Guideline for Group B

Public Water System Approval

Appendices

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Clark County Public Health
1601 E Fourth Plain Blvd., Bldg. 17
Vancouver, WA 98662
Phone: 360-397-8428
Fax: 360-397-8091
www.clark.wa.gov

APPENDIX I

BASIC SYSTEM AND SOURCE INFORMATION

The purpose of this appendix is to provide explanations of the attachments and other information requested in Section I of the Group B Workbook. Please note that Section I is to be complete prior to source development.

BASIC INFORMATION

Part A: Basic System Information

1. For the purpose of maintaining accurate records, please provide the information requested on the new or existing system as accurately and completely as possible.

2. Clark County Health Department is currently operating under the Clark County Coordinated Water System Plan. The Coordination Act of 1977 placed conditions on the development of new, independent water systems where an existing system is available to provide service. The burden is on the developer to justify why a new system is needed.

   If the proposed project is within the service area of an existing approved water purveyor, the developer must contact that system manager to determine if that purveyor has the capacity, and intent to serve the proposed project. For a list of water purveyors near the proposed development please contact Clark County Public Health.

   If the water purveyor indicates in writing that the existing system declines direct service to the proposed project, and will allow the temporary formation of a new water system in their service area, the developer may proceed to determine the viability of satellite management of the proposed independent water system.

   Clark County Public Health maintains a list of approved Satellite Management Agencies (SMA) for this region. Pursuant to Chapter 246-291-140 WAC, the proposed new water system must determine if an SMA will accept responsibility for managing the new system. Written refusal by 50% of the available SMA's will ascertain that the water system proposal may advance through the approval process without an SMA at this time.

Part B: Ownership and Management

1. Include appropriate names, addresses and phone numbers, as indicated. Owner must sign statements of responsibility and accuracy.

Part B: Ownership and Management (continued)

2. Ownership Statement / Joint Use And Maintenance Agreement.

   Owners of small water systems should, at a minimum, sign and attach a simple statement of responsibility for any future costs incurred or maintenance required in the continuing operation of a water system. However, it is strongly *recommended* that a formal legal agreement be drawn up between parties sharing a water system. This agreement can also be incorporated into the homeowner's association by-laws if applicable. A copy of any water users agreement that is implemented must be included with your application.

   A water users agreement should include:
   - Language indicating the location of water system easements for the purpose of providing access for maintenance or repair to the well, pump and distribution lines.
   - Each user's exact share (right) to the total amount of water available.
   - Each user's exact share of the maximum ½ acre that can be irrigated (see Water Right Permit, below).
   - Requirements for installation of water meters.
   - Provisions for financial responsibility for future repairs, maintenance and testing.
   - Provisions for future transfers of water shares that accompany the sale or transfer of the lots served.

   Upon final approval of the Group B Public Drinking Water System any agreement will be filed on all lots served with the local county auditor. A model water users agreement (Exhibit B) is included in Appendix III. You can also use the document "Notice to Future Property Owners" in Appendix III. Interested parties should consult with an attorney regarding its specific provisions.

Part C: Water Source Information

1. Water Right Permit

   Water is considered to be a public resource. The State Water Code specifies that a water right permit, obtained from the Washington Department of Ecology (Ecology), is required for all appropriations of public water except for wells used for the purposes of stock watering, single or group domestic supply, industrial uses and irrigation of lawn and/or garden **not greater than 1/2 acre**, **provided that the water used shall not exceed 5000 gallons per day**. This exception is principally used to provide single family dwellings with wells for their domestic needs without requiring a formal water right.

   Using a water withdrawal rate of 800 gallons per day per connection, Ecology does not require a water right permit for small domestic water systems serving **six** or fewer connections unless irrigation of more than 1/2 acre is proposed. If your project requires a water right, you must obtain the water right permit before we can accept plans for your new system. Further information on water rights can be obtained by calling Ecology at 1- 360-407-6300

Part C: Water Source Information (continued)

2. Well Site Evaluation Report

   In accordance with WAC 246-291, all Group B water system applicants must have the well sites inspected and approved **prior to drilling**. Include a copy of the well site inspection report with the application. Please call our office to arrange for an inspection. If any repairs or improvements are requested, you must show proof that you have complied before your water system will be approved.

3. Sanitary Control Zone

   Activities that occur on or near the ground surface near your well could affect the quality of the water beneath the surface. Protecting your water source from potential sources of contamination is the most important consideration in owning and operating a public water system.

   Drinking Water Regulations require that public water sources be protected by a sanitary control area that does not allow activities that could contaminate the water source. Current state law specifies that the minimum area that must be secured is a 100 foot radius circle around your well. In addition, you must complete an inventory of potential sources of contamination within a 600 foot radius of the well. The department may occasionally require a larger area if necessary.

   All water system owners are required to control either through direct ownership or covenant, the 100' radius area around the public water source.

   a. Covenants

      A covenant is a written agreement that restricts activities on the property described in the covenant. Water system owners use covenants as a legal tool to protect property from activities or practices that could contaminate their public drinking water source. Covenant language may be included on final plat drawings, but may not be substituted in place of recorded protective covenants.There are two types of covenants used for this purpose, sometimes both may be needed.

1. Declaration of Covenant
   The person who owns the property within 100 feet sanitary control area signs the declaration of covenant. The water system or the water system developer must own the 100 ft. sanitary control area around the well. This document must be signed (by the owner of the property where the well is located) in front of a notary and recorded with the county auditor on the lot where the well is located. A map should be attached to the covenant showing the exact location of the well on the property. This document may be included in the Joint Use & Maintenance Agreement.

2. Restrictive Covenant
   When someone other than the water system or water system owner owns all or part of the required sanitary control area, the owner must obtain a restrictive covenant from those landowners. This document must be completed, signed, and notarized by any other property owner whose land lies within the sanitary control zone and recorded with the county auditor on the lot where the well is located.

Submit copies of all proposed covenants with the Group B Workbook. Actual recording of any covenants is not required until prior to final approval of the water system.

Blank covenants are included with this workbook in Appendix III. The use of these exact forms is not required. You may create an equivalent covenant, but it still must secure and protect the 100 ft protective radius around the well. As is the case with any legal document, it is wise to consult with an attorney regarding specific provisions in the covenants.

b. Site Protection Sketch

All Group B applicants must submit a detailed drawing of the area around the well. A circle must be drawn to scale around the well representing the 600 ft. radius. Everything within the 600 foot radius should be included in the drawing even if part of the zone lies in a neighbor's property. **If a landfill or hazardous waste disposal site is located within 1000 feet of the property it must be shown on the drawing.** A well cannot be constructed within 1000 feet of a landfill or hazardous waste disposal site pursuant to well drilling regulations 173-160 160. Show distances from the well to property lines and roads, as well as distances to any potential source of contamination including but not limited to a septic tank and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, application of herbicides or insecticides, hazardous waste, ponds or lakes, storm water facilities, any type of surface water or garbage of any kind or description.

APPENDIX II

Group B Water System Design

The purpose of this section is to assist in the design of a small public water system. Included is information to help size and select pumps, distribution lines, storage tanks, and pressure tanks.

The first consideration and a potential limiting factor in small water system design is the capacity of your water source. The ultimate goal is to provide the quantity of water needed to meet the peak and daily demands of the water users at all times.

Part D: Water Source Information

1. Well Construction

   The well log (also known as a water well report) provides important information about the construction of your well and its vulnerability to contamination. It also contains information about your aquifer and sometimes your well capacity and pump setting. **A copy of the well log is required and must be included with this application** for all *new* systems and desired, if obtainable, for older *existing* systems.

   The Washington Department of Ecology (Ecology) requires well drillers to fill out the well log and file a copy with their office, with a copy going to the owner of the well and a third copy to be retained by the driller. If the owner's copy cannot be located, check with the company who drilled the well, the previous property owner, Ecology, or our office to see if they have a copy on file.

   If a well log is not available, as much information as possible must be provided. Evidence of an adequate surface seal and conformance with Ecology's current minimum well construction standards is required. The Department may require additional information prior to approving the source.

2. Totalizing Source Meter

   A totalizing source meter is **required** on all sources to accurately monitor the quantity of water pumped. These meter readings are used to verify conformance with a water right permit or water right exemption and to assist in the management of water resources. After the system is in operation, the owner must maintain a record of monthly meter readings. Individual service meters are recommended as these meters can provide more detailed information if leakage occurs in the distribution system and can be used to encourage water conservation.

3. Water Quality Tests

   You must submit your water samples to a state certified laboratory for analysis and attach a copy of the water sample results to our office with your application.

   Current regulations (WAC 246-291-100) require that all Group B water systems must have an initial complete inorganic chemical and physical analysis and a coliform bacteria test.

All proposed sources must conform to both primary and secondary water quality standards. Treatment systems (other than simple chlorination) must be designed by a licensed Professional Engineer and reviewed by the Clark County Public Health.

Primary inorganic chemical and physical standards are antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate (as N), nitrite (as N), selenium, sodium, thallium, and turbidity. Secondary chemical and physical standards are chloride, color, hardness, iron, manganese, silver, specific conductivity, sulfate*, total dissolved solids*, and zinc.

*Required only when specific conductivity exceeds 700 micromhos/centimeter.

Other water quality tests may be required, if the department determines they are necessary (WAC 246-291-300). Please contact our office to determine if you need to sample for additional water quality samples.

