Part

C

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Appendix C-1
Technical Standards and Specifications

1 Introduction

The Technical Standards and Specifications (Standards) outline the general and specific design and construction requirements for water systems operated and maintained by or for the Department of Corrections. Work completed by on-site staff must also comply with the standards and specifications listed herein.

Throughout this document any reference to DOC or project manager shall be the DOC Project Manager, DOC Plant Manager, or their authorized representative.

In general, all construction activities and material specifications shall conform to the following specifications. Specifications are listed in priority order. In case of conflicts between two sets of specifications, the one listed first below shall have precedence:

- Detailed plans and technical specifications written for a single project
- This document
- Rules and regulations of the Department of Health regarding the health aspects of Public Water Systems, Chapter 246-290 WAC, latest revision
- Recommendations of the manufacturer of materials or equipment
- "Standard Specifications for Road, Bridge, and Municipal Construction," Washington Department of Transportation/American Public Work Association, (DOT/APWA), latest edition
- Standards of the American Water Works Association (AWWA), latest revision.

2 Design Standards

2.1 Facility Placement

All DOC owned lines, pumps, wells, storage, and other facilities shall be located on property owned or leased by the DOC, public rights-of-way, or utility easements dedicated to the DOC. Normally utility easements will be a minimum of 20 feet in width, and lines will be installed no closer than five feet from the edge of easement. All location of DOC facilities within city or county rights-of-way must be approved by the appropriate entity.

In general, water lines within facility boundaries shall not be laid in travel way of existing roadways. Site specific modification to this requirement may be made with approval of the project manager.

2.2 Water Source Development

Water Source Construction

New water sources must be designed to meet the Department of Ecology (Ecology) and DOH regulations and design guidelines. Reference documents include RCW 18.104, Water Well Construction, administered by DOH; WAC 173-160, Minimum Standards for Construction and Maintenance of Water Wells, administered by Ecology; and WAC 246-290, regulations regarding the health aspects of public water system, as administered by DOH.

All test and production wells must be drilled in accordance with detailed drilling and testing specifications, which have either been prepared by, or approved by the DOC.

All new groundwater sources shall be provided with an access port for insertion of devices to measure depth to water and a meter to measure total production.

Water Rights

Water rights must be obtained in accordance with Ecology regulations and procedures (RCW 90.03 and 90.44). Water rights documents, correspondence, and other associated records will be maintained at DOC Headquarters by Environmental Services and at the appropriate institution. Ecology will also have a complete set of records.

Water Quality

Water quality must be proven to conform with the Federal Safe Drinking Water Act (as amended), DOH criteria specified in WAC 246-290, and/ or any additional requirements of the health district that has jurisdiction over the DOC facility.

2.3 Storage Requirements

Storage requirements are based upon adding the three components listed below, less any credit for the operation of reliable multiple wells, or other sources of water, with the largest source assumed to be out of service:

1. Standby storage (two times average day demand) required to supplement production from water sources during high demand periods.
2. Equalizing storage (greater of 150 * (peak hour demand (PHD) – Source capacity) or 15 percent of one peak day demand) required to supplement production from water sources during high demand periods.
3. Fire storage is equal to the flow/duration required for the area by applicable city or county ordinances, or the appropriate local fire district, whichever is more stringent.
4. Storage shall be in full compliance with Section 9 of the DOH Design Manual (latest edition).

2.4 Pressure Requirements

Water systems shall be designed to maintain a minimum residual pressure of 40 psi at meter outlets under peak hourly design flow conditions, excluding fire demand. This is higher than the DOH regulatory minimum system pressure of 30 psi under the conditions described above, for which water systems are analyzed to determine regulatory compliance. Furthermore, water systems shall be hydraulically designed to provide to service connections a maximum pressure range of 30-100 psi, with a desired range of 40-90 psi. For water systems requiring fire flow capability, the design shall be adequate to maintain, under peak day demand plus fire flow conditions, positive pressure throughout the system of 20 psi, as per WAC 246-290-230 requirements.

2.5 Pipe Sizing

Water mains shall be sized using the current edition of "Sizing Guidelines for Public Water Supplies," prepared by DOH. In general, pipe sizes shall not be less than 6 inches in diameter. For sizes 6 inches and above, minimum line size may be established by a licensed engineer using recognized hydraulic analysis techniques. Water line size shall be adequate to deliver required fire flow and to maintain the pressure requirement defined in paragraph 2.4 above.

Design criteria and analysis for water line improvements will normally use a maximum design velocity of 7 feet per second and a maximum head loss of 10 psi per 1,000 feet, although both criteria may be exceeded in certain cases under transient high flow conditions.

Water mains serving fire hydrants, as part of new construction, planned phased improvements, or replacement projects, shall be not less than 8 inches in diameter for a dead end line, nor less than 6 inches in diameter if looped. Hydrant leads extending less than 50 feet shall be of suitable size to carry the required fire flow, but shall not be less than 6 inches in diameter.

2.6 Pipe Cover

The depth of trenching, installation of water lines, and backfill shall be such as to give a minimum cover of 36 inches over the top of the pipe. This standard applies to transmission, distribution, and service lines. Backfill and compaction will be in accordance with applicable construction standards identified below. Materials capable of damaging the pipe or its coating shall be removed from the backfill material. Backfill material shall not contain rocks greater than 3/4-inch in diameter.

2.7 Isolation Valves

Valves shall be installed at all crosses and tees. The number of valves at each intersection shall equal the number of connecting lines. In addition, unvalved lengths of pipe shall not exceed 500 feet within the distribution system and 1,000 feet in

transmission mains. Dead end mains, having the potential for future extension, shall have a valve installed on the end of the main which shall be the same size as the existing main. A blind flange or plug (depending on valve connection) shall be installed on the valve.

All services to buildings shall have a valve located between the building connection and the distribution line.

2.8 Air and Air-vacuum Relief Valves

In order to minimize problems associated with air entrainment, air or combined air-vacuum relief valves shall be installed at points of high elevation throughout each distribution system. To prevent freezing, the vault lid and vault cavity will be insulated as directed by the DOC. These valves shall be installed as per these standard specifications and Standard Detail No. 1.

2.9 Blowoff Valves

A blowoff valve assembly shall be installed on all permanent dead-end runs and at designated points of low elevation within the distribution system. The blowoff valves shall be installed on DOC property or utility rights-of-way except where a written access and construction easement is provided to the DOC. In no case shall the location be such that there is a possibility of back-siphoning into the distribution system.

2.10 Fire Hydrant Locations

The requirements of the local fire authority shall dictate the location and placement of fire hydrants.

2.11 Water and Sewer Line Separation Distances

Transmission and distribution water piping shall be separated at least 10 feet horizontally (center-to-center) from waste disposal piping, drain fields, and/or wastewater gravity or force mains (where possible). The bottom of the water main shall be 18 inches above the top of the sewer component. All parallel and crossing installations of water and sewer lines shall be in accordance with provisions of WAC 248-96 (septic systems) and Section 2.413 of Ecology criteria for sewage works design.

2.12 Lids for Buried Vaults

All steel hatch lids for buried vaults shall be lockable and designed to meet HS-20 loading requirements. Openings in buried vaults for pipe to pass through shall be core drilled and sealed with link-seals.

3 Material and Installation Specifications

3.1 Introduction

All pipe, valves, meters, hydrants, fittings, and special material shall be undamaged, and designated for use in potable water systems. If used, undamaged materials are considered for service, they must be fully disinfected prior to being put into service. All material suppliers shall be bonded sufficiently for the value of material supplied. The subsequent paragraphs list specific requirements of the DOC. As time passes, industry is expected to develop water system components which are superior to the products or standards specified below. Use of components with proven, superior qualities is encouraged; however, deviations from the specifications in this manual will require prior, written authorization of the Plant Manager for the facility. Where a component is specified by manufacturer and/or model number, "or approved equivalent," the DOC must approve the equivalent component in writing.

3.2 Pipe, Joints, and Fittings

General

All pipe sizes, as shown on the drawings, and as specified herein, are in reference to "nominal" diameter, unless otherwise indicated. All pipe shall meet the DOC's standard specifications. One type of pipe shall be used throughout entire projects, except as necessary to match existing water lines, or as otherwise specified in writing by the DOC. Where relocation of, or replacement of, existing water lines is necessary during construction, materials used shall be subject to the written approval of the DOC.

The DOC does not allow the installation of new lead-based pipe, joints, or fittings.

Ductile Iron Pipe (DI)

Ductile iron pipe shall conform to the requirements of AWWA C151-76 specifications. Pipe thickness shall be of Class 50 or greater, if required, in accordance with the criteria specified in AWWA C150-76.

DI pipe shall be cement lined and sealed in accordance with AWWA C104-80. In addition, all pipe shall have mechanized joints or push-on rubber gasket joints and be furnished in ten to twenty foot lengths unless design conditions dictate otherwise.

DI pipe shall be Pacific States, or approved equivalent.

Polyvinyl Chloride (PVC) Pipe

PVC pipe shall conform to the requirements of AWWA C900-81 specifications. PVC pipe for distribution lines shall be pressure class 200. The pipe shall bear the seal of the

National Sanitation Foundation for potable water pipe. All pipe shall be listed by the Underwriters Laboratories, Inc.

PVC pipe shall be made from Class 12454-A or Class 12454-B virgin compounds, as defined in ASTM D1784. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM 3477. Solvent welded pipe joints will not be permitted.

PVC pipe shall be Johns Manville, or approved equivalent.

Galvanized Iron Pipe (GI)

Galvanized iron pipe shall conform to the latest revision of ASTM A-120 or A53, Grade A, Schedule 40, seamless pipe. Pipe shall be hot-dip galvanized. Pipe fittings shall be galvanized and threaded.

Fittings

All fittings shall be of the size, and type specified on the plans or by the pipe manufacturer.

Locator Wire and Warning Tape

All pipe shall be laid with one piece of No. 14 insulated copper wire. The locating wire shall be placed immediately adjacent to the pipe and connected to all valves. Warning tape will not be used as an alternative to wire but in some situations will be used in addition to the wire. Warning tape will be laid approximately 18 inches below the finish grade.

Compression (crimp) fittings shall be used in all wire splices. Locator wire shall be extended 1 foot above the ground at all valve locations except in offender areas and areas of foot traffic. For fire hydrants and blow-off valves, the locator wire shall be extended 1 foot above the hydrant traffic flange and 1 foot above grade at the blow-off valve.

3.3 Valves

Gate Valves

Valves shall be manufactured and tested in accordance with AWWA C500 specifications. They shall be equipped with mechanical joints or flange ends of Class 125 in accordance with ANSI B16 1. All gate valves shall open counterclockwise and, unless otherwise specified, shall be non-rising stem type, equipped with standard square stem nuts.

Gate valves, 2 inches and larger, shall be iron-body, resilient wedge valves which conform to AWWA C509 standards.

Gate valves smaller than 2 inches shall be 125 psi, wedge disk, all brass or bronze valves with screwed, soldered, or flanged ends which are compatible with the connecting pipe.

Gate valves shall be Dresser, Kennedy, Mueller, or approved equivalent.

Butterfly Valves

Butterfly valves shall be approved for use only where special applications are required. Butterfly valves shall meet or exceed all AWWA C504-80 specifications and shall be Class 150-B valves with short body which are suitable for direct bury. When they are installed, they shall have a position indicator which clearly shows the position of the disc. All butterfly valves shall be installed with the operator nut located toward the center line of the street. All valves shall be equipped with an underground manual operator with AWWA 2-inch square nut, and shall open with a counterclockwise rotation.

All butterfly valves shall be Dresser, Pratt, or approved equivalent.

Check Valves

Check valves, 3 inches or larger, shall be iron body, iron disc, bronze-mounted, swing type, clearway, quiet closing, lever and spring valves with flanged ends. All valves shall comply with AWWA C508-76 specifications.

Check valves, smaller than 3 inches, shall be bronze body, bronze-mounted, swing type with flanged or threaded ends depending upon installation.

Check valves shall be Dresser, Mueller, or approved equivalent.

Air and Air-Vacuum Relief Valve Assembly

Air and air-vacuum relief valves shall have cast iron bodies and covers and stainless steel floats. Float guides, bushings, and lever pins shall be stainless steel or bronze. Valves shall be designed for operating service to 150 pounds per square inch (psi). Air and air-vacuum relief valve assembly materials shall conform to Standard Detail No. 1.

Air and air-vacuum relief valves shall be APCO Model No. 142 or No. 143C for one-inch, or No. 144 or No. 145C for 2-inch, or approved equivalent.

Pressure Reducing Valve (PRVs)

PRVs within distribution systems shall maintain a constant outlet pressure with varying inlet pressures. PRVs shall be hydraulically operated, pilot-controlled, diaphragm-type, globe or angle valves. The main valve shall have a single removable seat and a resilient disc. The stem shall be guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. No external packing glands are permitted, and there shall be no pistons operating the main valve or any pilot controls. The pilot control shall be a direct-acting, adjustable, spring-loaded, normally open, diaphragm valve, designed

to permit flow when controlled pressure is less than the spring setting. The control system shall include a fixed orifice.

A bypass line of no less than three-quarters (3/4) the size of the main line PRV with isolation valves and pressure reducer shall be installed in parallel to the main PRV to manage low flows and assure continuity of service in event of main PRV failure.

Main line PRV installations shall conform to Standard Detail No. 2.

Main-line PRVs shall be Cla-Val Co. or approved equivalent and must have a local service representative.

Individual service pressure reducing valves shall be of bronze body construction with a renewable stainless steel seat, stainless steel integral strainer, and temperature resistant diaphragm. When required, they will be installed as directed by the DOC, on the owner's service line after the meter.

Individual service PRVs shall be Watts, Wilkins, or approved equivalent.

Valve Boxes

All valve boxes shall be two-piece cast iron, and equipped with a suitable extension for a 36-inch to 65-inch trench depth. Top sections and lids will be designed for installation in vehicular areas. Lids will be labeled "WATER," and lid tabs will point in the direction of the water main. Lids shall be lockable or secured as directed by the facility custody representative. All valves and valve boxes will be set plumb with the valve box centered on the valve. Valve box installation shall comply with Standard Detail No. 3A for paved area locations and No. 3B for unpaved area locations.

Cast iron valve boxes shall be Olympic Foundry or approved equivalent and must be compatible with the DOC's system.

Blowoff Valve Assembly

Two-inch blowoff assemblies shall be provided in accordance with either Standard Detail No. 4A or No. 4B at locations prescribed by the DOC.

The blowoff assembly shall consist of an approved saddle or cap, two-inch galvanized iron pipe, a valve box, a two-inch square nut gate valve, a two-inch stand pipe extending 36 inches above ground (24 inches between the valve and the stand pipe), an elbow at the bottom of the standpipe with a drain hole which discharges to drainage rock, a two-inch elbow with a two-inch male IPS inlet and a 2 1/2-inch male NST outlet, and a 2 1/2-inch locking fire cap.

