FLUORIDE	**ND**	mg/L	0.10	2	4	mvp	300.0	
114	NITRITE-N	**ND**	mg/L	0.10	0.5	1.0	mvp	300.0	
20	NITRATE-N	**ND**	mg/L	0.10	5	10	mvp	300.0	
161	TOTAL NITRATE/NITRITE	**ND**	mg/L	0.10	5	10	mvp	300.0	
	EPA Regulated (Secondary)								
8	IRON	**0.125**	mg/L	0.050	0.3	0.3	jn	200.7	
10	MANGANESE	**0.225**	mg/L	0.005	0.050	0.05	mvp	200.7	
13	SILVER	**ND**	mg/L	0.010	0.05	0.05	mvp	200.8	
24	ZINC	**ND**	mg/L	0.005	5	5	mvp	200.8	
21	CHLORIDE	**ND**	mg/L	20	250	250	mvp	300.0	
22	SULFATE	**ND**	mg/L	10	250	250	mvp	300.0	
	State Regulated								
17	TURBIDITY	**0.93**	NTU	0.02	1.0	1.0	mvp	SM2130 B	
14	SODIUM	**2.0**	mg/L	1.0			jn	200.7	
15	HARDNESS	**47.6**	mg/L	3.30			jn	200.7	
16	ELECTRICAL CONDUCTIVITY	**103**	uS/cm	10	700	700	mvp	SM2510 B	
18	COLOR	**7**	Color Units	5	15	15	mvp	SM2120 B	
	State Unregulated								
9	LEAD	**ND**	mg/L	0.002		0.015	mvp	200.8	
23	COPPER	**ND**	mg/L	0.005		1.3	mvp	200.8	

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH).

MCL (Maximum Contaminant Level) maximum permissible level of a contaminant in water established by EPA; Federal Action Levels are 0.015 mg/L for Lead and 1.3 mg/L for Copper. Sodium has a recommended limit of 20 mg/L. blank MCL value indicates a level is not currently established.

Trigger Level: DOH Drinking Water Response level. Systems with compounds detected in excess of this level are required to take additional samples. Contact your regional DOH office.

ND (Not Detected): indicates that the compound was not detected above the Specified Reporting Limit (SRL).

NA (Not Analyzed): indicates that this compound was not analyzed.

Comments:

FORM: IOC_ST

EDGE ANALYTICAL
11525 Knudson Rd.
Burlington, WA 98233
(800) 755-9295
(360) 757-1400 - FAX (360) 757-1402

VOLATILE ORGANIC COMPOUNDS (VOC) REPORT

Client Name: Robinson & Noble
5320 Orchard Street West
Tacoma, WA 98467

Reference Number: 03-4003

Project:

System Name: Bullervile Utility District
System ID Number: 13344P
DOH Source Number:
Multiple Sources:
Sample Type: B
Sample Purpose: B
Sample Location: well #2
County: Skagit

Field ID: Bullerville Utility Dist
Lab Number: 04607421
Date Collected: 7/11/2003
Date Extracted: 524_030714
Date Analyzed: 7/14/2003
Report Date: 7/17/2003
Analyst: CO
Supervisor:

EPA Method 524.2 For State Drinking Water Compliance

DOH#	COMPOUNDS	RESULTS	Units	SRL	Trigger	MCL	COMMENT
	EPA Regulated Monitoring Required						
45	VINYL CHLORIDE	ND	ug/L	0.5	0.5	2	
46	1,1 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	7	
47	1,1,1 - TRICHLOROETHANE	ND	ug/L	0.5	0.5	200	
48	CARBON TETRACHLORIDE	ND	ug/L	0.5	0.5	5	
49	BENZENE	ND	ug/L	0.5	0.5	5	
50	1,2 - DICHLOROETHANE	ND	ug/L	0.5	0.5	5	
51	TRICHLOROETHYLENE	ND	ug/L	0.5	0.5	5	
52	P - DICHLOROBENZENE	ND	ug/L	0.5	0.5	75	
56	METHYLENE CHLORIDE	ND	ug/L	0.5	0.5	5	
57	T - 1,2 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	100	
60	CIS - 1,2 - DICHLOROETHYLENE	ND	ug/L	0.5	0.5	70	
63	1,2 - DICHLOROPROPANE	ND	ug/L	0.5	0.5	5	
66	TOLUENE	ND	ug/L	0.5	0.5	1000	
67	1,1,2 - TRICHLOROETHANE	ND	ug/L	0.5	0.5	5	
68	TETRACHLOROETHYLENE	ND	ug/L	0.5	0.5	5	
71	CHLOROBENZENE	ND	ug/L	0.5	0.5	100	
73	ETHYLBENZENE	ND	ug/L	0.5	0.5	700	
76	STYRENE	ND	ug/L	0.5	0.5	100	
84	O - DICHLOROBENZENE	ND	ug/L	0.5	0.5	600	
95	1,2,4, - TRICHLOROBENZENE	ND	ug/L	0.5	0.5	70	
158	M/P - XYLENE	ND	ug/L	0.5	0.5		
159	O - XYLENE	ND	ug/L	0.5	0.5		
160	TOTAL XYLENES	ND	ug/L	0.5	0.5	10000	
	EPA Unregulated Monitoring Required						
53	CHLOROMETHANE	ND	ug/L	0.5	0.5		
54	BROMOMETHANE	ND	ug/L	0.5	0.5		
55	CHLOROETHANE	ND	ug/L	0.5	0.5		
58	1,1 - DICHLOROETHANE	ND	ug/L	0.5	0.5		
59	2,2 - DICHLOROPROPANE	ND	ug/L	0.5	0.5		

A Result of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL.

Maximum Contaminant Level, maximum permissible level of a contaminant in water established by EPA, NPDWR. State Advisory Level (SAL) for Unregulated compounds.
A blank MCL or SAL value indicates a level is not currently established.

If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.

Method Detection Limit is the lab's minimum concentration a compound can be measured and reported with 99% confidence that the compound concentration is greater than zero.

J - Estimated value.

VOLATILE ORGANIC COMPOUNDS (VOC) REPORT

DOH#	COMPOUNDS	RESULTS	Units	SRL	Trigger	MCL	COMMENT
62	1,1 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		
64	DIBROMOMETHANE	ND	ug/L	0.5	0.5		
65	CIS - 1,3 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		
69	TRANS- 1,3 - DICHLOROPROPENE	ND	ug/L	0.5	0.5		
70	1,3 - DICHLOROPROPANE	ND	ug/L	0.5	0.5		
72	1,1,1,2 - TETRACHLOROETHANE	ND	ug/L	0.5	0.5		
78	BROMOBENZENE	ND	ug/L	0.5	0.5		
79	1,2,3 - TRICHLOROPROPANE	ND	ug/L	0.5	0.5		
80	1,1,2,2 - TETRACHLOROETHANE	ND	ug/L	0.5	0.5		
81	O - CHLOROTOLUENE	ND	ug/L	0.5	0.5		
82	P - CHLOROTOLUENE	ND	ug/L	0.5	0.5		
83	M - DICHLOROBENZENE	ND	ug/L	0.5	0.5		
85	TRICHLOROFLUOROMETHANE	ND	ug/L	0.5	0.5		
86	BROMOCHLOROMETHANE	ND	ug/L	0.5	0.5		
87	ISOPROPYLBENZENE	ND	ug/L	0.5	0.5		
88	N - PROPYLBENZENE	ND	ug/L	0.5	0.5		
89	1,3,5 - TRIMETHYLBENZENE	ND	ug/L	0.5	0.5		
90	TERT - BUTYLBENZENE	ND	ug/L	0.5	0.5		
91	1,2,4 - TRIMETHYLBENZENE	ND	ug/L	0.5	0.5		
92	SEC - BUTYLBENZENE	ND	ug/L	0.5	0.5		
93	P - ISOPROPYLTOLUENE	ND	ug/L	0.5	0.5		
94	N - BUTYLBENZENE	ND	ug/L	0.5	0.5		
96	NAPHTHALENE	ND	ug/L	0.5	0.5		
97	HEXACHLOROBUTADIENE	ND	ug/L	0.5	0.5		
98	1,2,3 - TRICHLOROBENZENE	ND	ug/L	0.5	0.5		
162	DICHLORODIFLUOROMETHANE	ND	ug/L	0.5	0.5		
	EPA Regulated - Under Trihalomethanes Program						
27	CHLOROFORM	ND	ug/L				
28	BROMODICHLOROMETHANE	ND	ug/L				
29	CHLORODIBROMOMETHANE	ND	ug/L				
30	BROMOFORM	ND	ug/L				
31	TOTAL TRIHALOMETHANE	ND	ug/L			80	
	State Unregulated - Other						
0	METHYL TERT-BUTYL ETHER	ND	ug/L				

A Result of "ND" indicates that the compound was not detected above the Lab's Method Detection Limit - MDL.

Maximum Contaminant Level, maximum permissible level of a contaminant in water established by EPA, NPDWR. State Advisory Level (SAL) for Unregulated compounds.
A blank MCL or SAL value indicates a level is not currently established.

If a compound is detected > or = to the State Reporting Level, SRL, specified increased monitoring frequencies may occur per DOH.

Method Detection Limit is the lab's minimum concentration a compound can be measured and reported with 99% confidence that the compound concentration is greater than zero.

J - Estimated value.

W[illegible]hington State Public Health Lab[illegible]tory
[illegible]610 NE 150th Street, Shoreline WA. 98155-9[illegible]
Phone (206) 361-2896 FAX (206) 361-2899

RADIONUCLIDE ANALYSES REPORT

System ID No.:	System Name: Bullerville Utility District		
Lab/Sample No: 023610230	Date Collected: 7/9/03 13:00		DOH Source No:
Multiple Source Nos:	Sample Type: U		Sample Purpose: I
Date Received: 7/14/03	Date Reported: 10/16/03		Supervisor: JFR / JCM
	Date Analyzed: 09/29/03		Analyst: JFR
County: Skagit		Group: A	
Sample Location: Well 2			
Send Report To: Bullerville Utility District, Attn: Don Clark 58468 Clark Cabin Road Rockport, WA 98283		Bill To: Bullerville Utility District, Attn: Don Clark 58468 Clark Cabin Road Rockport, WA 98283	

DOH #	ANALYTES	LAB MDA	RESULTS	UNITS	DATE ANALYZED	MCL	ANALYST/METHOD
EPA REGULATED							
39	Radium 226			pCi/l		3	
40	Radium 226 + 228			pCi/l		5	
41	Gross Alpha	1	ND	pCi/l	09/29/03	15*	JFR/EPA 900.0
42	Gross Beta	3	ND	pCi/l	09/29/03	50	JFR/EPA 900.0
43	Tritium			pCi/l		20000	
44	Strontium 90			pCi/l		8	
107	Cesium 134			pCi/l		**	
108	Iodine 131			pCi/l		**	
EPA UNREGULATED							
105	Uranium			pCi/l			
109	Radon			pCi/l			

NOTES:

MCL: Maximum Contaminant Level. If the contaminant amount exceeds the MCL, immediately contact your regional DOH office.

MDA: Minimum Detectable Amount.

NA (Not Analyzed) indicates this analyte was not included in the current analysis.

ND (Not Detected) indicates this analyte was analyzed and not detected at a level greater than or equal to the MDA.

* Excluding Uranium

** The MCL for beta particle and photon radioactivity from man-made radionuclides is the average annual concentration which shall not produce an annual dose equivalent to the total body or any internal organ greater than four milli-rem/yr.

Comments

[illegible]arge Amount: $73.00

Appendix R

Emergency Plan

EMERGENCY RESPONSE PLAN

A. PLAN OVERVIEW

This Emergency Response Plan covers the emergency repair of the water system infrastructure, and the response to low pressure and water quality complaints.

This plan will be used in conjunction with the Water Conservation Plan and Water Shortage Response Plan developed for the Water System Plan and included in the Management & Operations Manual.

This plan assumes the construction of two new reservoir of 79,400-gallon minimum volume. With good conservation (e.g., <300 gpd/ERU), this volume of reservoir storage is adequate to serve 100± users for five days.

B. EMERGENCY TELEPHONE NUMBERS AND PERSONNEL

Response to all emergencies may be initiated by calling 9-1-1; the County Sheriff Department maintains a list of persons to contact for water systems.

Direct contact is through the following contract operator:

Kelly Wynn Water / Wastewater Services	(360) 466-4443

The booster pump house will be equipped with an auto-dialer/alarm monitor (item included in the capital improvement plan).

C. NOTIFICATION OF LOCAL AUTHORITIES

The following agencies shall be notified by a Commissioner, where required by statute, to request assistance, or to provide information for public inquiries:

Ms. Nancy Feagin, PE Regional Engineer WA Department of Health	(253) 395-6765
Lorna Parnet Skagit County Health Dept.	(360) 336-9380
County Engineer Skagit County Public Works Dept.	(360) 336-9400

D. VULNERABILITY ASSESSMENT

The most likely emergencies will include the following:

Complaint of low pressure
Water main leak or break
Complaint about water quality and/or positive bacteriological result from routine monitoring

Major and or wide-spread system failure may occur from the following:

Fire at the well house
Landslides due to flooding
Earthquake
Chemical contamination of sources of supply

E. EMERGENCY RESPONSE

Complaint of low pressure

Complaints of low pressure should be referred to the system operator. The operator should include the following actions in his investigation of the complaint:

- Verify that the source of supply pressure is normal.
- Reservoir is full
- Booster pump discharge pressures are in normal range
- Establish if low pressure is only apparent at the customer making the complaint. This may be done by checking the pressure at the meter to the customer making the complaint (remove meter and install pressure gauge), and the meter at the nearest customer.
- If the low pressure occurs at more than one home, check the distribution system for closed valves or leaks/breaks.
- If the low pressure is limited to one customer, check for closed main cock, leaking service pipe, or blocked meter or faulty meter check valve.
- If the pressure is normal at meter, recommended that customer contact plumber.

DO NOT undertake work on private property to correct a problem in the customer's plumbing system.

Water main leak or break

All system repairs will be done by System Operator where possible.

The system operator (contractor) has equipment and parts to accomplish most foreseeable repair work required in the system.

The contract operator usually maintains the following minimum supply of materials at the pump house to facilitate emergency repairs:

- Two lengths of 6 and 8-inch AWWA C-900 Cl. 150 PVC pipe
- Two 6 and 8-inch MJ ductile iron sleeves with joint materials
- 20 ft. each of 3/4 inch and 1-inch HDPE service tubing
- Brass fittings, connectors etc., for services
- Two 4 in. x 3/4 in service saddles and corp stops.
- 300 feet of 2.5-inch fire hose with two sets of coupling adapters to connect fire hose to 2-inch IPS fittings

When the work cannot be accomplished by the system operator, the contractors listed on page 1 of the Management and Operations Manual should be contacted.

Whenever possible, leaks in mains and services should be repaired without the shut down of the water main.

A water main break may need to be shut down for repair. When isolating the section of broken pipe, leave at least one gate valve slightly open to allow water to flow out of the broken section of pipe until dewatering equipment can remove the water surrounding the broken section of pipe. This is done to prevent groundwater and dirt from entering the broken section of pipe.

In the event of a water main break that shatters a section of pipe or otherwise allows groundwater to enter the main, contamination of the water pipe shall be assumed. As part of the repair procedure, the water system shall be disinfected with a high concentration of chlorine (e.g., 200 mg/L for 2 hours), and then flushed. Following flushing, a bacteriological sample will be collected from the customer at the downstream end of the system.

The system operator shall verbally notify all affected water consumers about the break, the disinfection procedure, and the need to boil water used for consumption until a satisfactory bacteriological test result is obtained from the lab.

Where a customer cannot be contacted immediately, a written notice will placed on the front door handle, and a follow-up visit will be made to confirm that the customer received notice about the break.

Upon receiving a satisfactory bacteriological test result, the system operator will verbally notify all affected water consumers as noted above.

Follow the emergency disinfection procedures outlined in AWWA Standard "Disinfecting Water Mains".

Disinfect all repair material with a 5 percent solution of sodium hypochlorite (bleach). Add chlorine to the open trench section as a precautionary measure; working in a wet trench exposes repair parts to groundwater, mud, etc.

If groundwater enters the broken pipe, a full disinfection by the "slug" method may be necessary. The chlorine dose for this method should be at least 500 mg/L.

Following the repair of a main break that requires dewatering of the system, to that confirm water quality is maintained, collect bacteriological samples, one upstream and one downstream of the break.

If a long period of time is necessary for the repair of a main, it may be necessary to provide temporary water supply to customers by:

- Using garden hoses to connect homes with water to those without, usually through the back yard hose bibs, and
- Using fire hose to run a temporary service main, and making connection to each meter setter.

All hoses used to provide temporary service connections should be disinfected.

Complaint about water quality and/or positive bacteriological result from routine monitoring

With respect to water quality issues, if a complaint indicates system contamination, or the results of water quality analysis shows that any maximum contaminant level (MCL) is exceeded, the system operator and manager shall follow the procedures set forth in WAC 246-290-320 (Appendix P).

Additional guidance on dealing with water quality complaints may be obtained from the following two publications:

Maintaining Distribution System Water Quality, 1985, published by the American Water Works Association.

Handling Water Quality Complaints, 1978, California-Nevada Section, AWWA

Backflow Incident Investigation Procedures, 1996, Pacific Northwest Section, AWWA

Corrective action may include the following, depending on the nature of the complaint or quality problem:

- Door-to-door or telephone notification of customers
- County and state Department of Health notification
- Public notification per WAC 246-290-330 and the Coliform Monitoring Plan.

Backflow Incident

Whenever the initial evaluation of a water quality complaint indicates that a backflow incident has occurred (potable water supply has been contaminated/polluted), may have occurred, or the reason for the complaint can not be explained as a "normal" aesthetic problem, a backflow incident investigation should be immediately initiated. It is wise to be conservative when dealing with public health matters.

Within 24 hours of knowledge of any incident of possible contamination of the potable water supply, both in the distribution system and/or in the customer's plumbing system, the state and county personnel listed above should be notified.

A backflow incident investigation is often a team effort. The investigation should be made or (initially) lead by the certified Cross Connection Control Specialist. The investigation team should include local health and plumbing inspectors.

General guidance on how to respond to a backflow incident may be obtained from the manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES, First Edition, 1996, published by the Pacific Northwest Section, American Water Works Association, P. O. Box 19581, Portland, Oregon, 97280, telephone 877-767-2992 (toll free).

The following points are included for initial guidance for dealing with a backflow incident; the above manual BACKFLOW INCIDENT INVESTIGATION PROCEDURES should be consulted as soon as possible.

- As soon as possible, notify customers not to consume or use water. Start the notification with the customers nearest the assumed source of contamination (usually the customer(s) making the water quality complaint).
- Give consideration to the distribution system as a potential source of the contaminant (e.g., air valve inlet below ground).
- Do not start flushing the distribution system until the source of contamination is identified. Flushing may aggravate the backflow situation, and will likely remove the contaminant before a water sample can be collected to fully identify the contaminant.
- Conduct a house-to-house survey to identify the source or contamination and the extent that the contaminant has spread through the distribution system.
- Isolate the portions of the system that are suspected of being contaminated by closing isolating valves; leaving one valve open to ensure that positive water pressure is maintained throughout the isolated system.
- Be sure to notify all affected customers in the isolated area, then the other customers in the system.

The public health and plumbing authorities should deal with all customers that may have consumed the contaminant, or had their plumbing systems contaminated.

Develop and implement a program for cleaning the contaminated distribution system.

Identification of the source and type of contaminant, and cleaning of a distribution system could take several days.

Most chemical or physical contaminants can be flushed from the water distribution system or customer's plumbing system with adequate flushing velocity. This may not be the case where scale and corrosion deposits (e.g., tuberculation on old cast iron mains) provides a restriction to obtaining adequate flushing velocity, or a chemical deposit or bacteriological slime (biofilm) on which the chemical contaminant may adhere.

To remove a chemical or physical contaminant, it may be necessary to provide a physical cleaning, using foam swabs (pigs), and/or to alter the form or the chemical contaminant, e.g., through oxidation using chlorination, or addition of detergents.

When adding any chemical (including chlorine) to remove a contaminant, it is essential that the chemistry of the contaminant is fully understood. The wrong chemical reaction could make the contaminant more toxic, more difficult to remove, or both.

Where both a chemical and bacteriological contamination has occurred, disinfection should follow the removal of the chemical contaminant.

Where any bacteriological contamination is suspected, field disinfection should be done. To disinfect water mains using the "slug" or "continuous flow" method, a field units should be used for chlorine injection, such as a chemical feed - metering or proportioning pump for sodium hypochlorite.

F. GENERAL REFERENCE

For major emergencies, such as those listed in the vulnerability assessment, emergency response procedures will need to be developed at the time of the emergency.

For general emergency planning, the following references should be studied before an emergency situation occurs:

> *Emergency Planning for Water Utility Management (M19)*, Third Edition, 1994, published by the American Water Works Association.

Appendix S

Financial Viability Assessment

		ASSUMED BASE	SIX-YEAR OPERATING BUDGET YEAR 1 2004	YEAR 2 2005	YEAR 3 2006	YEAR 4 2007	YEAR 5 2008	YEAR 6 2009
REVENUES								
1	Water Rates - Commodity	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Water Rates - Fixed Monthly		$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000
3	Fees - Connection	$ -	$ -	$ -	$ -	$ -	$ -	$ -
4	Other Revenue- misc charges		$ -	$ -	$ -	$ -	$ -	$ -
5	Other Revenue -bank interest	$ -	$ 80	$ 180	$ 270	$ 360	$ 450	$ 520
6	Total Revenue (1 to 4)	$ -	$ 24,080	$ 24,180	$ 24,270	$ 24,360	$ 24,450	$ 24,520
EXPENSES - OPERATIONS								
7	Salaries & F.B. [Note 1]		$ 3,000	$ 3,060	$ 3,121	$ 3,184	$ 3,247	$ 3,312
8	Equiv. of Salaries (pro-bono)							
9	Power & Other Utilities		$ 1,200	$ 1,224	$ 1,248	$ 1,273	$ 1,299	$ 1,325
10	Chemicals & Treatment		$ 200	$ 204	$ 208	$ 212	$ 216	$ 221
11	Monitoring		$ 1,500	$ 500	$ 1,000	$ 500	$ 500	$ 1,000
12	Materials, Supplies & Parts		$ 500	$ 510	$ 520	$ 531	$ 541	$ 552
13	Meter reading		$ 1,200	$ 1,224	$ 1,248	$ 1,273	$ 1,299	$ 1,325
14	Miscellaneous Expenses		$ 500	$ 500	$ 500	$ 500	$ 500	$ 500
15	Total - Operations (7 to 14)		$ 8,100	$ 7,222	$ 7,846	$ 7,473	$ 7,603	$ 8,235
EXPENSES - GENERAL ADMIN.								
16	Salaries & F.B. [Note 1]		$ 3,000	$ 3,060	$ 3,121	$ 3,184	$ 3,247	$ 3,312
17	Office Supplies/Postage/Rent		$ 1,400	$ 1,428	$ 1,457	$ 1,486	$ 1,515	$ 1,546
18	Insurance [2]		$ 4,000	$ 4,080	$ 4,162	$ 4,245	$ 4,330	$ 4,416
19	Accounting		$ 500	$ 500	$ 500	$ 600	$ 600	$ 600
20	Legal		$ 500	$ 500	$ 500	$ 500	$ 500	$ 500
21	Engineering's & Surveying		$ 1,000		$ -	$ -	$ -	$ -
22	Fees & taxes [3]	$ -						
23	Miscellaneous Expenses [4]	$ -	$ 500	$ 500	$ 500	$ 500	$ 500	$ 500
24	Total - Admin. (16 to 23)	$ -	$ 10,900	$ 10,068	$ 10,239	$ 10,514	$ 10,692	$ 10,874
25	Depreciation Expenses	$ -	$ -	$ -	$ -	$ -	$ -	$ -
26	**TOTAL EXPENSES** (15+24+25)	$ -	$ 19,000	$ 17,290	$ 18,086	$ 17,988	$ 18,295	$ 19,109

See page 4 for notes

		ASSUMED BASE	SIX-YEAR OPERATING BUDGET YEAR 1 2004	YEAR 2 2005	YEAR 3 2006	YEAR 4 2007	YEAR 5 2008	YEAR 6 2009
27	Taxes (property + B & O)		$ 1,000	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
28	Annual Debt Payments (P & I)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
29	Total Outstanding Debt (P & I)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CAPITAL IMPROVEMENTS								
30	New Facilities		Assumed all short-term work funded by $360,000 Public Facilitiy Grant					
	a) Well & treatment	$ -						
	b) New mains	$ -						
	c) Reservoir	$ -						
31	New Meter & Service $ 500	$ -						
32	PRV Station Replacement	$ -						
33	Water Main Replacement	$ -						
34	Telemetry system	$ -						
35	Non-Facility Costs [5]	$ -						
CAPITAL SOURCES								
36	Loan/Bond Funds	$ -						
37	Grants	$ -	$ -	$ -	$ -	$ -	$ -	$ -
38	Special assessments/rates	$ -	$ -	$ -	$ -	$ -	$ -	$ -
39	Withdrawal from Ex. Reserves	$ -	$ -	$ -	$ -	$ -	$ -	$ -
40	NET C.I.P. (30 to 35) - (36 to 39)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
RESERVES - OPERATING CASH								
41	Target Minimum Balance [6]	$ -	$ 2,375	$ 2,161	$ 2,261	$ 2,248	$ 2,287	$ 2,389
42	Annual Installment	$ 3,000						
43	Running Balance	$ -	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000
RESERVES - EMERGENCY [7]								
44	Target Minimum Balance [8]		$ 10,000	$ 10,300	$ 10,609	$ 10,927	$ 11,255	$ 11,593
45	Annual Installment from W Rates	$ -	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500
46	Annual Installment from Fees							
47	Running Balance	$ -	$ 2,500	$ 5,000	$ 7,500	$ 10,000	$ 12,500	$ 15,000
RESERVES- REPLACEMENT								
48	Target Balance [9]	$ -	$ -	$ -	$ -	$ -	$ -	$ -
49	Annual Installment from W Rates		$ 1,500	$ 2,500	$ 2,000	$ 2,000	$ 2,000	$ 1,000
50	Annual Installment from Fees		$ -	$ -	$ -	$ -	$ -	$ -
51	Annual Withdrawal (line 39)		$ -	$ -	$ -	$ -	$ -	$ -
52	Running Balance	$ -	$ 1,500	$ 4,000	$ 6,000	$ 8,000	$ 10,000	$ 11,000