After approval, a bacteriological sample must be submitted for analysis annually and at least one nitrate sample submitted every three years. Contact our office for a list of state certified laboratories 360-397-8428

Part E: Financial Viability

The goal of the financial viability worksheet is to set in place plans, policies and procedures that will enable the system owner(s) to have the ability to obtain sufficient funds, on a continuing basis, to cover the total cost of developing, constructing, operating, and maintaining the system in compliance with State and Local drinking water regulations.

The rates calculated on the worksheet on line 18 must be adequate to cover the operation and maintenance costs of the system and any budget deficits identified on line 16. It is important to remember that the line items on the financial viability worksheet are intended to be areas requiring consideration and may not be applicable a particular Group B water system and may be skipped if not applicable to your system. Use the rate calculated after full development on the Notice To Future Property Owners or your Water Users Agreement.

Information for the various line items may be obtained from various service providers. These could include equipment suppliers, chemical suppliers, tax assessor, utility companies, insurance agents, etc.

The following items are a brief explanation of each of the line items:

1. Annual Expenses For One Full Year

   Line #1 Wages and Benefits: Includes all compensation to employees of your utility who perform work related to the administration and operation of the utility, such as officers, directors, secretaries, operators, and meter-readers.

   Line #2 Electricity and Other Utilities: Includes the cost of all electric power, telephone, and any other utility-related expenses incurred in producing and delivering water.

   Line #3 Chemicals and Treatment: Includes the cost of all chemicals and hardware used in the treatment of water.

   Line #4 Monitoring Costs: Includes all water quality monitoring costs incurred by the utility, such as laboratory costs associated with bacteriological, nitrate, inorganic chemical and any other types of samples required or voluntarily conducted. In addition, this should include any costs for contracted monitoring of the treatment system.

   Line #5 Materials, Supplies and Repairs: Includes all materials, supplies, and replacement parts used in the operation and maintenance of the water system and in producing and delivering water to the customer.

   Line #6 Taxes/ Assessments: Your utility can incur a variety of taxes such as state utility tax, business and occupation (B&O) tax, property tax, etc. A summation of all taxes should be entered into line #6.

   Line #7 Insurance/ Misc. Expenses: Insurance costs include all the coverage costs related to the operation and administration of the water system. Miscellaneous expenses are those water system expenses not previous included in Lines 1 through 6.

Line #8 Subtotal – Operating Expenses: This subtotal is the expense of running a Group B water system on a yearly basis and should include the costs identified in Lines 1 through 7.

Line #9 10% Contingency: A Group B system should budget for unexpected expenses equaling 10% of their total annual operating expenses. A 10% contingency charge, built into the rates, will help prevent cash flow shortfalls. This contingency charge, when accumulated, will also enable the system to fund a reserve for other unexpected costs.

Line #10 Principal and Interest Payments (Debt Payment): Includes the annual costs of all short-term and/or long term system debt.

Line #11 System Replacement: Group B systems should start to generate funds to replace the system. This expense reflects the cost for replacing all major components of the water system assuming a 20 year life expectancy. 1/20th of the original cost of the system should be included in the budget.

Line #12 Total Revenue Required: Line 12 is the summation of Lines 8 through 11.

2. Annual Revenue From Sources Other Than Water Rates

Line #13 Hook Up/ Other User Fees: Includes the fees to be charged to connect new users to the system and all other miscellaneous fees and charges for service provided other than for water service.

Line #14 Other Revenue: includes all other revenues that do not apply to the categories above.

Line #15 Total Non Water Rate Revenue: Line #15 is the summation of Lines 13 and 14.

3. Annual Water Rate Calculations

Line #16 Budget Surplus/Deficit: Line 16 is the result of subtracting Line 12 from Line 15.

Line #17 Number of Connections: Line #17 is the total number of service connections served by your water system in at initial development and after full development of the system.

Line #18 Annual Water Rate: The annual water rate for your system is calculated by dividing Line #16 by the number of service connections on your system. The rate calculated must be sufficient to cover all of the operation and maintenance costs for your system and can be charged on a monthly, bimonthly, semiannual or annual basis.

Part F: Source Capacity, Pump and Pumphouse

Your well must be capable of supplying enough water to meet the state estimated daily demand for the number of connections in your system and the water system design rate cannot exceed the well capacity. For all new systems a **pump test** of the well must be performed to establish well capacity.

1. Pump/Well Yield Test Results

   Establishing well and/or pump capacity is critical to the formation of a small water system. A good well/pump test provides information regarding the capacity and reliability of your well, and also defines the area of influence of your well. The duration of the pump test must be for a sufficient period of time to ensure that the well can produce enough water to supply the required daily production of the system, but never for less than four hours after drawdown has stabilized. **A copy of the Well/Pump Test Report must be included with all applications.** For new systems, the results of this test are used to size and select your pump and storage system.

   Many well drillers and pump dealers offer this service for a fee, but all do not provide the same level of service for your money. A well/pump test should conform to state standards, a form is available at this office.

   At a minimum, the report should show the:

   - Static water level
   - Yield
   - Drawdown
   - Recovery rate
   - Duration of pumping, which must be no less than four hours after stabilization has occurred. (Or for long enough to supply the required daily demand.)

   If this well is located in close proximity to an adjacent well, the department may require that both wells be test pumped simultaneously to verify that the aquifer can adequately supply both wells.

   The department recommends, and may require that the well have an airline installed to facilitate future water level measurements. Airlines must be installed at the same time the pump drop pipe is installed.

   If your well can produce the daily demand, but not the peak flow, you will need to provide water storage. If water storage is required, but can not be provided with one or more simple pressure tanks, you must hire a professional engineer to design the storage tank and installation.

   You can use the capacity of the well (in gallons per minute), established from the pump test, along with the required pump head (in feet) (to be calculated in the next section), to select the proper pump size. If the pumping rate of the well is less than the required peak flow, storage is required.

Part F: Source Capacity, Pump and Pumphouse (continued)

In Western Washington, an average daily use of 400 gallons per day and a peak day use of 800 gallons per day are the flow design standards. See Table 1.

Please note that the flow design standards used in this appendix account for domestic use and limited watering of a typical lawn and garden space only. These design standards assume that all residences will be equipped with ultra low flow fixtures. If you anticipate additional uses or extensive irrigation, the system should be designed to a higher standard. If your property is served by separate irrigation you may use a lower design standard than specified in the tables below. Contact our office for further information.

Fire flow requirements vary depending on zoning, lot size, and the building size and material type. Fire flow may be required in some areas, but is not considered in this appendix. For more information consult with the County fire marshal at 360-397-2186. When fire flow is required, a professional engineer must be retained to perform a hydraulic analysis and design storage facilities.

Refer to Table 1 to determine the required maximum instantaneous (peak) flows, and minimum daily production for your system.

TABLE 1

Maximum Instantaneous Demand (MID) Flows and Minimum Daily Productions for Water Systems with 1 to 9 Connections												
NUMBER OF CONNECTIONS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
MID (GPM)	15	17	19	21	23	25	27	29	31	33	35	37
Required Minimum Daily Production In Gallons per Day	800	1600	2400	3200	4000	4800	5600	6400	7200	8000	8800	9600
In Gallons per Minute	1.0	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.6	6.1	6.7

Knowing the peak and daily demands for your system, you can now proceed to determine the required pump head. The required pump head (usually expressed in feet) is the equivalent height of a column of water above it that the pump must work against in order to deliver the design flow at the desired pressure to a specified point.

Part F: Source Capacity, Pump and Pumphouse (continued)

2. Calculating the Required Pump Head

The required pump head will depend on whether storage is required.

The required Total Operating Head (also called the minimum pump head) = (A)+(B)+(C)+(D) (See Figure 1 on page 30)

Where:

(A) Suction Lift: The vertical distance from the pumping level in the well (static water level plus draw-down) to ground surface, **PLUS**

(B)* Elevation difference: The distance between ground surface at the well head and the point of delivery, **PLUS**

(C) Friction Loss: The maximum frictional losses that can occur in the distribution system (this is converted to an equivalent amount of head in feet), **PLUS**

(D) Pressure Residual: The residual head (70 ft.) necessary to maintain the required pressure of 30 psi at each residence.

Static Head = (A)+(B)

* (B) may be positive or negative.
If positive, it is added to the required total operating head
If negative, it should be treated as zero unless it is greater than 50 ft then it is subtracted.

To calculate the required pump head you will need to perform a *hydraulic analysis* in order to figure what the maximum headloss will be in your distribution system.

To perform a hydraulic analysis you must first complete your system layout sketch, including elevation differences, pipe material, pipe diameter and distances of pipe runs. Use Table 2 on page 28 to determine headloss for various PVC pipe diameters at varying maximum design (peak) flows. With this information complete your hydraulic analysis in the space provided. (Table 2 headloss figures assume plastic (PVC) pipe is used - this is the most commonly available piping and results in the least headloss).

For systems built on level terrain (maximum elevation difference of 40 feet) using 2 inch diameter PVC pipe or larger, with a maximum length of pipe run of 300 feet, no hydraulic analysis is necessary (use headloss = 0 in Table B on page 10 in the Group B workbook).