Valve Marker Posts

A pre-cast valve marker post shall be furnished and installed with each single or closely grouped combination of valves. Marker posts shall be located as directed by the DOC.

Size of valve and distance (to the nearest foot) shall be stenciled on the face of the post with two-inch black painted figures. The top portion of the marker will be painted with blue enamel on all sides to aid location.

Valve marker posts shall be Fog-Tite Meter Seal Company, or approved equivalent.

3.4 Fire Hydrant Assembly

Fire Hydrant

Fire hydrant installation and flow requirements shall comply with the specifications and standards of the local fire authority.

Fire hydrants shall match existing hydrants at the specific facility or conform to AWWA Standard 502-80 for post-type, dry-barrel, self-draining hydrants suitable for at least a 54-inch depth. Each hydrant shall have a six-inch inlet, a minimum valve opening of 5 1/4 inches, two 2 1/2-inch hose connections, and a 4 1/2-inch pumper port with storz fitting. All ports shall have National Standard Threads or other connection devices consistent with local fire protection authority requirements. All valves and caps shall open counterclockwise and have a 1 1/2-inch flat point pentagon operation and cap nuts. Caps on fire hydrants within the secure perimeter must be lockable or secured as directed by the facility custody representative. Hydrants shall be break-away traffic models.

The configuration of the fire hydrant assembly shall be as shown in Standard Detail No. 5. The assembly shall have a cast iron tee (with mechanical joint connections to the main) a flanged tee, a 6-inch flanged gate valve with valve box, a 6-inch ductile iron pipe extension and shackle rods to connect the hydrant to the auxiliary valve at the main. The shackle rods shall be 3/4-inch diameter steel rods of suitable length.

Hydrants added to existing systems will be installed by wet tap. The hydrant shall have at least an 18-inch clearance between the ground and the lower port, and a 36-inch unobstructed radius around it for operation of a hydrant wrench. The steamer/pumper port shall face the street or the most likely direction of emergency approach.

Fire hydrants shall be Mueller, Iowa, or approved equivalent.

Hydrant Guard Posts

At locations specified by the DOC, schedule 40 steel posts filled with concrete 7 feet long and a minimum of 6 inches in diameter shall be installed according to standard detail No. 5 for fire hydrant installations.

3.5 Thrust Blocking

All hydrants shall be thrust blocked. Valves, tees and bends shall be either thrust blocked or installed with restrained joints (mega lug or equal). Only concrete thrust blocking is acceptable for installation of water system facilities. Concrete blocking shall be APWA

Class 5 (1 1/2) concrete mix, poured in place against undisturbed soil. Thrust blocking shall comply with the provisions of Standard Detail No. 6.

3.6 Cross-Connection Control Devices

Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross-connection control devices, in accordance with the cross-connection control program (see Section A7 of the Water System Plan for details).

3.7 Meters

Meter Set Assembly

Meter sets shall be installed using a meter yoke equipped with a locking angle meter valve and an angle check valve. Meter yoke inlets and outlets shall have male iron pipe size threads.

Meter yoke assemblies shall be Mueller H-1434-2, or approved equivalent as shown in Standard Details 11A and 11B.

Where static water pressure exceeds 80 psi, pressure reducing valves may be installed at the meter as directed by the DOC. Pressure reducing valves shall be Wilkins 600 or approved equivalent.

If meters need to be raised, Mueller H-14118 Meter Relocater, or approved equivalent shall be used.

Meter Boxes

Meter boxes shall be pre-cast concrete with steel cover and reader lid; Fog-Tite No. 1-D or approved equivalent. Carson 1419-15 with reader lid or approved equivalent may be used when meter location is away from vehicle traffic.

3.8 Water Treatment Chemicals

Any chemicals used in water treatment shall comply with the requirements of ANSI/NSF 60 Water Treatment Chemicals.

3.9 Materials in Substantial Contact with Drinking Water

Any products used to coat, line, seal, patch water contact surfaces (paint, pipe liners, interior tank coatings) or that have substantial water contact within collection, treatment, or distribution systems must comply with ANSI/NSF 61 Drinking Water System Components and Materials.

4 General Construction Standards

4.1 Safety

Contractors shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of work.

The Contractor shall comply with safety and health standards identified in Section 5.07 of the General Conditions for Washington State Facility Construction, latest edition.

4.2 Inspection Requirements

Unless previously authorized by the DOC, work on water mains shall not proceed without a DOC inspector or designee under contract to DOC being present. The DOC may refuse acceptance of any water mains installed without a DOC inspection. The presence or absence of an Inspector on any job will be at the sole discretion of the DOC. Such presence or absence of an Inspector will not relieve a Contractor of responsibility to deliver the construction results specified in the contract documents.

To permit scheduling an inspector, the DOC must receive a hard copy of the construction schedule at least two full working days before construction activities covered by the schedule begin. The DOC must be kept advised of changes to the construction schedule. When significant breaks in construction occur, the contractor must give two working days notice before resuming work. If contractor is working outside normal working hours, overtime expenses for DOC staff are the responsibility of the contractor.

All projects require design by a registered professional engineer licensed in the state of Washington. All work shall be inspected by the DOC or its designated representative, before closure of any excavation. Inspectors will be provided by the DOC or its designated representative. Inspectors will have access to work sites as necessary to keep the DOC informed of the progress of the work and the manner in which it is being done, to keep records, to act as liaison between the Contractor and the Manager, and to report any deviations from Plans or Specifications.

Inspectors shall have the authority to reject defective material and to suspend any work that is not conducted in accordance with the DOC's Technical Standards and Specifications only. DOC Inspectors are not authorized to issue instructions or to approve or accept any portion of the work which is contrary to the Plans and Specifications.

Failure of an inspector to call the attention of a Contractor to faulty work or deviations from the Plans or Specifications shall not constitute acceptance of said work.

Approvals, acceptances, or instructions, when given, must be in writing and signed by the DOC.

Any personal assistance which an Inspector may give a Contractor will not be construed as the basis of any assumption of responsibility in any manner, financial or otherwise, by the Inspector or the DOC.

4.3 Materials Delivery

Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the trench in a sound, undamaged condition. Particular care shall be taken not to injure the pipe, pipe coating, or lining. Before installation, the pipe and appurtenances shall be cleaned of foreign material and inspected for defects. Valves shall be cleaned of all foreign material and operated before installation to ensure proper functioning.

Pipe shall be delivered to the site capped and shall be stored in the same condition until ready for installation and disinfection.

Rubber gaskets shall be stored in a cool, dark place to prevent damage from the direct rays of the sun.

4.4 Alignment

Pipe shall be laid to specified grade and alignment as staked in the field. Alignment deviation shall not exceed plus or minus 0.5 feet, horizontally and vertically. Replacement of stakes lost or destroyed shall be made at the Contractor's expense and in accordance with contract plans, including modifications specified by the DOC.

4.5 Trench Excavation and Backfill

Trench excavation and backfill shall be performed in accordance with APWA Section 73-3, with a minimum cover of 36 inches. Grade staking, when required, will be performed by the contractor prior to installation of the mains. Compaction of backfill shall be accomplished by mechanical tamper in lifts not exceeding six inches to obtain 95 percent compaction. If the trench soil is unsuitable for trench backfill, as determined by the Inspector, the Contractor shall remove and dispose of unsuitable material and backfill the trench with approved backfill. The Contractor will keep the DOC informed of the disposal site of all unsuitable material removed form the project. New or unsuitable material shall not be dumped on neighboring properties. A typical trench section is shown in Standard Detail 10.

Finished backfill work shall leave all existing drainage ditches, culverts, and other appurtenances in a useable state equal to or better than their original condition.

4.6 Surface Restoration

Roads, driveways, shoulders, landscaping and all other areas removed, broken, caved-in, settled or otherwise damaged as a result of construction work, shall be repaired and/or resurfaced to match the existing surface or landscaped areas.

Existing shoulders and gravel surfaces shall be restored with like, crushed rock surfacing. Existing lawns shall be re-sodded after proper back-filling and consolidation. Existing landscaping, fences, mailboxes, ornamentation, etc. shall be restored as close to original conditions as possible. Private driveways, walks, and other surfaced areas shall be restored, patched, or resurfaced as required to match the original surface condition.

4.7 Excavation Standards

Excavation standards shall be adhered to in accordance with the provisions of the state of Washington Department of Labor and Industries and WAC Chapter 296-155 Part N - Excavation, Trenching, and Shoring.

4.8 Construction Site Erosion Control

Erosion control measures during construction shall be in full compliance with the Stormwater Pollution Prevention Plan prepared for the specific project and the General Industrial Stormwater Permit for the facility.

4.9 Sanitation Requirements

Extreme care should be used in checking and cleaning all pipe and fittings of dirt, debris and foreign matter during installation. All material shall be kept clean. Plugs shall be used to seal installed water mains when they are to be left for any period of time, including lunch breaks, coffee break, overnight, etc. Material contaminated by petroleum products or questionable chemicals shall be rejected. No trench water shall be allowed to enter installed water mains.

4.10 Main Testing and Flushing

All water mains shall be pressure tested in accordance with Section A8.4.11 of the DOC's Technical Standards and Specification. The Contractor shall provide all testing equipment. During construction, new water mains must be separated from the existing system (e.g. with a gate valve). Until satisfactory flushing, disinfection, and bacteriological sampling has been completed, the new water main must be treated as if it were contaminated. A connection can be made from DOC water mains to supply water for initial flushing, line filling, pressure testing, and disinfection. An approved backflow prevention assembly must be used on the supplying water line. The final testing shall be performed in the presence of a DOC inspector.

4.11 Hydrostatic Pressure and Leak Testing

A hydrostatic pressure and leakage test will be conducted on all newly-constructed water mains, fire lines, fire hydrant leads, and stubouts, after flushing, in accordance with APWA Section 7-11.3(11) and AWWA C-600 specifications. **Note: The DOC will assume no responsibility for the water tightness of existing valves.**

4.12 Disinfection and Bacteriological Testing

All water lines, reservoirs, and appurtenances shall be disinfected and tested at the contractor's expense in accordance with AWWA C601-68 and D105-80, DOT/APWA Section 7-11.2(12), and the requirements of DOH. Disinfected lines shall be flushed with water from the DOC's system and samples collected by DOC personnel from all mains for bacteriological testing. Copies of test results shall be retained by the both the Institution and DOC headquarters Environmental Services. If test results are not satisfactory, lines shall again be disinfected, flushed, and tested until two consecutive, satisfactory series of samples are obtained. Bacteriological testing must satisfy DOH criteria prior to acceptance or utilization of new water facilities.

4.13 Disposal of Disinfection Water

The chlorine concentration used for disinfection procedures (minimum 25 mg/L) renders water non-potable. Disinfection water, which contains chlorine, must be disposed of in accordance with Ecology specifications. Discharge of disinfection water into a storm drain, drainage ditch, or natural channel is a discharge to waters of the state and is prohibited by state law. Permission to discharge disinfection water must be obtained in advance from Ecology's Water Quality Section unless the water has been previously treated with a neutralizing agent. The chlorine in the water used to disinfect water lines, components, storage units, etc. may be toxic to fish and other aquatic life in the receiving waters.

Potential locations for disposal include, but are not limited to, the following:

- Tank truck for proper disposal off-site
- Sanitary sewer system (dechlorination is likely to be necessary for this option)
- Dechlorination and disposal to the stormwater collection system

4.14 Utility Location

New water lines and facilities shall be installed in accordance with the applicable county ordinance and specified utility location system. Where no ordinance applies, water mains shall be installed so as to be compatible with the existing water system, the terrain, geology, and the location of other utilities. Where practical, all water mains shall be installed parallel to the centerline on the North or East side of the street or road as shown on Standard Detail 7A and 7B. Deviations from standard locations must be documented, receive prior written approval by the DOC, and be accompanied by accurate "As-Built" maps. Water lines shall be located as follows:

Shoulder and Ditch Configuration

If practical, pipe shall be installed outside the ditch line, otherwise, it shall be installed in the shoulder, three feet from the edge of the travel lane.

Curb and Gutter Configuration

Pipe shall be installed three feet outside of the curb when there is a curb and gutter in the road cross-section.

4.15 Record Drawings

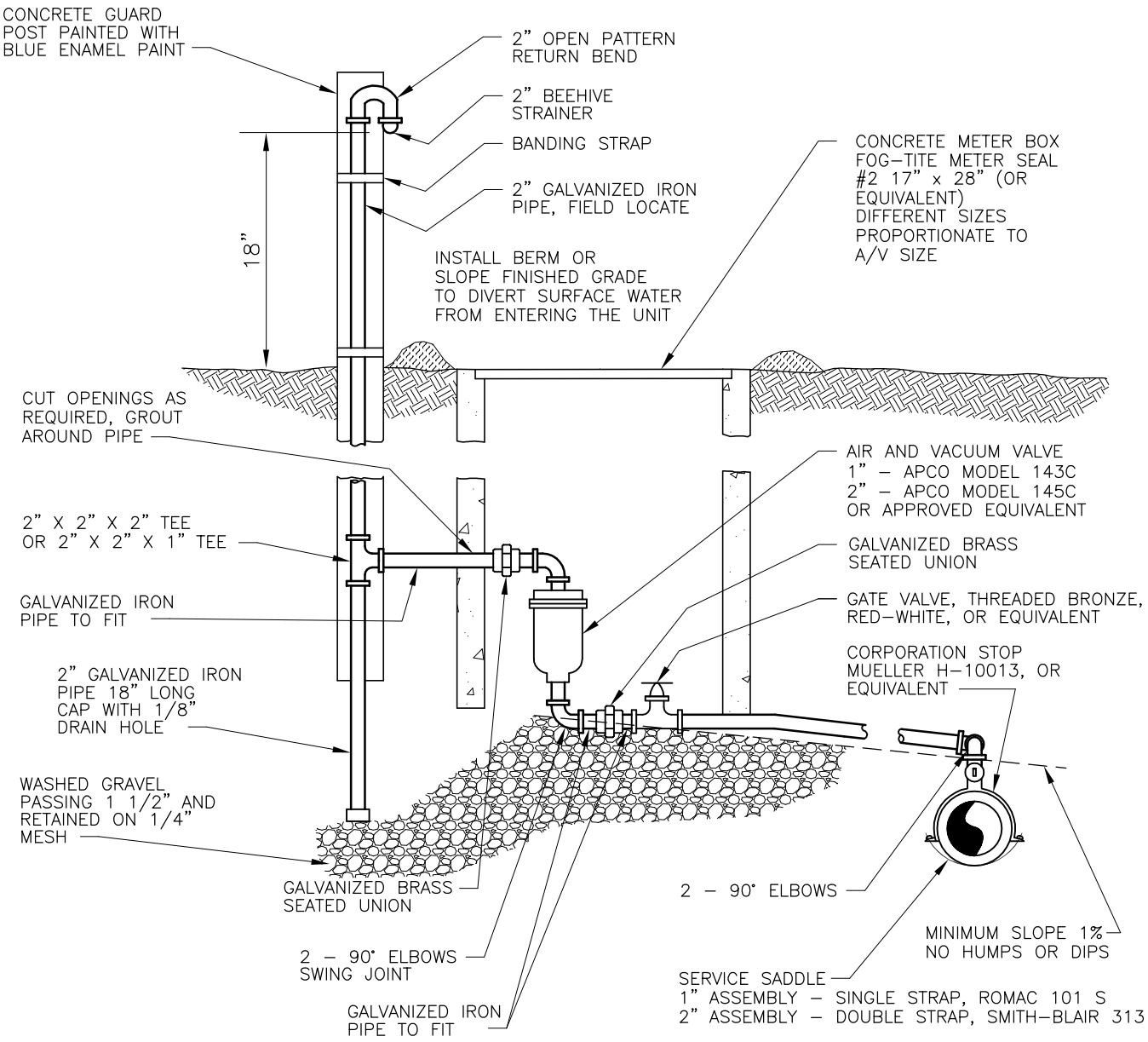
Prior to final payment to the contractor, accurate record drawings, tied to local horizontal and vertical data, shall be completed and delivered to the project manager in the format specified in the project specifications.