		SIX-YEAR OPERATING BUDGET					
	BASE YEAR BASE	YEAR 1 2004	YEAR 2 2005	YEAR 3 2006	YEAR 4 2007	YEAR 5 2008	YEAR 6 2009
TOTAL REVENUE REQUIRED		$ 24,000	$ 23,790	$ 24,086	$ 23,988	$ 24,295	$ 24,109
53 (lines 26,27, 28,39,42,45,46,49,50)							
BUDGET SURPLUS (DEFICIT)	na	$ 80	$ 390	$ 184	$ 372	$ 155	$ 411
54 (line 5 - line 53)		0%	2%	1%	2%	1%	2%

		SIX-YEAR PROJECTION OF INCOME FROM RATES AND CHARGES					
	BASE YEAR BASE	YEAR 1 2004	YEAR 2 2005	YEAR 3 2006	YEAR 4 2007	YEAR 5 2008	YEAR 6 2009
WATER RATE INCOME							
a) Number of Services [10]							
Single-family residential	7	7	7	7	7	7	7
Commercial (as ERUs)	68	68	68	68	68	68	68
b) Meter Charge (flat rate/year)							
Single-family residential	$ 260	$ 320	$ 320	$ 320	$ 320	$ 320	$ 320
Commercial (as ERUs)	$ 260	$ 320	$ 320	$ 320	$ 320	$ 320	$ 320
c) Income (flat rate x number)							
Single-family residential	$ 1,820	$ 2,240	$ 2,240	$ 2,240	$ 2,240	$ 2,240	$ 2,240
Commercial (as ERUs)	$ 17,680	$ 21,760	$ 21,760	$ 21,760	$ 21,760	$ 21,760	$ 21,760
d) Sub-total	$ 19,500	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000
WATER COMMODITY INCOME							
e) Volume sold (gallons/year) [11]	8,212,500	$ 8,212,500	$ 8,212,500	$ 8,212,500	$ 8,212,500	$ 8,212,500	$ 8,212,500
Volume sold (cu. ft./year)	1,097,928	1,097,928	1,097,928	1,097,928	1,097,928	1,097,928	1,097,928
f) Base charges (per cu. ft.)	0	0	0	0	0	0	0
up to 1,600 cu. ft. / 2 months							
g) Sub-total	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CONSERVATION SURCHARGE							
h) Excess, 1,601 to 2,400 cu. ft.		$ -	$ -	$ -	$ -	$ -	$ -
Excess, over 2,400 cu. ft.		$ -	$ -	$ -	$ -	$ -	$ -
TOTAL OF RATE & CHARGES	$ 19,500	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000
CONNECTION INCOME							
l) Added residential connections		0	0	0	0	0	0
j) Added commercial connections		0	0	0	0	0	0
k) Connection fee		$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
TOTAL OF CONNECTION FEES	$ -	$ -	$ -	$ -	$ -	$ -	$ -

FINANCIAL VIABILITY TEST SUMMARY

		YEAR 1 2004	YEAR 6 2009
A 1	REVENUES		
A 2	Water Rates (lines 1+2)	$ 24,000	$ 24,000
A 3	Total other revenues (3+4)	$ 80	$ 520
A 4	Total revenue (A2+A3)	$ 24,080	$ 24,520
A 5	EXPENSES		
A 6	O&M, Adm, etc. (15+24+25)	$ 19,000	$ 19,109
A 7	Taxes (27)	$ 1,000	$ 1,500
A 8	Debt Payment (28)	$ -	$ -
A 9	CIP from rates (38)	$ -	$ -
A 10	Add to Oper. Reserve (42)	$ -	$ -
A 11	Add to Emer. Reserve (45+46)	$ 2,500	$ 2,500
A 12	Add to Repl. Reserve (49+50)	$ 1,500	$ 1,000
A 13	Total Revenue Req'd. (A6 to A12)	$ 24,000	$ 24,109
A 14	REVENUE - EXPENDITURES	$ 80	$ 411
A 15	Line A 4 greater than A 13 (Y/N)	YES	YES
	HOUSEHOLD INCOME		
D 26	Medium Income [9]	$ 43,136	$ 43,136
D 27	Medium Income x 0.015	$ 647	$ 647
D 28	Number of ERUs (line 'a')		
	Single-family	$ 7	$ 7
	Commercial equivalent	$ 68	$ 68
	Total ERUs	$ 75	$ 75
D 29	Req'd Revenue/ERU (53/D 28)	$ 320	$ 321
D 30	Line D 27 greater than D 29	YES	YES

		YEAR 1 2004	YEAR 6 2009
	OPERATING RESERVES		
B 16	Current Operating	$ -	$ 3,000
B 17	Budgeted Increase (42)	$ -	$ -
B 18	Total Reserve (43)	$ 3,000	$ 3,000
B 19	REQUIRED OPERATING CASH RESERVES (line A 6 x 0.125)	$ 2,375	$ 2,389
B 20	Line B 18 greater than B 19	YES	YES
	EMERGENCY RESERVES		
C 21	Current Emergency	$ -	$ 12,500
C 22	Budgeted Increase (45+46)	$ 2,500	$ 2,500
C 23	Total Reserve (47)	$ 2,500	$ 15,000
C 24	COST OF MOST VULNERABLE FACILITY [8]	$ 10,000	$ 11,593
C 25	Line C 23 greater than C 24	NO	YES

TABLE NOTES:

[1] Includes commissioners & one admin staff
Certified operator assumed in item 7 as contract
[2] Includes vehicles, general liability & worker comp.
[3] No sales tax on water and connections
[4] Includes office bldg constr in 2003
[5] Such as water conservation promotion, CCR
[6] One-eighth of Expenses - General Admin.
[7] May be alternative financing, e.g., line of credit
[8] Most vulnerable component - water main break
[9] 2000 Census report
[10] System connections for 75 ERUs:
7 SF homes
8 commercial accounts:

Sun Court	Laudromat
Forrest Court	Campers Restrooms
Lawn Court	Restaurant
River Court	RV Dump

[11] Annual use based on ADD of 300 gpp/ERU

GENERAL NOTES:

[a] Assumed inflation rate for capital costs 2.0%
[b] Assumed cost of borrowing from PWTF 1.5%
(for calculating annual debt repayment, line 28)
n = 20 CRF = 0.05825
[c] Connection fee (buy-in + installation cost) = $ 1,500
Connection fees allocated to capital reserves
[d] Interest revenue assumed as 2.0%
(applied to lines 47 & 52, entered into line 4)

Appendix T

Service Policies

SERVICE POLICIES

Resolution No. _____

A RESOLUTION OF THE BOARD OF COMMISSIONERS OF BULLERVILLE UTILITY DISTRICT ESTABLISHING WATER SERVICE APPLICATION, BILLING, PAYMENT, COLLECTION AND CROSS CONNECTION PROCEDURES AND POLICIES.

A. DEFINITIONS

"Board of Commissioners" or "Board" means the Board of Commissioners of the Bullerville Utility District.

"Customer" mean the current owner of the parcel of land as defined by the Island County Auditor's parcel number and as recorded with the District's Manager.

"Customer account" means the account maintained by the District for each Customer to which water service is provided by the District.

"Delinquency penalty" means the penalty established by the District by resolution under the authority granted in RCW 57.08.081.

"Delinquent sum" means any portion of a Customer's account that remains due and unpaid at the end of any payment period.

"District" means the Bullerville Utility District, also referred to as the "Purveyor" hereinafter.

"Manager" means the duly appointed manager of the District as either an employee or independent contractor to perform the functions of the manager.

"Payment period" means a period of time equal to thirty (30) calendar days from and after the District mails bills to the Customer reflecting the sums due on the Customer's account for water service provided.

"Shut off" means the discontinuation of service referred to in RCW 57.08.081.

"Water service" or "service" means the supply of potable water from the District's system to its Customer.

"Water service connection" or "water connection" means the physical installation of the tap, fittings, pipe and other necessary appurtenances required to deliver water from the water main up to and including the meter box, meter setter and/or meter.

B. GENERAL

Service is provided by agreement between the *Bullerville Utility District*, a government body formed under Island County, hereinafter referred to as the Purveyor, and each owner of a single parcel of land as defined by the Island County Auditor's parcel number, hereinafter referred to as the Customer.

The form of agreement consists of the *"Application for Water Service"* to be signed by each initial Customer or *"Reapplication for Water Service"* to be signed by each new Customer for a change of ownership of the parcel of property served. A copy of the terms of the agreements, as represented by the application form "*Application for Water Service*" is attached hereto. The Purveyor shall apply these policies equally to all customers.

The Purveyor shall accept an "*Application for Service*" on the condition that Customer will start construction of a dwelling unit within one (1) year. The Customer shall submit with the "*Application for Service*" a check or money order for the connection charges established by the Purveyor. If the Customer fails to start construction within the prescribed period, the application will be voided and the Purveyor will refund the amount of the connection charge to the Customer without interest. No refund will be made for water rate fees and charges. Except, where circumstances presented to the District Commissioners in writing, an extension may be granted for a period up to six (6) months.

Until the Purveyor has approval from the WA Department of Health to supply a number of equivalent single-family residential units equal to or greater than the number of platted lots within the service area, an "*Application for Service*" shall not be accepted for the purpose of the Customer pre-servicing a parcel prior to its sale.

Upon the Purveyor's acceptance of an "*Application for Service*", the water rate fees and charges outlined in Section D and Section E, by resolution, hereinafter, shall be billed to the Customer.

All lots within the District's service area without a service connection at the time of formation of the District (1992) are considered single parcels and are entitled to purchase one single-family residential service connection (ERU). Provision of water in a greater amount (than one ERU) is at the sole discretion of the District.

Water shall not be conveyed by the Customer beyond the lot being served.

No person shall tamper or interfere with the Purveyor's water system, nor shall any person, except as authorized by the Purveyor, connect to or operate any pipe, valve, meter, hydrant or other part of the water system.

The Purveyor reserves the right to require any customer to install as a condition of receiving or maintaining water service a pressure reducing valve, surge tank, air gap or backflow prevention assembly, or similar devices at any location where the Purveyor determines a need to protect the Purveyor's water system from physical damage or contamination.

The supply of water to any customer is contingent upon:

1) The requirement that the Customer shall take all measures necessary to prevent the contamination of the plumbing system within his/her premises and the Purveyor's water distribution system that may occur from backflow from a cross connection. These measures shall include the prevention of backflow under any backpressure or backsiphonage condition, including the disruption of supply from the Purveyor's system that may occur by reason of routine system maintenance or during emergency conditions, such as a water main break.

2) The Customer installing, operating and maintaining at all times his/her plumbing system in compliance with the current edition of the Uniform Plumbing Code as it pertains to the prevention of contamination, prevention of water hammer, and protection from thermal expansion due to a closed system that could occur with the present or future installation of backflow preventers on the Customer's service and/or at plumbing fixtures.

The Customer shall be responsible to indemnify and hold harmless the Purveyor and its agents and employees for all contamination of the Customer's plumbing system or the Purveyor's water distribution system that results from an unprotected or inadequately protected cross connection within his/her premises. This indemnification shall pertain to all backflow conditions that may arise for the Purveyor's suspension of water supply, recognizing that an air gap separation on the customer's service pipe would otherwise be provided by the Purveyor to supply water to the Customer, and the air gap would necessitate the Customer providing adequate facilities to collect, store and pump water for his/her premises.

The Purveyor shall not be liable for damages nor will allowances be made for loss of production, sales or service in case of water pressure variations, or revisions to pressure within the system, or in case the operations of the Purveyor's sources of water supply or means of distribution fails or is curtailed, suspended or interfered with, or for any cause reasonably beyond the Purveyor's control. Such pressure variations, failure, curtailment, suspension, interruption or interference shall not be held to constitute a breach of contract on the part of the Purveyor, or in any way affect any liability for payment by the customer for rates, fees and charges due.

The Purveyor shall supply water service at a pressure equal to or greater than the level required by the WA Department of Health. Above this pressure, the Purveyor may alter the pressure supplied to the Customer as needed for the efficient design and operation of the water system.

The Purveyor shall supply water service at a pressure less than 150 psi. Should the Customer wish pressure less than that supplied by the Purveyor, the Customer shall be responsible for the installation of a pressure-reducing valve on its plumbing system.

The Customer shall not install a booster pump within its plumbing system without the express written permission of the Purveyor.

These policies apply to all Customers within the Purveyor's service area.

C. INSTALLATION, OWNERSHIP AND MAINTENACE RESPONSIBILITIES

The Purveyor shall install the service pipe, meter, and meter box to a new Customer.

The Purveyor may delay installation of a service connection until such time as the Customer's construction activities will not present a risk of damage to the Purveyor's facilities.

The Purveyor ownership of the public water system starts at the sources of supply, includes all the public water treatment, storage, and distribution facilities, and ends at the point of delivery to the Customer's water system, which begins at the downstream end of the service connection located on the public right-of-way or Purveyor held easement. The downstream end of the service connection shall be defined by the downstream connection to the meter setter or meter (where a meter setter is not utilized) inside the Purveyor's meter box. The Customer shall be responsible for the installation, maintenance, repair and future replacement of the service pipe from the downstream connection to the meter setter to the connection to the Customer's plumbing system consisting of all piping located within the Customer's premises.

D. WATER RATES AND CHARGES

The District's most recent "*Schedule of Water Rates and Charges*" established by resolution shall apply.

The quarterly water bill shall reflect the following for each billing period:

- Total water used.
- The "Flat Rate or Meter" charge.
- The "Commodity" charge.
- Miscellaneous fees and charges as described hereinafter.
- All delinquency in the Customer's account.
- Applicable tax.

The connection fee for a ¾-inch service pipe not exceeding, 60-feet in length shall include the following: *Per RCW 57.08.005 (10)*

- The pro rata share of the cost of the purchase, maintenance and improvement of the existing water system, based on the number of connections currently authorized by the WA Department of Health. Maintenance costs shall include all costs not associated with producing water (e.g., cost of electricity, chemicals).

- The average cost of installation of service and meter. The calculated average shall incorporate the difference in cost of short services (no crossing of road pavement) and long services (road crossing).
- Applicable tax and administration fees.

Any water connection with a service larger than ¾-inch or longer than 60-feet shall include all additional costs for its installation. At the time of the Customer's submittal of the "*Application for Service*" the Purveyor shall estimate the additional cost. The Customer's application shall be processed upon the Customer's payment of the estimated additional cost. Upon completion of the service connection, the Purveyor shall submit a refund or bill to the Customer for the difference between the estimated cost and the actual cost of installation.

The connection fee shall be based on the Purveyor's assessment of the Customer's water demand in terms of equivalent single-family residential unit (ERU). One ERU is the amount of water assumed in the water system design for the maximum day demand (MDD). The quantity of water for one ERU shall be the amount established in the Purveyor's *Water System Plan* approved by the Washington Department of Health.

The minimum assessed MDD per customer is 1 ERU. For multi-family and mixed use premises, the number of ERUs assessed to a customer shall be rounded upward to the nearest ½ ERU. An auxiliary residential dwelling with less than 800 square feet of floor space (excluding garage) for a single-family customer that contains a kitchen facility (e.g., mother-in-law suite) will be assessed as ½ ERU. Auxiliary residential dwelling of 800 square feet or greater shall be assessed as 1 ERU.

The Purveyor shall reassess a Customer's water demand for a change of property use or expansion of premises. The Customer with a change in occupancy or application for building permit shall pay in addition to the connection fee, a hook-up expansion fee assessed for expansion of service. The Purveyor shall not give a refund for a reduction in service.

Prospective customers shall, at the time of application for service, specify the type and scale of use proposed for the service. The Purveyor's approval of a service connection as signified by the issuance to the County of a "Water Availability Form" shall be contingent upon the connection serving the use specified at the time of application.

During the duration of the service, the Purveyor shall have the authority to disapprove changes in use of a service or apply restrictions or conditions to approval of a change of use necessary for proper system operation and protection of the public water system from contamination.

Separate service connections may be requested for residential fire sprinkler systems only. The separate fire service connection shall be equipped with a Customer installed and District approved backflow prevention assembly. The connection fee shall include the actual cost of installation plus the administration overhead charges set forth in Section D and Section E.

The fee for the Purveyor to install a backflow prevention assembly on the Purveyor's service pipe to isolate the Customer's premises shall include the actual cost of installation plus the administration overhead charges set forth in Section D and Section E. Once installed, a quarterly maintenance fee of ten dollars ($10.00) shall be assessed to the Customer for the Purveyor's annual testing, inspection, maintenance, repair and future replacement of the assembly in accordance with WAC 246-290-490.

The Purveyor shall submit the water bill to the Customer (owner of the property obtaining water).

E. MISCELLANEOUS FEES, CHARGES AND ASSESSMENTS

An administration charge of five dollars ($5.00) shall be assessed to each bill issued with delinquent fees or charges. *Per RCW 57.08.081 (3)*

In the event the Purveyor terminates water service as a result of a delinquent billing, the fee for reinstatement shall include an administration fee of twenty-five dollars ($25.00).

For accounts that are repeatedly delinquent, the District may require a deposit before re-instatement equal to the current quarterly Base Rate to be deposited in the District's Account. When such time the Customer demonstrates a one-year history of timely payments, the held deposit, shall be credited to the Customers water account. The District shall retain any interest on the deposited funds.

An interest rate of one percent (10%) per annum shall be assessed to any delinquent amount. *Per RCW 57-08-081 (3)*

An administration charge of twenty-five dollars ($25.00) shall be charged for any dishonored check received by the Purveyor in payment of water bill or other debt owed to the Purveyor. Any entry for payment of the debt shall be reversed in the Purveyor's accounts.

In each quarterly billing period, the Customer may obtain one scheduled turn-on or shut-off of service at the meter during normal working hours at no cost, provided at least twenty-four (24) hours written notice is given to the Purveyor. The Customer shall be billed the after-hour rate for a service call for all other shut-off and turn-on of service within the thirty-day period.

The per hour rate for after hour service calls requested by the Customer for water meter shut-off due to problems on the Customer side of the water meter shall be fifty dollars ($50.00) per call for the first hour, plus fifty dollars ($50.00) for each additional hour, or portion thereof.

After-hours is considered to include:

- Before seven-thirty a.m. and after four-thirty p.m. Monday through Friday
- Weekends and holidays.

Water used for construction shall be assessed a commodity charge of one dollar ($1.00) per one thousand gallons, plus an administration fee for monitoring water use of ten dollars ($10.00) per day.

The Customer may request a check of the calibration of their meter. If the meter is found to be within the accuracy limits established by American Water Works Association standards (e.g., for displacement type meters at ¼-gpm: 95 to 101% of volume), a fee of seventy-five dollars ($75.00) will be assessed to the Customer. For the same meter, for any subsequent request for a check of meter calibration within a one-year period, a seventy-five dollar ($75.00) deposit will be required. This deposit will be refunded if the meter is found to be outside of the previously noted accuracy range.

If the meter is found to be outside of the accuracy limits, an estimate will be made of any overcharge to the Customer, and a credit for the previous two-month period will be applied to the next water billing. No assessment will be made to the Customer for under recording of water usage.

The Customer may request a special meter reading and billing statement for a change in property ownership. A fee of up to thirty dollars ($30.00) shall be charged for each billing. For a change of ownership of property, the Customer at the time of billing shall be responsible for payment for the pro-rated billing period.

If a meter is unreadable due to any action by the Customer, such as but not limited to parking a vehicle over the meter box or encroachment of the Customer's landscaping, the Purveyor shall estimate the amount of the Customer's water usage for the billing period based on past billing records. The Customer will be billed for this estimated usage plus a ten percent (10%) contingency. Upon reading of the meter, the subsequent billing will be adjusted to reflect the actual usage when the meter was blocked from reading. An administration charge of twenty dollar ($20.00) shall be charged for each billing period where the meter is deemed un-readable.

The administration overhead charge shall be ten percent (10%) and shall be added to the cost of work done "at cost" on behalf of the Customer or others (e.g., other utility), including but not limited to the relocation of services or meter boxes and extension of water mains.

For the cost of work billed to the Customer with an estimated value over $20,000, the Purveyor may determine the applicable administration overhead charge as part of the agreement to perform the work.

F. BILLING PERIOD, PERIOD OF DELINQUINCY AND TERMINATION OF SERVICE

The Purveyor shall bill Customers for water service on a quarterly basis, with the first quarter ending in March of each year. The bill shall cover a reading period of approximately three months preceding the end of the quarter, except for an initial or final bill to any Customer. Each bill shall state the due date.

Payment of water bills and other debts owed to the Purveyor shall be made to the Purveyor's business address only. Delivery of payment shall be made by mail or by courier service.

All water billing shall be delinquent if not paid within thirty (30) days from the date of billing. In the event that a water billing shall become delinquent, the Purveyor shall issue the following notices to the Customer:

1) The first notice shall be issued within ten (10) days after a water bill has become delinquent.

2) A second notice shall be issued thirty days after a water bill has become delinquent. The second notice shall state that the Purveyor may terminate water service on the tenth (10) day following the date of delivery of the second notice.

A water billing shall be considered delinquent if not paid in full when due and owing, including all penalties and interest charges assessed pursuant to Section D and Section E.

Said notices shall be deemed delivered on the date the Purveyor deposits the notice in the U.S. Mail and shall be mailed to the Customer at its regular billing address. The Purveyor shall have no obligation to provide notice of delinquency and termination of water service to any person occupying or renting the Customer's property. Notwithstanding the aforesaid, the delivery of a shut-off notice utilizing a door hanger placed on the front door of the dwelling occupying the Customer's premises shall constitute additional written notice to the Customer issued on the date of delivery.

The Customer notified of the pending shutoff of service for delinquency in payment of a debt owned to the Purveyor may submit a written appeal prior to two (2) working days before the date stated for shutoff of service. The appeal shall be sent by registered mail or by courier service to the Purveyor's business address. The appeal shall set forth the reasons the Customer disputing the delinquent billing or state the reasons for requesting additional time to pay the bill. The appeal shall be reviewed and a ruling issued at the next regularly scheduled meeting of the Board. Should the Board's ruling reaffirm the shutoff, water may be shut off without further notice.

After the first notice of pending shutoff of service, the Purveyor may deliver subsequent shut-off notices, or after shutoff of service, a notice that service has been shutoff using a door hanger envelope. Such practice of providing these notifications shall not constitute an obligation on the part of the Purveyor.

For undue hardship for a Customer, the Board may extend the period for payment of a delinquent water billing and/or other debts owed to the purveyor for a period of up to ninety (90) calendar days. With any extension of time for payment, the Customer's bill shall accrue interest and other charges pursuant to Section D and Section E.

Any correction in the Customer's account due to errors or omission by the Purveyor may be made within one year of the issuance of a water bill. The Purveyor shall make a refund or assess the Customer for the difference, including refunding any assessed interest or administrative charges.

In the event that the Purveyor terminates water service as a result of delinquent billing, water service shall be reinstated at the Purveyors convenience but not until such time as the delinquent bill plus fees and charges assessed pursuant to Section D and Section E, have been paid in their entirety.

All delinquent billings and costs related to the termination of service, including, but not limited to the removal of water meter, shall become a lien upon the real property served; per *RCW, 57.08.081 (8)* after the Purveyor certifies such delinquency to the County Auditor. The said lien shall be in accordance with and foreclosed in the manner set forth in the Revised Code of Washington. In the event of foreclosure of lien, the person and/or real properties against whom the foreclosure occurs shall pay the Purveyor reasonable attorney's fee and court costs for the foreclosure, as allowed by law. Per RCW 57.08.081 (4)

The Customer acknowledges the right of the Purveyor to discontinue water supply within 72 hours of giving notice, or a lesser period of time if required to protect the public health, in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system.

Without limiting the generality of the foregoing, in lieu of discontinuing water service the Purveyor may install a reduced pressure backflow assembly (RPBA) on its service pipe to provide premises isolation, and recover all of its costs for the installation and subsequent maintenance and repair of the assembly, appurtenances and enclosure from the Customer as fees and charges for water. The failure of the Customer to pay these fees and charges may result in termination of service in accordance with the Purveyor's water billing policies.

G. SUPPLY TO SUBDIVIDED PROPERTY / EXPANSION OF SERVICE AREA

No service shall be provided to Customers outside the service area without the District first obtaining:

- A revised Service Area Agreement with Island County.
- WA Department of Ecology approval of a change in water rights to cover the additional area of service, and if necessary, new water rights to supply the additional Customers.
- WA Department of Health approval of an update or minor revision to the District's *Water System Plan.*

No service shall be provided to lots created within the service area by the subdivision of property without the District first obtaining WA Department of Health approval of an update or minor revision to the District's *Water System Plan.*

Water shall not be supplied to an adjacent public water system (i.e., through a system intertie), except for temporary supply in an emergency, without the District first obtaining:

- A revised Service Area Agreement with Island County.
- WA Department of Ecology approval of a change in water rights to cover the additional area of service, and if necessary, new water rights to supply the additional Customers.
- WA Department of Health approval of an update or minor revision to the District's *Water System Plan*.

Service shall not be provided to lots outside the service area or additional lots created through subdivision of parcels inside the service area without the District first establishing the adequacy of supply for the existing vacant lots within the service area. The adequacy of supply for the existing platted lots and proposed additional lots shall be established through the number of connections (ERUs) the WA Department of Health authorizes the District to supply.

All costs for the expansion of service area or supply of subdivided parcels within the service area shall be borne by the applicant for service to the proposed newly created Customers. The costs shall include, but are not limited to the following:

1. Extension of water main(s) to the new Customers.
2. Construction of additional or upgrading of existing:
    a. Source(s) of supply (i.e., wells).
    b. Reservoir(s).
    c. Booster pump station(s).
3. Engineering, surveying and legal costs associated with construction of facilities necessary for serving additional connections, including the preparation of project report and water system plan documents.
4. Regulatory agency fees and charges.
5. Applicable administration overhead charges as set forth in Section D and Section E.

The District (not the applicant for service) shall prepare and make all submissions to regulatory authorities for approval to supply additional customers.

Prior to any review by the District of a proposed expansion of service area or supply of subdivided parcels, the applicant shall enter into a written agreement to bear the costs noted above. The customer shall pay a deposit to the District in the amount estimated by the District for the review of the application, including the cost of professional fees, and submissions of document to regulatory authorities.