FIGURE 1 – Required Pump Head

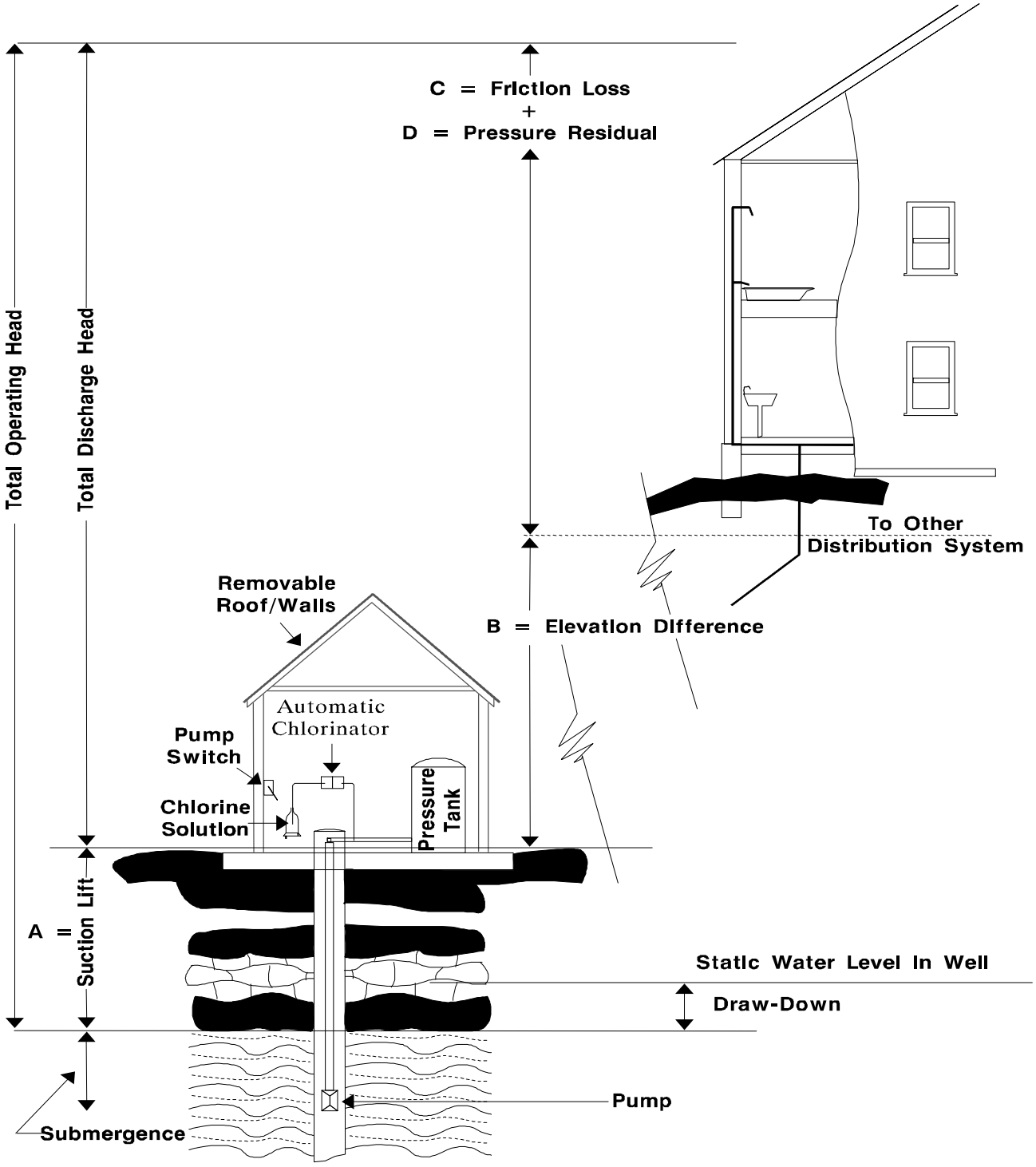


FIGURE 2

For Booster Pump

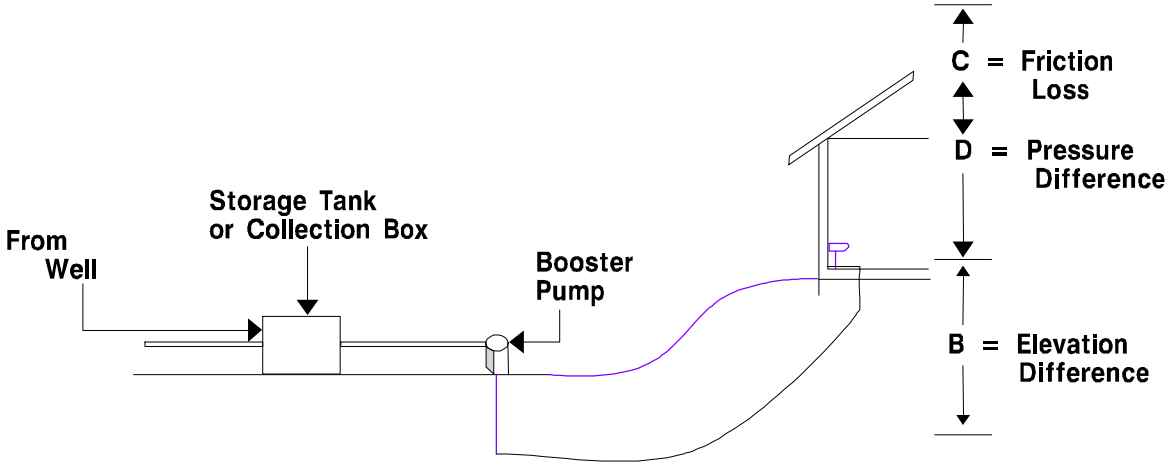
If a booster pump is used, a professional engineer is required to design the water system.

Required Pump Head - B, C & D are for a well pump. Again B may be positive, negative or zero.

If zero, the required head = B + D

If positive, the required head = B + C + D

If negative, the required head = same as for zero, unless C is greater than 70 ft. to the first service. At that point, the gravity head available may be so great that no pump will be necessary.



BOOSTER PUMP

TABLE 2
Connections and Design Flow (gpm)

Pipe Diameter (Inches)	Connections/ GPM	1/15	2/17	3/19	4/21	5/23	6/25	7/27	8/29	9/31	10/33	11/35	12/37
	HEADLOSS PER 100 FEET OF PVC PIPE (IN FEET) **												
1*		14.7	18.6	22.8	27.5	32.5	37.9	43.7	49.9	56.4	63.4	70.7	86.4
1¼		5.0	6.3	7.7	9.3	11.0	12.8	14.8	16.8	19.1	21.4	23.9	26.5
1½		2.0	2.6	3.2	3.8	4.5	5.3	6.1	6.9	7.9	8.8	9.8	10.9
1¾		1.0	1.2	1.5	1.8	2.1	2.5	2.9	3.3	3.7	4.2	4.6	5.1
2		0.5	0.6	0.8	0.9	1.1	1.3	1.5	1.7	1.9	2.2	2.4	2.7
3		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
4		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
6		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

* PROVISION IS MADE IN THE HEADLOSS TABLE FOR ANALYSIS USING 1 INCH PIPE. HOWEVER, EXTENSIVE USE OF THESE PIPE SIZES IS NOT RECOMMENDED, SINCE IT RESULTS IN VERY LARGE HEADLOSS, REQUIRING A LARGER, MORE EXPENSIVE PUMP IN MANY CASES
** Values calculated using Hazen-Williams formula assuming smooth (PVC) pipe and CH 140.

NOTE: For steel (galvanized) pipe (i.e., Hazen-Williams Coefficient of about 100) multiply the headloss values given in the foregoing Table 2 by a factor of two. {i.e., The specific headloss for steel pipe is approximately twice that associated with PVC pipe}

Example 1: Pipe Headloss Calculations

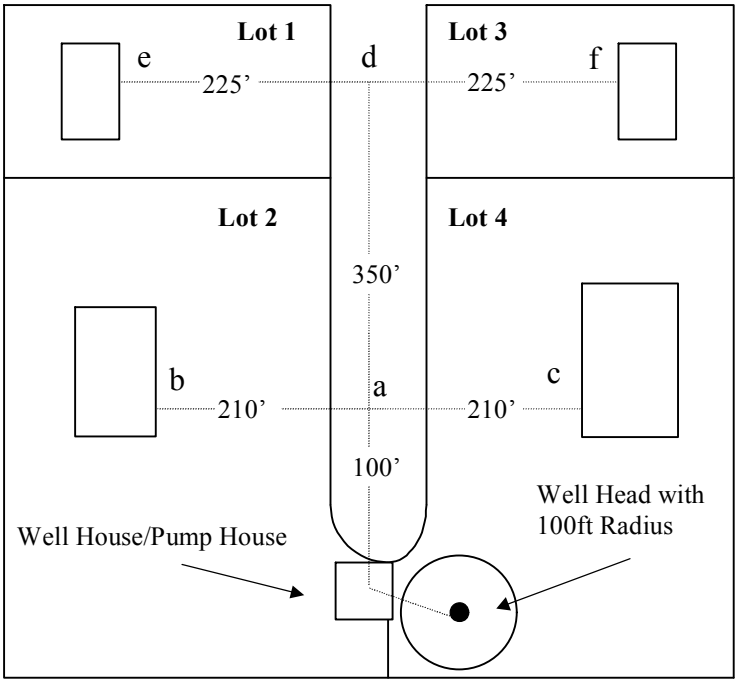
1. Refer to the system layout sketch on the next page. The distribution system is broken into links; a,b,c,d,e, etc. In the example, the analysis for the pairs of services 1 and 2, 3 and 4 are performed only once. This is because the pipe type, lengths and flows are the same for each of these pair. There is no need to repeat calculations unnecessarily.