If included in the design contract, the design engineer shall prepare digital copies of the record drawings from the contractor. Both a digital and hard copy of the record drawing set shall be submitted to the project manager.

5 Standard Detail Drawings

Installation of water facilities shall conform with the preceding material and construction standards, and standard detail drawings below:

1. Air and air-vacuum relief valve assembly
2. Pressure reducing station
3A. Valve box - paved roadway
3B. Valve box - unpaved roadway
4A. 2-inch blowoff assembly
4B. 2-inch blowoff assembly - bottom connection
5. Fire hydrant assembly
6. Concrete thrust blocking
7A. Standard utilities location - shoulder and ditch configuration
7B. Standard utilities location - curb and gutter configuration
8A. Reduced pressure principle backflow devices (RPBD)
8B. Double check valve assemblies (DCVA)
8C. Double detector check valve assemblies (DDC)
8D. Pressure & atmospheric vacuum breakers (PVB/AVB)
9. Altitude valve assembly, vault plan, and elevation
10. Typical trench detail
11A. 1 1/2-inch and 2-inch meter yoke assemblies
11B. Meter set with pressure reducing valve.

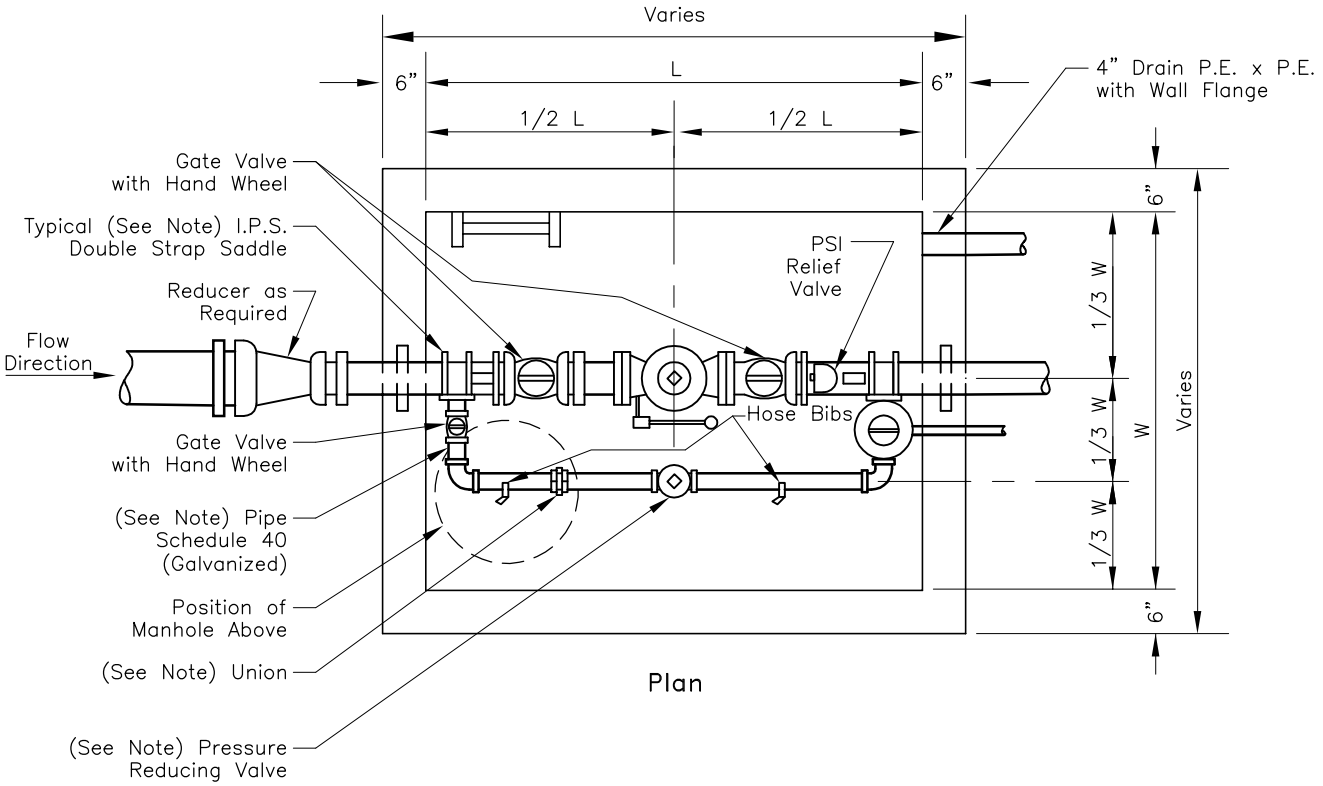


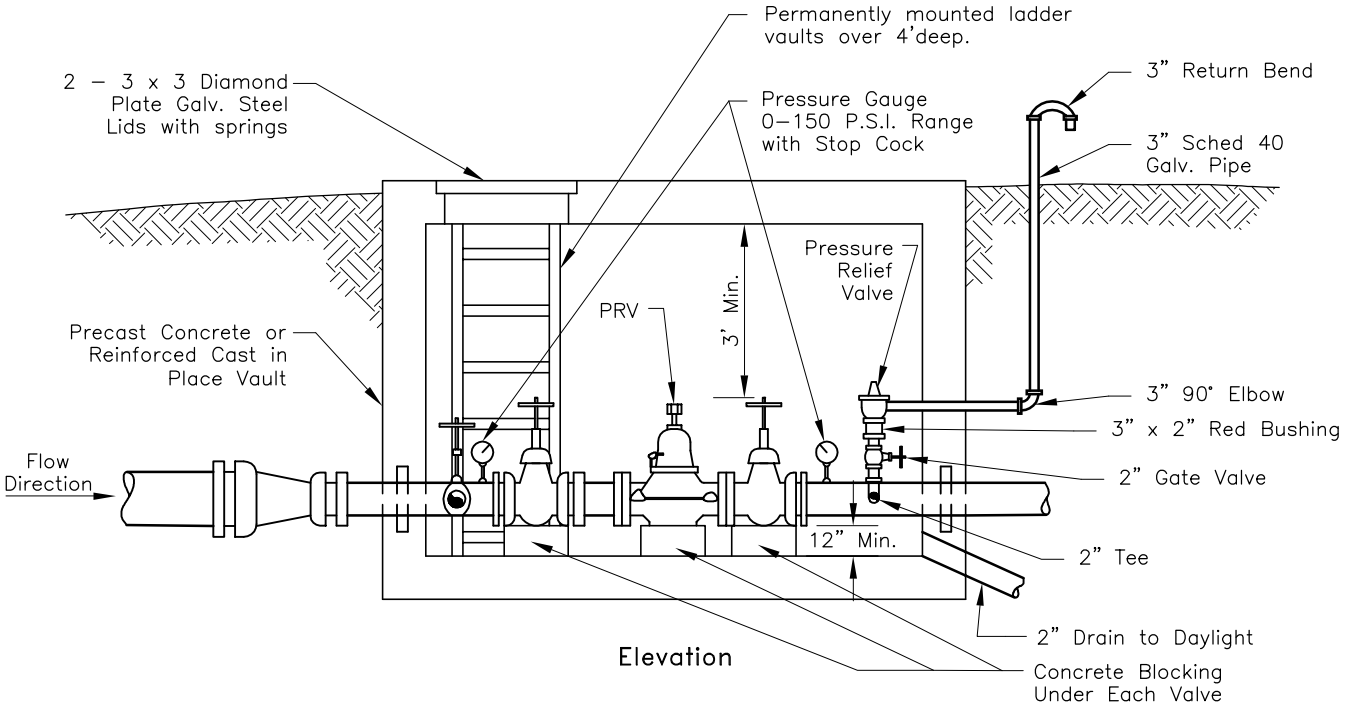
NOTE:
AIR & VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF LINE. IF HIGH POINT FALLS IN A LOCATION WHERE ASSEMBLY CANNOT BE INSTALLED, PROVIDE ADDITIONAL DEPTH OF LINE TO CREATE HIGH POINT AT A LOCATION WHERE ASSEMBLY CAN BE INSTALLED. ALL PIPE AND FITTINGS TO BE GALVANIZED IRON.

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #1
Air and Air-Vacuum Relief Valve Assembly



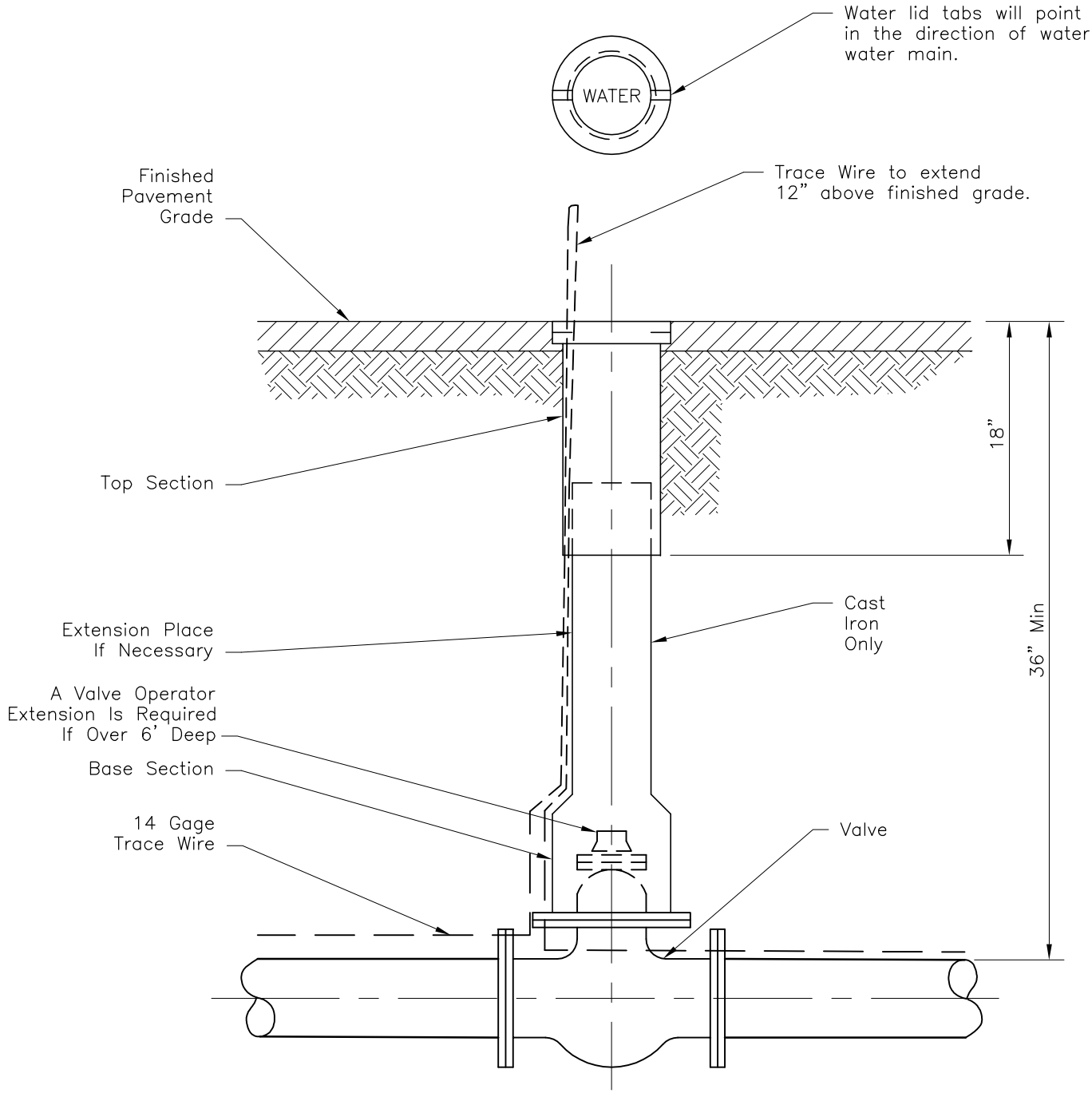


Note: Size varied by Engineer

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #2
Pressure Reducing Station