Any cost paid by the applicant for the District for the review and submission to regulatory authorities shall not be refunded to the applicant should the regulatory approval for the District be denied or otherwise restricted, or the applicant's project is cancelled, modified or denied by the County or other administrative authority having jurisdiction.

H. SIZE AND LOCATION OF SERVICE AND METER

Water meter and service sizes shall conform to those prescribed by the American Water Works Association in the most current edition of "Sizing Water Service Mains & Meters" (AWWA M22), as published from time to time, with any interpretations of those standards to be made by the District. Regardless of type or use of service pipe and meter size, the District has the authority to modify the size of the meter or service pipe throughout the duration of a service. The meter shall be sized based on considerations of volume and rate of water use, fire safety, existing equipment requirements and other relevant criteria.

Unless otherwise approved by the District, the service pipe shall be installed perpendicular to the water main in the street or District owned easement.

The service pipe and water meter shall not be installed within the Customer's driveway or entrance sidewalk or behind any fencing or landscaping that restricts the District's reading or maintenance of the meter and/or maintenance of the service pipe.

I. INSTALLATION STANDARDS

Water mains and services shall be installed in accordance with the District's Standard Plans and Specifications included in the District's *Water System Plan* approved by the WA Department of Health.

J. USE OF FIRE HYDRANTS

With prior approval of the District, water for construction may be obtained from designated fire hydrants provided the following equipment is provided and maintained by the applicant for water:

- Water meter of a type approved by the District.
- Backflow prevention assembly of a type approved by the District and tested by a WA Department of Health certified backflow assembly tester (BAT) to demonstrate performance of the assembly.

Approval for use of a hydrant for construction water, or other purposes not related to fire fighting, shall be at the sole discretion of the District. Application for water use for construction or any use not related to firefighting shall be made on a form provided by the District that sets forth the conditions for District's approval of the use of the hydrant.

K. WATER CONSERVATION

To respond to drought or emergency conditions, the District may impose temporary water conservations measures that include, but are not limited to the following:

- Additional water commodity charges (i.e., surcharge for high usage).
- Odd/even day or other lawn water restrictions.
- Ban on lawn watering and washing of vehicles.

Any Customer failing to repair leaks within 30 days of receipt of written notification of such leaks, the District may have the water shut-off or may restrict the flow to the Customer by partly closing a service valve, installing a restriction fitting, or other means without further notice until such leak's repaired.

Leaks discovered on vacant homes may be shut-off at the meter immediately and a notice will be hung on the door of the vacant home explaining reason for shut-off. The District shall not be held responsible for shutting off or failing to shut off a leaking service to a vacant home and/or not notifying a Customer of a suspected leak.

L. INCONSISTENT PRIOR POLICIES AND PROCEDURES SUPERSEDED

All existing District resolutions, policies and procedures are hereby modified, amended and superseded to be in accordance with the polices and procedures set forth below.

M. EFFECTIVE DATE

This resolution and the policies and procedures set forth herein shall be effective the date set forth below.

APPROVED AND ADOPTED THIS 12th day of February, 2003

_____
Commissioner

_____
Commissioner

_____
Commissioner

APPROVED AS TO FORM AND SIGNED BY ATTORNEY

_____

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

WA DOH ID #13344P

Project Report

RESERVOIRS, BOOSTER PUMP STATION AND CONNECTION OF WELLS

George Bratton, P.E.
Civil Engineer
1252 S. Farragut Drive
Coupeville, WA 98239
(360) 678-4552

April 2004

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Specifications

Above Ground Concrete Reservoir and Associated Reservoir Piping, with Management & Operations Manual Supplement for Reservoir Maintenance and geotechnical report on the reservoir site.

Booster Pumps, Hydropneumatic Tank and Associated Piping

Hypochlorinator Chemical Feed Pump with WA DOH form "Hypochlorinator Facilities for Small Systems Submittal Checklist".

Wood Frame Building Construction

Emergency Generator

Automatic Alarm Dialing System

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[11" x 17"]
Comprehensive Map, Initial Facilities
Comprehensive Map, Reservoir & Pump House, Site Plan
Water Main Installation, Initial Water System

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R-2	Outlet Details
R-3	Overflow & Drain Details
R-4	Gage Board & Float Details
R-5	Hatch, Ladder & Vent Details
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R-10	Erosion Control, Site Work
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PH-3	Booster Pump Piping Schematic
PH-4	Piping Details
PH-5	Building Electrical
PH-6	Electrical One-Line Diagram
PH-7	Building Construction Details
CL-1	Hypochlorinator

Well [8 ½"x 11"]

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W-3	Fire Hydrant Details
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W-5	Disinfection & Flushing
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W-7	Residential Service Detail
W-8	Air Valve Detail
W-9	Casing Pipe, Road Crossing
E-1	Erosion Control, Water Main Installation
E-2	Erosion Control, Water Main Installation
E-3	Erosion Control, Water Main Installation

Attachments

Geotechnical Report from Materials Testing and Consulting, Inc., Mount Vernon, WA for the reservoir site.

A. PURPOSE

The purpose of this report is to obtain WA DOH approval for the following system improvements:

- Construction of two 79,400-gallon storage reservoirs.
- Construction of a building to house booster pumps and associated equipment, and hypochlorinator.
- Installation of booster pumps and associated equipment. The associated equipment includes an emergency generator, an alarm monitoring system, and hypochlorinator.
- Equipping two new (existing) wells and installation of wellhead enclosures.
- Installation of yard piping as shown on the accompanying drawings.
- Installation of chain-link security fence for the above.

The above projects are described in the Associations Water System Plan accompanying this Project Report.

B. BACKGROUND AND DESCRIBUTION OF SYSTEM

Information about this system is included in the accompanying Water System Plan.

C. PLANS AND SPECIFICATIONS

The following specifications and plans accompany this Project Report:

- Booster Pumps, Hydropneumatic Tank and Associated Piping
- Above Ground Concrete Reservoir and Associated Reservoir Piping, with Management & Operations Manual Supplement for Reservoir Maintenance
- Wellhead Piping and Enclosures
- Hypochlorinator Chemical Feed Pump with completed WA DOH form "Hypochlorinator Facilities for Small Systems Submittal Checklist".
- Wood Frame Building Construction
- Emergency Generator
- Automatic Alarm Dialing System
- Standard Specifications for Water Main Installation (see Water System Plan)

Attached to this project report is the geotechnical report on the reservoir site.

Calculations for the sizing of the above equipment are provided in the accompanying Water System Plan.

D. S.E.P.A.

The State Environmental Project Act, erosion control plan, and other permit issues, will be reviewed by Skagit County as part of the building permit approval process for the reservoir construction.

For all other work, SEPA requirements do not apply to this project because it is exempt under the provisions of WAC 197-11-800 (24).

E. PROJECT INSPECTION

Pursuant to WAC 246-290-040, the Owner/Contractor shall be aware of the requirements for Engineer's inspection and certification of the work and completion of the Department of Health forms "Construction Report for Public Water System Projects" and "Pressure, Leakage and Bacteriological Test Results". Where a specific phase of the work is to be inspected by the Engineer, as noted herein or in the attached specifications, the Owner/Contractor shall ensure that the work remains accessible until the Engineer's inspection is complete.

Work is not to proceed prior to obtaining D.O.H. project approval.

DESCRIPTION OF WORK	ENGINEER'S INSPECTION
SITE PIPING:	
Underground piping	Before backfilling
Pressure, leakage test and disinfection	Upon completion
RESERVOIR:	
Piping under slab	Before backfilling
Structural reinforcing	As required; Building Department to Inspect
Reservoir appurtenances	Upon completion
Reservoir disinfection	A beginning and end of procedure
BOOSTER PUMPS:	
Building construction	Building Department to Inspect
Pumps, tanks, etc.	At acceptance test
PRV STATIONS:	
Pipe and fittings	Upon completion

DRAWINGS

(See also drawings with specifications)

NOTES:

1) THE INFORMATION ON THIS PLAN IS PROVIDED FOR WATER SYSTEM PLANNING ONLY. FOR OTHER USES, INFORMATION SHOULD BE CONFIRMED BY LICENSED SURVEYOR OR FROM SKAGIT COUNTY RECORDS.

2) ZONING INFORMATION CODES ARE SHOWN BELOW FOR THE PARCEL NUMBERS OF THE LOTS IN THE INITIAL SERVICE AREA. THE FOLLOWING DESCIBES THE CODES:

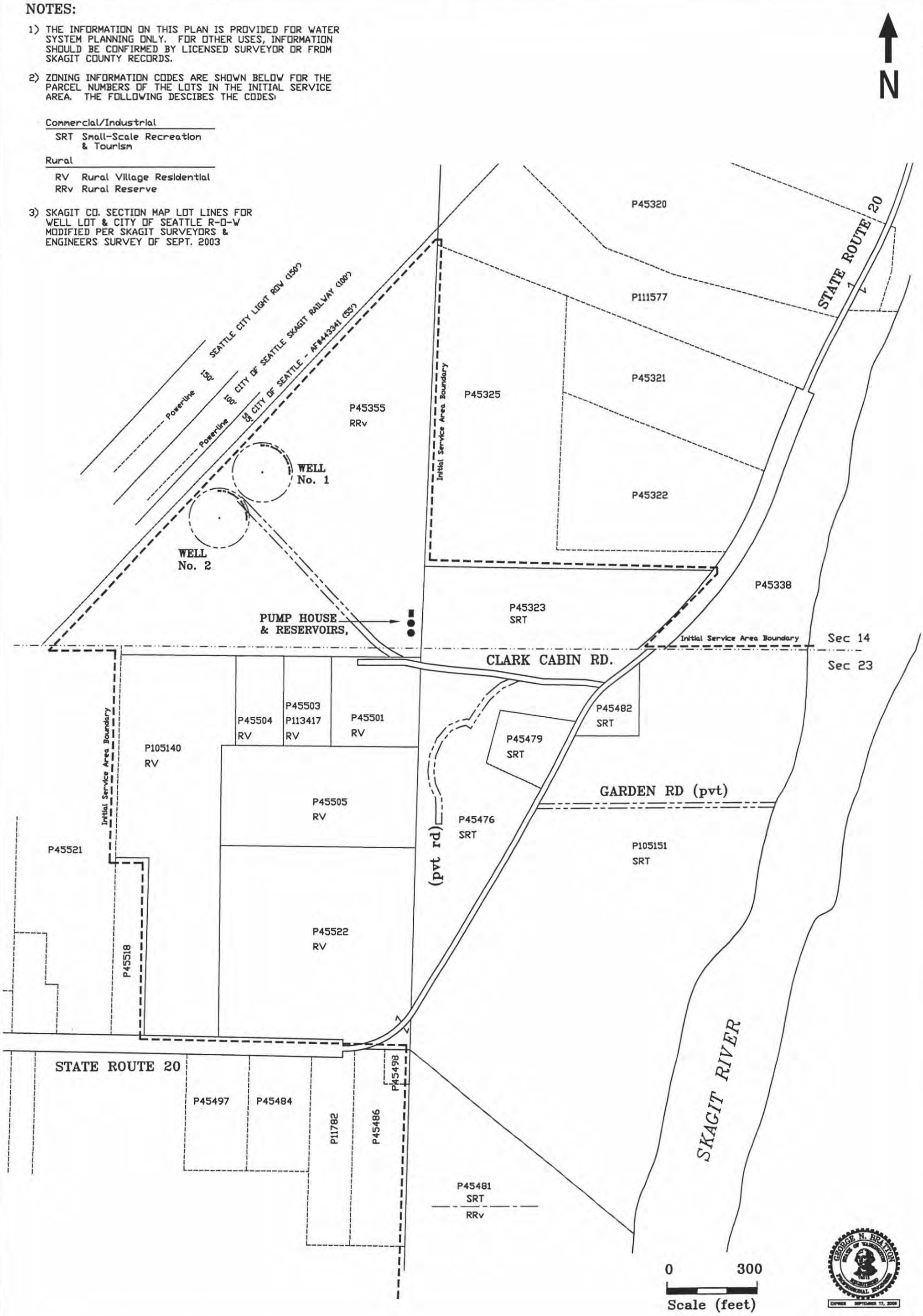
Commercial/Industrial

SRT Small-Scale Recreation & Tourism

Rural

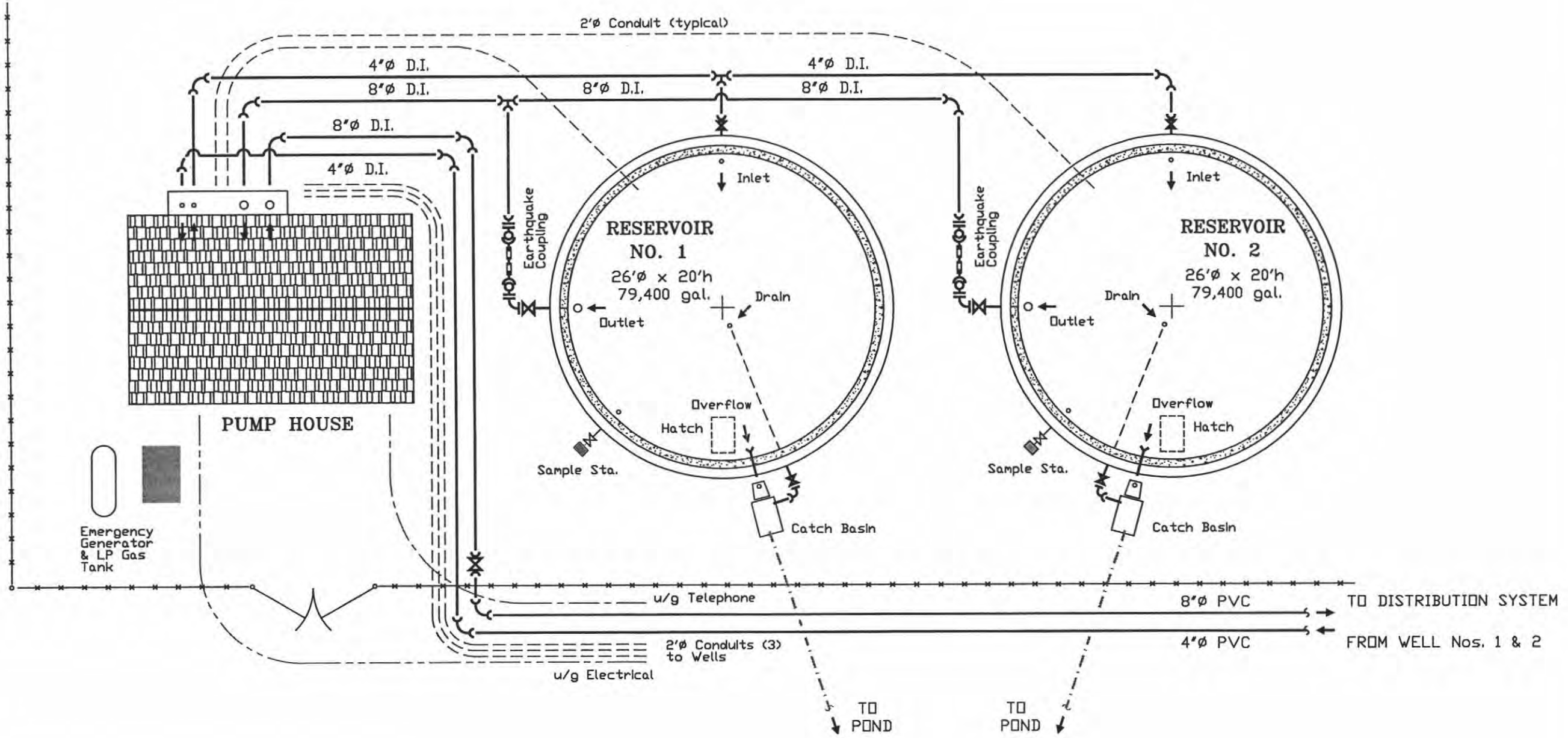
RV Rural Village Residential
RRv Rural Reserve

3) SKAGIT CO. SECTION MAP LOT LINES FOR WELL LOT & CITY OF SEATTLE R-O-W MODIFIED PER SKAGIT SURVEYORS & ENGINEERS SURVEY OF SEPT. 2003



Latest revision 4/19/04

Sht. 1 of 1	BULLERVILLE UTILITY DISTRICT 58468 Clark Cabin Road Rockport, WA 98283	WATER DISTRIBUTION SYSTEM COMPREHENSIVE MAP Initial Facilities	GEORGE BRATTON, CIVIL ENGINEER 1252 S. Farragut Drive Coupeville, Washington 98239 Job 538 May 2003



NOTES:

1) WATER PIPING INTO RESERVOIRS AND PUMP HOUSE SHALL BE MINIMUM CLASS 50 DUCTILE IRON. WATER PIPING OUTSIDE OF FENCE SHALL BE CLASS 150 PSI, AWWA C900 PVC

2) RESERVOIR CATCH BASINS ARE PROVIDED TO ALLOW DECHLORINATION OF WATER PRIOR TO DISCHARGE TO POND

3) CONNECT BUILDING DRAIN TO RESERVOIR CATCH BASIN

4) REFER TO GEOTECHNICAL REPORT BY MATERIAL TESTING AND CONSULTING FOR RESERVOIR AND PUMP HOUSE FOUNDATION REQUIREMENTS.

5) MINIMUM EASEMENT TO BE 10-feet BEYOND EDGE OF ANY PRESENT OR FUTURE STRUCTURE, OR YARD PIPE SHOWN. EASEMENT TO BE RECORDED AFTER CONSTRUCTION.

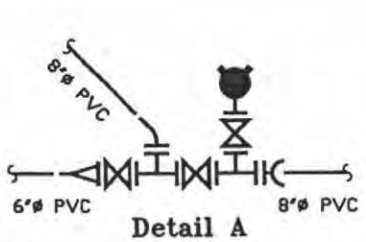
0 10
Scale (feet)

GEORGE BRATTON, CIVIL ENGINEER
1252 S. Farragut Drive
Coupeville, Washington 98239
Job 538 April 2004

WATER DISTRIBUTION SYSTEM
COMPREHENSIVE MAP
Reservoir & Pump House
Site Plan

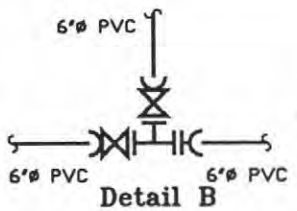
BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

Sht. 1 of 1



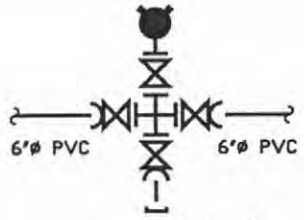
Detail A
n.t.s.

8"ø Flg. Tee
8"ø Flg. x PE 45° Bend
8"ø Flg. Gate Valve (2)
8" x 6"ø Flg. x PE Reducer
8" x 8" x 6"ø Flg. Tee
6"ø Flg. Gate Valve
Fire Hydrant
8"ø Flg. x MJ Adapter



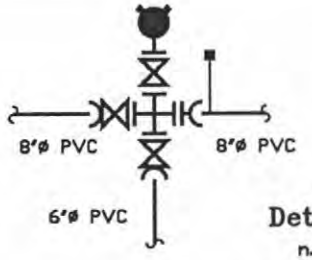
Detail B
n.t.s.

6"ø Flg. Tee
6"ø MJ x Flg. Gate Valve (2)
6"ø Flg. x MJ Adapter



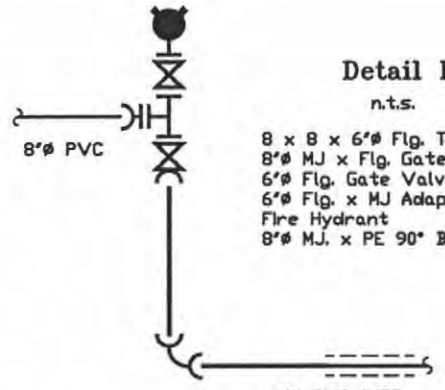
Detail C
n.t.s.

6"ø Flg. Cross
6"ø MJ x Flg. Gate Valve (2)
6"ø Flg. Gate Valve
Fire Hydrant
6"ø MJ. x PE 45° Bend



Detail D
n.t.s.

8 x 8 x 6 x 6"ø Flg. Cross
8"ø MJ x Flg. Gate Valve
6"ø MJ x Flg. Gate Valve
6"ø Flg. Gate Valve
Fire Hydrant
6"ø Flg. x MJ Adapter
KUPFERLE "Eclipse" No. 88
Water Sample Station
c/w Locked Weather Shield



Detail E
n.t.s.

8 x 8 x 6"ø Flg. Tee
8"ø MJ x Flg. Gate Valve
6"ø Flg. Gate Valve
6"ø Flg. x MJ Adapter
Fire Hydrant
8"ø MJ. x PE 90° Bend

N

RESERVOIRS &
PUMP HOUSE

110± ft, 8"ø PVC

900± ft, 4"ø PVC to Well Nos. 1 & 2

HYD

380± ft, 8"ø PVC

See Detail D

HYD

360± ft, 8"ø PVC

HYD

CLARK CABIN RD.

See Detail E and Std. Plan W-9

See Detail A

370± ft, 6"ø PVC

340± ft, 6"ø PVC

HYD 200± ft, 6"ø PVC

285± ft, 6"ø PVC

HYD

See Detail B

MOUNTAIN CRT. (pvt)

See Detail C

Possible future main extension

Possible future main extension

STATE ROUTE 20

PRELIMINARY
Running line of new main to be determined after topo and R-O-W survey and u/g utility locates

0 100
Scale (feet)

Latest revision 4/19/04

NOTES:

1) WATER MAINS AND APPURTENANCES SHOWN LARGER THAN SCALE FOR CLARITY
2) ALL MAINS TO BE INSTALLED IN EASEMENTS RUNNING PARALLEL TO COUNTY ROADS.
3) LOCATION OF HYDRANTS TO BE DETERMINED IN CONSULTATION WITH LOCAL FIRE DISTRICT.
4) SEE B.U.D. STANDARD PLANS AND SPECIFICATIONS FOR OTHER INSTALLATION DETAILS.
5) WHERE REQUIRED BY COUNTY ROAD PERMIT, INSTALL CASING PIPE PER STD. PLAN W-9
6) MINIMUM WATER UTILITY EASEMENT WIDTH:
   7.5 feet ADJACENT TO COUNTY ROAD R-O-W
   15.0 feet ALL OTHER EASEMENTS

LEGEND:

- Water main
- Water service c/w shutoff and meter setter
- GV — Gate valve
- BO — Standpipe / Blow-off
- AV — Air release valve
- HYD — Fire hydrant c/w isolating valves

GEORGE BRATTON, CIVIL ENGINEER
1252 S. Farragut Drive
Coupeville, Washington 98239
Job 538 March 2004

WATER DISTRIBUTION SYSTEM
COMPREHENSIVE MAP
Water Main Installation
Initial Water System

BULLERVILLE UTILITY DISTRICT
58468 Clark Cabin Road
Rockport, WA 98283

Sht. 1 of 1

SPECIFICATIONS

BOOSTER PUMPS, HYDROPNEUMATIC TANK AND ASSOCIATED PIPING

1. General:

These specifications are prepared for the Bullerville Utility District (hereafter referred to as Owner) to accompany their invitation for proposals for the installation of water storage reservoirs, booster pump house and associated work.

These specifications cover the installation of booster pumps, pump controls, pump house piping, fittings and valves, hydropneumatic tanks, and associated material for the new pump house shown in the attached drawings. These specifications shall be used in conjunction with the contract documents provided by the Owner or Bidder, and with the other portions of the Project Report containing these specifications.

2. Pump House Equipment:

Booster Pump System - Phase 1 (500 gpm fire flow) - Four booster pumps shall be installed as shown on the attached drawings. The pump performance shall meet the following minimum criteria:

Flow:	0	gpm	135	gpm
Head:	180	foot	140	foot

The pumps shall be PACO Type L, Series 1250, 7.5 hp, single phase or approved equal. {Note: Owner may provide three phase power to building}

The pumps shall be supported by a channel frame as shown in the accompanying drawings.

Booster Pump System –Phase 2 (Increased fire flow) – Two additional booster pumps shall be installed as shown on the attached drawings. The pump performance shall meet the above criteria:

All pumps shall be equipped with 1/4-inch brass bleed cocks located to permit manual removal or air from the volutes.

Motors shall be of open drip-proof construction, of American manufacture.

Pump Controls - The lead and lag operation of the booster pumps in each system shall be alternated. Pumps shall be automatically by switching the control circuits (not the pump power leads) by means of a 115 VAC alternating relay installed in the controller for booster pump number 1.

Pressure Switches - Pressure switches shall be of the adjustable type, Square D Class 9012 Type GAW5 NEMA 4 or equal. The switches shall be mounted on the header pipe to the hydropneumatic tanks. The pump "on" and "off" setting shall be initially set as follows:

Operation	Pressure Switch Settings On / Off
Lead pump	56 psi / 74 psi
First lag pump	54 psi / 72 psi
Second lag pump	50 psi / 70 psi
Third lag pump	48 psi / 68 psi

The lag pump operation is intended to provide a backup to the failure of the lead pump.

A NEMA size 1, 3-pole FVNR magnetic starter, or equal, shall be supplied with each pump. The booster pump starter, and the new well pump starter (see well pump specifications) shall be grouped in a motor control center. Starters shall be equipped with auxiliary relays and reset buttons for undervoltage protection in case of power interruption. All starters shall have hands-off-automatic switches and red pilot lights to indicate pump operation. Each booster pump shall be equipped with an hour meter.

All pumps to be on time delay for starting at minimum 2-minute intervals (or as otherwise specified by PSE), starting with lead booster pump and ending with lag well pump.

Electrical - The electrical installation shall be in accordance with the National Electrical Code and all applicable State and local codes. Equipment and materials shall bear Underwriters laboratories label where required. All electrical wiring shall be copper.

A 200 amp minimum electrical panel shall be installed.

All wiring in the pump house shall be installed in galvanized rigid steel or PVC conduit, except that Greenfield or similar flexible conduit may be used for short connections to motors or equipment.

The well pump control shall be relocated to the booster pump house.

For connection of the remote control cable to the reservoir, use #14 WG conductor type PTN direct burial control cable. For security, the cable shall be installed in buried conduit or in above-ground conduit (e.g., on reservoir) where shown on the accompanying drawings. Control shall be by a MAGNETEK series 52 in NEMA 1 enclosure as manufactured by B/W Controls.