2. Using information from your system layout sketch:
   a. Enter the pipe information (material, diameter and length) for each link leading to a given connection into each of the appropriate columns in the hydraulic analysis table.
   b. Enter the number of services (connections) downline from each link in the next column.
   c. Enter the peak flow from Table 1 that corresponds to the number of downline services in the next column.
   d. Enter the headloss per 100 feet of pipe from Table 2 that corresponds to the peak flow for that diameter pipe in the next column.
   e. Multiply the headloss per 100 feet by the number of hundred feet of pipe in each link and enter that figure in the last column (example - 480 feet of pipe = 4.8 times headloss per 100 feet).

3. For each connection in your distribution system, add up the headloss associated with each link leading to that service and enter it in the chart under "TOTAL".

4. When the total headloss for each connection has been calculated, compare the values and use the greatest value obtained anywhere in your system for the headloss when completing Table B – Total Required Pump Head in the Group B Workbook on page 12.

EXAMPLE 1



EXAMPLE 1
TABLE - Headloss

From	To	Connections	MID in GPM	Diameter of Pipe in inches	Headloss per 100 feet of pipe	Length of pipe in feet	Total Headloss
Well	a	4	21	2"	0.9	100’	0.9
A	b, c	1	15	1 3/4"	1.0	210’	2.1
							Total of 3.0 feet
Well	a	4	21	2"	0.9	100’	0.9
A	d	2	17	1 1/2"	2.6	350’	9.1
D	e, f	1	15	1 1/4"	5.0	225’	11.25
							Total of 21.25 feet

Where: MID = Maximum Instantaneous Demand for connections in gallons per minute (GPM). You can find these values in Table 1 on page 28.

Headloss per 100 ft. of pipe = Friction loss through PVC pipe in feet. You can find these values in Table 2 on page 32.

Total Headloss = Is the amount of headloss in a section of the system. To determine headloss multiply “Headloss per 100 feet of pipe” by “Length of Pipe in feet” and divide this result by 100.

Having calculated what the maximum headloss will be in your distribution system, you can complete the section for well pumps in Table B in the Group B Workbook on page 12 to determine the Required Pump Head.

Part F: Source Capacity, Pump and Pumphouse (continued)

3. Pumping Equipment Selection

The Required Pump Head = Static head of the well + The Pressure Residual head +The greatest headloss determined in the hydraulic analysis.

The Static Head is the distance in feet from the water surface in the well during pumping to the point to which water service is to be delivered. In other words the Static Head is the summation of static water level, the amount of drawdown during pumping and the increase in elevation between the well and the highest service connection.

The Pressure Residual Head is the pressure required to make the water come out the faucet at each connection at a high enough pressure. The standard pressure required is 30 psi (pounds per square inch) or 70 feet residual.

To convert psi to feet of water multiply by 2.307. Example 45 psi x 2.307 = 103.8 feet residual head.

Headloss is the equivalent distance in feet that the pump must work against due to the resistance of pipe friction and similar causes.

Example: If one were to assume that the well in Example 1 on page 34 was 250 feet deep with a static head of 220 feet with 0 (zero) drawdown, and the elevation difference for the water system is 10 ft., you would be able to complete Table B below.

EXAMPLE 1

Table - Required Pump Head

	Well Pump	Pump #2 (BOOSTER PUMP IF NEEDED)*
Distance from Pumping Level in Well to Ground Surface (WELL HEAD)**	220 FEET	------FEET
Elevation Difference from Well Head to Point of Delivery	10 FEET	------FEET
Greatest Headloss (Note: This number is from the hydraulic analysis in Example Table A- Headloss)	11.25 FEET	------FEET
Pressure Residual Head (30 psi = 70 Feet of Head)	70 FEET	------FEET
TOTAL REQUIRED PUMP HEAD	311 FEET	------FEET

***** For Booster pumps a licensed Professional Engineer is required.

** Distance from pumping level in well to ground surface (Static water level + Drawdown (220 ft + 0 ft = 220 ft.).

Part F: Source Capacity, Pump and Pumphouse (continued)

For this water system you would need a pump powerful enough to deliver 21 gpm against 311 ft of head. Knowing the required pump head (in feet) and the pump rate your well is capable of (in gpm), you can select the pump that best fits your needs. Enter the requested pump information in Part F, 3, (page 15 of the workbook and attach pump curve and specifications.

4. Booster Pumps

In situations where booster pumping is performed, the calculation is the same as for a well pump sizing. Most frequently this calculation will be necessary when the storage requirement is so large (and expensive) that storage cannot be provided just using a pressure tank. For booster pump sizing, the second half of Table B should be completed. Enter the requested information in Part F, 4 on page 15 of the workbook and attach pump curve and specifications. **NOTE: If the system requires booster pumping, a professional engineer must design the water system.**

5. Pumphouses

If you plan on constructing a pumphouse, you must install the pumphouse above the surface of the ground See Figure 3 on page 37. The pumphouse floor should be watertight, preferably concrete, and should slope uniformly in all directions away from the well casing. The pumphouse must have a floor drain that drains to daylight. It should be unnecessary to use an underground discharge connection (pitless adapter) if the pumphouse is insulated and heated. Adequate lighting and a thermostatically controlled electric heater must be provided.

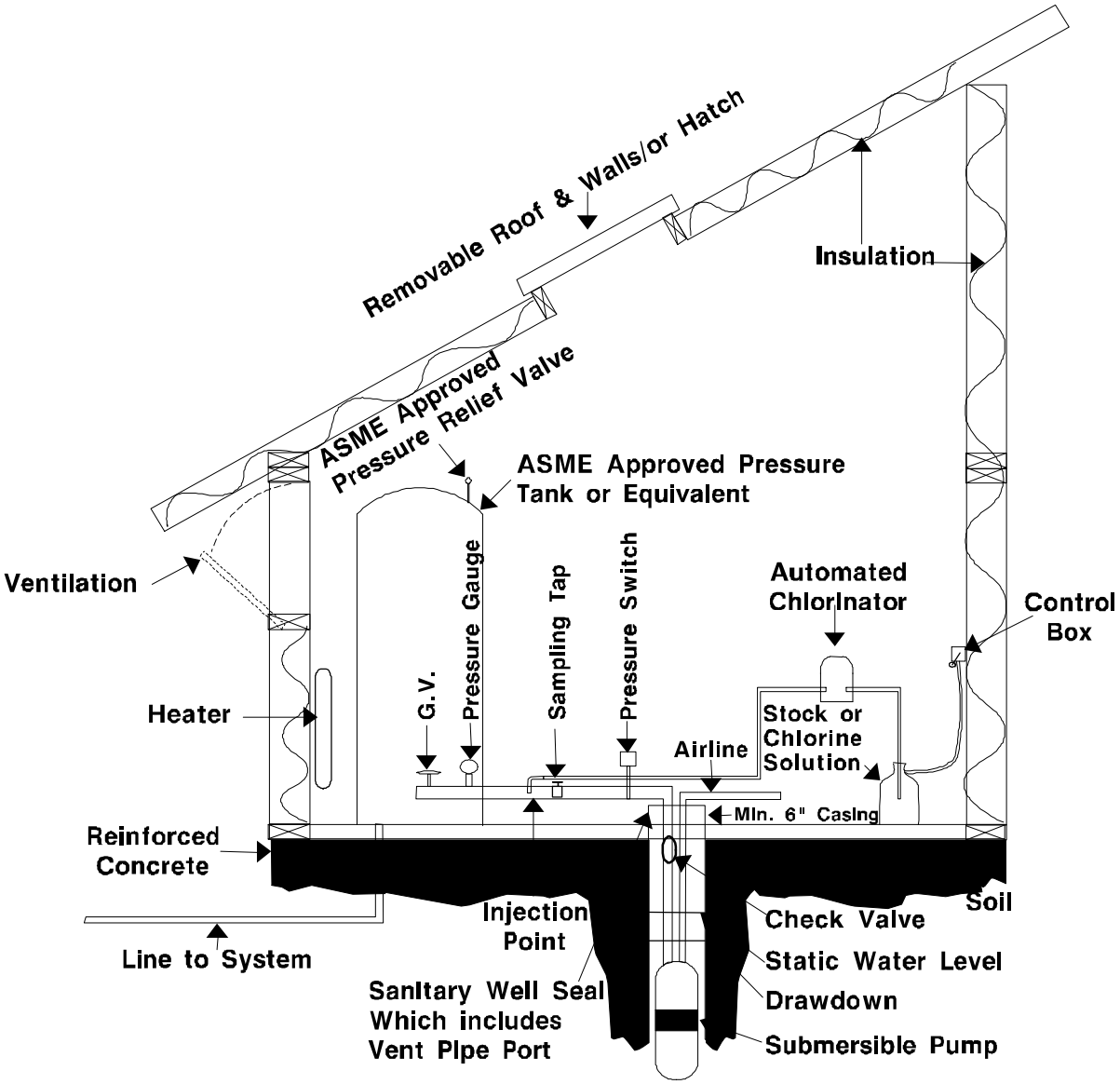
Please provide a schematic of your proposed pumphouse. An example of a typical pumphouse can be found on page 37.

Contact Clark County Planning and Development Services at 360-397-2375 to determine if you need a building permit to construct the pumphouse. The well cannot be placed inside any structure that is intended to be used for anything other than a pumphouse. The well cannot be placed inside a garage, shop or any other outbuildings. In addition you cannot store any potential sources of contamination inside the pumphouse, including but not limited to gasoline, herbicides, pesticides, lawnmowers, paint or cleaning agents.