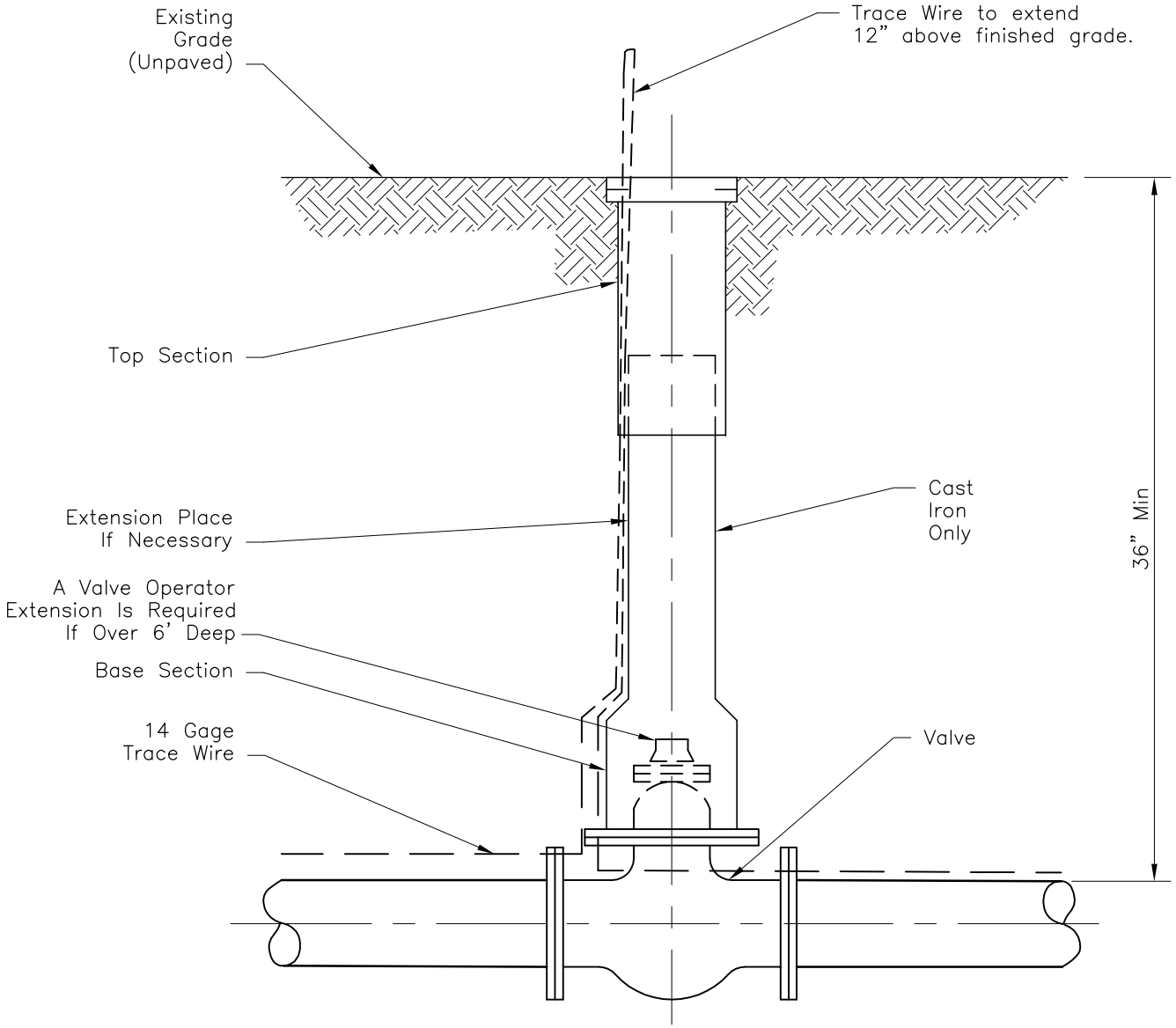


NOTE:
Valve Box by Olympic Foundry, or approved Equivalent.

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #3A
Valve Box
Paved Roadway

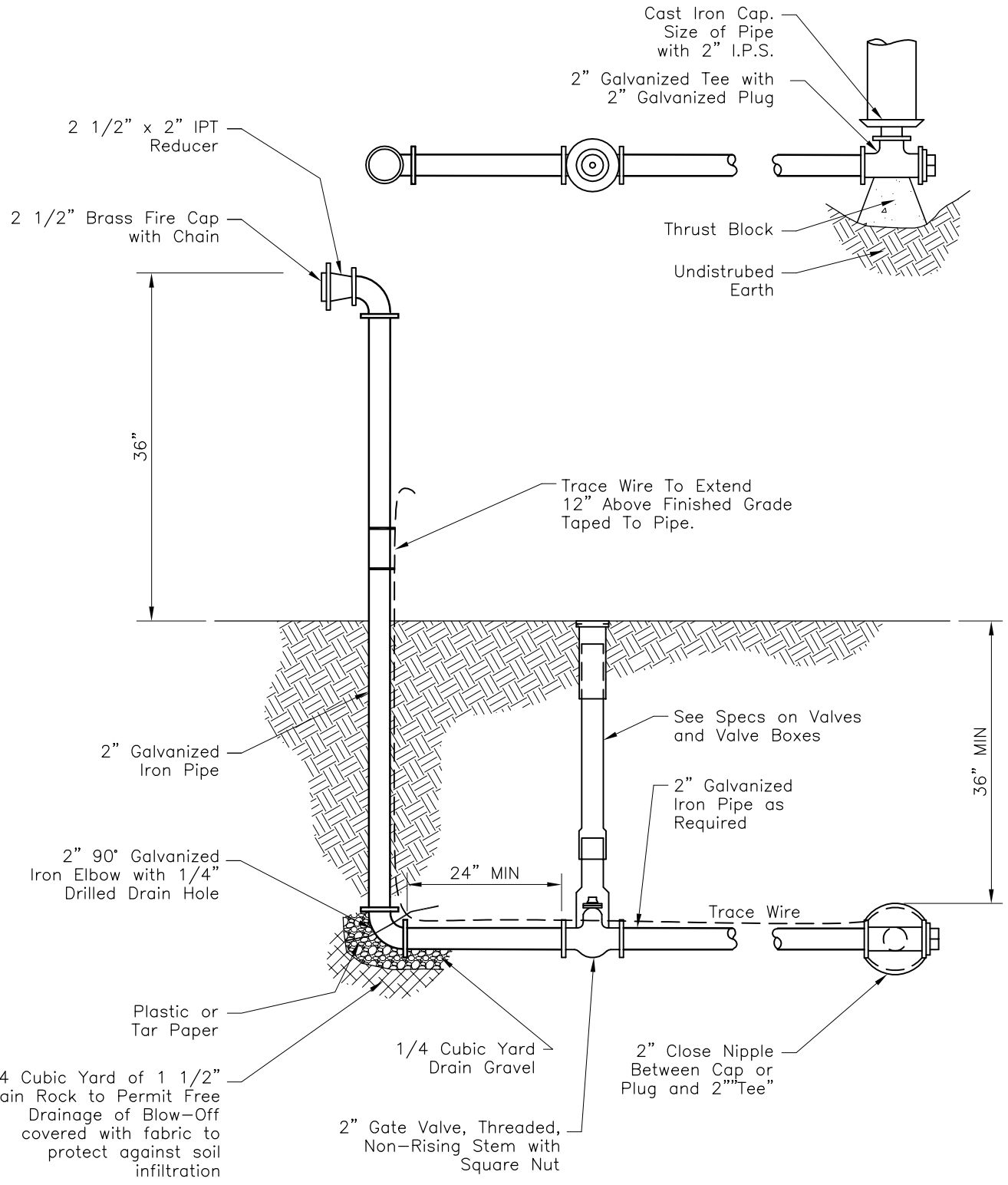


NOTE:
Valve Box by Olympic
Foundry, or approved Equivalent.

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

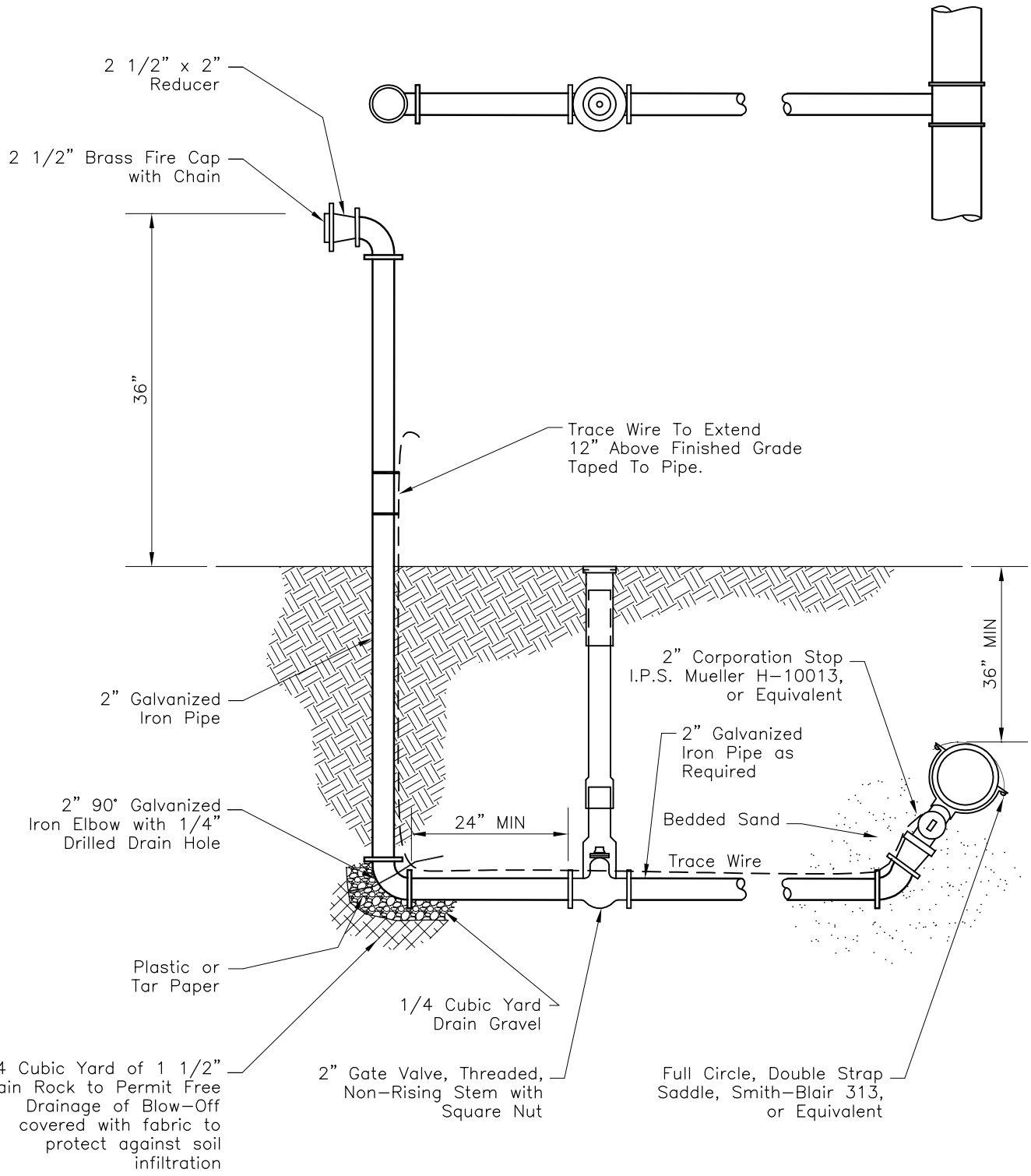
Standard Detail #3B
Valve Box
Unpaved Roadway



Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

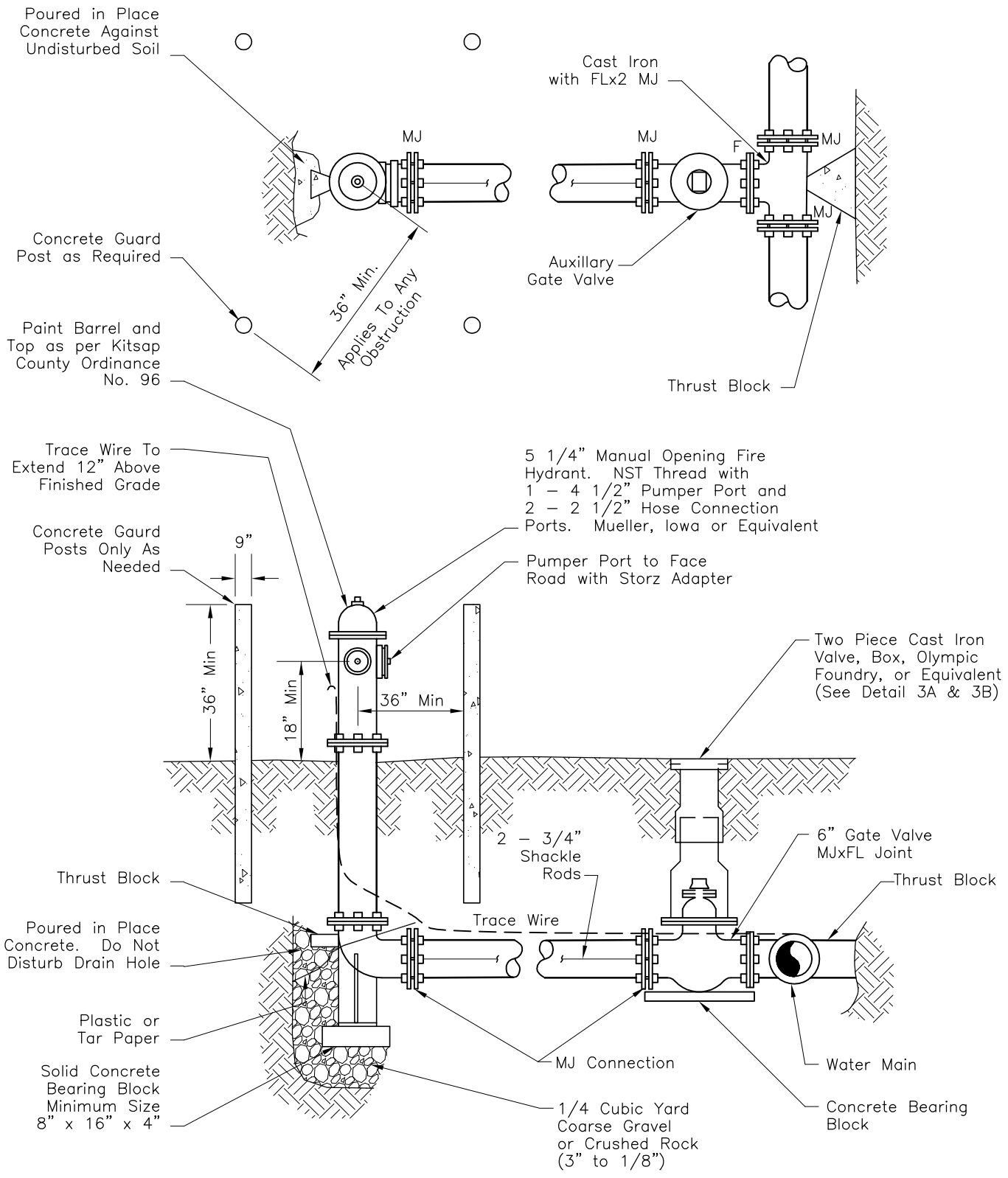
Standard Detail #4A
2" Blow-Off Assembly



Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

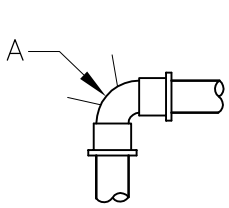
Standard Detail #4B
2" Blow-Off Assembly
Bottom Connection