Piping inside pump house - All piping inside the pump house shall be (standard weight) schedule 40 galvanized steel, conforming to ASTM specification A53, Grade B or ductile iron pipe, class 50.

All exposed threads on galvanized pipe shall be protected against rust by covering with plastic tape or protective paint, neatly applied.

No leaky joints will be permitted.

All piping shall be carefully placed and supported and connected in a manner that will not introduce unnecessary strain. The Contractor shall provide all necessary supports, tie rods, brackets, anchors, etc. Horizontal runs of the suction and discharge headers for the pumps shall be rigidly supported in place with "Standon" adjustable supports, model appropriate to the installation. Unions shall be installed adjacent to all equipment items and valves to facilitate their removal, and where necessary to make the installation.

At the Owners option, all pipe, bolts, and other iron or steel material and equipment that is not factory coated, shall be cleaned, primed and painted.

ASME Hydropneumatic Tank - The hydropneumatic tanks shall be Canal Boiler Works, or Owner approved equal, ASME rated (and labeled) 113 psi, horizontal configuration 54-inch diameter by 126-inch (over all length), 1,147-gallon capacity steel tanks. The tank shall be supplied with welded legs, and one 3-inch (minimum) threaded outlet, sight tube c/w isolating cocks, ASME relief valve, air volume controller connection, etc. The tank shall have a NSF "Potapox" lining or equal and two coats shop applied exterior primer.

After installation of all connection, the shop shall be touched up and the entire exterior of the tank and the supports shall be painted with one coat of top quality white interior paint.

The tank legs shall be shimmed and grouted so that the weight of the tank and contents is uniformly distributed to the floor slab. The legs shall be bolted to the floor with drill-in type expansion bolts.

Air Volume Controller - The air volume controller shall be a Whitewater "Air-rite" Model 610. The air volume controller installed on the hydropneumatic tank as recommended by the manufacturer.

Isolating Valves - Isolating valves 1.5-inch and smaller shall be a full port ball valve, Watts Series FBV or equal. Isolating valves 2-inch through 3-inch shall be either a full port ball valve, Watts Series FBV or equal, or a resilient wedge gate valve meeting AWWA Standard C509, Clow Model 5-6100 or equal.

Pressure Relief Valve - On the header pipe to the hydropneumatic tank, install one 3/4-inch ASME water pressure safety relief valve, Watts Series 174A, or equal.

The pressure relief setting shall be the working pressure of the hydropneumatic tank, or 160 psi, whichever is the lesser. The relief port shall be piped so that the water will discharge to the outside of the well house.

Water Sample Tap - For the collection of water samples from the well supply and other locations shown on the accompanying plans, install a standard hose bib faucet, Watts SC-1, or equal. The hose bib shall be installed horizontal so that the outlet discharges downward.

Pressure Gages - Gages shall be 4.5-inch diameter, plain case, Marsh "Standard" line or approved equal, with 1/2-inch NPT connection and individual brass cock. Pressure range shall be 0 to 150 psi on each of the pump discharge headers; 0 to 30 psi on the pump suction header.

A performance test shall be conducted under the supervision of the Owner/Engineer to demonstrate that the completed installation will meet the performance requirements of this specification.

3. Yard Piping:

All water pipe shall be installed in accordance with the "Standard Specifications for Water Main Installation" included in the Owner's Water System Plan. All yard piping shall be ductile iron or galvanized steel unless otherwise shown on the accompanying plans.

All thrust blocks shall be capable of resisting the thrust created from the application of a 225 psi hydrostatic test pressure (i.e., 1.5 times the rated working pressure of the water main material) as shown in the attached drawings.

4. Disinfection and Pressure Test:

The Contractor shall thoroughly clean and keep clean all piping and appurtenances of foreign matter before and during installation.

All underground piping and all piping within buildings shall be disinfected in accordance with AWWA Standard C651 "Disinfecting Water Mains".

The leakage and hydrostatic pressure test shall be applied to all piping, pumps, tanks and associated equipment. The tests shall conform to AWWA C600. The pressure test shall be for a 2-hour duration.

Any visible leakage detected shall be repaired regardless of the allowable leakage specified above.

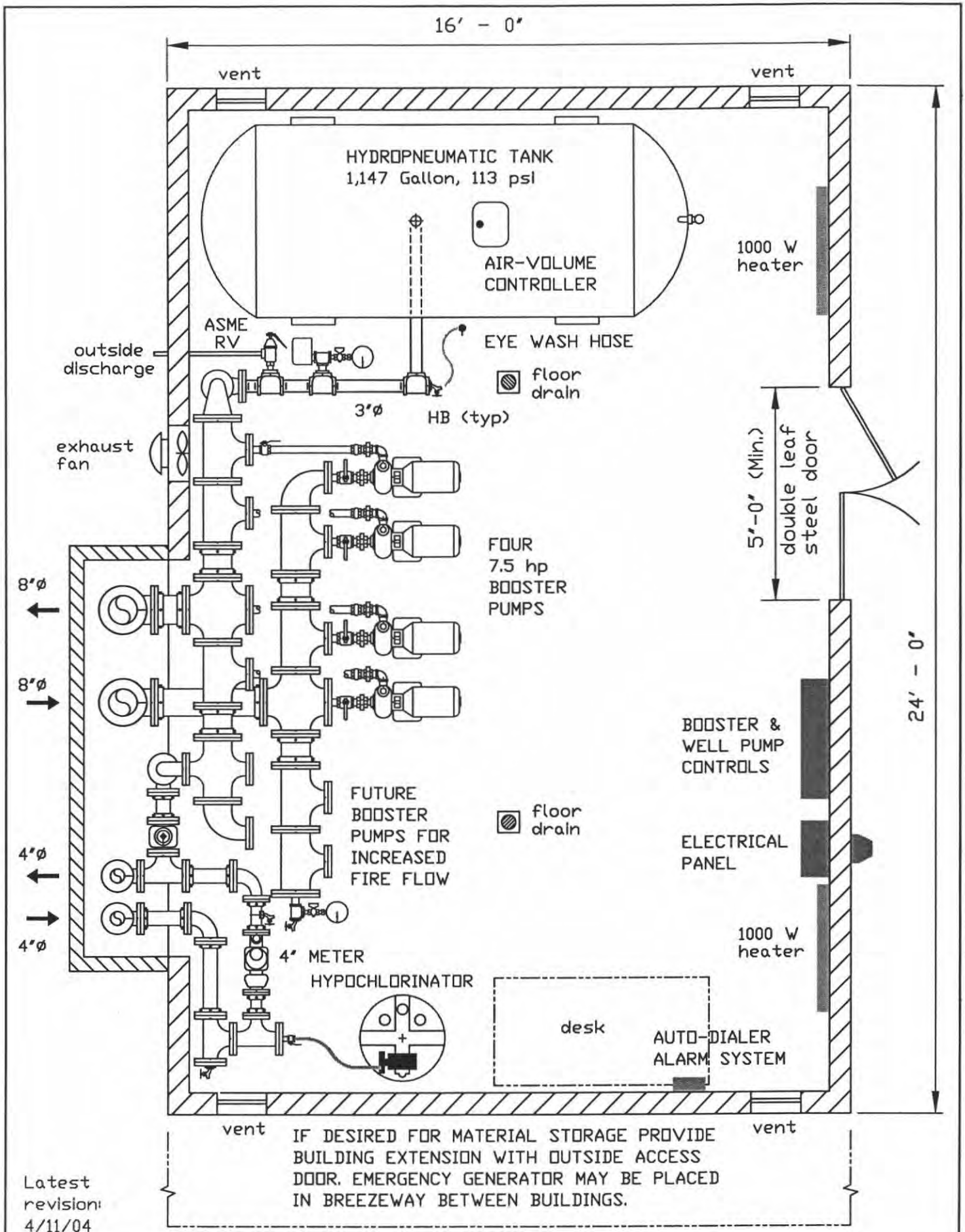
5. Inspection:

Pursuant to WAC 246-290-040, the Owner/Contractor shall be aware of the requirements for Engineer's inspection and certification of the work and completion of the Department of Health forms "Construction Report for Public Water System Projects" and "Pressure, Leakage and Bacteriological Test Results" are required. The Engineer's inspection is outlined in the Project Report containing these specifications.

6. List of Drawings:

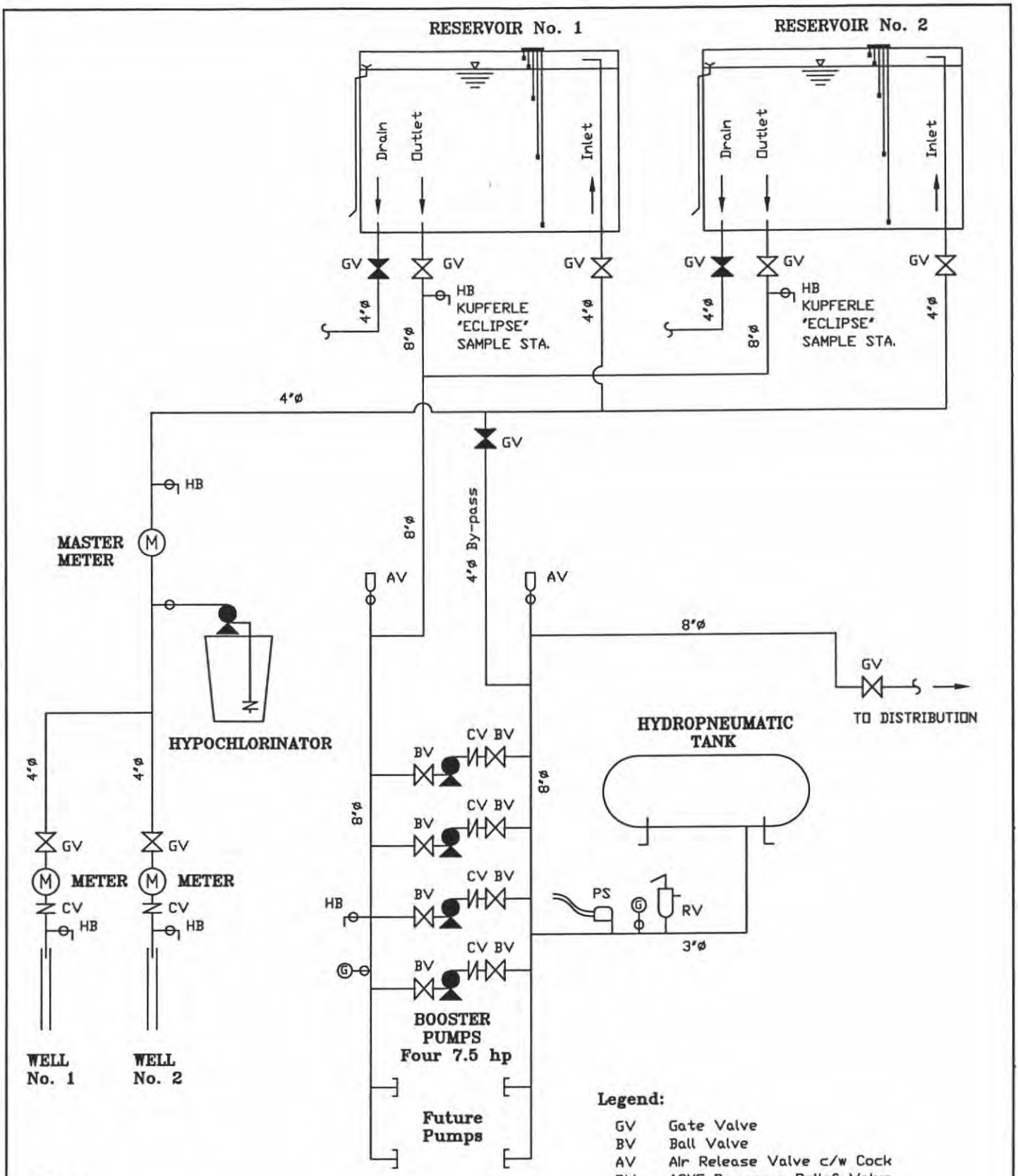
The following attached drawings shall be used in conjunction with these specifications:

PH-1	Site Plan
PH-2	Floor Plan – Equipment Layout
PH-3	Booster Pump Piping Schematic
PH-4	Piping Details
PH-5	Building Electrical
PH-6	Electrical One-Line Diagram
PH-7	Building Construction Details
CL-1	Hypochloriator



Latest
revision:
4/11/04

Date: May 03	**Scale:** 1"=3'-0"	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Floor Plan – Equipment Layout	**Dwg. #** PH-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



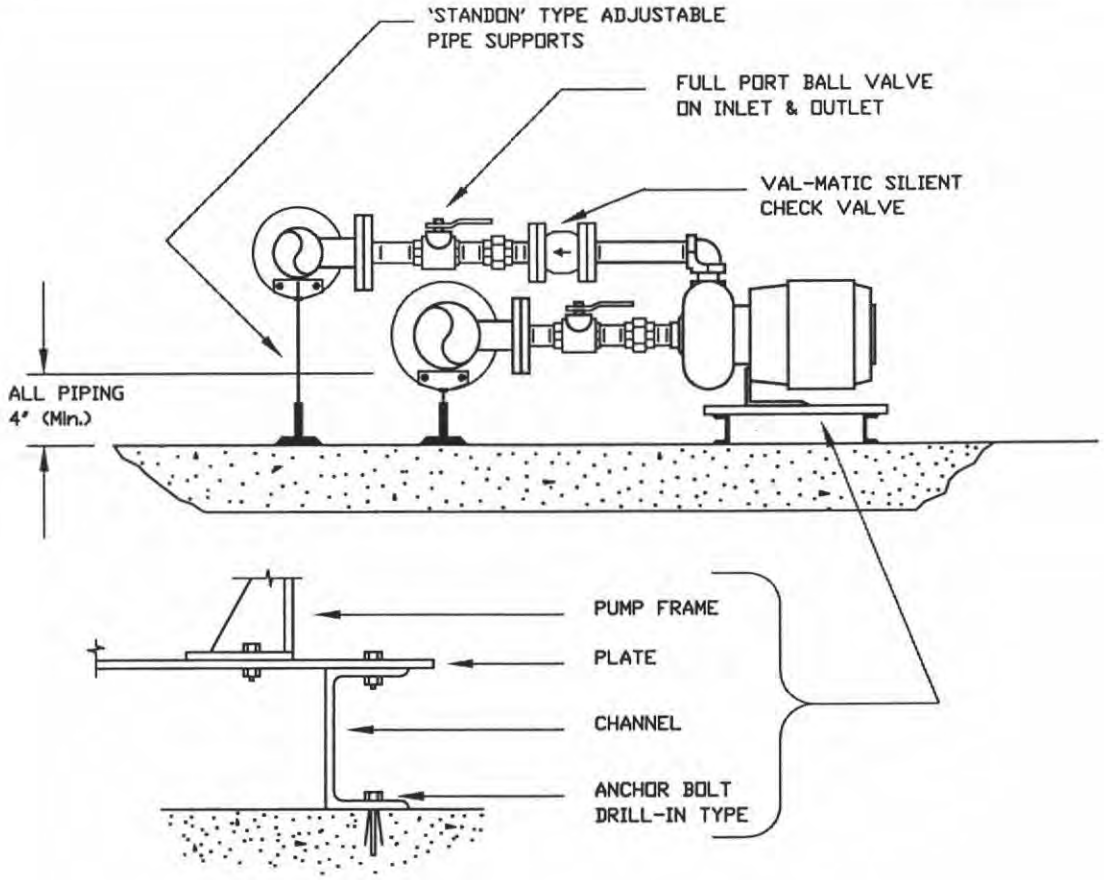
Notes:

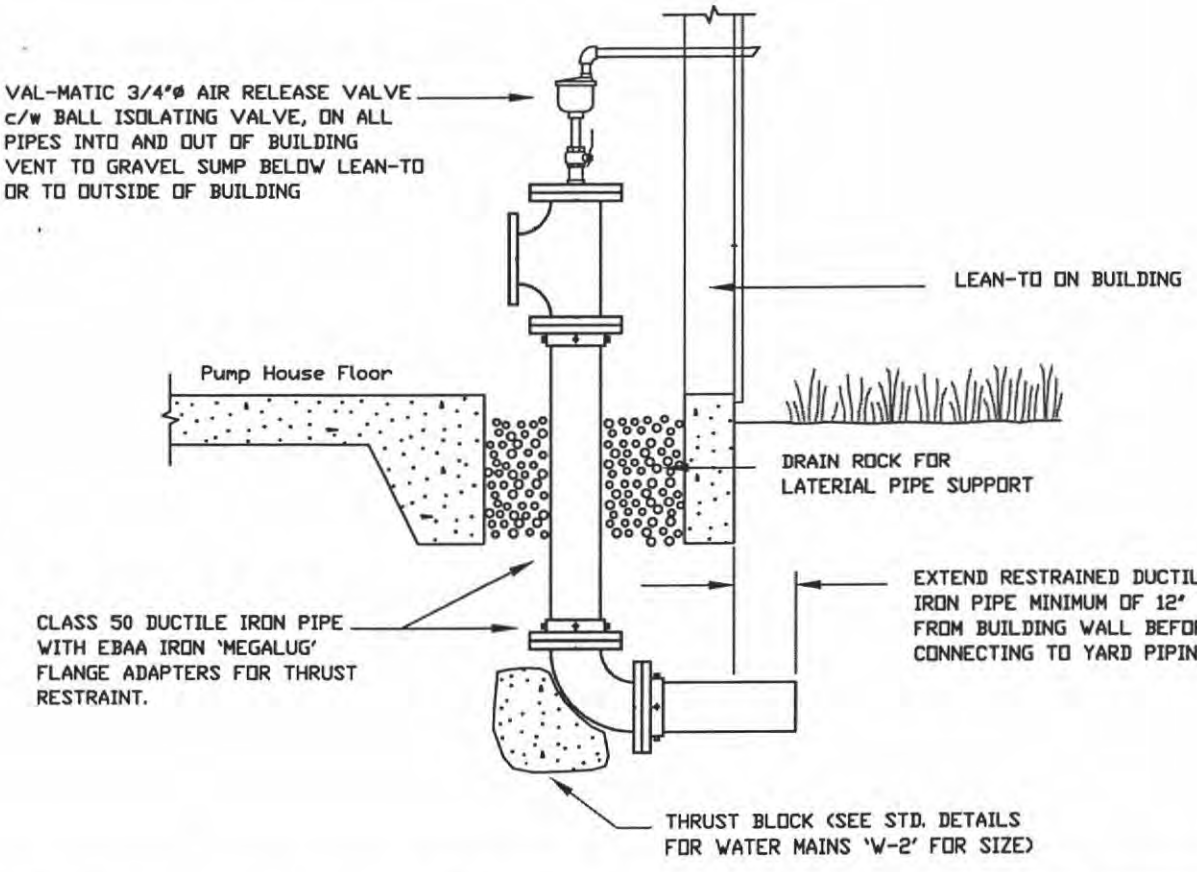
4-inch by-pass allows direct supply of system from wells when both reservoirs are out of service. Well control to be manually changed to booster pump lead/lag pressure switches.

Legend:

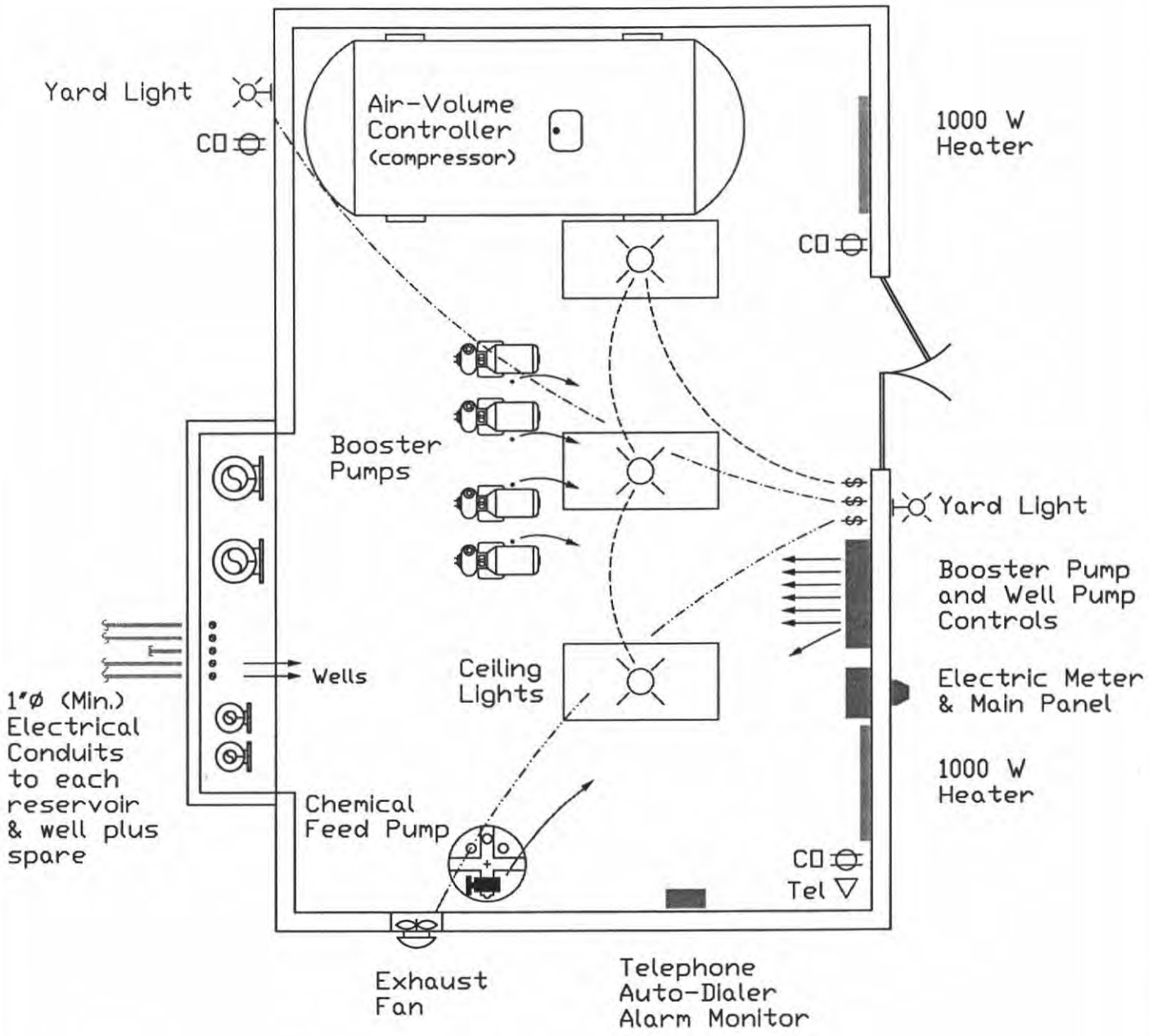
GV	Gate Valve
BV	Ball Valve
AV	Air Release Valve c/w Cock
RV	ASME Pressure Relief Valve
CV	Check Valve
HB	Hose Bib for Water Sample Tap
G	Pressure Gauge c/w Cock
PS	Pressure Switches for Pumps
M	WATER METER

Date: May 03	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Booster Pump Piping Schematic	**Dwg. #** PH-2
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			





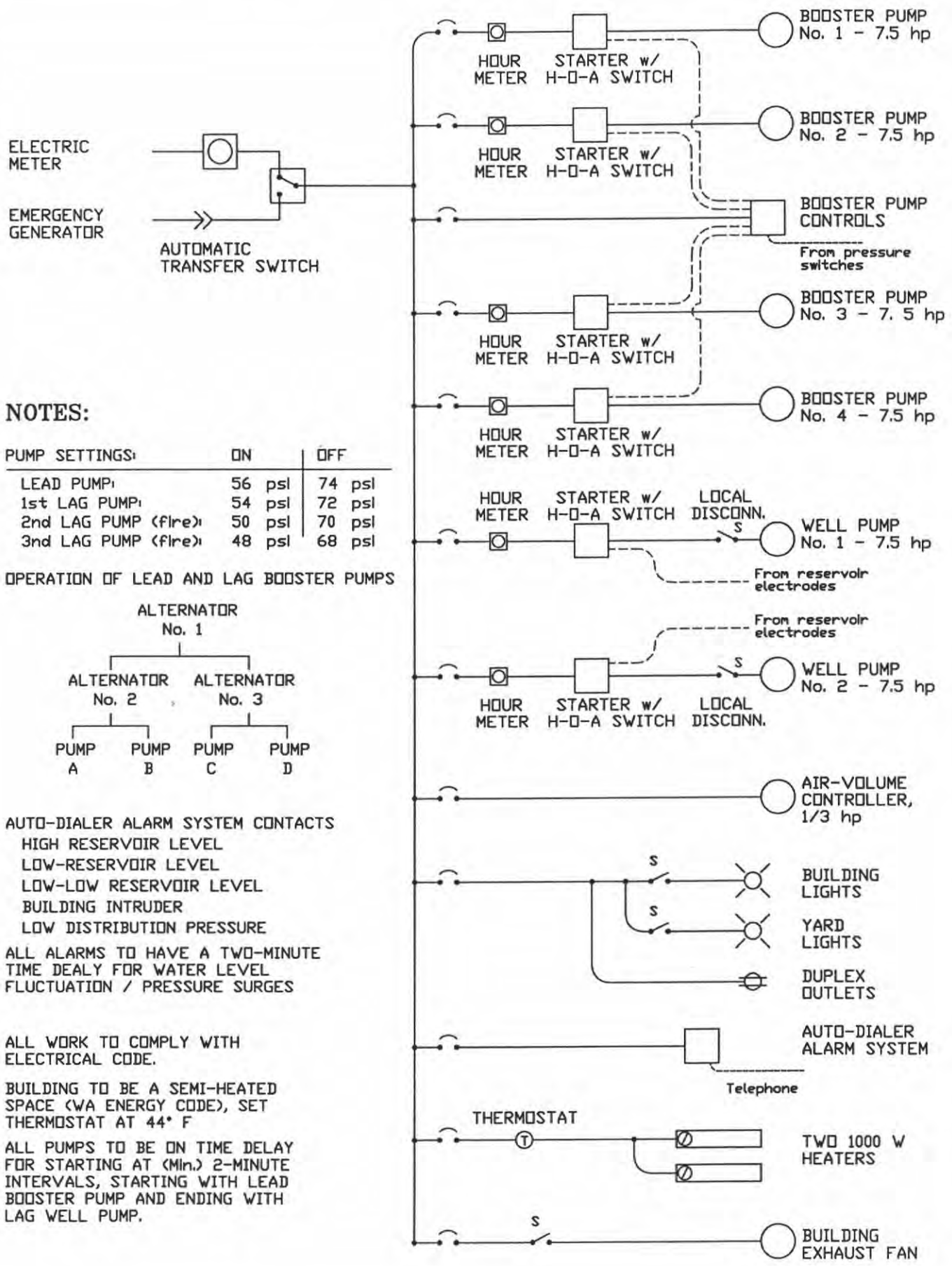
Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Piping Details	Dwg. # PH-3
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