Typical Pumphouse:

- The roof may be one surface, sloping, with a hatch to replace or repair the pump in the future.
- There should normally be one foot access between the wall and equipment for ease of repair and maintenance.
- The pitless adapter unit, if used, must be from a list approved by the State Department of Health.
- Plumbing should be installed for pumping to waste.
- Where chlorination is practiced, space must be made for the solution tank and contact chamber.
- A sample tap should be provided before any treatment and prior to the distribution system.

FIGURE 3



(Not Drawn to Scale)

Part G: Pressure Tanks and Storage Facilities

1. Storage

   If your well pump cannot produce enough water to supply the water system demand, you must provide storage. This storage is called equalizing storage. The amount of storage needed depends on several factors including the capacity of the well. In some cases, where only a small amount of storage is needed, you can install extra pressure tanks as opposed to installing non-pressurized storage such as a water reservoir.

   Although normally used for pump protection, pressure tanks can be used in some instances for a small amount of equalizing storage, especially if the pump capacity is within 20% of the MID (Maximum Instantaneous Demand).

   If your water system requires a large amount of storage such that you must use nonpressurized storage (a water reservoir) a professional engineer must design the water system.

   To determine how much equalizing storage you need for your water system use the following equation:

   Es = (MID – Q) x 60 minutes

   Where: Es = Equalizing storage in gallons.
   MID = Maximum instantaneous demand for the water system found in Table 1 on page 28 in gallons per minute.
   Q = The delivery capacity of your well pump (not the well itself) in gallons per minute.

   Example:

   Given: A water system with 8 connections (Looking at Table 1 on page 28 we can see the MID for 8 connections is 29 gpm.)
   Pump Capacity = 25 gpm

   Es = (MID – Q) x 60 minutes
   Es = (29 gpm - 25 gpm) x 60 minutes
   Es = 240 gallons of storage.

   In this case since the pump capacity is within 20% of the MID, pressure tanks can be used for storage and pump protection. This information will be used when determining how many pressure tanks will be needed for you water system.

   Determine the amount of equalizing storage needed for your water system by using the formula above and fill in the information in the workbook on page 16.

2. Pressure Tanks

   All pressure tanks shall be equipped with a properly sized and installed pressure relief valve that has been approved by the American Society of Mechanical Engineers (ASME). A properly sized ASME relief valve will prevent a rise in pressure in the vessel of more than 10 percent above the maximum allowable working pressure. A properly installed ASME relief valve shall be located on the top of the tank or on the outlet piping as close as possible to the tank with no intervening valves.

Part G: Pressure Tanks and Storage Facilities (continued)

Pressure tanks can be used in a system to provide pump protection from excessive cycling. By storing (air) pressure and some water (a portion of which is called working storage, i.e. the volume that can be withdrawn between pumping cycles) in your system, they eliminate the need for your pump to turn on every time a small amount of water is used.

There are two basic types of pressure tanks:
- Conventional tanks are those that allow direct air-water contact.
- Bladder tanks have some type of membrane separating the air from the water.

In either type, maintaining the proper air vs. water volume is important to the efficient operation of the tank. Some mechanism for recharging the conventional pressure tank with air is needed. This is generally a system using a small compressor or snifter valve arrangement.

3. Pressure Tank Sizing

A. Bladder Tank Sizing for Pump Protection

Bladder tanks are mainly used for pump protection. The procedure for selecting or sizing bladder tanks differs from that used for conventional tanks in that the actual tank size is selected first and then the number of that size tank needed to provide pump protection is determined. The low operating pressure is calculated in a similar fashion as with conventional tanks, but the bladder tank must be precharged with air to a pressure 5 psi below the low operating (cut-on) pressure for the system.

To determine the number of bladder tanks needed for pump protection only use the following equation:
(Only use this equation if the pump is able to meet the water system demands. For example if you have a four connection system, your well pump must be able to deliver at least 21 gpm.)

To determine the number of bladder tanks needed for pump protection, use the following equations.

Equation 1: $Vt \geq 10 \times Q$

Where Vt = The total volume of the bladder tanks in gallons.
Q = The delivery capacity of your well pump (not the well itself) in gallons per minute.

Equation 2: $Tb \geq \frac{Vt}{Vb}$

Where Tb = The number of bladder tanks of size Vb required.
Vt = The total volume of the bladder tanks as calculated in equation 1.
Vb = The volume of an individual bladder tank to be used in the system.

Example: A 6 connection water system with a well pump capacity of 25 gpm, proposing to use 86 gallons pressure tanks (one of the most common sizes available).

Equation 1: $Vt \geq 10 \times Q$
$Vt \geq 10 \times 25$
$Vt \geq 250$ gallons

Part G: Pressure Tanks and Storage Facilities (continued)

Equation 2: $Tb \geq \frac{Vt}{Vb}$

$Tb \geq \frac{250}{86}$

$Tb \geq$ 2.9 tanks. Round up to the next size, 3 tanks are needed for pump protection.

B. Bladder Tanks for Pump Protection and Equalizing Storage

Although normally used for pump protection, bladder tanks can be used in some instances for a limited amount of equalizing storage, especially if the installed pump capacity is within 20% of the MID (Maximum Instantaneous Demand). To determine how many bladder tanks are needed for equalizing storage, use the following equations.

Step 1: Determine the amount of equalizing storage.

Es = (MID – Q) x 60 minutes

Where: Es = Equalizing storage in gallons.
MID = Maximum instantaneous demand for the water system found in Table 1 on Page XXX in gallons per minute.
Q = The delivery capacity of your well pump (not the well itself) in gallons per minute.

Step 2: Determine the working storage using equation 2.

$Vw \geq \frac{Vt}{4}$

Where: Vw = Working storage in gallons.
Vt = The total volume of the bladder tanks in gallons as calculated in equation 1 on page 39.

Step 3: Add Es from Step 1 to Vw from Step 2 to obtain the total working storage required.

Vwt = Es + Vw

Where: Vwt = Total working storage in gallons.
Es = Equalizing storage from Step 1.
Vw = Working Storage from Step 2.

Step 4: Calculate how many gallons of storage needed for pump protection and storage with the following equation.

Vg = Vwt x 4

Where: Vg = Number of gallons needed for pump protection and equalizing storage
Vwt = The total working storage from Step 3

40Part G: Pressure Tanks and Storage Facilities (continued)

Step 5: Determine the number of tanks needed for pump protection and storage

$$Tb \geq \frac{Vg}{Vb}$$

Where: Tb = The number of bladder tanks of size Vb required.
Vb = The volume of an individual bladder tank to be used in the system.
Vg = Number of gallons needed for pump protection and equalizing storage as calculated in Step 4.

Example:

A water system with 8 connections with a well pump capacity of 25 gpm, proposing to use 86 gallon storage tanks.

Step 1: Es = (MID – Q) x 60 minutes
Es = (29-25) x 60 minutes
Es = 240 gallons

Step 2: $Vw \geq \frac{Vt}{4}$

$Vw \geq \frac{250 \text{ gallons}}{4}$

Vw ≥ 62.5 gallons

Step 3: Vwt = Es + Vw
Vwt = 240 + 62.5
Vwt = 302.5 gallons

Step 4: Vg = Vwt x 4
Vg = 302.5 x 4
Vg = 1210 gallons

Step 5: $Tb \geq \frac{Vg}{Vb}$

$Tb \geq \frac{1210 \text{ gallons}}{86 \text{ gallons}}$

Tb ≥ 14 tanks are needed for pump protection and equalizing storage.

C. Conventional Tanks Sizing for Pump Protection

In sizing conventional non-bladder tanks, the working storage is calculated first, then a table is used to select the actual size of the tank.

If a tank is used for pump protection only, use the following equation.

Vw = 2.5 x Q

Where Vw = The working storage in gallons.
Q = The delivery capacity of your well pump in gallons per minute.

Part G: Pressure Tanks and Storage Facilities (continued)

Example: For a water system with 6 connections and a well capacity of 25 gallons per minute.

Vw = 2.5 x Q
Vw = 2.5 x 25
Vw = 62.5 gallons is needed for working storage.

D. Conventional Tanks for Pump Protection and Equalizing Storage

If the tank is used for pump protection and equalizing storage use the following equation.

Vw = (MID – Q) x 20

Where:
- Vw = The working storage in gallons.
- Q = The delivery capacity of your well pump in gallons per minute.
- MID = Maximum instantaneous demand for the water system found in Table 1 on page 24 in gallons per minute.

Once the working storage for either situation (for pump protection only or pump protection and equalizing storage) has been calculated refer to Table 3 to select the actual storage tank size. For the selected pressure range, select the value in the corresponding vertical working storage column. The top value in each box is the horizontal model and the bottom value is the vertical type.

Before using this table, you will need to determine what will be the minimum pressure setting.

Ps = (E + H +70) x 0.433

Where:
- Ps = Minimum pressure setting (in psi)
- E = Elevation difference from the well head to the point of delivery (in ft.)
- H = Maximum headloss in system (in ft.)

If the Ps value is not an even increment of 10, select the next highest minimum pressure range in Table 3.

Example: A water system with a maximum headloss of 9ft and no elevation difference.

Ps = (E + H +70) x 0.433
Ps = (0 + 9 + 70) x 0.433 = 34.2 psi, so select 40/60 psi pressure range in Table 3.

Example: For a water system with 8 connections:

Vw = (MID – Q) x 20
Vw = (29-25) x 20
Vw = 4 x 20
Vw = 80 gallons of working storage.
From Table 3 for the 40/60 psi pressure range this water system needs a 489 gallon conventional pressure tank.