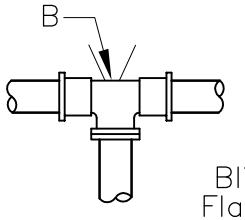
Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

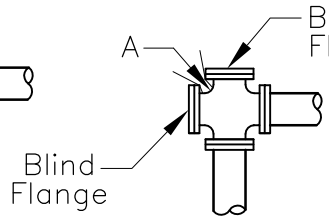
Standard Detail #5
Fire Hydrant Assembly



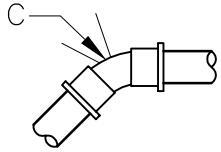
90° Bend



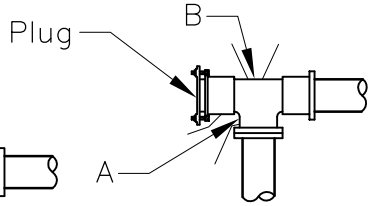
Tee



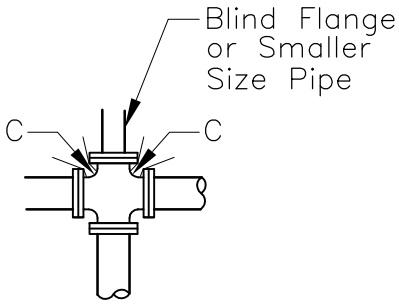
Capped Cross



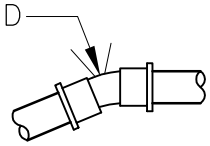
45° Bend



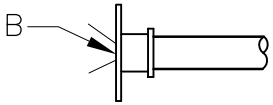
Tee



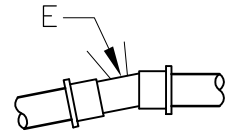
Cross



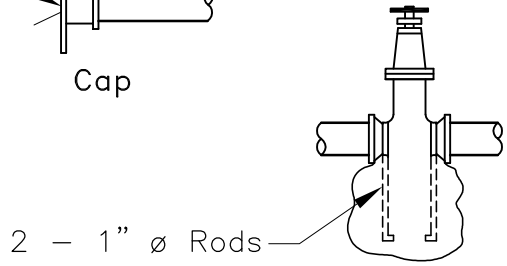
22 1/2° Bend



Cap



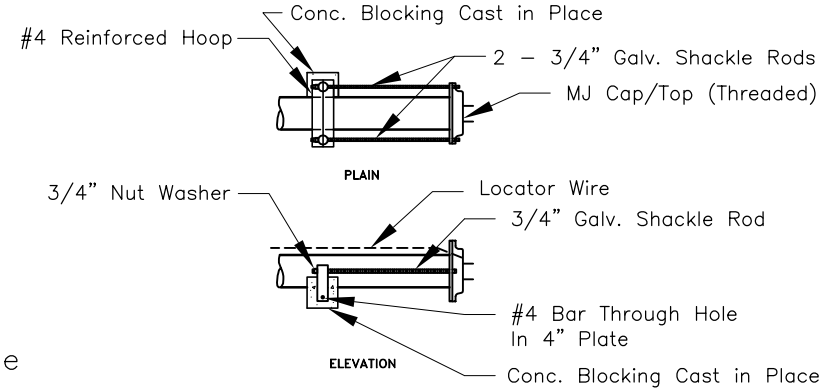
11 1/4° Bend



Gate Valve

Note: As required by Engineer.

Concrete Blocking



Tie–Back Blocking Note: #4 Shackle Rods Required

Min. Bearing Area Against Undisturbed Soil
Square Feet

Pipe Size	A(ft.²)	B(ft.²)	C(ft.²)	D(ft.²)	E(ft.²)
4"	3	1	1	1	1
6"	4	4	2	1	1
8"	7	6	4	2	1
10"	11	10	6	3	2
12"	16	14	9	5	3

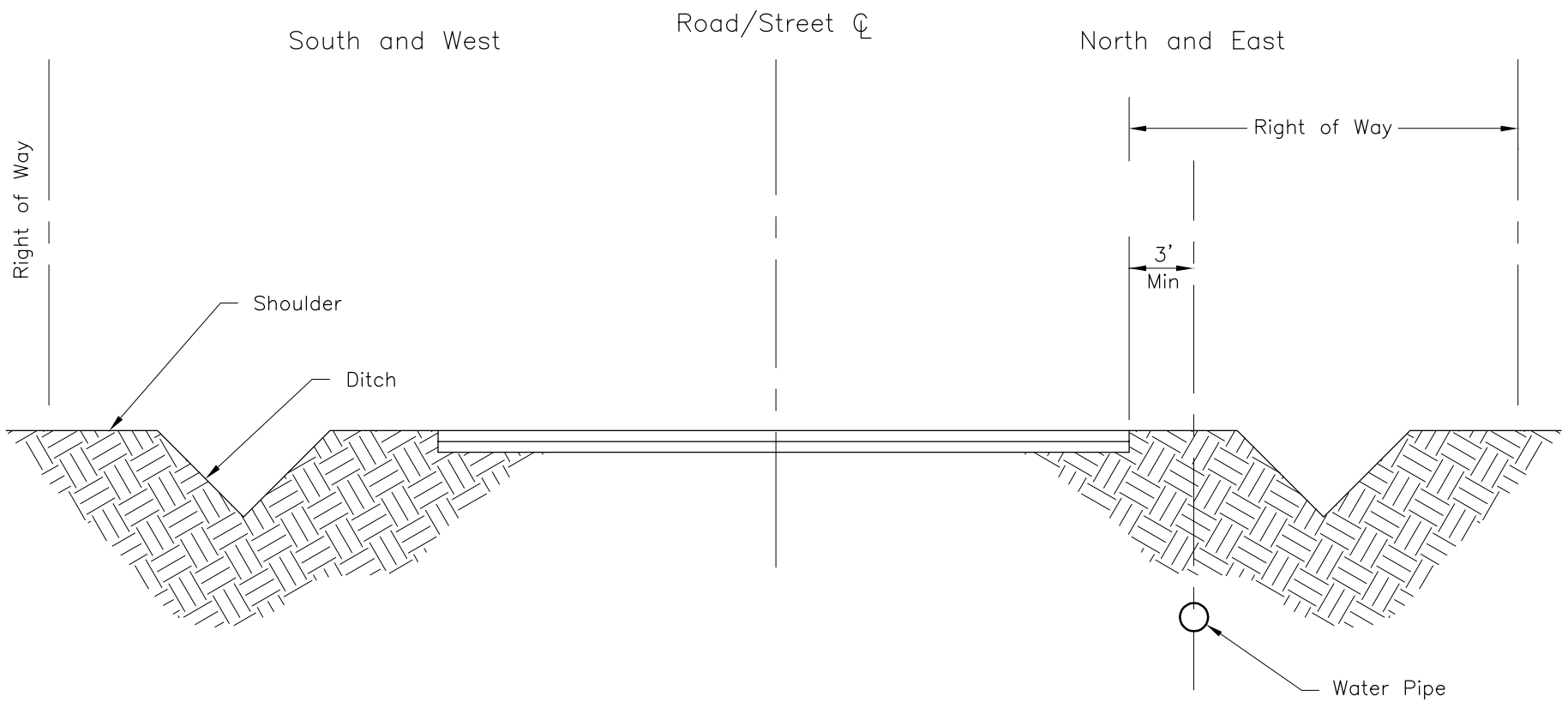
Notes:

1. Bearing area of concrete thrust–block based on 200 psi pressure and save soil bearing load of 2,000 pounds per square foot.
2. Areas must be adjusted for other pipe sizes, pressures and soil conditions.
3. Concrete blocking shall be cast in place and have a minimum of 1/4 square foot bearing against the fitting.
4. Block shall bear against fittings only and shall be clear of joints to permit taking up or dismantling of joint.
5. Contractor shall install blocking adequate to withstand operation pressure under all conditions of service.

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

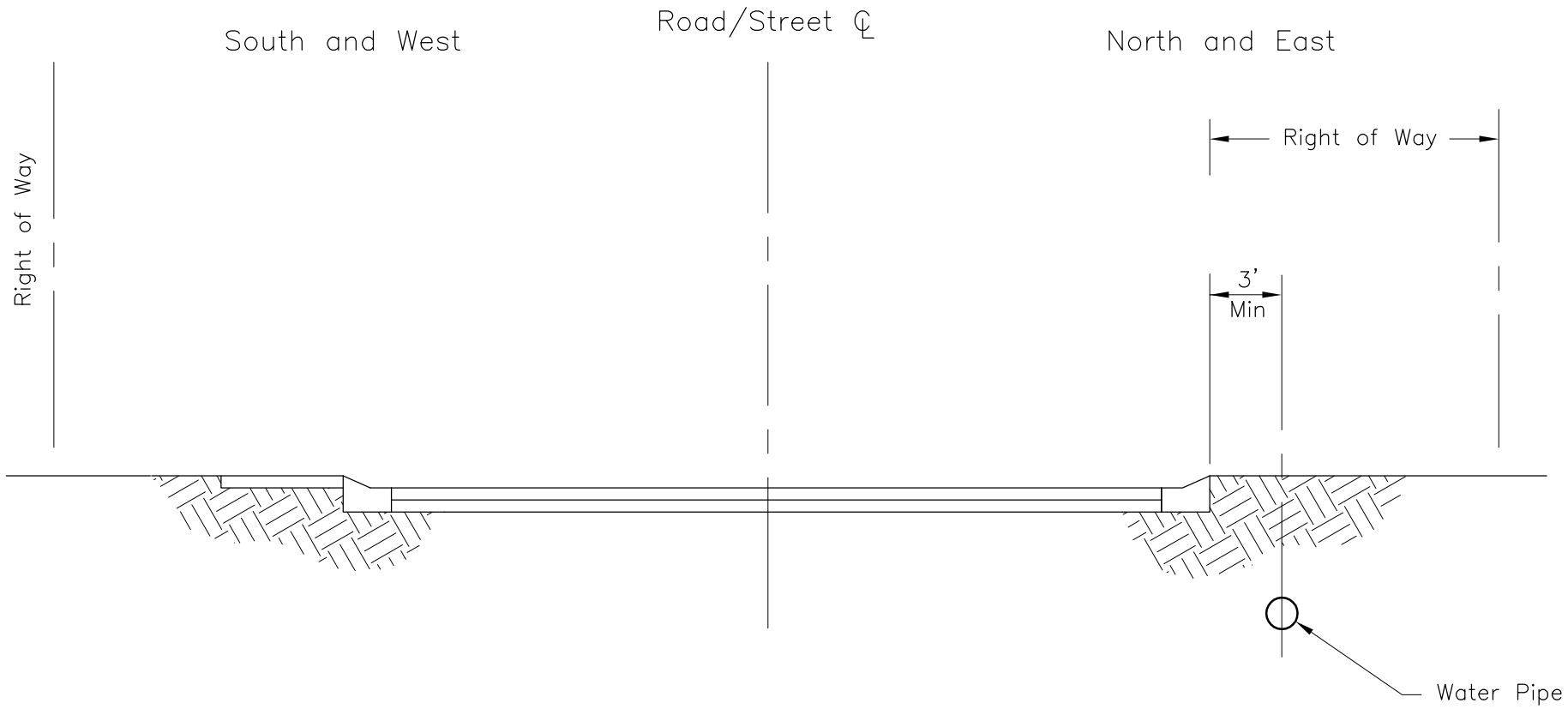
Standard Detail #6
Concrete Thrust Blocking



Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

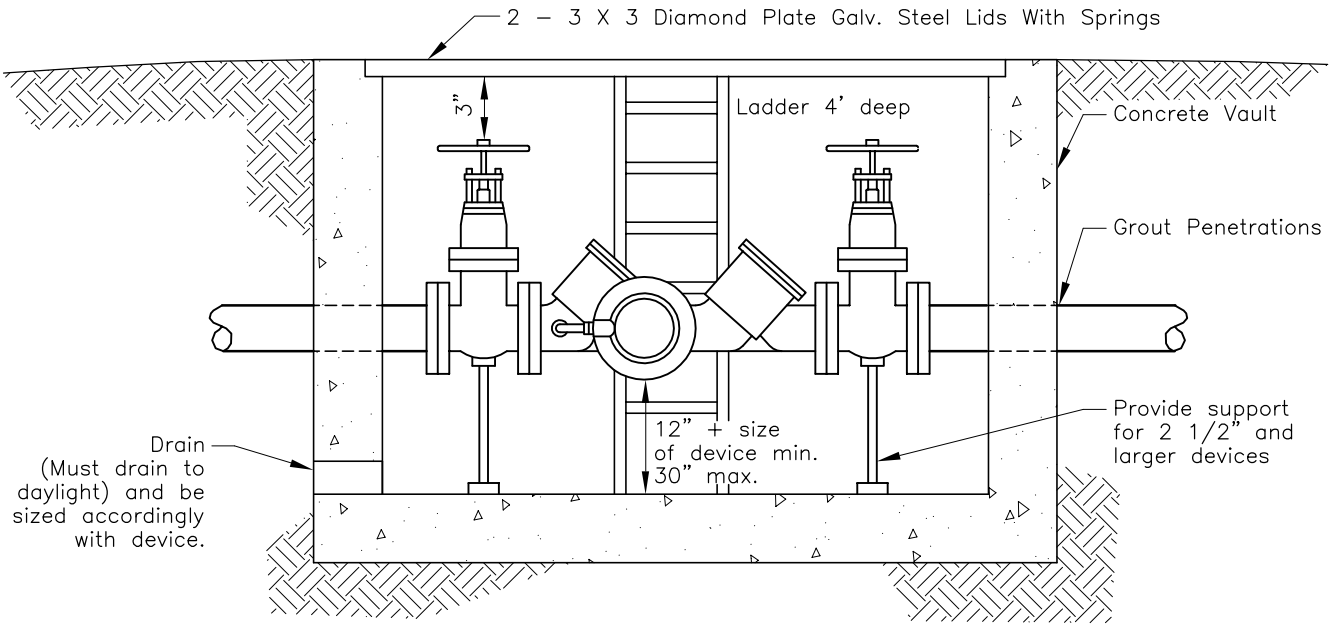
Standard Detail #7A
Standard Off-Site
Utilities Location
Shoulder and Ditch Configuration