NOTES:

1) ALL WORK TO COMPLY WITH ELECTRICAL CODE
2) CONDUIT INSIDE BUILDING SHALL BE WALL/CEILING MOUNTED RIGID GALV. STEEL OR PVC. USE "GREENFIELD" OR EQUAL FLEXIBLE CONDUIT TO CONNECT TO PUMP MOTORS
3) INTERIOR LIGHTING FIXTURES SHALL BE 2-LAMP FLUORESCENT UNITS
4) EXTERIOR LIGHTS SHALL BE 70-WATT SODIUM, WALL MOUNTED, POINTED TOWARDS GROUND
5) SET HEATER THERMOSTAT TO 44° F.
6) EXHAUST FAN TO BE "DAYTON" MODEL No. 2C634, OR EQUAL, 10"ø, 580 CFM PROVIDE SCREENED, LOUVERED VENT IN ONE DOOR OR OTHER ROOM AIR INLET

Date: May 03	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Building Electrical	**Dwg. #** PH-4
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



NOTES:

PUMP SETTINGS:	ON	OFF
LEAD PUMP:	56 psi	74 psi
1st LAG PUMP:	54 psi	72 psi
2nd LAG PUMP (fire):	50 psi	70 psi
3nd LAG PUMP (fire):	48 psi	68 psi

OPERATION OF LEAD AND LAG BOOSTER PUMPS

AUTO-DIALER ALARM SYSTEM CONTACTS
- HIGH RESERVOIR LEVEL
- LOW-RESERVOIR LEVEL
- LOW-LOW RESERVOIR LEVEL
- BUILDING INTRUDER
- LOW DISTRIBUTION PRESSURE

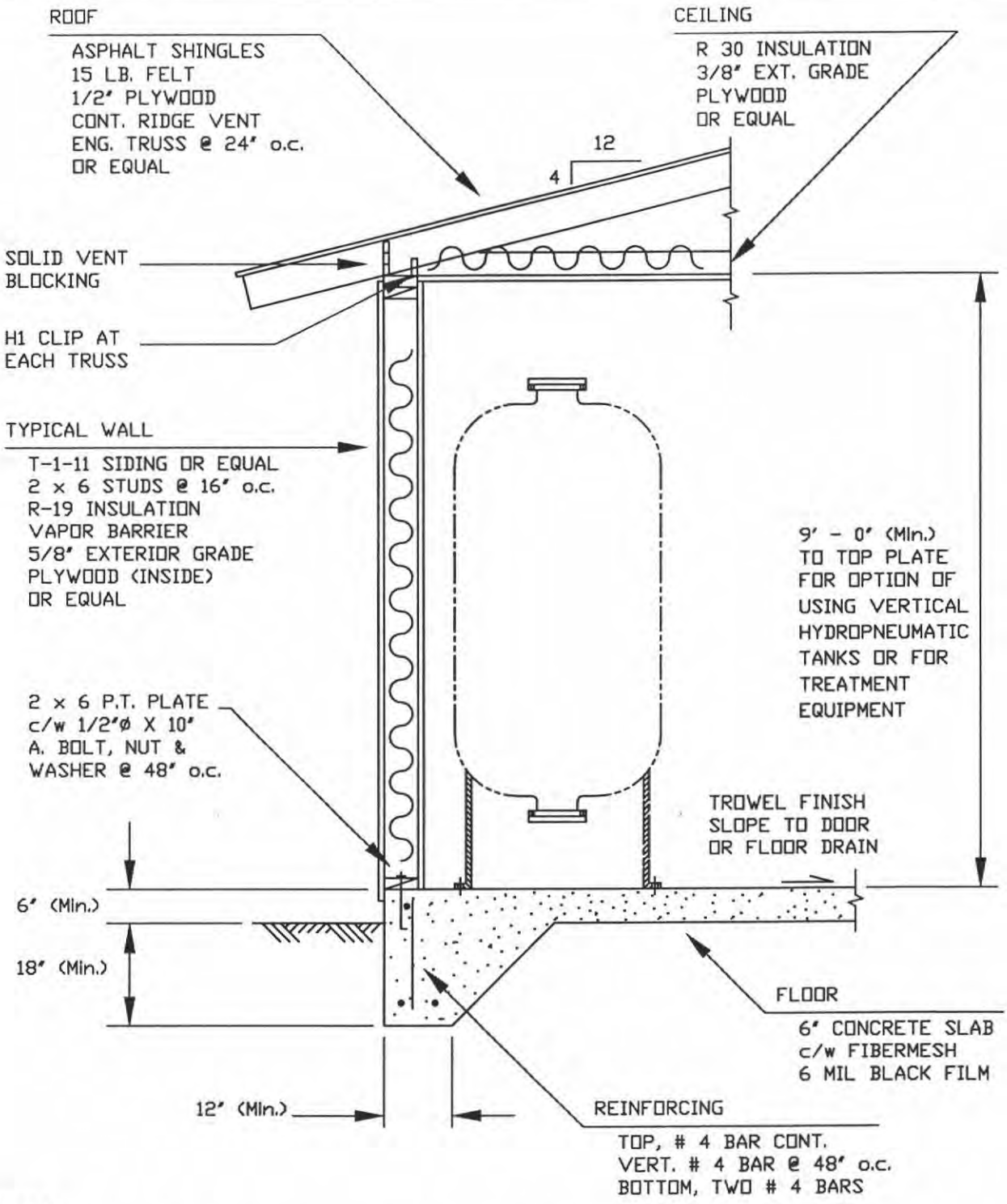
ALL ALARMS TO HAVE A TWO-MINUTE TIME DEALY FOR WATER LEVEL FLUCTUATION / PRESSURE SURGES

ALL WORK TO COMPLY WITH ELECTRICAL CODE.

BUILDING TO BE A SEMI-HEATED SPACE (WA ENERGY CODE), SET THERMOSTAT AT 44° F

ALL PUMPS TO BE ON TIME DELAY FOR STARTING AT (Min.) 2-MINUTE INTERVALS, STARTING WITH LEAD BOOSTER PUMP AND ENDING WITH LAG WELL PUMP.

Date: Aug. 03	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Electrical One-line Diagram	**Dwg. #** PH-5
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



NOTES:

BUILDING TO BE A SEMI-HEATED SPACE (WA STATE ENERGY CODE)
SET THERMOSTAT CAPABLE OF PREVENTING HEATING ABOVE 44 °F

ALL WORK TO COMPLY WITH APPLICABLE BUILDING, PLUMBING AND ELECTRICAL CODES

FOR 9'-0" CEILING HEIGHT, OWNER MAY PROVIDE 1'-0" HIGH CONCRETE CURB WITH FOUNDATION SLAB OR 6"± CURB WITH ADDITIONAL P.T. PLATES

SEE GEOTECHNICAL REPORT BY MATERIALS TESTING AND CONSULTING FOR FOUNDATION REQUIREMENTS

Date: May 03	**Scale:** n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Building Construction Details	**Dwg. #** PH-6
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

ABOVE-GROUND CONCRETE RESERVOIRS AND ASSOCIATED RESERVOIR PIPING

1. General

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the construction two 79,400-gallon above ground, reinforced concrete storage reservoirs located on the Owner's lot identified in the accompanying Project Report.

These specifications shall be used in conjunction with the contract documents approved by the Owner's attorney, and with the other portions of the Project Report containing these specifications.

The term "Contractor" shall refer to one or more contractors engaged by the Owner to accomplish the work described. The division of responsibilities between different contractors shall be defined in the contract documents prepared by the Owner.

2. Site Work:

The location for the reservoir is shown on the drawing included in the Project Report.

The area inside the clearing limits at the tank site shall be cleared, grubbed, and graded as specified in Section 2-06 of D.O.T. "Standard Specifications for Road, Bridge and Municipal Construction". The clearing and grubbing limits shall be a minimum of six feet beyond outside diameter of the reservoir.

A geotechnical analysis of the reservoir site is provided in the Project Report accompanying this specification. If further analysis is required for the reservoir design, the Contractor shall request specific information from the Owner.

The reservoir base shall comply with the recommendations of the geotechnical analysis.

All structure excavation shall be unclassified. It shall conform to the dimensions and elevations necessary to construct the reservoir.

Where, in the opinion of the Engineer (geotechnical engineer that prepared the above noted analysis), the undisturbed conditions of the natural soil below the reservoir base is inadequate for the support of the planned structure, the Contractor shall improve the supporting capacity as directed.

Drain rock for the tank foundation shall meet the requirements of Section 9-03.12(4) of DOT Standard Specifications.

The Contractor shall first install all piping under the reservoir foundation slab, stubbed out to 3 feet beyond the slab. This piping shall include the inlet/outlet and drain gate valves.

The Contractor shall then install all other site piping, including, but not limited to the overflow/drain pipe to the road ditch, connection of the inlet and outlet piping previously installed under the reservoir, etc., necessary to complete the project.

Except as directed, over excavation by the Contractor under slabs or drain rock mats shall be restored to grade with Class B gravel backfill conforming to Section 9-03.12(1)B of the DOT Standard Specifications.

Perforated drainpipe, if required by the geotechnical report for the reservoir foundation, shall be laid with the perforations on the bottom. All joints shall be made with standard couplings, and all junctions shall be made with standard pipe fittings.

3. Site Piping:

All water pipe shall be installed in compliance with the attached "Standard Construction Specifications for Water Mains", unless modified hereinafter, or in the drawing accompanying the Project Report accompanying these specifications.

All water pipe on the reservoir site shall be ductile iron, minimum class 50, single cement lined. Other piping materials shall not be considered equal.

All fittings larger than 4-inch shall be ductile iron, AWWA C-110, C-153 or Engineer approved equal.

All ductile iron pipe with EBAA IRON series 100, 1000, 1200 or similar restraining glands and/or flange adapters shall be thickness class 53 or greater as recommended by the manufacturer. EBAA IRON "Megalug" fittings may be used with thickness class 50 or greater.

All underground water pipe and fittings on the reservoir site and the water pipe extension to connect with the existing distribution system shall be restrained. Restraint at fittings shall be made using EBAA IRON series 1200 ductile iron mechanical joint retainer glands, series 1000 ductile iron flanged adapters, or "Megalug". Pipe restraint shall be provided using US PIPE "TR-FLEX" restrained joint pipe or "Field Loc" gasket system, or Engineer approved equal.

All pipe, valves and fittings shall be manufactured in the United States or Canada unless otherwise approved by the Engineer.

All gate valves shall be resilient seat type, AWWA C-509 c/w a cast iron slip type valve box.

Schedule 40 PVC conduits shall be installed in the trench with the 4 or 8-inch ductile iron pipe as shown on the drawings. The conduits will be installed with a 10 gage steel pull wire.

4. Reservoir Design:

The detailed structural design of the reservoir shall be a proprietary design that is pre-approved by the Washington Department of Health (WA DOH).

The appurtenances for the reservoir (e.g., inside ladder, hatch, vent, etc.) are shown on the drawings included in the Project Report. All appurtenances shall be supplied and installed by the Contractor.

The Contractor shall perform the disinfection and leakage test of the reservoir. The tank shall be disinfected in accordance with AWWA Standard C-652. The leakage test shall be in accordance with AWWA D-110.

The Contractor shall install the remote control cable to the reservoir. The cable shall be 8-#14 WG conductor type PTN direct burial control cable. Control shall be by a MAGNETEK series 52 in NEMA 1 enclosure as manufactured by B/W Controls. Electrodes, suspension wire, and electrode holder shall be suitable for outdoor installation and connection to a 4-inch flanged galvanized iron pipe on the tank roof. Pull-boxes shall be provided as necessary.

5. Permits:

Unless otherwise stated in the Contract or Proposal accompanying these specifications, the Contractor shall apply and pay for all permits, and shall include the cost of same in his bid price.

For the application for building permit, attached is a copy of the M & O Manual Supplement - Reservoir Maintenance. The Supplement contains instructions relating to the draining of the reservoir to County road ditch.

6. Project Inspection:

Pursuant to WAC 246-290-040, the Owner/Bidder shall be aware of the requirements for Engineer's inspection and certification of the work and completion of the Department of Health forms "Construction Report for Public Water System Projects" and "Pressure, Leakage and Bacteriological Test Results".

Where a specific phase of the work is to be inspected by the Engineer, as noted in the following schedule, the Owner/Bidder shall ensure that the work remains accessible until the Engineer's inspection is complete.

Work is not to proceed prior to obtaining WA DOH project approval.

DESCRIPTION OF WORK	ENGINEER'S INSPECTION
SITE PIPING:	
New underground piping from wells	Before backfilling
Pressure, leakage test and disinfection	Upon completion (1)
RESERVOIR:	
Piping under slab	Before backfilling
Foundation	Upon completion (2)
Reservoir base	Before pouring Reinforcing concrete (2)
Reservoir wall/roof reinforcing	Before pouring concrete (2)
Reservoir appurtenances	Upon completion
Reservoir disinfection	Present at beginning and end of procedure, bacteriological sample to be collected with Engineer or Owner present

(1) Pipe under reservoir to be pressure tested before pouring reservoir base.
(2) Indicates inspection by County building inspector.

7. Contractor's Submittal:

The Bidder/Contractor shall supply three sets of the following information:

- The "shop" drawings of the all equipment supplied (e.g., reservoir hatch);
- List of common replacement parts (with prices), and the name, address and phone number of suppliers; and
- Recommended maintenance instructions.

The first set shall be provided, if requested, prior to award of a contract. The remaining sets shall be supplied for the Owner's "Management and Operations Manual".

8. Cooperation with other contractors

If the Owner awards portions of the work for this project to different contractors, each contractor shall cooperate with the other and with the Owner and Engineer in prosecuting the work. Neither the Owner/Engineer or the various Contractors shall be held responsible to each other for delays in completion of each separately assigned work task or contract.

9. Existing Utilities

The location of existing utilities is uncertain. The Contractor shall locate all utilities, and shall verify the location of same by hand digging before beginning excavation for pipe laying.

The Contractor shall have adequate repair couplings on site should it be necessary to repair damage to the existing piping.

10. List of Standard Details

The following attached drawings shall be used in conjunction with these Specifications:

R-1	Inlet Detail	R-2	Outlet Detail
R-3	Overflow & Drain Details	R-4	Gage Board & Float Detail
R-5	Hatch, Ladder & Vent Details	R-6	Hatch, Ladder & Vent Details
R-7	General Piping Layout	R-8	Earthquake Coupling
R-9	Erosion Control Plan	R-10	Erosion Control Plan

The following M & O Manual information is provided as a supplement to the reservoir specifications for submittal to the County for the building permit.

RESERVOIR MAINTENANCE

Type Construction: Twin 79,400 gallon
Mt. Baker Silo reinf. concrete

Monthly

Monthly inspection shall include the following tasks:

- Check base of tank and walls for leakage.
- Inspect overflow discharge for signs of overflow, if outside pipe overflow, check that insect screen is intact.
- Inspect drain discharge for signs of leakage past drain valve.
- Clean roof vent and inspect for damage.
- Inspect roof hatch for proper seal.
- Check roof for cracks and openings that may permit entry of rain into the reservoir.
- Check gage board, pulley, and target, check target position relative to water level in tank.
- Check for signs of vandalism.

The results of the inspection and subsequent maintenance shall be recorded on the attached form "Reservoir Inspection and Maintenance Report". A record of the inspection and items noted for repair should also be made in the Operator's Daily Logbook.

Annually

Until water treatment is provided, the reservoir shall be drained and cleaned annually. An inspection shall be done at the time of reservoir cleaning. The inspection shall include the following tasks:

- Inspect internal ladder connections (e.g. bolts) for signs of corrosion.
- Inspect all pipe penetrations and internal piping for corrosion, joint seal, alignment, and structural integrity.
- Check internal concrete surfaces for cracks, spalls, etc.

The results of the inspection and subsequent maintenance (including cleaning and disinfection) shall be recorded in the form," Reservoir Inspection and Maintenance Report". A record of the inspection and the items noted for repair should also be made in the Operator's Daily Logbook.

Bratton {5/30/03}

The reservoir cleaning and disinfection should be scheduled for the early fall outside of significant rainfall events. The following procedures should be used:

- Check the ditch, swale or pond below the drain outlet pipe to ensure that discharge of drainage water will not cause problems.
- Shut-off the reservoir that will not be cleaned. Then to reduce the water level in the reservoir to be cleaned, thus reducing the amount of water to be discharged to drain, switch the well pump off at the control panel two or more days before removing the reservoir from service.
- Monitor the reservoir level. When the level is approximately 1 foot above the reservoir floor, switch system operation to the adjacent reservoir.
- If both reservoirs need to be shut off for maintenance, switch the booster pumps off, and change the pressurization of the system to the well pumps. The well pump operation will be controlled by the booster pump "on" and "off" pressure switches.
- Open the roof hatch to allow adequate air flow and drain the reservoir by partially opening the drain valve.
- Monitor the discharge at and below the end of the drain and adjust flow to prevent erosion or other damage. The flow rate should be reduced as needed to ensure that the water soaks into the soil or is contained in the pond downstream before the water reaches the County's road ditch.

When drainage is complete, undertake interior cleaning, inspection and repair work.

For discharge of water from tank containing chlorine (e.g., systems with hypochlorinator), if water may reach stream or other environmentally sensitive area, neutralize chlorine as recommended in AWWA Standard C652-86, Disinfection of Water Storage Facilities, such as allowing the discharged water to run through sacks of sodium bisulfite placed in a catch basin, or ditch.

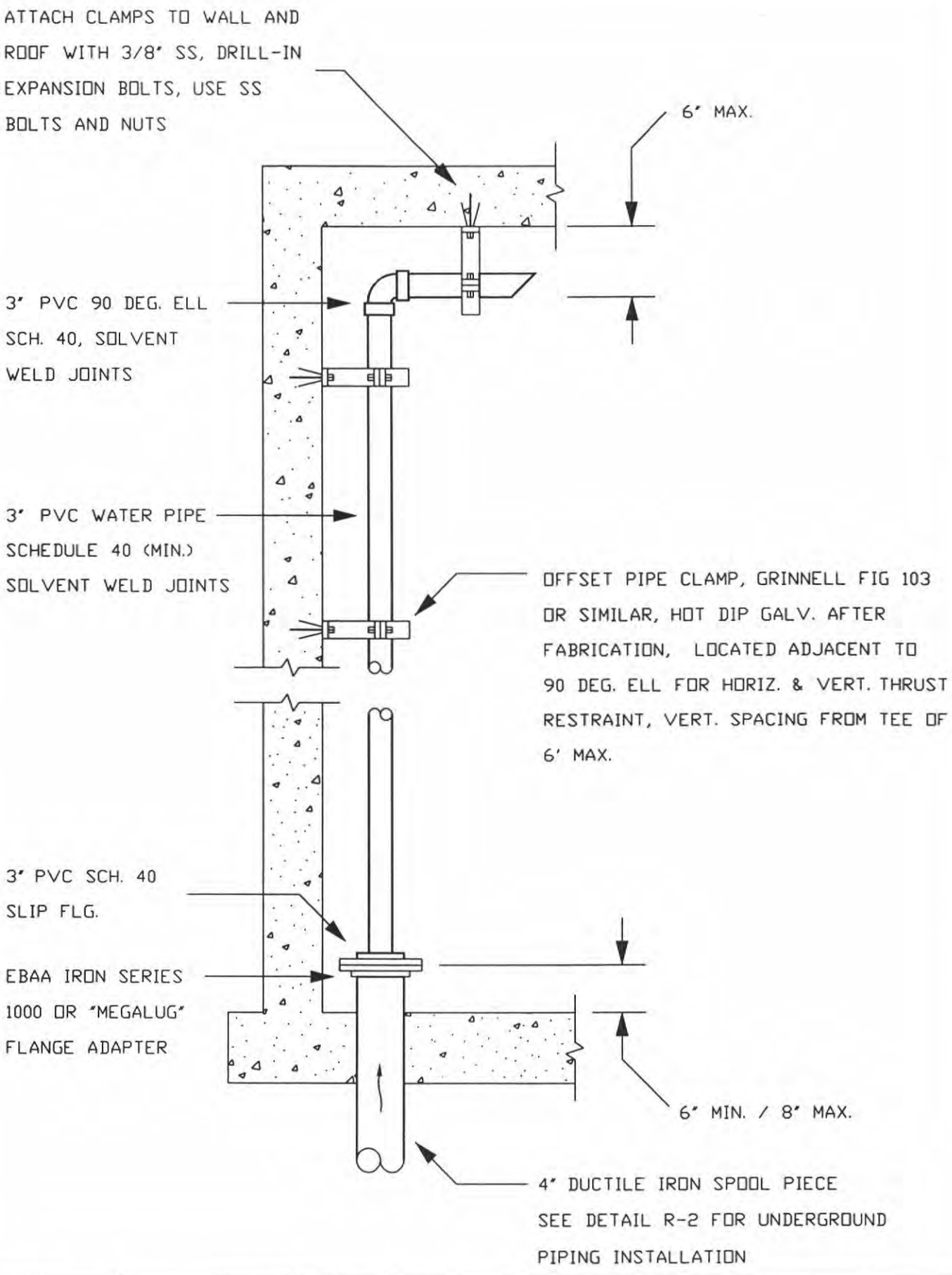
For reservoir cleaning and disinfection, follow procedures outlined in AWWA Standard C652-86, Disinfection of Water Storage Facilities. When cleaning and disinfection have been completed, close the roof hatch and drain valve and direct water from the well to the reservoir. When water level reaches within 1 foot of full, shut-off reservoir.

Draw a sample for bacteriological analysis from the reservoir sample tap. Once a satisfactory bacteria sample result is obtained, return the reservoir to service. Check to see that operation of well and booster pumps and all appurtenances are normal.

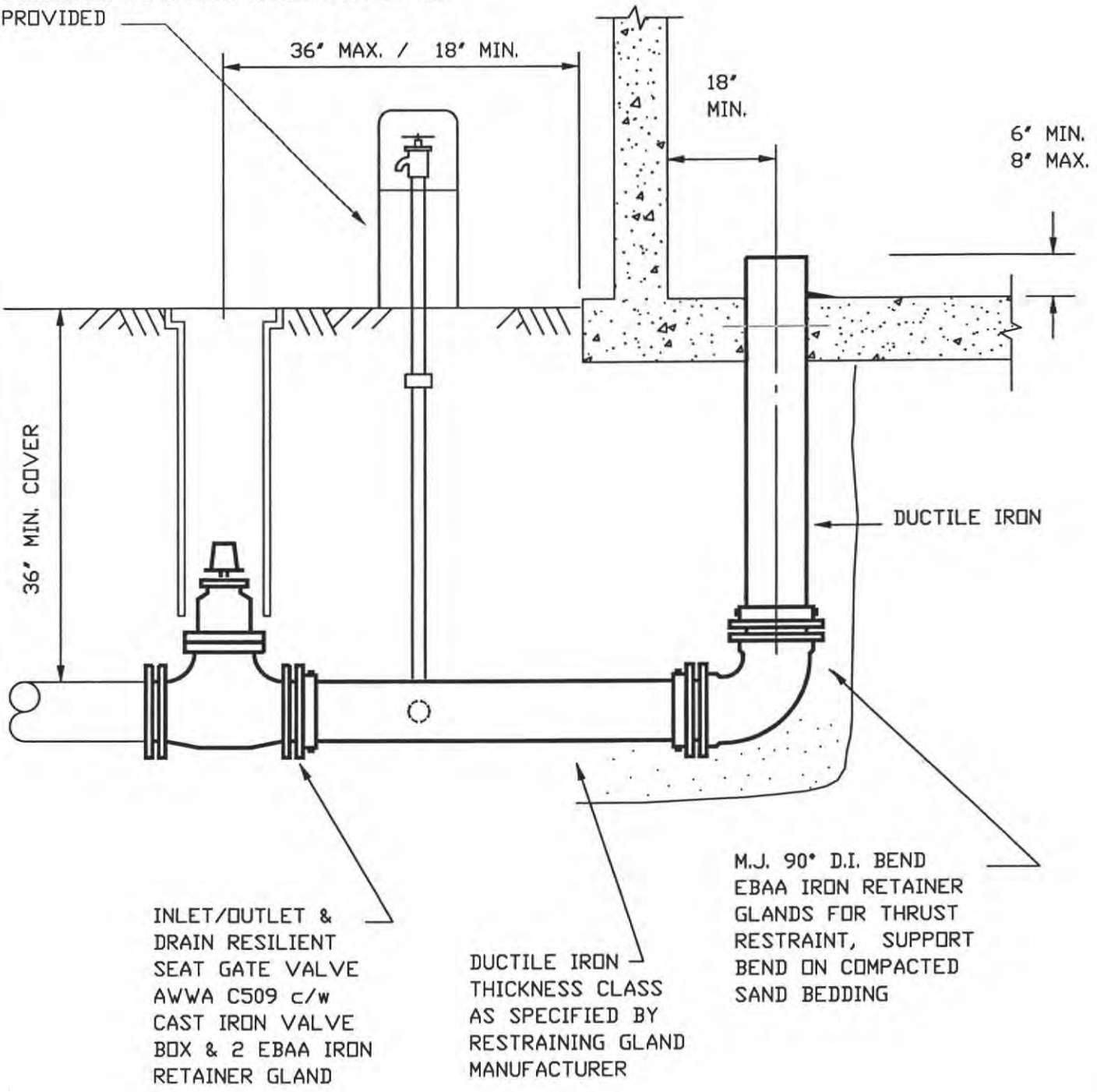
Whenever entering the reservoir, follow the confined space entry safety procedures required by the WA Department of Labor and Industries (OSHA/WHISA). These could include, but are not limited to:

- Persons entering the reservoir should wear a safety harness for rescue purposes.
- Someone must remain at the entrance to observe the person in the reservoir and to hold a safety rope attached to the harness of the person in the reservoir.