Part G: Pressure Tanks and Storage Facilities (continued)

TABLE 3
Available Horizontal / Vertical Commercial Tank Sizes

PRESSURE RANGE LOW PRESSURE / HIGH PRESSURE	WORKING STORAGE IN GALLONS											
	25	50	75	100	150	200	250	300	350	400	450	500
30 / 50 (psi)	109/ 93	223/ 186	333/ 296	370/ 370	594/ 594	749/ 749	965/ 965	1110/ 1110	1371/ 1371	1517/ 1517	1755/ 1755	1874/ 1874
40 / 60 (psi)	135/ 113	260/ 260	370/ 370	489/ 489	712/ 712	965/ 821	1160/ 962	1371/ 1183	1636/ 1371	1874/ 1636	2045/ 1874	2338/ 1993
50 / 70 (psi)	137/ 137	296/ 260	405/ 370	542/ 489	712/ 712	1089/ 962	1183/ 1183	1398/ 1398	1636/ 1636	1874/ 1874	2112/ 2112	2338/ 2338
60 / 80 (psi)	156/ 137	333/ 260	436/ 436	533/ 806	806/ 806	1089/ 1089	1371/ 1371	1636/ 1636	1874/ 1874	2112/ 2112	2609/ 2609	2632/ 2632

The top value in each box is the horizontal model, and the bottom value is the vertical type.

4. Storage Tanks

NOTE: If system design requires nonpressurized storage, the system must be designed by a licensed Professional Engineer.

All storage tanks, distribution lines, and other surfaces of a public water system in direct contact with water must be constructed of materials that will not impart contaminants or impurities indirectly into the water. As a result, all system components must meet the requirements of either of the following two alternatives:

- Product acceptability shall be established under the applicable ANSI/NSF Standard 60 or 61 and be certified to that effect by an ANSI-accredited listing agency, or;
- Product shall have appeared on the final (May 8, 1989) EPA advisory listing entitled, "Report on Acceptable Drinking Water Additives".

Part H: Treatment

For information on chlorination or other treatment system design approval, please contact the department. Treatment systems other than simple chlorination must be designed by a licensed engineer and may require additional review from DOH.

If treatment equipment is provided, measures will be required to insure that the equipment is properly maintained and monitored. For all treatment systems an Operation and Maintenance (O&M) manual and the appropriate test kits will also be required.

Part I: Distribution System

In this section a sketch or system diagram is to be provided in order to determine the location of the various system components and their relation to each other. This sketch or diagram must be as accurate and complete as possible in order to determine that the system was properly designed and located. The sketch or diagram must include the items listed in Part I on page 17 of the Group B Workbook.

Part I: Distribution System (continued)

With reference to the construction of the distribution system, all pipe, fittings, valves, and fire hydrants (if required) shall conform to the latest standards issues by the AWWA and/or NSF (i.e. AWWA Standards C900-89, C907-91, etc.). Special attention shall be given to selecting pipe materials which will protect against both internal and external pipe corrosion. Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards.

The installation of all components of the distribution system must be accomplished according to good engineering practices as identified in manuals such as AWWA Manual 23, PVC Pipe - Design and Installation, the Pacific Northwest AWWA Section's Cross-Connection Control Manual, and the AWWA Standards for Disinfecting Wells, Water Mains and Water Storage Facilities.

Part J: Reliability

Owners of Group B public water systems shall ensure that their systems are constructed operated and maintained to protect against failures. While it is hoped that the construction, operation, and maintenance of a Group B water system will minimize system failures, some system failures will occur. With this in mind, all Group B water system applicants must provide information on what provisions, if any, have been or will be made to ensure that their system is capable of providing an adequate quantity and quality of water in a reliable manner.

Customers of Group B water systems have a right to know about the reliability of their system during periods of power outages, pump failures, or other system component failures.

APPENDIX III
Group B Water System Documents and Additional Information

As a condition of system approval, certain documents must be recorded on property titles. These fall into two broad categories, including protective covenants and informational notices. Additionally, we recommend that ownership and maintenance agreements be recorded.

1. Protective covenants are required to prohibit placing certain potential sources of contamination in the vicinity of ground water and GWI sources in accordance with the provisions of WAC 246-291-100(2)(h) or WAC 246-291-110(3)(f)(ii), respectively. For the property containing the well, use the *Declaration of Covenant* form. Use the *Restrictive Covenant* form for any adjacent property(ies) which are within the required area of protection.

2. Information notices are to be recorded for each property which will be served by the public water system. This is intended to provide basic information which will be useful to future property owners. *The Notice To Future Property Owners* form is to be used for this purpose. You may also use the Water Users Agreement.

Other attached documents:

- Example Contract letter
- Request for Water Sample Review
- Example Water Users Agreement
- Notice to Future Property Owners Commercial Public Water System
- Notice to Future Property Owners Residential Public Water System
- Declaration of Covenant Public Water Supply
- Restrictive Covenant Public Water Supply
- Certification of Inspection and Installation of Group B Public Drinking Water System Projects
- Generator Disconnect/Manual Transfer Switch
- Pumping Test Data Form

Example Contact Letter

(Date)

(Name/Address of Water System Being Contacted)

To Whom It May Concern:

I am the owner of the property at (address). I am considering developing a small public water system to serve this property. Prior to deciding whether to develop a separate system, I would appreciate finding out if you could provide service to this property.

In responding to this request for information, please provide the following information:

(a) Would service be provided by extending your existing system?

(b) What design standards you would require for my system?

(c) What other requirements do you have for providing service?

(d) What is the estimated cost of providing service?

(e) How soon could you provide service to my development?

I have enclosed a vicinity sketch to assist you in locating my property. The following is additional information to assist you in responding to my questions:

(a) Property Tax Account Number: *(Number)*

(b) Location: Quarter, Quarter, Section *(Number)*, Township *(Number)*, Range *(Number)*

(c) Approximate Address: *(Address)*

(d) Subdivision Name or Number: *(Name or Number)*

(e) Number of Parcels To Be Served: *(Number)*

(f) Average Lot Size: *(Number)* Acre(s)

I would appreciate receiving a response to this request within fourteen (14) days. If you have any questions, please contact me at *(telephone number)*.

Sincerely yours,

(Signature)
(Name of Owner)
(Mailing Address)

Example Water Users Agreement

OWNERSHIP OF THE WELL AND WATERWORKS

It is agreed by the parties that each of said parties shall be and is hereby granted an undivided one-half interest in and to the use of the well and water system to be constructed. Each party shall be entitled to receive a supply of water for one residential dwelling and shall be furnished a reasonable supply of potable and healthful water for domestic purposes.

COST OF WATER SYSTEM CONSTRUCTION

Both parties herein agree to share equally in the cost incurred in well site approval, well construction, design of the water system for approval by the Health Officer, and construction and/or installation of the waterworks equipment, the pumphouse and water distribution pipes, and initial well water quality tests.

COST OF MAINTENANCE OF WATER SYSTEM

Each party hereto covenants and agrees that they shall equally share the maintenance and operational costs of the well and water system herein described. The expense of water quality sampling as required by the State of Washington and Whatcom County shall be shared equally by both parties. The parties shall establish and maintain a reserve account at a mutually agreed upon banking institution. Each party shall be entitled to receive an annual statement from said banking institution regarding the status of the reserve account. The monetary funds in the reserve account shall be utilized for the sole purpose of submitting water samples for quality analysis and maintaining, repairing or replacing the well and common waterworks equipment or appurtenance thereto.

EASEMENT OF WELL SITE AND PUMPHOUSE

There shall be an easement for the purpose of maintaining or repairing the well and appurtenances thereto, within 30 feet of the well site in any direction. Said easement shall allow the installation of well house, pumps, water storage reservoirs, pressure tanks, and anything necessary to the operation of the water system.

WATER LINE EASEMENTS

Smith grants Jones an easement for the use and purpose of conveying water from the well to the property of Jones. Said easement shall be fifteen (15) feet in width and shall extend on, over, across, and underneath said strip of land from designated well site to common point as referred to. The centerline of said fifteen (15) foot strip of land shall be the west line of the east 32 feet of the south 75 feet of Smith's property line herein described. No permanent type of building shall be constructed upon the water line easement except as needed for the operation of the well and water system.

MAINTENANCE AND REPAIR OF PIPELINES

All pipelines in the water system shall be maintained so that there will be no leakage or seepage, or other defects which may cause contamination of the water, or injury, or damage to persons or property. Pipe material used in repairs shall meet approval of the Health Officer. Cost of repairing or maintaining common distribution pipelines shall be born equally by both parties. Each party in this agreement shall be responsible for the maintenance, repair, and replacement of pipe supplying water from the common water distribution piping to their own particular dwelling and property. Water pipelines shall not be installed within 10 feet of a septic tank or within 10 feet of sewage disposal drainfield lines.

PROHIBITED PRACTICES

The parties herein, their heirs, successors and/or assigns, will not construct, maintain or suffer to be constructed or maintained upon the said land and within 100 feet of the well herein described, so long as the same is operated to furnish water for public consumption, any of the following: septic tanks and drainfields, sewerlines, underground storage tanks, county or state roads, railroad tracks, vehicles, structures, barns, feeding stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste or garbage of any kind. The parties will not cross connect any portion or segment of the water system with any other water source without prior written approval of Whatcom County Health Department and/or other appropriate governmental agency.

WATER SYSTEM PURVEYOR

Smith is designated "Purveyor" of the water system. The purveyor shall be responsible for arranging submission of all necessary water samples as required in the Washington Administrative Code, and handling emergencies such as system shutdown and repair. The purveyor shall provide his/her name, address and telephone number to the Health Officer and shall serve as a contact person to the Health Officer. The purveyor shall organize and maintain the water system records and notify the Health Officer and all parties, service connections and lots that are included in this agreement, of the water quality tests that are required by WAC 246-291. Water system records shall be available for review and inspection by all parties in this agreement and the Health Officer.