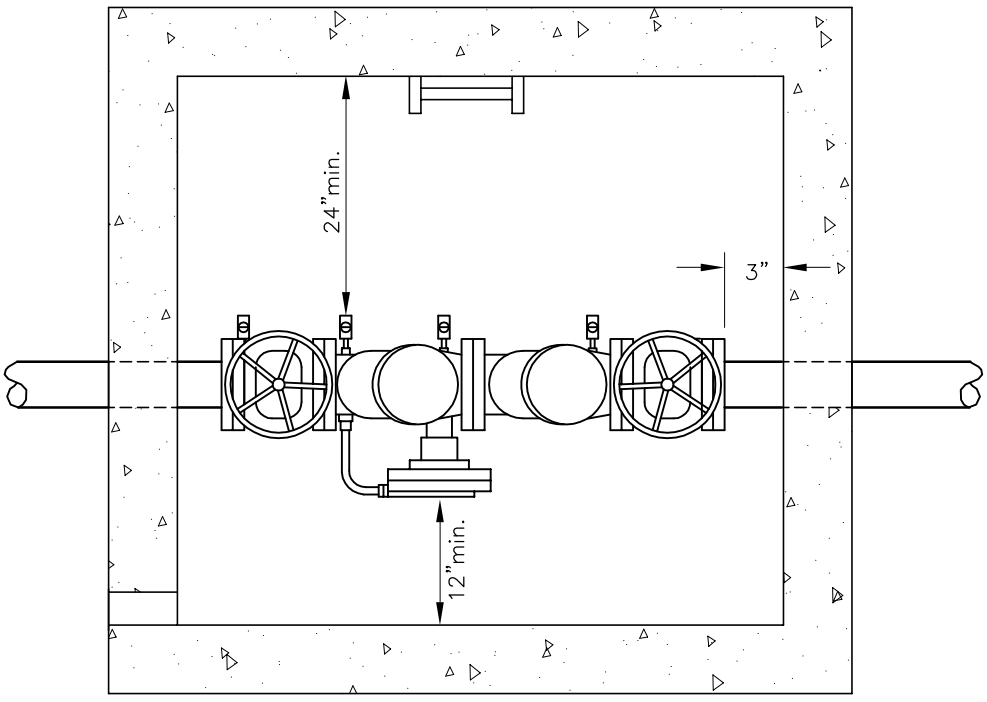


Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #7B
Standard Utilities Location
Curb and Gutter
Configuration



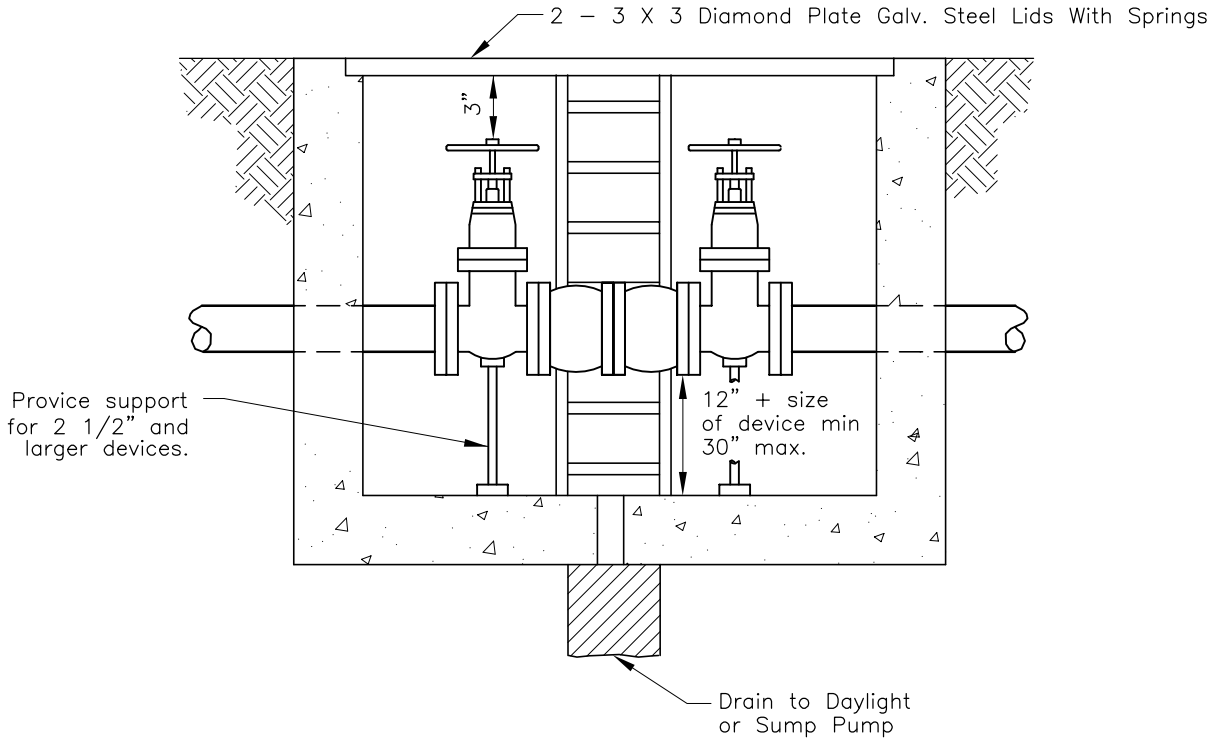


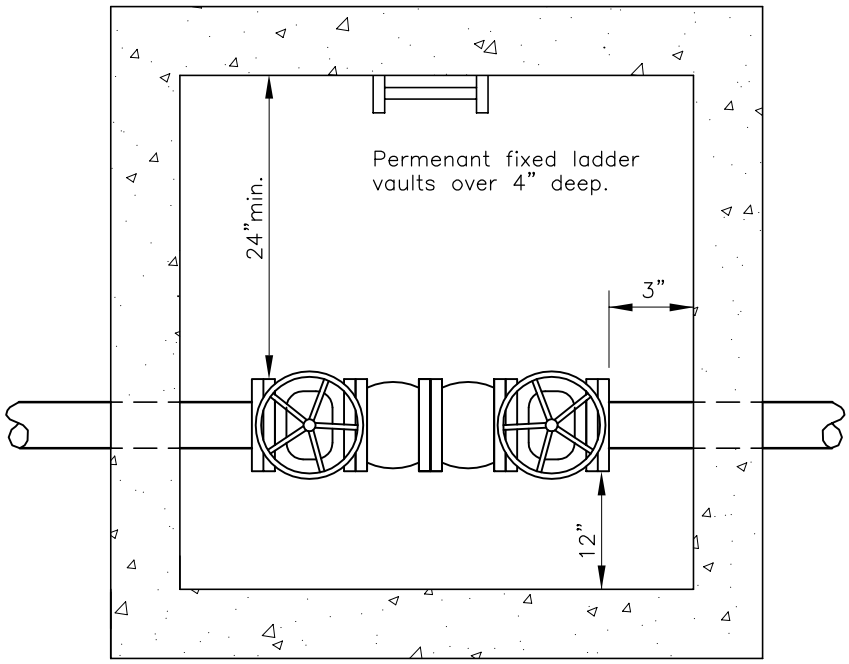
NOTE: Clearances still apply when devices are installed inside buildings.

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #8A
Reduced Pressure Principle Backflow Devices (RPBD)



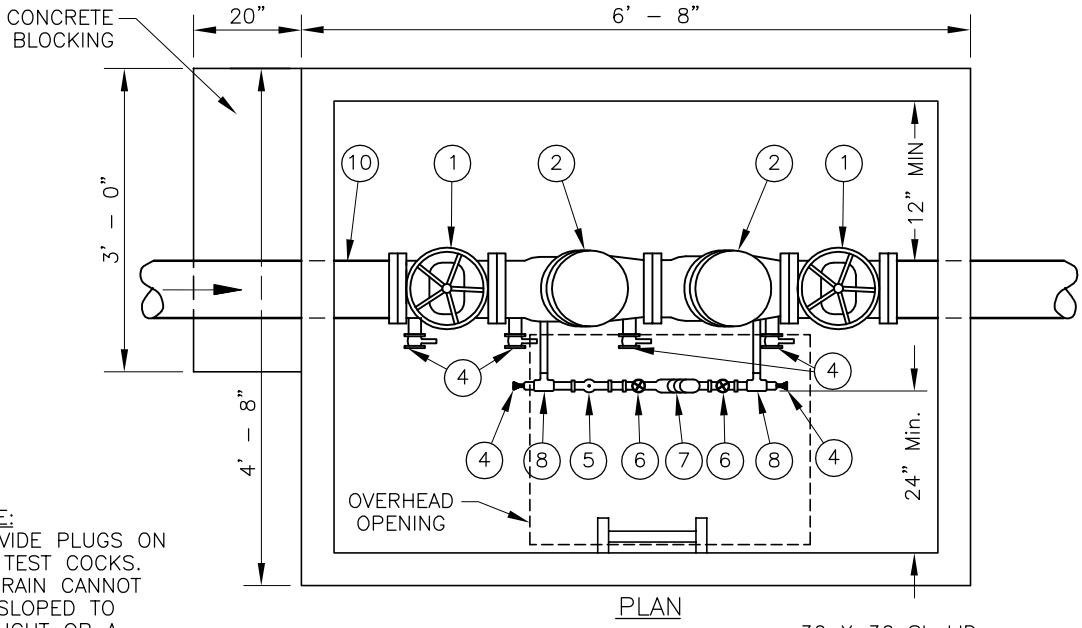


NOTE: Clearances still apply when devices are installed inside buildings.

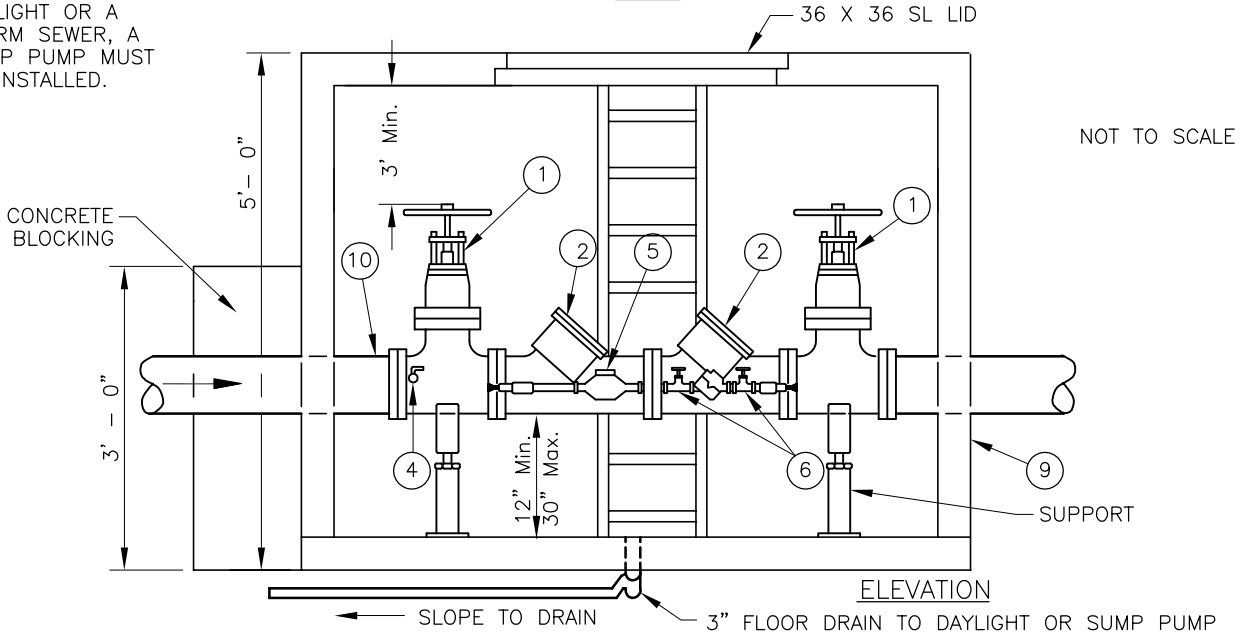
Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #8B
Double Check Valve Assemblies (DCVA)



NOTE:
PROVIDE PLUGS ON ALL TEST COCKS. IF DRAIN CANNOT BE SLOPED TO DAYLIGHT OR A STORM SEWER, A SUMP PUMP MUST BE INSTALLED.



NOT TO SCALE

MATERIAL LIST

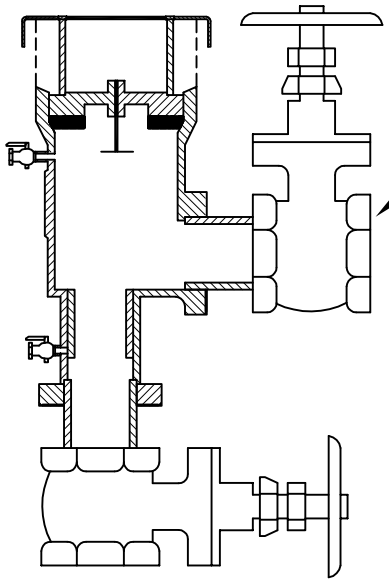
1. MAIN GATE VALVE, RESILIENT SEATED FULL FLOW SHUT OFF VALVES/TEST COCKS.
2. DOUBLE DETECTOR CHECK CONFORMED TO AWWA STANDARDS C506–78.
3. POST INDICATOR VALVE
4. 3/4" BALL VALVE (TEST COCK)
5. 5/8" X 3/4" DOMESTIC METER, 1 TO 20 GPM
6. 3/4" GATE VALVE, ASTM B584–78
7. 3/4" DOUBLE CHECK VALVE BACKFLOW PREVENTOR
8. 3/4" TEE
9. VALVE CHAMBER, PIPE INTERNATIONAL. PIPE 8 ENGINEERING, INC. WM19 W/12" RISER OR EQUAL.
10. WALL PIPE, FXPE WITH INTEGRALLY CAST COLLAR

NOTE: ITEMS 1–10 ARE PACKAGED AS AN "APPROVED ASSEMBLY" NO SUBSTITUTIONS ON ALTERATIONS ALLOWED AND ARE SUBJECT TO FIRE MARSHALL'S APPROVAL.