- In addition, a third person should be standing by to assist in rescue if necessary. If rescue cannot be affected using the safety harness, immediately contact the fire department.
- Before entering the reservoir, be sure there is adequate ventilation (e.g. by using an air blower). If adequate ventilation is not available, persons in the reservoir must use self-contained breathing apparatus.
- Always wear protective clothing when spraying or pressure cleaning a reservoir interior. Protective clothing should consist of a rubberized suit (rain gear-pants and coat), rubber boots, gloves, hard hat, and face shield,

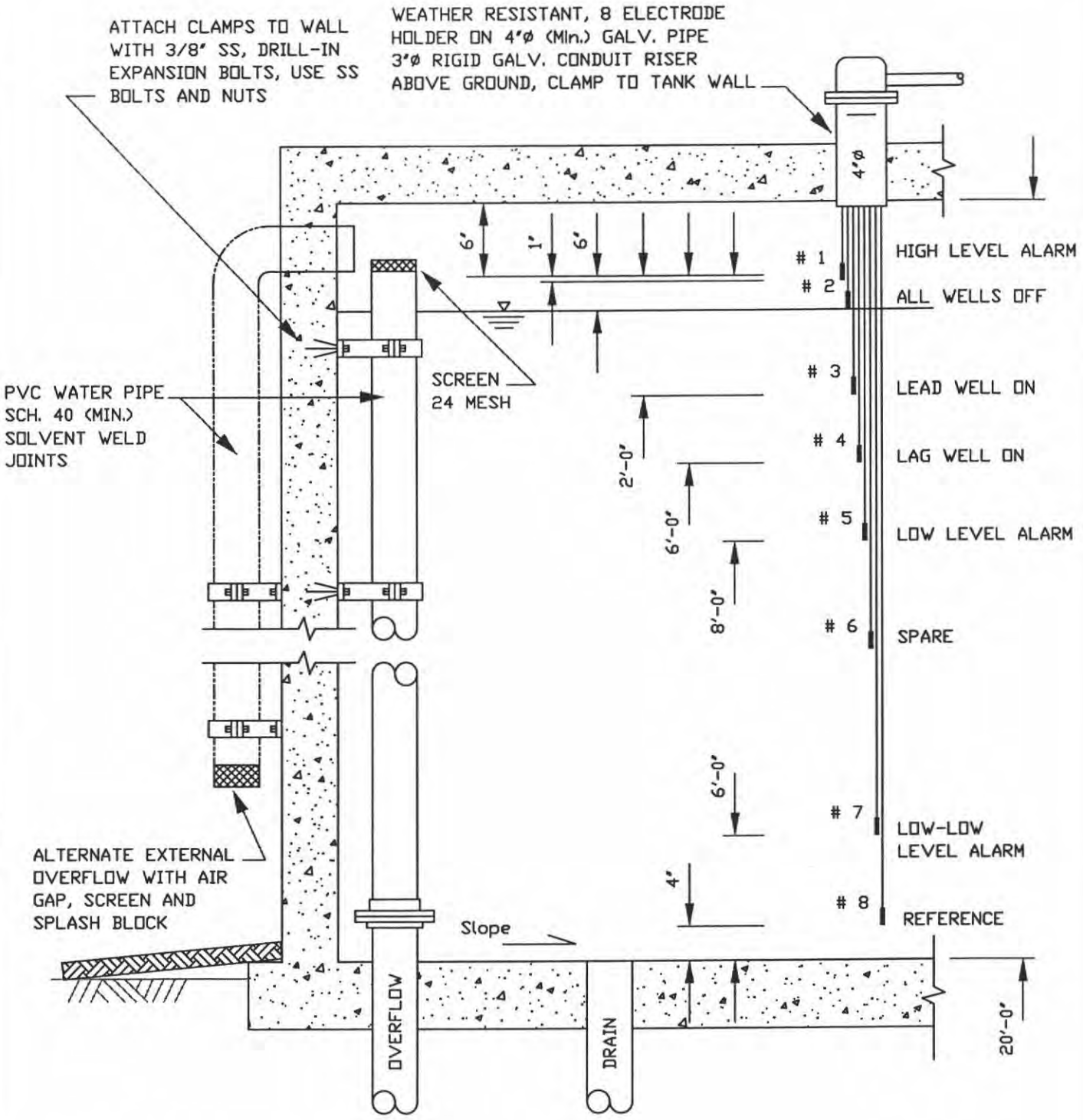


Date: May 03 **Scale:** N.T.S.		BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Inlet Detail	**Dwg. #** R-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



ALL PIPING UNDER RESERVOIR TO BE DUCTILE IRON, WITH ALL FITTINGS AND PIPE JOINTS RESTRAINED

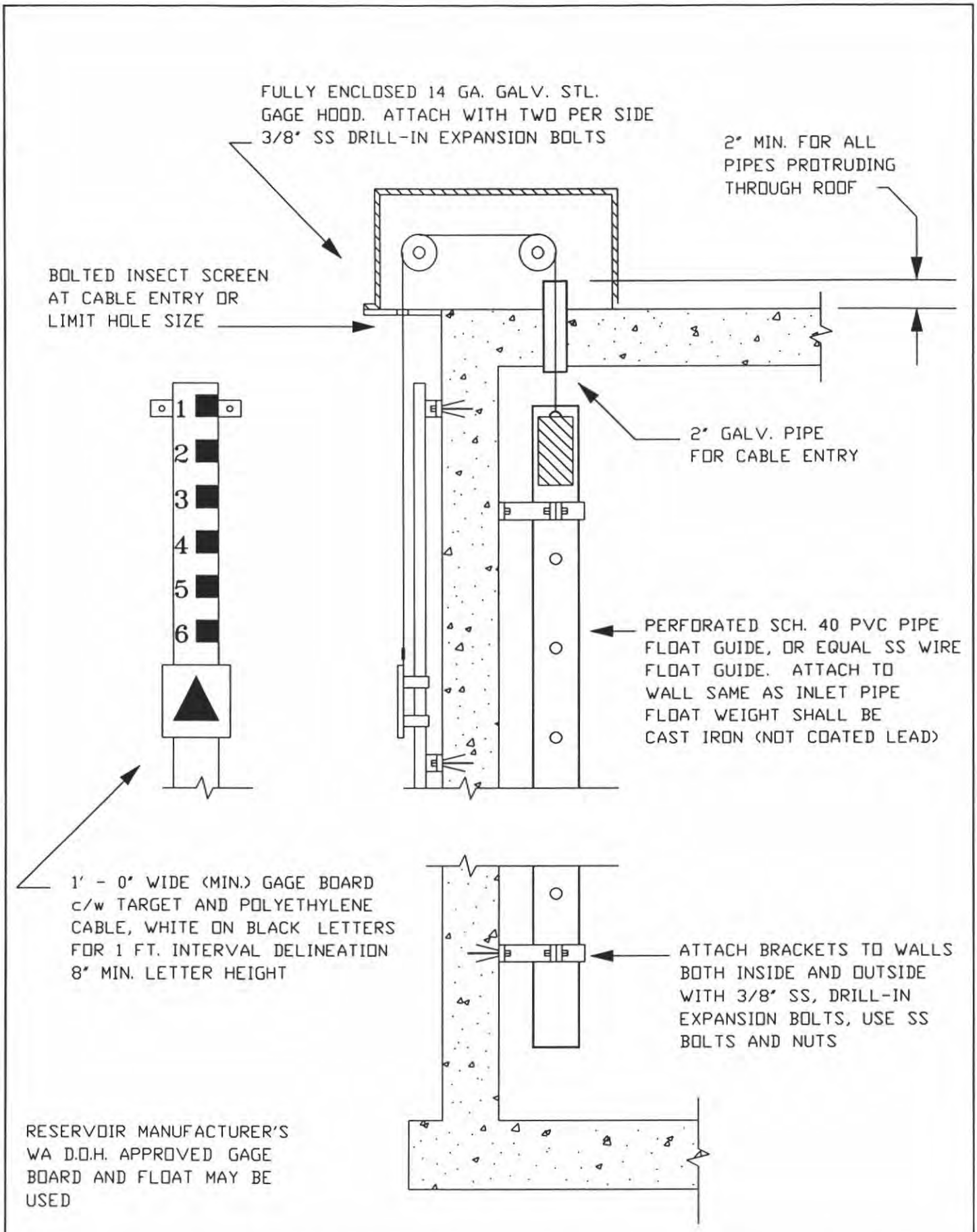
Date: Apr. 04 **Scale:** N.T.S.		BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Outlet Detail	**Dwg. #** R-2
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



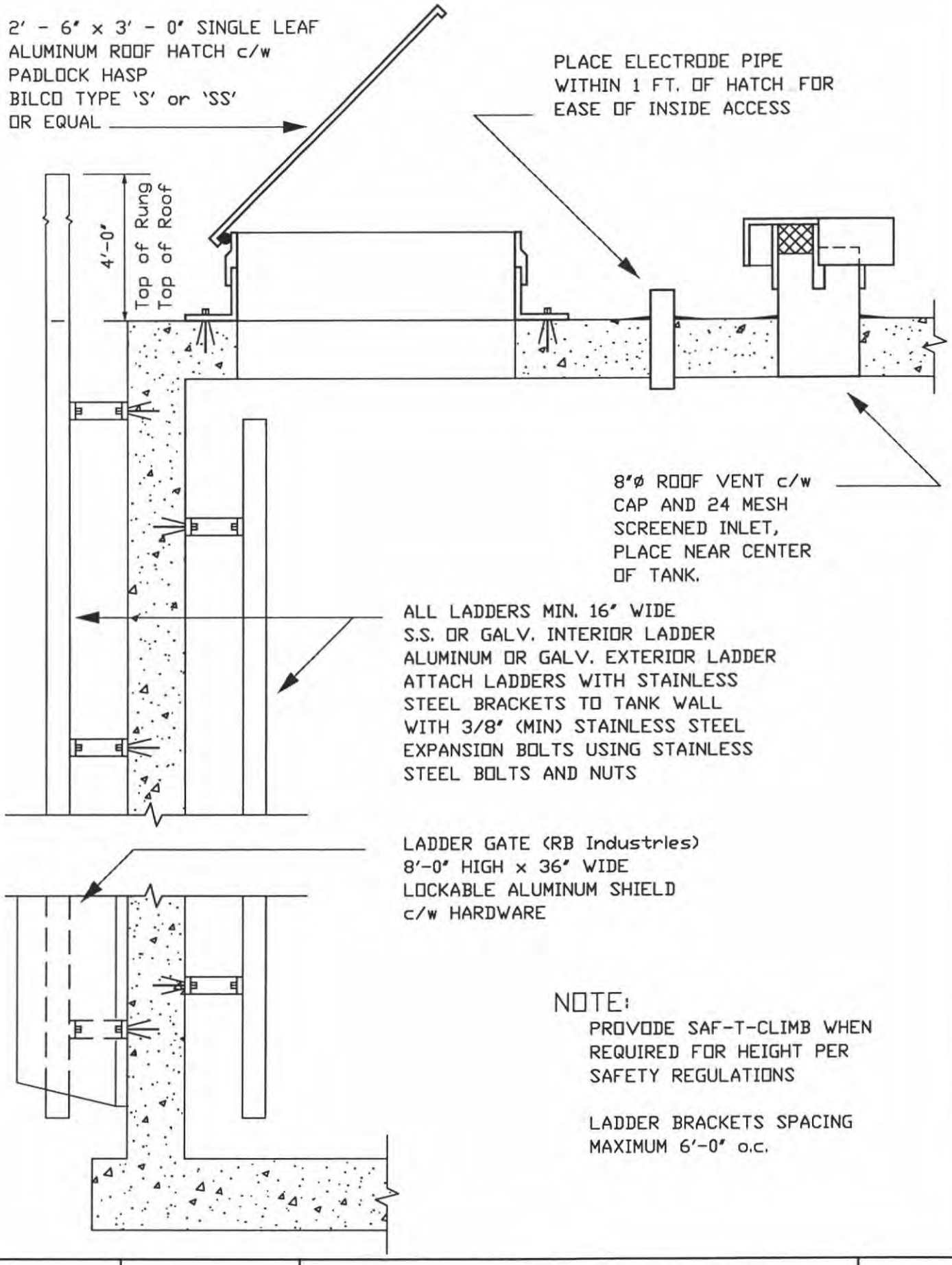
NOTES:

1) SEE DETAIL R-2 FOR UNDERGROUND PIPING INSTALLATION
2) ELECTRODE HOLDER TO BE MAGNETEK TYPE E-55-4", CAST IRON OR EQUAL
3) ELECTRODES TO BE MAGNETEK WIRE SUSPENSION TYPE, 303 STAINLESS STEEL WITH SHIELDS OR EQUAL.

Date: Aug 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Overflow & Drain Details	**Dwg. #** R-3
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



Date: May 03	**Scale:** N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Gage Board & Float Detail	**Dwg. #** R-4
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

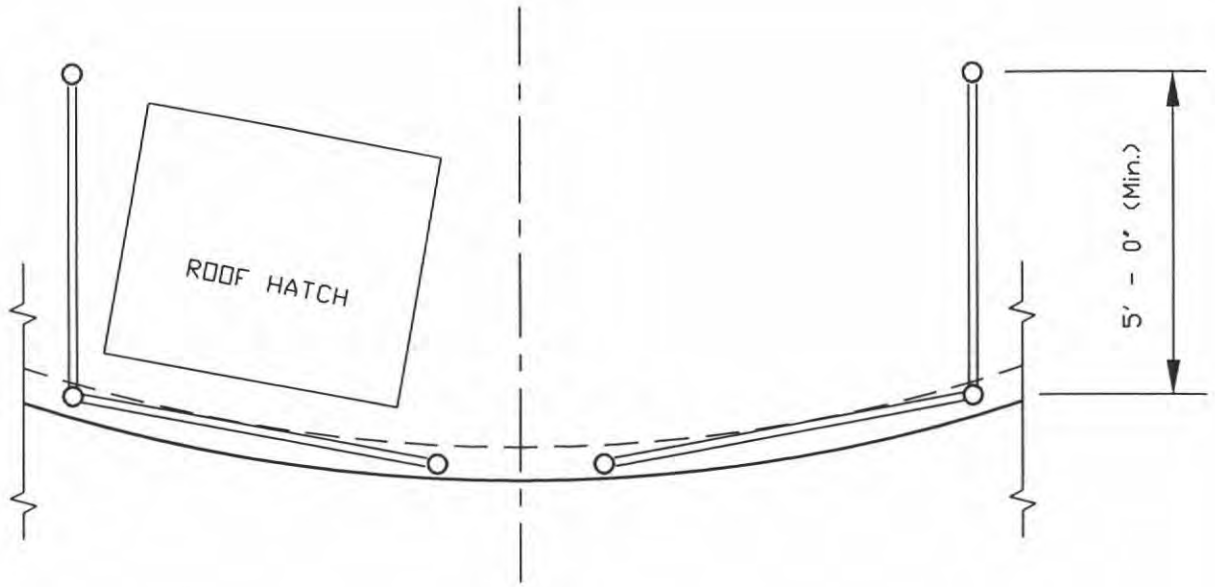


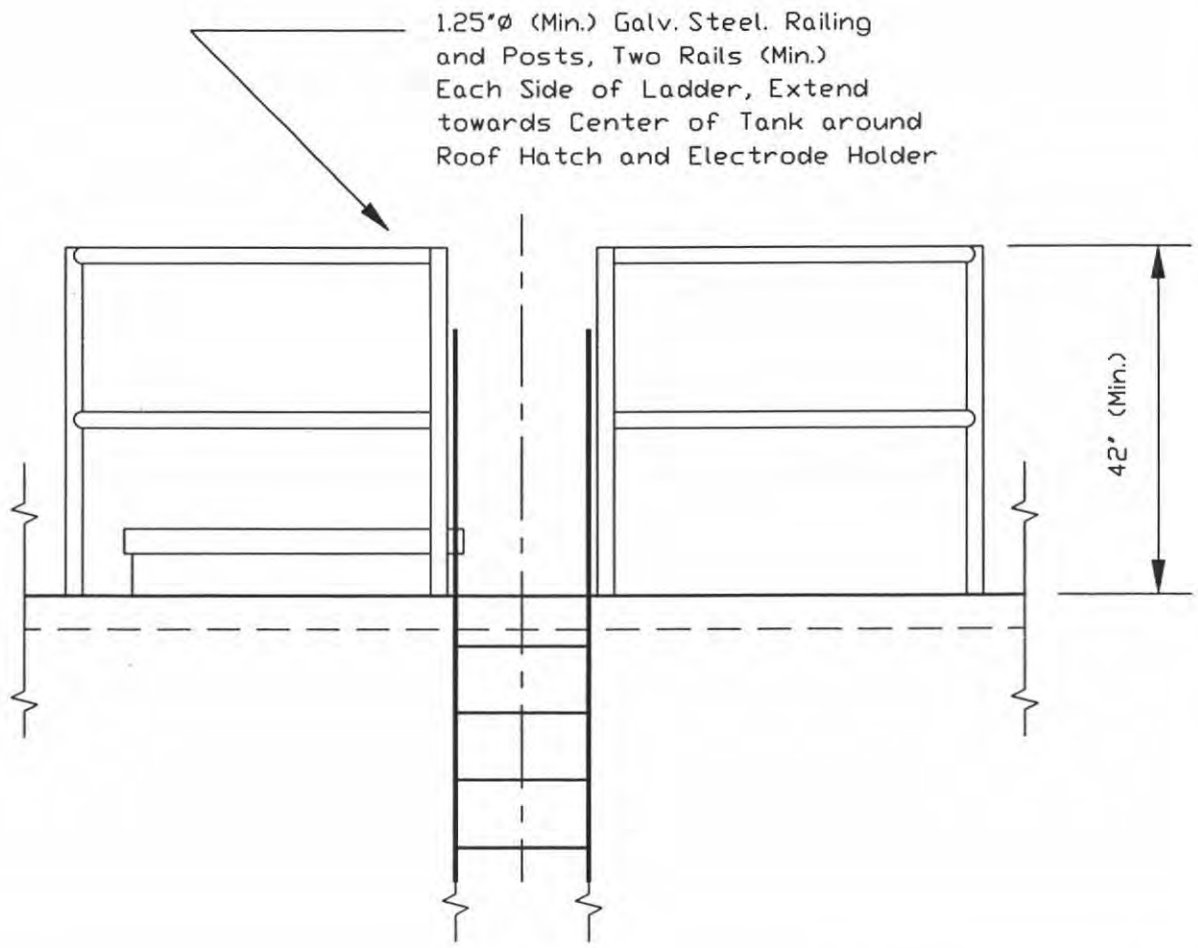
NOTE:

PROVIDE SAF-T-CLIMB WHEN REQUIRED FOR HEIGHT PER SAFETY REGULATIONS

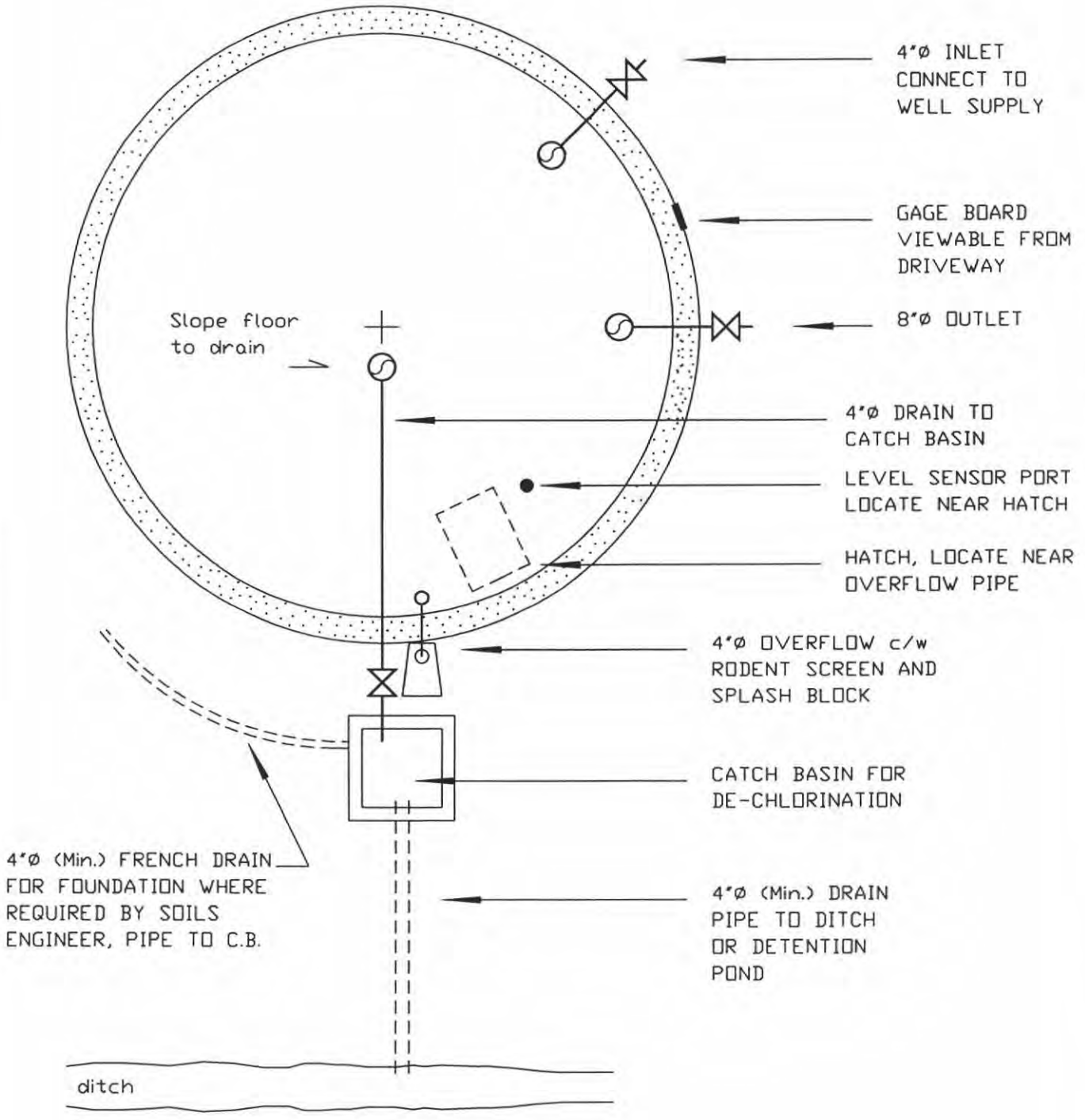
LADDER BRACKETS SPACING MAXIMUM 6'-0" o.c.