PROVISIONS FOR CONTINUATION OF WATER SERVICE

The parties agree to maintain a continuous flow of water from the well and water system, herein described in accordance with public water supply requirements of the State of Washington and Whatcom County. In the event that the quality or quantity of water from the well becomes unsatisfactory as determined by the Health Officer, the parties shall develop a new source of water. Prior to development of, or connection to a new source of water, the parties shall obtain written approval from the Health Officer. Each undivided interest and/or party shall share equally in the cost of developing the new source of water and installing the necessary equipment associated with the new source.

RESTRICTION ON FURNISHING WATER TO ADDITIONAL PARTIES

It is further agreed by the parties hereto that they shall not furnish water from the well and water system herein above described to any other persons, properties or dwelling without prior consent of both properties and written approval from Clark County Health Department.

HEIRS, SUCCESSORS AND ASSIGNS

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

ENFORCEMENT OF AGREEMENT ON NON-CONFORMING PARTIES AND PROPERTIES

The parties herein agree to establish the right to make reasonable regulations for the operation of the system, such as the termination of service if bills are not paid within forty-five days of the due date, additional charges for disconnection, reconnection, etc. Parties not conforming with the provisions of this agreement shall be subject to interest charges of __% per annum together with all collection fees.

After recording, return to
Clark County Public Health
1601 E Fourth Plain Blvd., Bldg 17
Vancouver, WA 98662

NOTICE TO FUTURE PROPERTY OWNERS
COMMERCIAL/NON-RESIDENTAL PUBLIC WATER SYSTEM

GRANTOR(S):_____

LEGAL DESC:_____

_____

_____

TAX PARCEL #:_____

This property is served by a public water system which is subject to the provisions of Chapter 246291 WAC. This system may also be subject to other state and local regulations. The system owner is responsible for maintaining this system in compliance.

The name of this system is: _____

The state Department of Health and local health departments share administration of the drinking water regulations. Therefore, when the term "department" is used, it refers to whichever agency regulates this particular system. You can contact the local health department to find out which agency is applicable.

This water system is designed to provide for _____ services. Additional planning and design approvals must be obtained from the department prior to expanding beyond this number of services. Please note that the design flow standards account for commercial use only. The design assumes that all buildings will be equipped with ultra low flow plumbing fixtures and that all users will keep conservation in mind whenever they use this system. Additionally, if system wide water use exceeds 5000 gallons per day or if the total property being irrigated by the system exceeds 1/2 acre, a water right permit must be obtained from the Department of Ecology.

Public water systems are subject to ongoing requirements. These include periodic water quality monitoring, system maintenance and various record keeping. Prior to purchasing this property, it is recommended that you contact the department to determine whether this system is in compliance with applicable regulations. Fees may be charged by the department for providing various services.

The department maintains current information on this system to expedite retrieval of information for your use or for lending institutions which require information on the system as part of their loan approval process. Each time information changes, such as a change in the number of homes

NOTICE TO FUTURE PROPERTY OWNERS – COMMERCIAL/NON-RESIDENTIAL PUBLIC WATER SYSTEM

number of homes connected to the system; a change in owner/operator name, address or phone number; etc., the owner of the water system must submit an updated *Water Facilities Inventory Form* to the department.

This system (has/has not) been granted one or more waivers from specific provisions of the regulations. (Attach a brief summary of waivers, if any, which were granted.)

At the time this system is fully developed, the financial plan indicates an average cost of _____ /year per connection to properly operate and maintain the system in compliance with state and local drinking water regulations. Current information on costs is available from the system owner.

The department recommends and may require ownership and/or operation by a state-approved satellite management agency.

WITNESS my hand this _____day of _____, 20 _____.

_____Grantor

_____Grantor

State of Washington)

County of Clark)

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.

_____

Notary Public in and for the State of Washington

Residing at: _____

(SEAL or STAMP)

FILING: Clark County Auditor (Recording Department)
1300 Franklin
Vancouver, WA 98660
(360) 397-2241

After recording, return to:
Clark County Public Department
1601 E Fourth Plain Blvd, Bldg. 17
Vancouver, WA 98662

NOTICE TO FUTURE PROPERTY OWNERS
RESIDENTIAL PUBLIC WATER SYSTEM

GRANTOR(S):_____

LEGAL DESC.:_____

_____

_____

TAX PARCEL #:_____

This property is served by a public water system which is subject to the provisions of Chapter 246-291 WAC. This system may also be subject to other state and local regulations. The system owner is responsible for maintaining this system in compliance.

The name of this system is:_____

The state Department of Health and local health departments share administration of the drinking water regulations. Therefore, when the term "department" is used, it refers to whichever agency regulates this particular system. You can contact the local health department to find out which agency is applicable.

This water system is designed to provide for _____ services. Additional planning and design approvals must be obtained from the department prior to expanding beyond this number of services. Please note that the design flow standards account for domestic use and watering of a typical lawn and garden space only. The design assumes that all buildings will be equipped with ultra low flow plumbing fixtures and that all users will keep conservation in mind whenever they use this system. Additionally, if system wide water use exceeds 5000 gallons per day or if the total property being irrigated by the system exceeds 1/2 acre, a water right permit must be obtained from the Department of Ecology.

Public water systems are subject to on-going requirements. These include periodic water quality monitoring, system maintenance and various record keeping. Prior to purchasing this property, it is recommended that you contact the department to determine whether this system is in compliance with applicable regulations. Fees may be charged by the department for providing various services.

The department maintains current information on this system to expedite retrieval of information for your use or for lending institutions which require information on the system as part of their loan approval process. Each time information changes, such as a change in the number of homes connected to the system; a change in owner/operator name, address or

NOTICE TO FUTURE PROPERTY OWNERS – RESIDENTIAL PUBLIC WATER SYSTEM

phone number; etc., the owner of your system must submit an updated *Water Facilities Inventory Form* to the department.

This system (has/has not) been granted one or more waivers from specific provisions of the regulations. (Attach a brief summary of waivers, if any, which were granted.)

At the time this system is fully developed, the financial plan indicates an average cost of _____ /year per home to properly operate and maintain the system in compliance with state and local drinking water regulations. Current information on costs is available from the system owner.

The department recommends and may require ownership and/or operation by a state-approved satellite management agency.

WITNESS my hand this _____ day of _____, 20_____.

_____Grantor

_____Grantor

State of Washington)

County of Clark)

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.

_____

Notary Public in and for the State of Washington

Residing at:_____

(SEAL or STAMP)

FILING:
Clark County Auditor (Recording Department)
1300 Franklin
Vancouver, WA 98662
(360) 397-2241

After recording, return to:
Clark County Public Health
1601 E Fourth Plain, Bldg. 17
Vancouver, WA 98662

DECLARATION OF COVENANT
PUBLIC WATER SUPPLY

GRANTOR: _____

GRANTEE: _____

LEGAL DESC.: _____

_____

TAX PARCEL #: _____

The grantor herein is (are) owner(s) of (an interest in) the following described real estate situated in Clark County, State of Washington, to-wit: _____

_____

on which the grantor reserves an area to own and operate a future well and waterworks supplying water for public use located on said real estate, to-wit: **(PINPOINT THE ACCURATE LOCATION OF THE WELL SITE, FOR EXAMPLE, 125 FEET OF THE SOUTH PROPERTY LINE AND 100 FEET EAST OF THE WEST PROPERTY LINE)**_____

_____

_____

and said grantor is required to keep said well or waterworks potable.

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

NOW, THEREFORE, the grantor(s) agree(s) and covenant(s) that said grantor its (their) heirs, successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor and within **100 feet** of the well on the land of the grantor and potential source of contamination (per the Clark County Drinking Water Ordinance 24.11 and WAC's 173-160, 246-290 and 246-291) including but not limited to a septic tank and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosures for maintaining fowl or animal manure, liquid or dry chemical storage, application of herbicides or insecticides, hazardous waste, ponds or lakes, storm water facilities, any type of surface water or garbage of any kind or description.

These covenants shall run with the land and shall be binding on all parties having or acquiring and right, title or interest in the land described herein or any part thereof, as long as said well or waterworks is used for the purpose of supplying potable water.

Declaration of Covenant
Public Water Supply

WITNESS my hand this _____ day of _____, 20_____.

_____Grantor
_____Grantor

State of Washington)

County of Clark County)

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.

_____
Notary Public in and for the State of Washington

Residing at:_____

(SEAL or STAMP)

FILING:

Clark County Auditor (Recording Department)
1300 Franklin
Vancouver, WA 98660
(360) 397-2375

After recording, return to:
Clark County Health Department
1601 E Fourth Plain Blvd., Bldg. 17
Vancouver, WA 98660

RESTRICTIVE COVENANT
PUBLIC WATER SUPPLY

GRANTOR: _____

GRANTEE: _____

LEGAL DESC.: _____

_____

TAX PARCEL #: _____

The grantor herein is (are) owner(s) of (an interest in) the following described real estate situated in Clark County, State of Washington, to-wit: **(NEIGHBOR'S LEGAL, PARCEL NUMBER AND ADDRESS)**_____

_____

The grantee(s) herein, _____ is (are) the owner in fee simple of (an interest in) the following real estate situated in Whatcom County, State of Washington, to-wit: **(WELL OWNER'S LEGAL, PARCEL NUMBER AND ADDRESS)**

_____

on which the grantee owns and operates a well and waterworks supplying water for private use located on said real estate, to-wit: **(PINPOINT THE ACCURATE LOCATION OF THE WELL SITE, FOR EXAMPLE, 125 FEET OF THE SOUTH PROPERTY LINE AND 100 FEET EAST OF THE WEST PROPERTY LINE)**_____

_____

which well and waterworks is in close proximity to the land of the grantor(s), and said grantee(s) is (are) required to keep the water supplied from said well or waterworks free from impurities which might be injurious to public health.