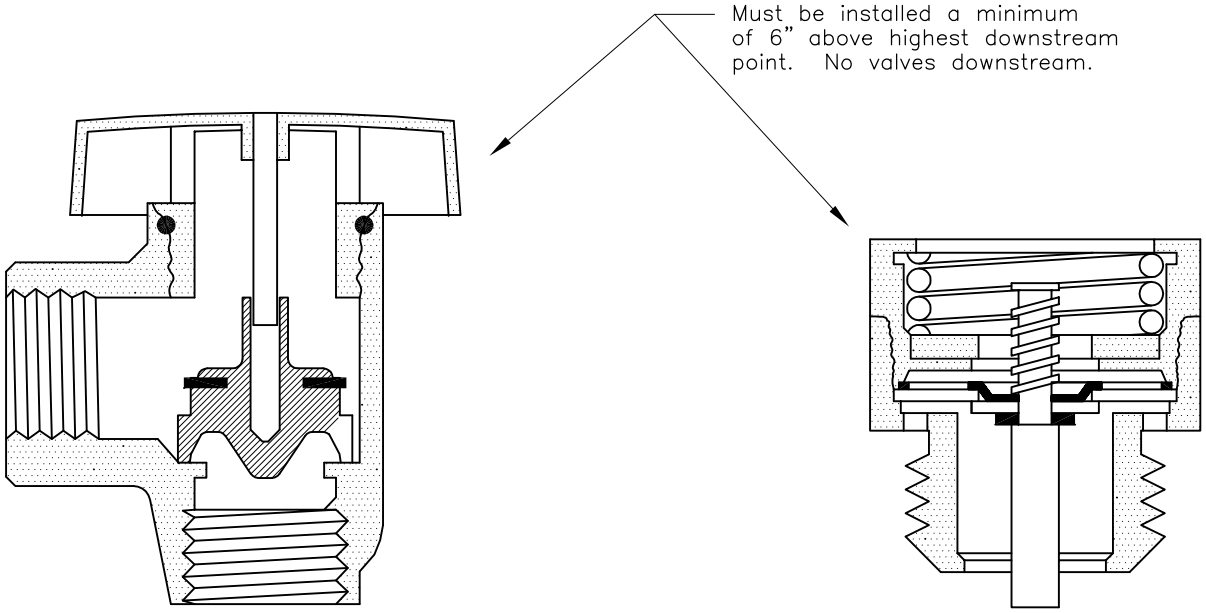
Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #8C
Double Detector Check Valve Assemblies



PRESSURE TYPE
VACUUM BREAKER



ATMOSPHERIC
VACUUM BREAKER
CROSS SECTION

HOSE BIBB
VACUUM BREAKER
CROSS SECTION

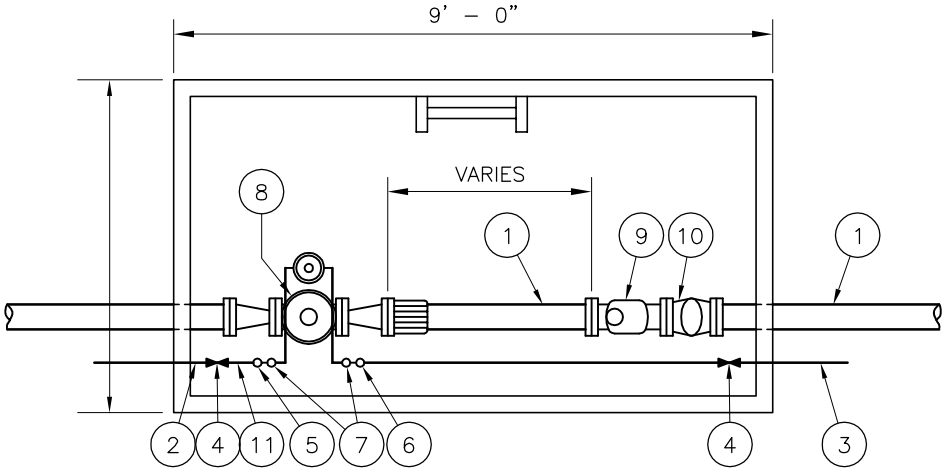
Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

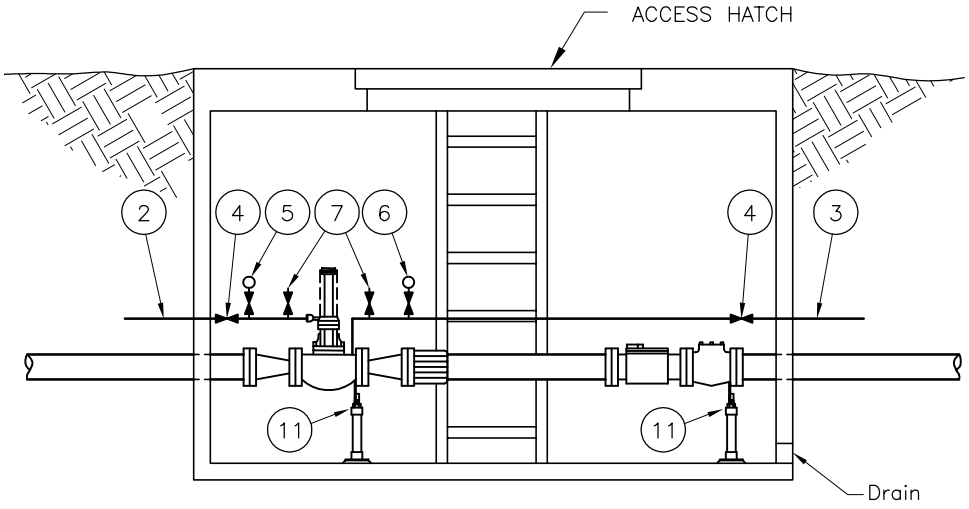
Standard Detail #8D
Pressure and Atmospheric
Vacuum Breakers

FITTING SCHEDULE

1. DUCTILE IRON SPOOL, LENGTH TO FIT, 3 PLACES
2. 3/4" POLYETHYLENE RESERVOIR SENSING LINE, TAPPED INTO RESERVOIR SIDE OF INSTALLATION WITH SERVICE SADDLE AND CORPORATION STOP
3. 3/4" POLYETHYLENE BACK PRESSURE SENSING LINE TAPPED INTO INLET SIDE OF MAIN WITH SERVICE SADDLE AND CORPORATION STOP
4. 3/4" BALL VALVE, SHUT OFF
5. LIQUID FILLED PRESSURE GAGE, 0 TO 30 PSI, WITH 3/4" BALL VALVE AND 3/4" TEE
6. LIQUID FILLED PRESSURE GAGE 0 TO 100 PSI, WITH 3/4" BALL VALVE AND 3/4" TEE
7. 3/4" TEE WITH 3/4" BALL VALVE. THESE TO BE INSTALLED NEAR ALTITUDE VALVE AT POINT IN LINES TO PROVIDE FOR AIR RELEASE. PROVIDE I.P.T. TO HOSE THREAD ADAPTER ON DISCHARGE
8. ALTITUDE VALVE FLANGED. CLA–VAL OR EQUAL. THIS INCLUDES A BACK PRESSURE SUSTAINING FEATURE AND OPENING AND CLOSING SPEED CONTROL.
9. TURBO METER, SENUS OR EQUAL
10. STRAINER (SEDIMENT TRAP TYPE), FLANGED
11. SUPPORT AS REQUIRED



PLAN



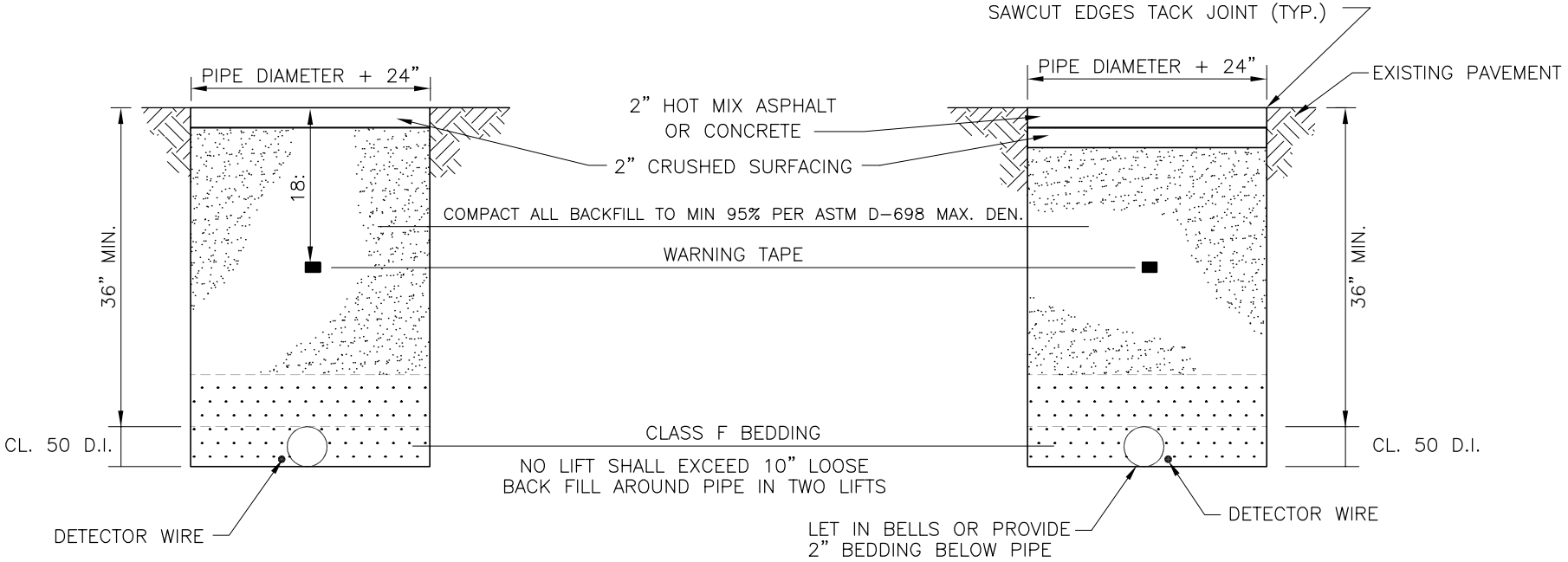
ELEVATION

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #9
Altitude Valve Assembly
Vault Plan & Elevation

NOTE: Contractors are required to meet all Washington State D.O.T. Standards and Kitsap County Standards for Trench and Asphalt Surfacing.



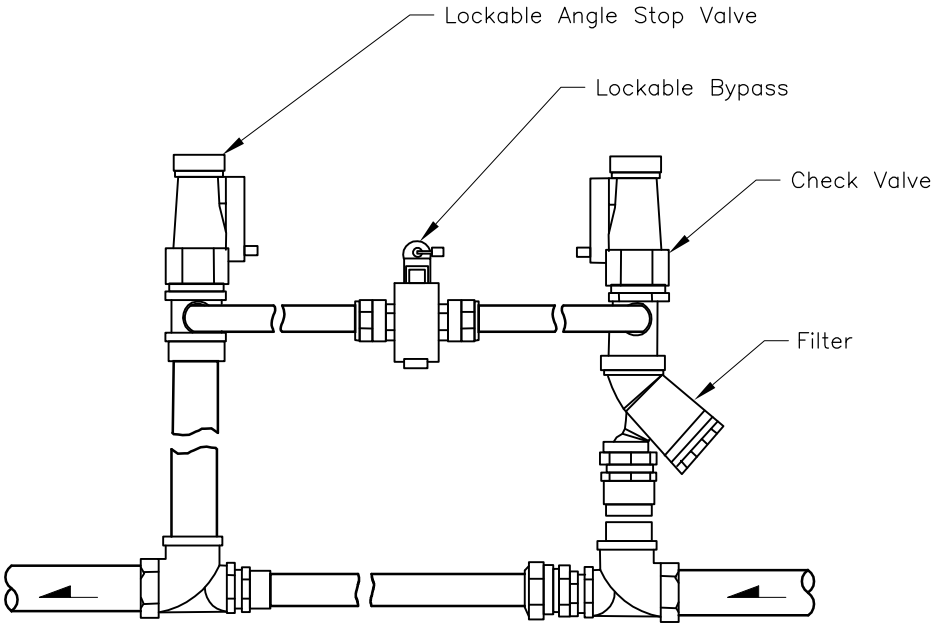
ALONG SHOULDER

WITHIN PAVING

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #10
Typical
Trench Detail

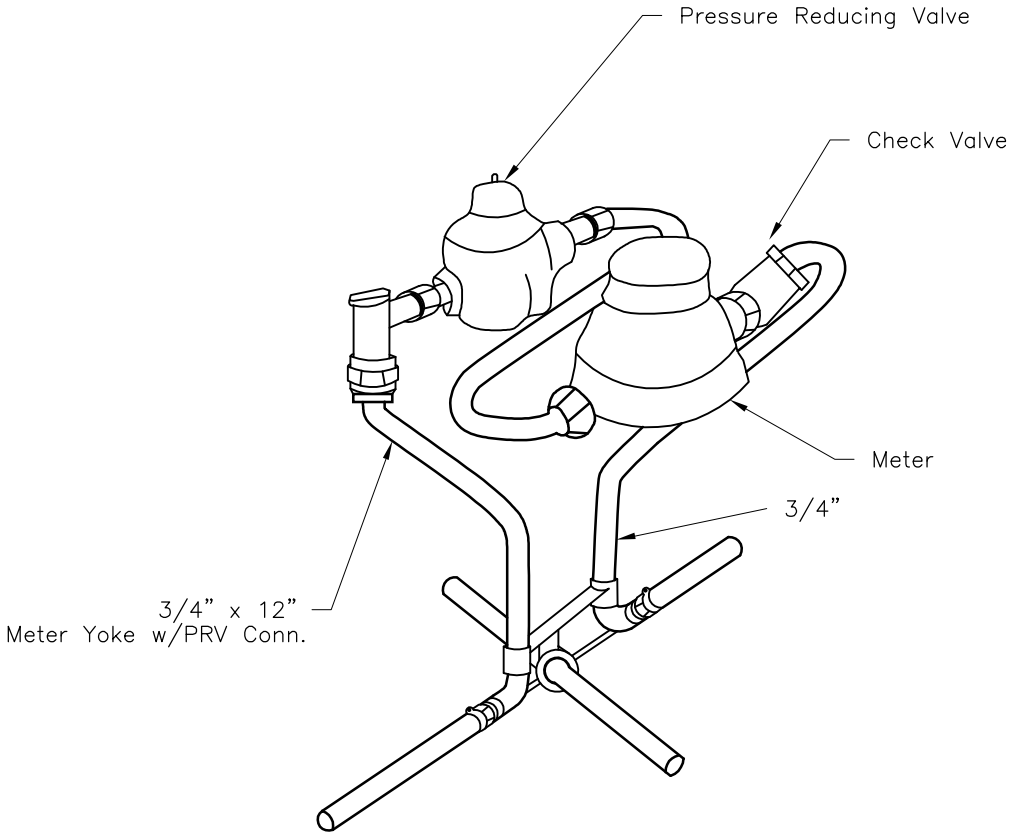


OR EQUAL

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #11A
1 1/2" and 2" Meter Yoke



OR EQUAL

Department of Corrections

DOC WORKING TOGETHER FOR SAFE COMMUNITIES

Standard Detail #11B
Meter Set w/ PRV

C-2
Municipal Water Law Consistency Statement Checklists

DOC has submitted the Draft WSP to local planning jurisdictions concurrent to the submittal to DOH, requesting completion of the Consistency Statement Checklists. It is anticipated that completed checklists will be received prior to receipt of DOH comments, and will then be included in the Final WSP.