Date: May 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Hatch, Ladder & Vent Details	Dwg. # R-5
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

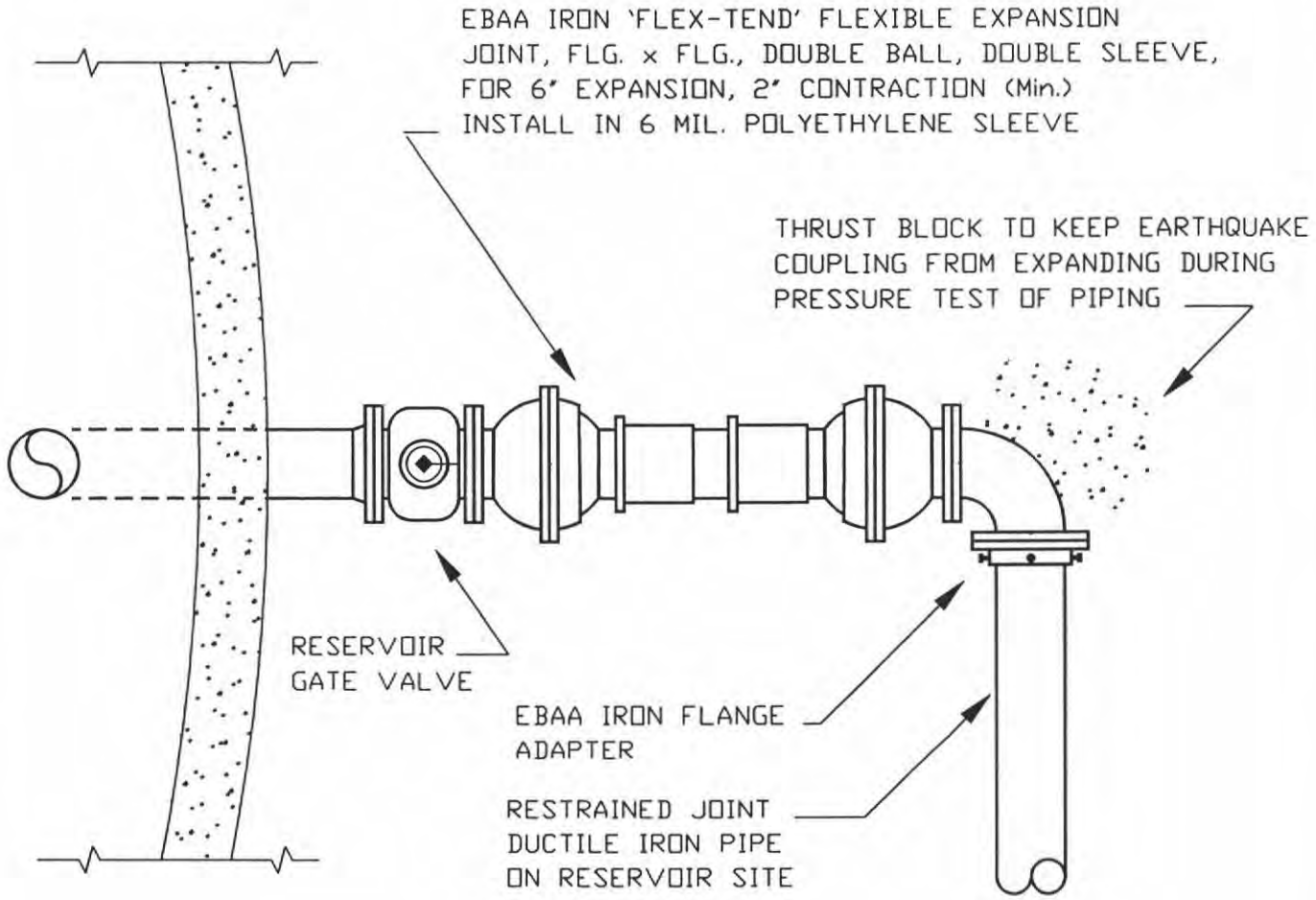




Date: May 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Hatch, Ladder & Vent Details	Dwg. # R-6
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

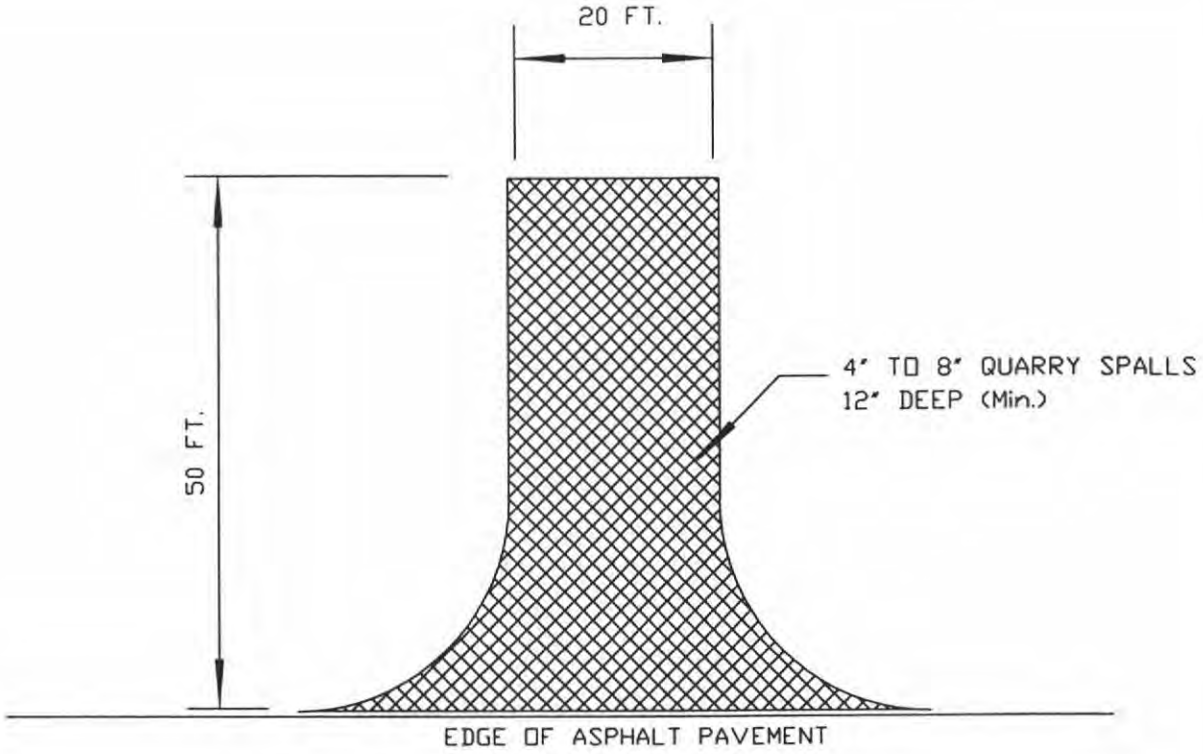


Date: May 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR General Piping Layout	Dwg. # R-7
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



"FLEX-TEND" FLEXIBLE EXPANSION JOINT

Date: May 03	Scale: N.T.S.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Earthquake Coupling	Dwg. # R-8
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



CONSTRUCTION ENTRANCE

NOTES:

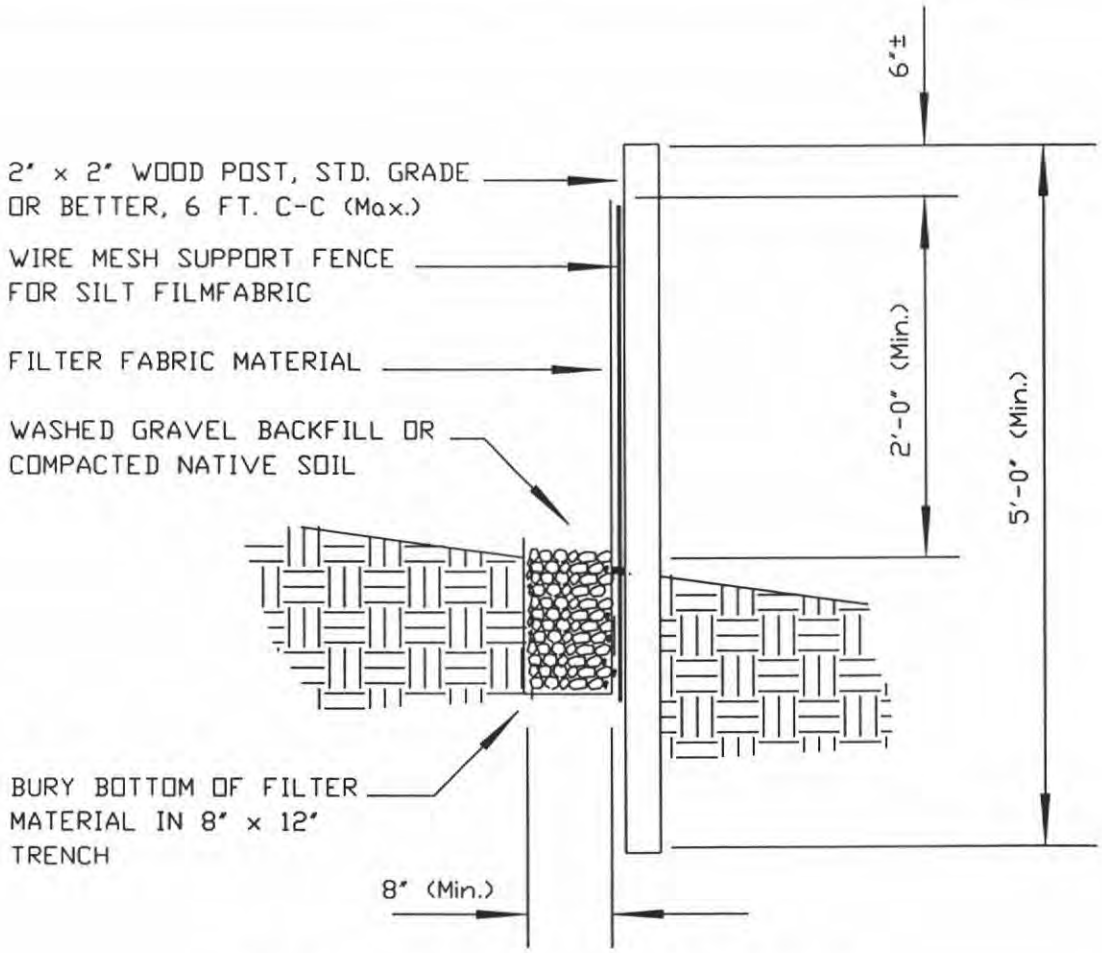
1) APPLY TO CONTRACTOR'S TEMPORARY WORKS YARD(S)

2) DELINEATE CONSTRUCTION AREA ON GROUND WITH READILY VISIBLE FLAGS, CONFINE EQUIPMENT, MATERIAL STORAGE AND OPERATIONS TO CONTRUCTION AREA.

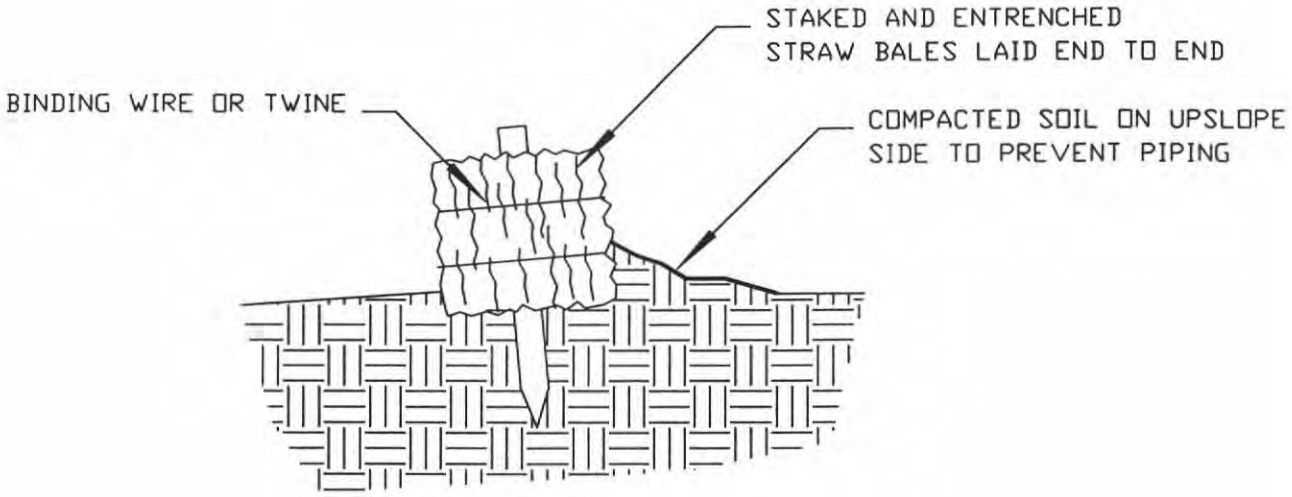
3) FIRST CONSTRUCT SWALE FOR SEDIMENT SUMP, WITH DITCHES AS NECESSARY TO CONVEY RUNOFF TO SUMP.

4) MAINTAIN SWALE (SUMP), DITCHES AND SILT BARRIERS DURING CONSTRUCTION PERIOD.

Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Erosion Control – Site Work	Dwg. # R-9
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			



FILTER FABRIC FENCE DETAIL



TEMPORARY STRAW BALE BARRIER

FOR GENERAL NOTES, SEE DETAIL E-2

Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT WATER STORAGE RESERVOIR Erosion Control – Site Work	Dwg. # R-10
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

WELLHEAD PIPING AND ENCLOSURES

1. General:

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the installation of pipe, isolating valve(s), check valve, meter, vaults and other appurtenances on existing wells.

These specifications shall be used in conjunction with the contract documents provided by the Owner or Bidder, and with the other portions of the Project Report containing these specifications.

The Bidder shall visit the site and satisfy himself as to all conditions that affect the work.

Unless otherwise agreed to by the Owner, the Bidder shall apply and pay the cost of all permits.

2. Well Appurtenances:

In general, the well shall conform to all applicable requirements of AWWA Standard A-100, *Standard for Water Wells*, and WAC 173-160, *Minimum Standards for Construction and Maintenance of Wells*.

Casing – If necessary, the well casing shall be extended a minimum of 18-inch above the surrounding ground surface.

Well casing seal – The well casing shall be equipped with a WA Department of Ecology approved casing seal and screened vent. A pitless adapter shall not be installed.

Sounding tube – A 1-inch polyethylene tube without joints, shall be installed for monitoring water level with a well probe or transducer. The sounding tube shall terminate 6-inches above well pump outlet. The tube to be perforated with 1/4-inch holes at approximate 5 foot spacing for the bottom 20 ft.

Discharge gate valve - A 2-inch (min.) resilient seated wedge gate valve meeting AWWA Standard C509 shall be installed on the column pipe as shown on the accompanying plans

Discharge check valve – A 2-inch (min.) Val-Matic, series 1400 or 1800 silent check valve, or Owner approved equal shall be installed on the column pipe as shown on the accompanying plans.

Discharge pipe and fittings – Discharge pipe shall be 2-inch (min.) schedule 40 galvanized iron.

Well meter – A 2-inch (min.) Sensus displacement meter shall be installed on the column pipe as shown on the accompanying plans. Meter registration shall be in units of cubic feet.

Well enclosure – The wellhead shall be protected by an insulated enclosure, Hot Box aluminum style, Model HB4N with twin 30 or 36-inch locking doors replacing standard single door, factory applied paint with Owner specified color. The Hot Box shall be installed on a 4-inch concrete slab se as shown in the accompanying plans.

Meter enclosure – The meter shall be installed within a Utility Vault Company No. 4242-LA or 3642-LA with locking steel cover or Engineer approved equal as shown in the accompanying plans.

Connecting pipe - From the well to the adjoining booster pump building, install 4-inch water line and twin 1-inch electrical conduits (for power supply to well and power supply to convenience outlet for heat tape) in accordance with the Owner's "Standard Construction Specifications" and accompanying plans.

3. Testing:

The Contractor shall conduct a pressure and leakage test of the wellhead piping and water line from the well to the booster pump building in accordance with the Owner's "Standard Construction Specifications".

4. Disinfection:

The bidder shall thoroughly clean and keep clean all piping and tanks of foreign matter before and during installation. The Bidder shall thoroughly flush and disinfect the well, in accordance with the A.W.W.A. Standards C654 "Disinfecting Water Wells".

The Contractor shall conduct a pressure and leakage test and disinfect the water pipe from the well(s) to the booster pump house in accordance with the Owner's "Standard Construction Specifications".

The Bidder shall collect, and pay the cost, of the bacteriological sample following disinfection.

5. Contractor's Submittal:

The bidder shall supply two sets of manufacture's catalog information, installation instruction, etc., for all material.

6. Cooperation with Other Contractors:

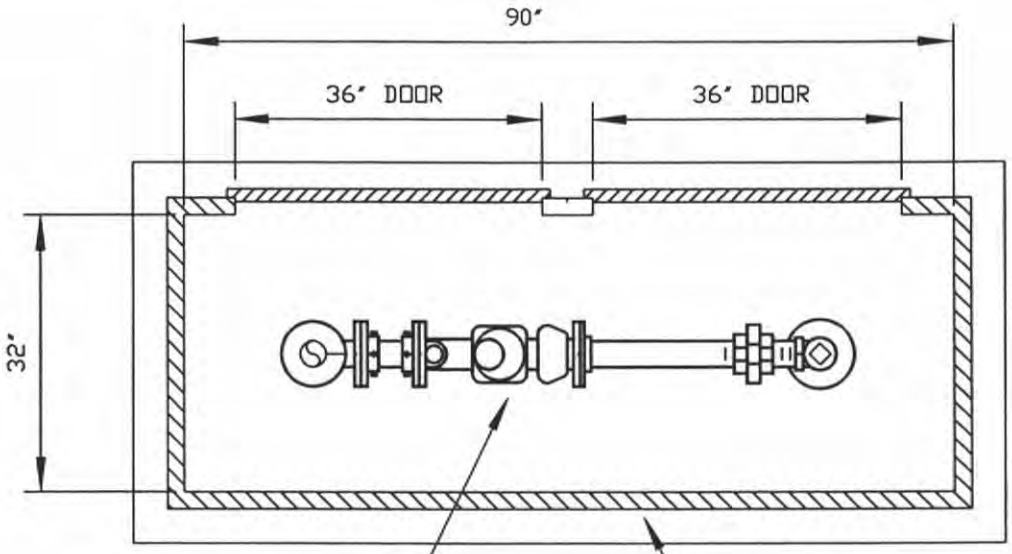
If the Owner awards portions of the work for the project to different contractors, each contractor shall cooperate with the other and with the Owner and Engineer in prosecuting the work. Neither the Owner/Engineer or the various Contractors shall be held responsible to each other for delays in completion of each separately assigned work task or contract.

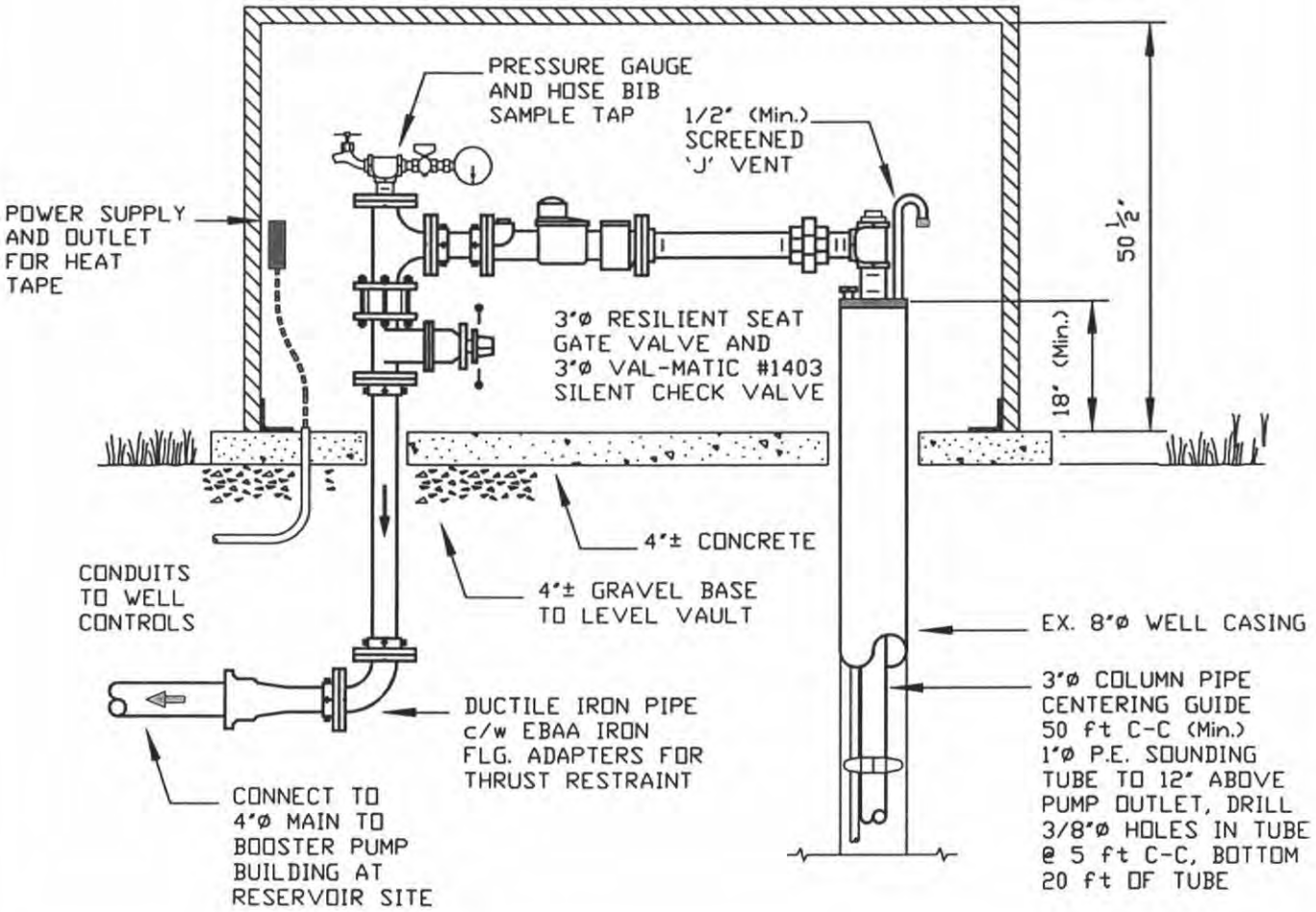
7. Warranty:

The Bidder shall warrantee all material and equipment for a one-year period.

8. Inspection:

Pursuant to WAC 246-290-040, the Owner/Contractor shall be aware of the requirements for Engineer's inspection and certification of the work and completion of the Department of Health forms "Construction Report for Public Water System Projects" and "Pressure, Leakage and Bacteriological Test Results" are required. The Engineer's inspection is outlined in the Project Report containing these specifications.





Date: Feb. 04	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT STANDARD WELLHEAD DETAILS Insulted Enclosure for Meter & Well	Dwg. # WL-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

HYPOCHLORINATOR
CHEMICAL FEED PUMP

1. General:

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the installation of a hypchlorinator and associated material for the pump house shown in the attached drawings.

These specifications shall be used in conjunction with the contract documents approved by the Owner's attorney, and with the other portions of the Project Report containing these specifications.

2. Equipment:

Hypochlorinator - The hypochlorinator shall be a 2.0 GPH, 50 psi Series A16 Metering Pump as manufactured by LMI Liquid Metronics Division, of Action, MA.

The initial dose rate and sodium hypochlorite solution dilution shall conform to the hypochlorinator sizing calculations provided in the Project Report containing these specifications.

The hypochlorinator shall be supplied with all tubing, tubing connectors, foot valve, strainer, and other accessories for installation.

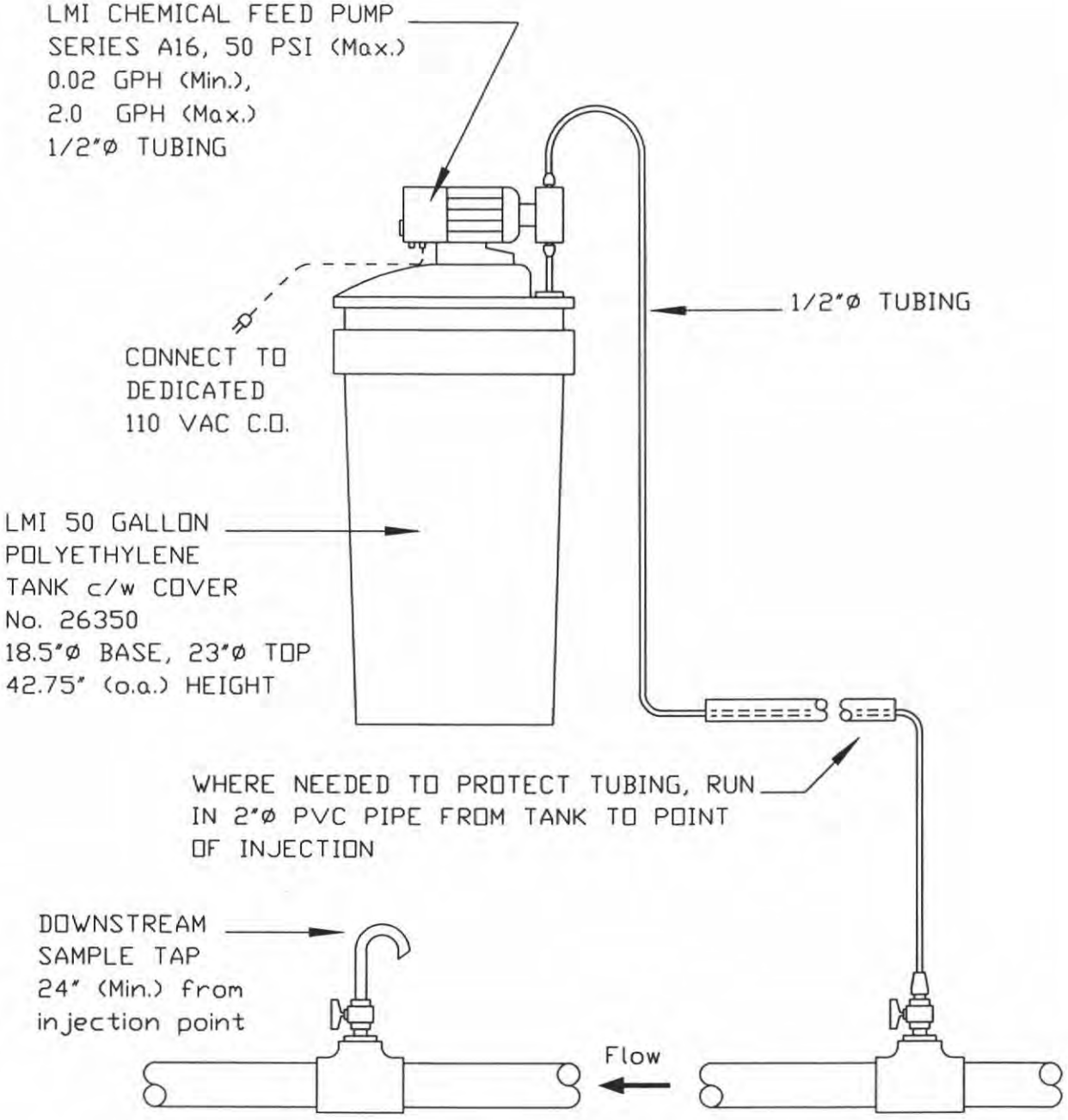
The power supply to the chemical fed pump shall be connect to the 120 VAC power supply circuit to the well pump such that the chemical feed pump will operate only when the well pump is operating.

Solution Tank - The chemical feed pump shall be mounted on a 50-gallon polyethylene tank with cover assembly, LMI Model No. 26350, or approved equal. Alternatively, the chemical feed pump may be installed on a wall bracket immediately above the solution tank.

Test Kit - The hypochlorinator equipment shall be supplied with a HACH Model CN-70 (Cat. No. 14542-00) DPD/color disk test kit for measuring free and total chlorine in the range 0 to 3.5 mg/L.

Emergency Eye Wash -The building housing the hypochlorinator shall have a water connection from to supply a HAWS Model 8901B hand held eye/face and body spray for emergencies involving contact with strong concentrations of sodium hypochlorite.

Sample Port - For monitoring of the chlorine residual after injection, a hose bib for collection of a water sample shall be installed at least three feet downstream of the chlorine injection point, or after a bend, water meter or other means to ensure mixing of the chlorine in the water before sample collection.



NOTES:

POWER TO ALL WELL PUMPS AND CHEMICAL FEED PUMP (HYPOCHLORINATOR) TO OPERATE OFF SAME CIRCUIT.

Date: May 03	Scale: n.t.s.	BULLERVILLE UTILITY DISTRICT BOOSTER PUMP STATION Hypochlorinator	Dwg. # CL-1
By: GEORGE BRATTON, P.E. CIVIL ENGINEER			

WASHINGTON STATE DEPARTMENT OF HEALTH

Hypochlorination Facilities for Small Systems
Submittal Checklist

General Water System Information

System name Bullerville ID number 13344P County Skagit

Owner Bullerville Utility District Manager Don Clark

Address 58468 Clark Cabin Rd Address Same

Rockport WA 98283

Phone 360-873-2250 Phone

Description of Problem - Brief description of problem and identification of cause, if known. Previous measures taken to solve problem. (Attach additional sheets if necessary)

New System. Chlorination provided as precautionary measure for transient population. When demand requires added well production chlorinator to be modified to flow proportioned unit to accommodated lead/lag well operation

Chlorine Feed Pump Specifications (Attach manufacturer's specifications)

Make LMI Model A16 see attached for sizing calculations

Pressure range of water system (psi) min _____ max _____

Maximum injection pressure of pump (psi) _____

Flow range of metering pump (gal/hr) min _____ max _____

Desired chlorine dose, C_s (ppm)
(must account for chlorine demand) _____

Proposed chlorine stock feed solution

- Raw chlorine strength (percent), C_c _____
- Amount of raw chlorine used (gallons), V_c _____
- Total amount of feed solution (gallons)*, Vf _____
- Concentration of feed sol'n (ppm), C_f _____

$$Cf = \left(\frac{(Cc)(Vc)(10{,}000)}{Vf} \right)$$

* Vf is the sum of the raw chlorine volume and the volume of added dilution water.