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

NOW, THEREFORE, in consideration of One Dollar ($1.00) in hand paid and other good and valuable consideration received by said grantor(s), the grantor, agree(s) and covenant(s) with the grantee, its successors and assigns, said covenants to run with land for the benefit of the land of the grantee, that said grantor, its (their) heirs, successors and assigns will not

Restrictive of Covenant
Public Water Supply

construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor and within **100 feet** of the well on the land of the grantee, any potential source of contamination (per Clark County Drinking Water Ordinance 24.11 and WAC's 173-160, 246-290 and 246-291) including but, not limited to any easements for ingress and egress, sewer main, privy, sewage or manure lagoon, railroad tracks, manure pile, drainfield or any other receptacle for the disposal of sewage, storm water facility, roads, underground fuel tank, structure for the storage of liquid or dry chemicals, application or storage of herbicides or pesticides or ponds or lakes.

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, as long as said well or waterworks is used for the purpose of supplying potable water.

WITNESS my hand this _____ day of _____, 20_____.

_____Grantor
_____Grantor

State of Washington)
County of Clark)

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.

_____
Notary Public in and for the State of Washington
Residing at:_____

(SEAL or STAMP)

FILING:
Clark County Auditor (Recording Department)
1300 Franklin
Vancouver, WA 98660
(360) 397-2375

CERTIFICATION OF INSPECTION AND INSTALLATION
OF GROUP B (3 – 14 CONNECTIONS ONLY)
PUBLIC WATER SYSTEM PROJECTS

Within sixty days following the completion of and prior to the use of any project or portion thereof for which plans and specifications have received the approval of Clark County Health Department, and signed by the water system designer or professional engineer that the project was inspected by him/her or his/her authorized agent and that it is constructed in accordance with the plans and specifications approved by the appropriate agency.

Instructions:

1. If a project is being completed in stage construction, attach a map and description of the portion of the project being certified as completed as approved on the date given below.

2. As future portions of staged construction projects are completed, each must be certified as required by WAC 246-290-040.

_____
Name of Water System

Date Plans and Specifications were approved:_____

_____
Mailing Address

Date project or portions thereof completed:_____

_____
City State Zip

The undersigned water designer or his authorized agent has inspected the above described project, which as to layout, size and type of pipe, valves and material, reservoir and other designed physical facilities have been constructed in accordance with the plans and specifications approved by the Clark County Health Department, and in the opinion of the water designer or professional engineer, the installation, testing and disinfection of the system was carried out in accordance with the specifications approved by the appropriate agency for the project. A hydrostatic pressure test was conducted on __ and the pressure was _____. The pressure did not vary more than five psi for the duration of the test.

Engineer's Seal, if Applicable

_____
Water System Designer or Professional Engineer

_____
Date

Please return to: Clark County Health Department
1601 E Fourth Plain Blvd., Bldg. 17
Vancouver, WA 98662
Phone: (360) 397-8428 Fax: (360) 397-8091

DECLARATION OF WATER UTILITY SERVICE AREA

For

CLARK COUNTY COORDINATED WATER SYSTEM PLAN

This Declaration, submitted by the _____ water utility, confirms that the attached map accurately identifies the service area **that the water utility is willing and able to serve unless regulatory constraints do not enable the utility to do so.**

The intent of this declaration is to define service areas in a manner, which assures that time, effort and money are best used by avoiding any unnecessary duplication of service. **In the absence of overlapping boundaries**, the Clark County Health Department along with the Washington State Department of Health (DOH) will recognize these boundaries as the exclusive service are of the undersigned utility, giving the utility **right of first refusal** for serving future customers.

As a condition of being granted this designate service area, the utility will be required to ensure that the same boundary is utilized for preparation of its individual water system plan. **The utility will also need to provide service in a manner consistent with its own individual water system plan and service policies. The utility also fully recognizes that this declaration is developed in fulfillment of the Clark County Coordinated Water System Plan (CWSP).**

The person signing below assures that he or she has been authorized to sign the Declaration on behalf of the utility.

_____ _____

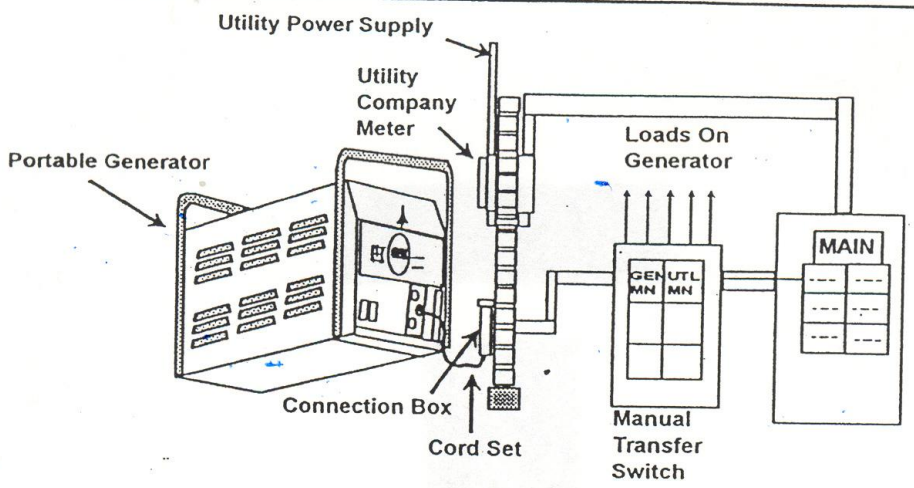
Date Water Utility

_____

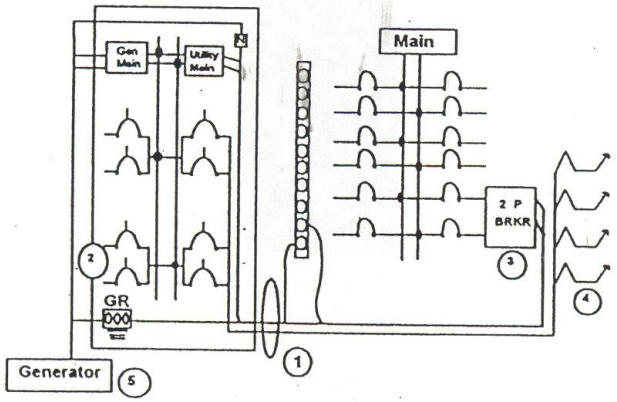
Authorized Representative

_____

INFORMATION SHEET *
GENERATOR DISCONNECT / MANUAL TRANSFER SWITCH



Typical Use of a Portable Generator in an Emergency Power Application



Installation Instructions

(1) Install transfer switch next to existing panelboard using a conduit nipple to convey all the wires between the transfer switch and the existing panelboard. N.E.C. ART. 310; Item 8(A): Derating of conductors shall not comply to conductors in nipples having a length not exceeding 24 inches (610mm).

(2) Install the circuit breakers in the transfer panel for the lights and appliances that are needed on generator.

(3) Install 2 pole circuit breaker in existing panelboard, matching the amps of the utility main in the transfer switch. Install proper conductors to transfer switch for utility main, neutral and ground.

(4) Convey wires for the circuits from transfer switch to the existing panelboard. Remove conductors from the circuit breakers and splice to wires from transfer switch. N.E.C., ART. 374-5; If there are not more than 30 conductors in a cross section on each side of the panelboard breaker channels and if it does not exceed 20% of the fill.

(5) Connect wires from generator according to local code in 3R box or WMTSMBL 1430 power inlet box.

*Work should be performed by a licensed electrician. Contact a licensed electrician or the Washington State Department of Labor & Industries for further information.

DW 2/28/95

CLARK COUNTY PUBLIC HEALTH
1601 E Fourth Plain. ♦ PO Box 9825
Vancouver, WA 98666-8825
(360) 397-8428 ♦ Fax (360) 397-8091

WELL PUMPING TEST DATA REPORT

Well Owner Name: _____ **Date:** _____

Mailing Address: _____ **Phone:** _____

_____

Job Location: _____ Cnty: _____ State: _____

_____

Well Depth: _____ Pump @ _____ Well Description: _____
Pre-test Static W.L.: _____ Date: _____ _____
Measuring Pt. (MP): _____ _____
Pump Type: _____
Tested by: _____ Pump Company: _____
_____

Date	Test Time		Level	Drawdown	Air	Discharge	Water Condition
	Time Start	Recovery	(below MP)	(SWL-level)	Gauge	GPM	/ Remarks

This report shall document static & pumping water levels, discharge, recovery, and test duration. Minimum testing durations following drawdown stabilization are : 2 hrs for SINGLE DOMESTIC; 6 hrs for GROUP B wells. Pumping levels shall be considered stabilized at 1 ft/hr drawdown with constant discharge rate. **Additional table space on reverse side.**

WELL PUMPING TEST DATA REPORT

Date	Test Time		Level	Drawdown	Air	Discharge	Water Condition
	Time Start	Recovery	(below MP)		Gauge	GPM	/ Remarks