Maximum system flowrate, Qs,(gpm) _____

Required feed pump rate, Qf (gallons/hour)

$$Qf = \frac{(Qs)(Cs)(60)}{Cf} = \_\_\_\_\_ \text{gals/hr}$$

see attached for sizing calculations

Falls in mid-range of metering pump? yes ____ no ____

Size of solution tank (gallons) _____

Estimated average usage of solution (gallons/day) _____

Shelf life of feed solution (months) _____

Chlorine contact time Minimum contact time for groundwater sources: 30 minutes at 0.2 ppm and 10 minutes at 0.6 ppm (WAC 246-290-440)

Available contact volume (gallons) _____

Maximum system flowrate (gpm) _____

Calculated contact time (min) _____
(Use 10 percent of theoretical detention time for an unbaffled tank.)

Sampling taps for both raw and finished water	yes x no ____
Source meter to record total volume pumped	yes X no ____
Flow proportioned feed pump	yes x no ____
Solution tank covered and volume calibrated	yes x no ____
DPD chlorine test kit in specifications	yes x no ____
DOH monthly report forms provided to utility	yes x no ____
Plans and specifications attached	yes x no ____
O & M Plan attached	yes x no ____

Submitted/prepared by:

Name George Bratton
Address 1252 S Farragut Drive
Coupeville WA 98239
360 678-4552
Phone
Date 3/15/04

(Engineer's signature and stamp)

GEORGE E. N. BRATTON STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

EXPIRES 11/10/05

Note: Chlorination designs for systems with 10 or more connections must be prepared by a professional engineer and submitted to DOH for review and approval. Smaller systems should contact their local health jurisdiction for instructions.

HYPOCHLORINATION

Hypochlorinator installed to provide precautionary residual in distribution system for one well operating. Second well used as redundant supply. No iron or manganese present in water in lead well to cause chlorine demand. Chlorine dose based on 10% strength, allowing for reduced shelf life of purchased 12.5% solution.

System operating data:

{p}	Max. operating pressure at injector:	40	psi
{Qa}	Average daily flow (75 ERUs x 800 gpd/ERU):	60,000	gal/day
{Qs}	Flow rate at injection point (from well):	55	gpm (PHD)
{Qo}	Max. flow rate from contact chamber (reser.):	136	gpm (PHD)

Required chlorine dose:

{Ct}	Target free chlorine residual	0.20	mg/L
{Cd}	Estimated chlorine demand (allowance)	0.10	mg/L
	{Cs} Required dose	**0.30**	mg/L

Chlorine feed pump requirements:

{Vf & Vt}	Solution tank volume:	50	50	gal
{Cc}	NaOCl strength:	10%	5%	
{Vc}	NaOCl added to tank:	1.0	2.0	gal
		8.0	16.0	cups

{Cf} Concentration of feed solution in tanks: **2,000** mg/L

{Qf} Design feed rate	minimum	**0.50**	gal/hr
	maximum	**0.8**	gal/hr

Solution tank:

Time between tank refills (peak period):	**5.6**	days
Estimated shelf life of feed solution:	2	months

Chlorine contact time:

{Vs}	Available contact volume:		**138,710**	gal
	Reservoir volume:	158,800 gal		
	minus equalizing storage	12,150 gal		
	minus operating storage:	7,940 gal		
{n}	Assumed baffling efficiency:		0.1	
	{T} Contact time:		**102**	min.
	{CtT} Dose x contact time (target=6):		**20.4**	

Recommended hypochlorinator:

	Gal per hour			Max. pressure	
LMI Model A16	0.02	to	2.0	50	psi

WOOD FRAME BUILDING CONSTRUCTION

1. General:

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the construction of wood frame buildings for well houses, booster pumping facilities, and other associated structures.

These specifications shall be used in conjunction with the contract documents approved by the Owner's attorney, and with the other portions of the Project Report containing these specifications.

2. Building Design:

The building and electrical shall conform to all applicable building codes and local ordinances. Should greater details be required for obtaining permits, the Contractor shall be responsible for the preparation of such plans as may be required.

The building structural design shall be based on standard plans for garage construction commercially available from a building supply center or lumberyard, but modified as shown on the attached plans or specified hereafter.

For security, install a double metal door with a minimum width of 5-feet and minimum height of 8-feet, American Standard "Steelcraft", Grade II – heavy duty 1 ¾-inch or Owner approved equal. If requested by the Owner, one door shall include a narrow lite. The door shall be equipped with a grip handle and dead bolt, Schlage L series heavy-duty mortise lock or Owner approved equal.

3. Electrical:

The electrical work shall be as shown in the Plans and shall include all necessary work for the installation, operation and control of the equipment specified.

Equipment and materials shall bear Underwriters Laboratory labels where required. All electrical wire shall be copper. A continuous grounded conductor shall be run to all outlets and electrical equipment and connected to the ground rod at the meter and also to the well casing of the on-site well.

Conduit inside the building shall be rigid galvanized steel or PVC. Use "Greenfield" or equal flexible conduit to connect to motors and other electrical apparatus. Galvanized conduit installed below grade or embedded in slabs shall first be wrapped with two continuous layers of plastic electricians tape. Alternatively, Schedule 40 or heavier

PVC conduit with cemented joints may be used for buried portions only.

Furnish and install switches and convenience outlets as shown on the accompanying engineering drawings. Lighting fixtures shall be fluorescent type, of good commercial quality.

The heaters shall be baseboard type, King Electrical manufacturing Co., Seattle, WA, model KP 1210, 120 Volt, 1,000 Watt, or Owner approved equal, provided with thermostatic control.

4. Yard and Building Piping:

See accompanying specifications for the installation of booster pumps, hydropneumatic tank, and other associated equipment and piping.

5. Inspection:

Inspection of the structural integrity of the building will be carried out through the normal County building inspection process.

Pursuant to WAC 246-290-040, Engineer's inspection and certification of the work and completion of the Department of Health reports "Construction Report for Public Water System Projects" and "Pressure, Leakage, and Bacteriological Test Results" are required. The Engineer's inspection is outlined in the accompanying specifications for the installation of booster pumps, hydropneumatic tank, and other associated equipment and piping.

EMERGENCY GENERATOR

1. General

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the supply and installation of one emergency generator (auxiliary engine/generator set) adjacent to the booster pump house shown on the attached plans. The generator will provide emergency power to operate one 7.5 hp booster pump plus building load. During a power outage, the booster pumps shall not be operated to provide fire flow to the system.

These specifications shall be used in conjunction with the contract documents approved by the Owner's attorney, and with the other portions of the Project Report containing these specifications.

The term "Contractor" shall refer to one or more contractors engaged by the Owner to accomplish the work described. The division of responsibilities between different contractors shall be defined in the contract documents prepared by the Owner.

All work and materials shall conform to:

1) All applicable building and electrical codes, and
2) The requirements of the electrical utility, and
3) The additional or more stringent requirements stated in these specifications, and in the other portions of the Project Report containing these specifications.

The Bidder may propose alternatives to the equipment specified herein. The equivalency of proposed alternate equipment shall be determined by the Owner based on the Bidder's demonstration of performance.

The Bidder shall obtain and pay for all permits.

The Bidder shall examine the site and existing equipment to verify the work and new equipment and material needed to complete the proposed project. The Bidder shall include in his proposal all work and equipment necessary to accomplish the project of providing a functional emergency generator. Whether or not each item of work or equipment is individually listed or described in the Bidder's proposal, it shall be assumed that the lump sum price quoted shall include all of the Bidder's costs, profit, overhead, and other charges.

2. Equipment

The emergency generator (unit) shall be compatible with the existing 120/240 V, single-phase electrical service.

The unit shall be capable of starting and carrying the load from one 7.5 hp submersible well pump plus a building allowance for tow 1000 watt heater load, and 400 watt lighting load with a 20% margin of excess capacity.

The unit shall be connected to the main power supply panel. An automatic transfer switch shall be furnished and installed as near to the main panel as possible. For outdoor installation, the transfer switch shall be in a NEMA 3R enclosure. Electrical conductors shall be copper, of adequate capacity for the equipment provided, and shall be enclosed in rigid galvanized steel or Schedule 40 PVC conduit with appropriate fittings.

The unit shall be a KOHLER Model 20 RY (minimum capcity), or Owner approved equal, with the following features:

- The unit shall be free standing, in a weather-proof painted steel enclosure suitable for mounting on a concrete slab. The enclosure shall protect the entire unit and shall have separate doors for access to the control panel and all points requiring maintenance.

- The unit shall have an integrally mounted critical grade exhaust silencer, complete with tail pipe and rain cap.

- The unit shall be liquid cooled, with radiator and fan, and shall have a thermostatically controlled electrical block heater to prevent condensation of moisture inside the enclosure.

- The unit shall have a 12-volt electric starting system complete with alternator, battery, battery charger, gage, and cables.

- The unit shall be for liquified propane (LP) vapor fuel and have a spark ignition engine.

- The control panel shall be furnished with the full complement of meters, indicators, gages, and controls including a running time meter.

- The unit shall have a voltage regulation of 2 percent from no load to full load and a frequency regulation of 5 percent under loads varying from no load to full load.

The automatic transfer switch shall transfer power to one of the booster pumps dedicated for operation during a power outage. Alternatively, the system operator shall be responsible to manually shut-off all circuits to the well pumps and the remaining booster pumps not selected for operation with the generator. It is assumed that the system operator, on power failure, will monitor the operation of the generator and booster pump.

An LP gas tank of sufficient capacity for seven days of continuous operation shall be provided, complete with gage, pressure regulator, and connecting flexible fuel line.

Both the emergency generator unit and accompanying fuel storage tank shall be installed on a suitable concrete slab foundation. All equipment shall be attached to the slab with anchor bolts. The concrete pads shall be placed as close as allowed by code and access requirements to the existing well control building.

The unit shall be supplied with a manual transfer switch. At the Owners option, an automatic transfer switch may be installed.

3. Miscellaneous

The Bidder shall provide two sets of general maintenance literature, parts list, and operating instructions.

The unit shall be the product of an American manufacturer with at least ten years experience in the production of similar equipment, and with sales and maintenance facilities located in the Puget Sound region of the State of Washington.

On completion of the work, the Bidder shall perform an operating test in the presence of the Owner's representatives.

4. Delivery and Payment

The Bidder's proposal shall include time for completion and terms of delivery and payment. Washington State sales tax shall be stated separately.

5. Warranty

All equipment and material shall carry a 100 percent labor and equipment repair or replacement warranty extending for a period of 12 months from the date of final acceptance of the installation by the Owner. If not otherwise agreed between the Owner and Bidder, the date of final acceptance shall be established by the date on the Owner's check for the final payment for the work.

AUTOMATIC ALARM DIALING SYSTEM

1. General

These specifications were prepared for the Bullerville Utility District (hereinafter also referred to as the Owner), a government agency formed under Chapter 57 RCW, within the authority of Skagit County.

These specifications cover the installation of a remote monitoring system to send a prerecorded telephone message in response to the triggered alarm.

These specifications shall be used in conjunction with the contract documents approved by the Owner's attorney, and with the other portions of the Project Report containing these specifications.

2. Equipment

One programmable alarm monitor shall be installed in the booster pump building and connected to a telephone line to be installed underground into the building along the alignment selected by the Owner.

The alarm monitor shall be installed near the electrical and pump control center. An additional telephone jack shall be installed adjacent to the alarm monitor. A wall mounted, push-button telephone phone will be installed by the Owner.

The programmable alarm shall be one of the following or Owner/Engineer approved equal:

- Model CB-4 "Chatterbox" alarm monitor manufactured by RACO, Emeryville, CA.
- Model D118 "Sensaphone" remote monitoring system manufactured by DICKSON, Addison, IL.

The unit shall have a minimum of eight contact inputs, eight telephone number capacity, 115 VAC with battery backup for 6 hours.

The alarm monitor contacts shall include high reservoir level, low reservoir level and intruder (building door).

The remaining alarm monitor contact input shall be made by the Owner.

At the Owner's discretion, the unit may be upgraded to a unit with eight alarm monitor contacts.

The Bidder shall provide two sets of general maintenance literature, parts list, and operating instructions.

On completion of the work, the Bidder shall perform an operating test in the presence of the Owner's representatives.

The Bidder shall instruct the Owner on the procedures for programming the unit.

SOILS REPORT

Reservoir Site

MTC Materials Testing & Consulting, Inc.

August 18, 2003

Mr. Don Clark
Bullerville Utility District
58468 Clark Cabin Road
Rockport, WA 98283

Soil Investigation
Bullerville Utility District Reservoir
Rockport, WA
Project No.: 03BM178

Dear Mr. Clark:

This report presents the results of a site and soil investigation we conducted for two proposed water reservoirs for the Bullerville Utility District, WA. The project consists of constructing two concrete above ground water storage tanks and booster pump station to serve the Bullerville area. The tanks will be of concrete construction and will have dimensions of 26 feet in diameter by 20 feet high with a capacity of 79,400 gallons each. The system replaces an existing system that has been in place since the 1890's. One tank will be erected in the near future, the other at some later time.

Our scope of work was to investigate the site and provide a recommended bearing capacity for design of the tank foundations.

Initially we visited the site on June 16, 2003 to conduct a dynamic cone penetrometer test at the tank site. A Wildcat dynamic cone penetrometer was used to determine bearing capacity of the soils. Three tests were conducted at the initial tank site to depths of 8 to 13 feet as shown on the site plan. Blow counts were recorded for 10 centimeter increments as a thirty five pound weight was dropped a distance of 15 inches. The blow counts were then converted to resistance in kilograms per square centimeter (kg/cm^2), standard penetration blow counts (N-values) and consistency descriptions. However, the results of that investigation indicated that the bearing capacity of that site was very low and would have required extensive site preparation in order to provide adequate bearing.

Subsequent to that work, the owner selected two alternative sites for further investigation. At each site, a test pit was excavated to depths of about seven and eight feet, respectively. It was determined that very dense gravelly soil was present at depths shallow enough that tanks could be sited here.

On August 13, 2003, our engineer arrived at the site and inspected and logged the two test pits. One of the test pits had encountered gravelly soil at about six feet deep and the other at about three feet deep. The site with the shallower overburden was selected for further investigation and a second test pit was excavated. This second test pit confirmed that the overburden thickness was fairly consistent across the site and this site was selected by the owner for the tank construction. The site soils consist of 3.2 to 4.0 feet of brown sandy silt (ML) that is sift to medium stiff and dry to moist, containing abundant roots. Underlying the silt is a light brown silty sandy gravel with abundant cobbles and boulders that is dense to very dense and dry. The locations of the test pits

and cone penetrometer probes are shown on the attached site plan. The logs of test pits and cone penetrometer probes are also attached.

Based on he results of the field investigation, we conclude that the site selected by the owner and as shown on the site plan can be developed as planned. The silty overburden soils are too soft and contain too many roots to provide adequate bearing capacity for the anticipated loads. To provide adequate bearing soils, the following recommendations should be followed:

1. Tank and pump house footings should be founded a minimum of 18 inches below grade.
2. Remove the silty soils from the tank area down to the silty sandy gravel layer. This depth should be about three to four feet. Deeper excavation may be required if the surface of the gravelly soil is not at a uniform depth. The excavation limits should extend out from the tank perimeter a distance equal to the depth of excavation. The pump house footing excavations should extend out beyond the footing a distance equal to the depth of the excavation.
3. Backfill tank and footing excavations with compacted, imported structural fill.
4. Imported fill should consist of clean sandy gravel with less than 10% passing the #200 sieve size. The fill should not contain gravel larger than three inches in diameter. Pit run gravel should be suitable for structural fill if the larger sizes are removed.
5. Imported fill should be placed in lifts not exceeding 12 inches in thickness, moisture conditioned to within 2% of optimum moisture content and compacted with vibratory compaction equipment to at least 95% relative compaction as determined by the ASTM D 1557 modified compaction test method.
6. For fills installed as described above, an allowable bearing capacity of 2500 pounds per square foot (psf) may be used for design. This value may be increased by one third for live loads including wind and seismic.

In order to check the quality of the fill and the degree of compaction, MTC should be present during construction to observe the work and to perform compaction testing of the fill.

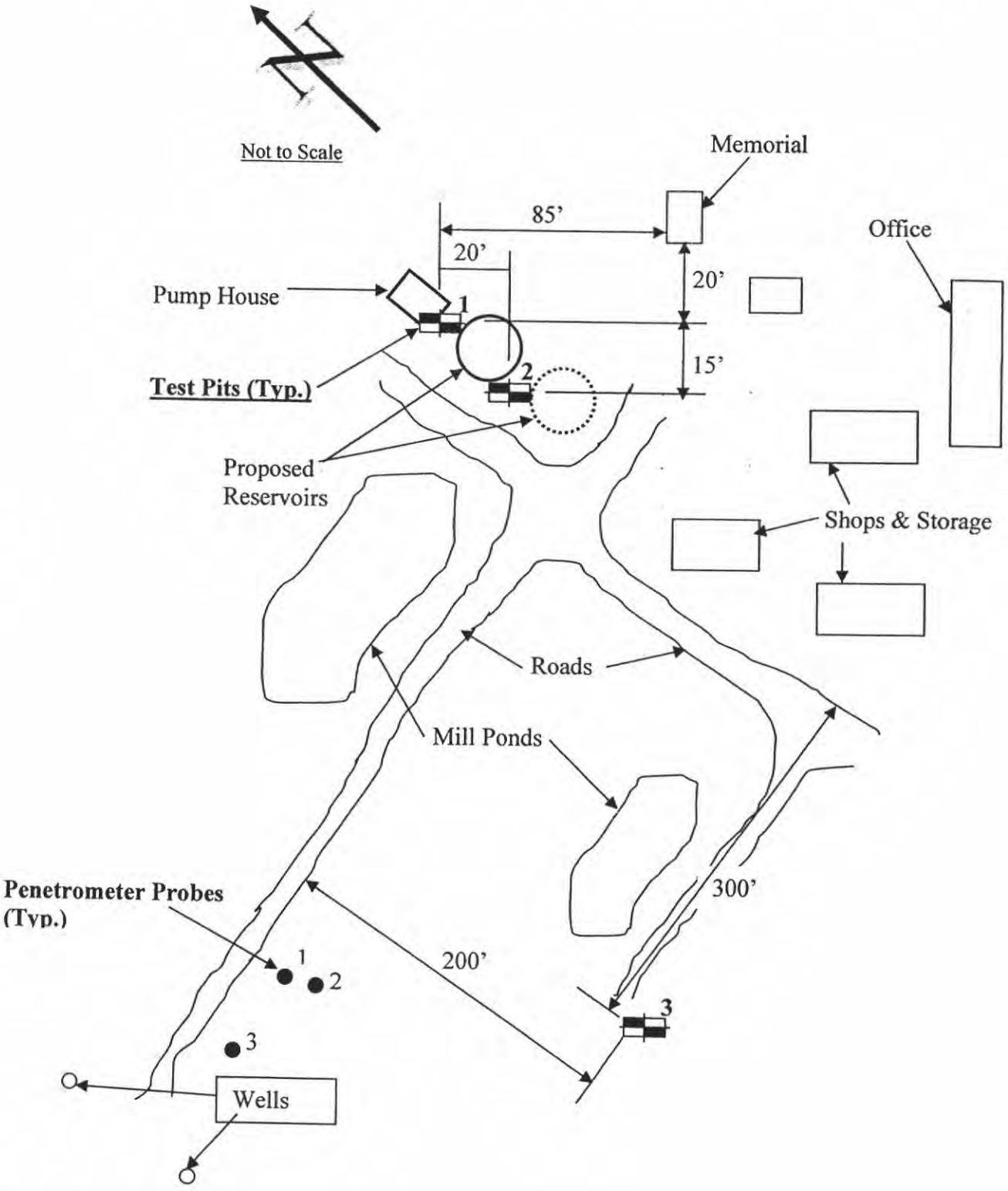
Mr. Clark, we trust this report presents the information you require; if we can be of further assistance or if you have questions, please do not hesitate to call.

Respectfully Submitted;
MATERIALS TESTING & CONSULTING, INC.

EXPIRES 7-14-04

Randolph R. Ross, P.E.
Senior Geotechnical Engineer

Site Plan and Test Pit Locations



Test Pit Logs

Depth (ft)	USCS	Soil Description
Test Pit 1		
0.0-0.2	**OL**	brown organic **SILT**, soft, moist, with abundant roots to 2" diameter (topsoil)
0.2-3.2	**ML**	light brown sandy **SILT**, soft to medium stiff, moist, with abundant roots to 2" diameter
3.2-7.0	**GM**	light brown silty sandy **GRAVEL**, dense to very dense, dry, with rounded to subrounded cobbles to 10" diameter
		Pit walls stand vertically above gravel. No free water encountered.
Test Pit 2		
0.0-0.2	**OL**	brown organic **SILT**, soft, moist, with abundant roots to 2" diameter (topsoil)
0.2-4.0	**ML**	light brown sandy **SILT**, soft to medium stiff, moist, with abundant roots to 3" diameter
4.0-6.0	**GM**	light brown silty sandy **GRAVEL**, very dense, dry, with rounded cobbles to 8" diameter
		Pit walls stand vertically above gravel. No free water encountered.
Test Pit 3		
0.0-0.5	**OL**	dark brown forest duff and organic **SILT**, soft, dry
0.5-6.0	**ML**	light brown sandy **SILT**, soft to medium stiff, wet
6.0-8.0	**GM**	brown silty sandy **GRAVEL**, dense, dry, with rounded to subrounded cobbles to 12" diameter
		Pit walls stand vertically above gravel. No free water encountered.

WILDCAT DYNAMIC CONE LOG

Materials Testing and Consulting
777 Chrysler Drive

PROJECT NUMBER: 03BM178
DATE STARTED: 06-16-2003
DATE COMPLETED: 06-16-2003

HOLE #: 1
CREW: AI
PROJECT: Bullerville Utility District
ADDRESS: 58468 Clark Cabin Road
LOCATION: Rockport, WA 98283

SURFACE ELEVATION:
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	CLAY
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	2	8.9	••	2	VERY LOOSE	SOFT
- 1 ft	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 2 ft	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	2	8.9	••	2	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 3 ft	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 m	3	13.3	•••	3	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 4 ft	2	7.7	••	2	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
-	3	11.6	•••	3	VERY LOOSE	SOFT
- 5 ft	3	11.6	•••	3	VERY LOOSE	SOFT
-	2	7.7	••	2	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 6 ft	4	15.4	••••	4	VERY LOOSE	SOFT
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 2 m	3	11.6	•••	3	VERY LOOSE	SOFT
- 7 ft	3	10.3	••	2	VERY LOOSE	SOFT
-	2	6.8	•	1	VERY LOOSE	VERY SOFT
-	18	61.6	•••••••••••••••••	17	MEDIUM DENSE	VERY STIFF
- 8 ft	45	153.9	••	-	DENSE	HARD
-	50	171.0	••	-	DENSE	HARD
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

Materials Testing and Consulting
777 Chrysler Drive

PROJECT NUMBER: 03BM178
DATE STARTED: 06-16-2003
DATE COMPLETED: 06-16-2003

HOLE #: 2
CREW: AI
PROJECT: Bullerville Utility District
ADDRESS: 58468 Clark Cabin Road
LOCATION: Rockport, WA 98283

SURFACE ELEVATION:
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	TESTED CONSISTENCY CLAY
	3	13.3	•••	3	VERY LOOSE	SOFT
	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
1 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
2 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
	3	13.3	•••	3	VERY LOOSE	SOFT
	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
3 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
1 m	3	13.3	•••	3	VERY LOOSE	SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
4 ft	2	7.7	••	2	VERY LOOSE	SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
5 ft	2	7.7	••	2	VERY LOOSE	SOFT
	3	11.6	•••	3	VERY LOOSE	SOFT
	3	11.6	•••	3	VERY LOOSE	SOFT
6 ft	2	7.7	••	2	VERY LOOSE	SOFT
	3	11.6	•••	3	VERY LOOSE	SOFT
2 m	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
7 ft	4	13.7	•••	3	VERY LOOSE	SOFT
	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
8 ft	23	78.7	••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
	50	171.0	••	-	DENSE	HARD
9 ft						
3 m 10 ft						
11 ft						
12 ft						
4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

Materials Testing and Consulting
777 Chrysler Drive

PROJECT NUMBER: 03BM178
DATE STARTED: 06-16-2003
DATE COMPLETED: 06-16-2003

HOLE #: 3
CREW: AI
PROJECT: Bullerville Utility District
ADDRESS: 58468 clark Cabin Road
LOCATION: Rockport, WA 98283

SURFACE ELEVATION:
WATER ON COMPLETION:
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	TESTED CONSISTENCY CLAY
	2	8.9	••	2	VERY LOOSE	SOFT
	2	8.9	••	2	VERY LOOSE	SOFT
1 ft	3	13.3	•••	3	VERY LOOSE	SOFT
	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
2 ft	9	40.0	••••••••••••	11	MEDIUM DENSE	STIFF
	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
	3	13.3	•••	3	VERY LOOSE	SOFT
3 ft	2	8.9	••	2	VERY LOOSE	SOFT
1 m	3	13.3	•••	3	VERY LOOSE	SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
4 ft	1	3.9	•	1	VERY LOOSE	VERY SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
	3	11.6	•••	3	VERY LOOSE	SOFT
5 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
	3	11.6	•••	3	VERY LOOSE	SOFT
	2	7.7	••	2	VERY LOOSE	SOFT
6 ft	3	11.6	•••	3	VERY LOOSE	SOFT
	3	11.6	•••	3	VERY LOOSE	SOFT
2 m	3	11.6	•••	3	VERY LOOSE	SOFT
7 ft	2	6.8	•	1	VERY LOOSE	VERY SOFT
	3	10.3	••	2	VERY LOOSE	SOFT
	2	6.8	•	1	VERY LOOSE	VERY SOFT
8 ft	4	13.7	•••	3	VERY LOOSE	SOFT
	7	23.9	••••••	6	LOOSE	MEDIUM STIFF
	13	44.5	••••••••••••	12	MEDIUM DENSE	STIFF
9 ft	50	171.0	••	-	DENSE	HARD
	50	171.0	••	-	DENSE	HARD
3 m 10 ft						
11 ft						
12 ft						
4 m 13 ft						