C-3
Agreement between DOC and City of Gig Harbor WCCW Water Supply

42540|6

Recorded at the Request of,
When Recorded, Return To:

The City of Gig Harbor
City Administrator
M/A: P.O. Box 145
Gig Harbor, WA 98335

UTILITY EXTENSION, CAPACITY AGREEMENT AND AGREEMENT WAIVING RIGHT TO PROTEST LID

THIS AGREEMENT is entered into on this 14th day of October, 1994, between the City of Gig Harbor, Washington (hereinafter referred to as the "City"), and the Washington State Departments of Natural Resources (hereinafter referred to as "DNR") and Corrections (hereinafter referred to as "DOC").

WHEREAS, DNR is the owner of certain real property located in Pierce County, legally described as set forth in Exhibit "A", attached hereto and incorporated herein by this reference as though set forth in full, and

WHEREAS, DOC leases certain real property from DNR located in Pierce County, legally described as set forth in Exhibit "A", and

WHEREAS, DOC is also the owner of certain real property located in Pierce County, legally described as set forth in Exhibit "B" attached hereto and incorporated herein by this reference as though set forth in full, and

WHEREAS, the properties owned by DNR and DOC are not currently within the City limits of Gig Harbor, and

WHEREAS, DOC, as the leasee on certain real property owned by the DNR as described in Exhibit "A", and the owner of certain real property as described in Exhibit "B", desires to connect to the City water, hereinafter referred to as "the utility", and the City is willing to allow connection only under certain terms and conditions in accordance with Title 13 of the Gig Harbor Municipal Code, as now enacted or hereinafter amended, NOW THEREFORE,

FOR AND IN CONSIDERATION OF the mutual benefits and conditions hereinafter contained, the parties agree as follows:

1. Warranty of Title. DOC and DNR warrant that they are the owners of fee title or a substantial beneficial interest in the properties described in Exhibit "A", and "B" and are authorized to enter into this Agreement.

DOC Contract #CAP3374

2. Extension Authorized. The City hereby authorizes DOC to extend service to DOC and DNR propety from the existing lines on Skansie Avenue at the following location:

Bujacich Drive

3. Costs. DOC will pay all costs of designing, engineering and constructing the extension. All construction shall be done to City standards and according to plans approved by the City's Public Works Director. Any and all costs incurred by the City in reviewing plans and inspecting construction shall be paid for by the DOC.

4. The City agrees to provide 80,000 gallons per day average use and 210,000 gallons per day peak usage water service to DOC, on DNR property as described in Exhibit A. DOC will connect to the City water via a 16" water line extension on 54th Street from the existing water main on Skansie Avenue. DOC will provide 2" and 8" compound water meters at the point of connection to the City water.

5. Capacity Commitment Payment. The City agrees to reserve the above said capacity for a period of 12 months after execution of this Agreement by all parties, provided that a payment for water capacity commitment is received within 45 days after City Council approval of extending water service to DNR and DOC's properties. Water capacity shall not be committed beyond a three year period.

DOC agrees to pay the City the sum of $790.88 for water capacity reservation for a one year period of 12 months after execution of this Agreement by all parties.

6. Extension of Commitment Period. In the event DOC chooses to permanently reserve water capacity by paying the entire connection fee before the expiration date set forth above, DOC shall be responsible for paying the City's monthly water base charge. The current City water base charge for a 2" meter is $47.52 per month.

7. Permits - Easements. DOC shall secure and obtain, at their sole cost and expense, any necessary permits, easements and licenses to construct the extension, including, but not limited to, all necessary easements, excavation permits, street use permits, or other permits required by state, county and city governmental departments including the DNR, the Pierce County Public Works and Planning Departments, Pierce County Environmental Health Department, State Department of Ecology, Pierce County Boundary Review Board and City of Gig Harbor Public Works and Planning Departments.

8. Turn Over of Capital Facilities. DNR and DOC agree to dedicate to the City an easement of combined length of 5,100 lineal feet, for the purpose of constructing a 16 inch water main. DNR and DOC agree to turn over this utility at no cost, upon completion of construction, approval and acceptance of the same by the City. That portion of this easement, as dedicated by DNR, is further described by separate easement contract between DNR, is further described by separate easement contract between DNR and the City and attached hereto as Exhibit "C".

As a prerequisite to such turn over and acceptance, DNR and DOC, as applicable, will furnish to the City the following:

A. As built plans or drawings in a form acceptable to the City Public Works Department;

B. Any necessary easements, permits or licenses for the continued operation, maintenance, repair or reconstruction of such facilities by the City, in a form approved by the City Attorney;

C. A bill of sale in a form approved by the City Attorney; and

D. A bond or other suitable security in a form approved by the City Attorney and in an amount approved by the Public Works Director, ensuring that the facilities will remain free from defects in workmanship and materials for a period of two (2) years.

9. Connection Charges. DOC agrees to pay the connection charges, in addition to any costs of construction as a condition of connecting to the city utility system at the rate schedules applicable at the time DOC requests to actually connect its property to the system. Any commitment payment that has not been forfeited shall be applied to the City's connection charges as they are levied.

10. Service Charges. In addition to the charges for connection, DOC agrees to pay for utility service rendered according to the rates for services applicable to properties outside the city limits as such rates exist, which is presently at 150% the rate charged to customers inside city limits, or as they may be hereafter amended or modified.

11. Annexation. DOC and DNR understand that annexation of the properties described in Exhibit "A" and "B" to the City will result in the following consequences:

A. Pierce County ordinances, resolutions, rules and regulations will cease to apply to the properties upon the effective date of annexation;

B. City of Gig Harbor ordinances, resolutions, rules and regulations will begin to apply to the properties upon the effective date of annexation;

C. Governmental services, such as police, fire and utility service, will be provided to the properties by the City of Gig Harbor upon the effective date of annexation;

D. The properties as identified in Exhibit "A" and Exhibit "B", may be required to assume all or any portion of the existing City of Gig Harbor indebtedness, and property tax rates and assessments applicable to the property may be different from those applicable prior to the effective date of annexation;

E. Zoning and land use regulations applicable to the properties after annexation may be different from those applicable to the property prior to annexation; and

F. All or any portion of the properties may be annexed and the properties may be annexed in conjunction with, or at the same time as, other property in the vicinity.

With full knowledge and understanding of these consequences of annexation and with full knowledge and understanding of DNR and DOC's decision to forego opposition to annexation of the property to the City of Gig Harbor, DNR and DOC agree to sign a petition for annexation to the City of the properties described on Exhibit "A" and "B" as provided in RCW 35.14.120, as that statute now exists or may hereafter be amended, at such time as DNR and DOC are requested by the City to do so. DNR and DOC also agree and appoint the Mayor of the City as DNR and DOC's attorney-in-fact to execute an annexation petition on DNR and DOC's behalf in the event that DNR and/or DOC shall fail or refuse to do so and agree that such signature shall constitute full authority from DNR and DOC for annexation as if DNR or DOC had signed the petition itself. DNR and DOC further agree not to litigate, challenge or in any manner contest, annexation to the City. This Agreement shall be deemed to be continuing, and if DNR and/or DOC's property is not annexed for whatever reason, including a decision by the City not to annex, DNR and DOC agree to sign any and all subsequent petitions for annexations. In the event that any property described on Exhibit "A" and "B" is subdivided into smaller lots, the purchasers of each subdivided lot shall be bound by the provisions of this paragraph.

12. Land Use. DNR and DOC agree that any development or redevelopment of the properties described on Exhibit "A" and "B" shall meet the following conditions after execution of Agreement:

A. The use of the properties will be restricted to uses allowed in accordance with the City's Comprehensive Plan designation at the time of development or redevelopment.

B. The development or redevelopment of the properties shall comply with all requirements of the City Comprehensive Land Use Plan, Zoning Code and Building Regulations for similar zoned development or redevelopment in effect in the City at the time of such development or redevelopment. The intent of this section is that future annexation of the properties to the City of Gig Harbor shall result in a development which does conform to City standards.

C. It is understood by the City that the property described in Exhibit "A" and "B" is utilized for a correctional facility and this type of use will not be prohibited in the City after the annexation.

13. Liens. If any of the property described in Exhibits "A"and "B" is owned by the State at the time any payment delinquency under this Agreement arises, the City's remedies under this paragraph shall be limited as provided in RCW 79.44.060, as that statute now exists or may hereafter be amended. However, if these properties are sold to persons or entities other than the State, DNR and DOC, then their successors, assigns, and legal representatives agree that delinquent payments under this Agreement shall constitute a lien upon the above described property. If the extension is for sewer service, the lien shall be as provided in RCW 35.67.200, and shall be enforced in accordance with RCW 35.67.220 through RCW 35.67.280, all as now enacted or hereafter amended. If the extension is for water service, the lien shall be as provided in RCW 35.21.290 and enforced as provided in RCW 35.21.300, all as currently enacted or hereafter amended.

14. Termination for Non-Compliance. In the event DNR or DOC fails to comply with any term or condition of this Agreement, the City shall have the right to terminate utility service to DNR and/or DOC's properties, in addition to any other remedies available to it.

15. Latecomers Agreement. DOC has the right to initiate a latecomers agreement, pursuant to RCW 35.91.010, as that statute now exists or may hereafter be amended, with the City after the construction completion of the project. DOC's request is already approved by the City Council to initiate such. DOC will be responsible for providing all necessary documentation and recording such documents with the Pierce County Auditor's office.

16. Specific Enforcement. In addition to any other remedy provided by law or this Agreement, the terms of this Agreement may be specifically enforced by a court of competent jurisdiction.

17. Covenant. This agreement shall be recorded with the Pierce County Auditor and shall constitute a covenant running with the land described on Exhibit "A" and "B" and shall be binding on the DNR, DOC, their heirs, lessees, successors and assigns. All costs of recording this Agreement with the Pierce County Auditor shall be borne by the DOC.

18. Attorney's Fees. In any suit or action seeking to enforce any provision of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees and costs, in addition to any other remedy provided by law or this Agreement.

DATED this 14th day of October, 1994.

CITY OF GIG HARBOR

Gretchen Wilbert

Mayor Gretchen Wilbert

ATTEST/AUTHENTICATED:

City Clerk, Mark Hoppen

APPROVED AS TO FORM:

City Attorney

WASHINGTON STATE DEPARTMENT
OF NATURAL RESOURCES

SIGNED

Name:
Title:

WASHINGTON STATE DEPARTMENT
OF CORRECTIONS

Name: CHASE RIVELAND
Title: SECRETARY

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

On this 11th day of October, 1994, before me personally appeared Mayor and City Clerk of the municipal corporation described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said municipal corporation, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.

Molly M Towslee

Molly M. Towslee
(print or type name)
NOTARY PUBLIC for the State
of Washington, residing at
Gig Harbor.
My commission expires 12/2/95.

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

On this _____ day of _____ , 1994, before me personally appeared _____ described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of the Department of Natural Resources for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.

_____

_____
(print or type name)
NOTARY PUBLIC for the State
of Washington, residing at
_____.
My commission expires _____.

STATE OF WASHINGTON)
) ss.
COUNTY OF PIERCE)

On this 14th day of October , 1994, before me personally appeared Chase Rivelaud described in and that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of the Department of Corrections for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS THEREOF, I have hereto set my hand and affixed by official seal the day and year first above written.

VERLENE M. SMITH
COMMISSION EXPIRES
NOTARY
PUBLIC
SEP 16, 1996
STATE OF WASHINGTON

Verlene M. Smith

VERLENE M. SMITH
(print or type name)
NOTARY PUBLIC for the State
of Washington, residing at
Olympia.
My commission expires 9/16/96.

EXHIBIT 'A'

Legal Description of Premises

That portion of the south 1/2 of the southeast 1/4 of Section 36, Township 22 North, Range 1 East, Willamette Meridian, County of Pierce, State of Washington, lying east of the thread of the west fork of McCormick Creek; containing an area of 62.6 acres, more or less.

EXHIBIT 'B'

PARCEL "A":

That portion of the South half of the South half of the Southwest quarter of Section 31, Township 22 North, Range 2 East of the Willamette Meridian, lying West of the West line of State Highway No. 16 (Primary State Highway No. 14), in Pierce County, Washington.

EXCEPT the South 510 feet thereof.

TOGETHER with an easement for ingress, egress and utilities over, under and across the West 30 feet of the South 510 feet of the South half of the South half of the Southwest quarter of Section 31, Township 22 North, Range 2 East of the Willamette Meridian.

EXCEPT the South 60 feet thereof.
ALSO EXCEPT 54th Avenue N.W.

PARCEL "B":

That portion of the North half of Government Lot 4 of Section 31, Township 22 North, Range 2 East of the Willamette Meridian lying West of the Westerly right of way line of Primary State Highway No. 16, in Pierce County, Washingtron.

EXCEPT the West 10 feet thereof conveyed to Pierce County for 54th Avenue N.W. by Deed recorded under Auditor's No. 2497083.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
JENNIFER M. BELCHER, Commissioner of Public Lands
Olympia, Washington 98504

Agreement No. 50-054204

EXHIBIT C

THIS AGREEMENT, made and entered into this 11th day of October, 1994 by and between CITY OF GIG HARBOR, herein called the "Grantee," Grantee and the STATE OF WASHINGTON, acting by and through the Department of Natural Resources, herein called the "State," WITNESSETH:

The State, for and in consideration of mutual benefits, terms and conditions specified herein, hereby grants and conveys to the Grantee, its successors and assigns:

A permanent easement for a right of way for the construction, operation, use and maintenance of a water line only, over and across portions of certain real property in Pierce County legally described as set forth in Exhibit A of the Utility Extension, Capacity Agreement, attached hereto and incorporated herein by this reference, the location of which is shown on Exhibit C-1, indicating said right of way in red, and by this reference made a part hereof.

Subject, however, to the following encumbrances:

Inst. Type	No.	For	Term	Grantee	Date Gtd.
LSE	60-058866	PRISON	10/31/00	DOC	
ESE	50-CR2994	SEWER	INDEF	PIERCE COUNTY	

Assignment

This Agreement, or any of the rights granted herein, shall not be assigned without prior written consent of the State, except that said rights granted herein may be used by any employee, contractor, or representative of the Grantee, hereinafter collectively referred to as "Permittee," while engaged in the Grantee's operations.

Forfeiture

In the event that any portion of the right of way as shown on attached Exhibit C-1 is not used by the Grantee, or its assigns, for the purpose for which it was granted, within a period of five (5) years from the day and year first above written, the rights of the Grantee within said portions of the right of way shall revert to the State, its successors or assigns; and said portions of the right of way shall be freed from the easement as fully and completely as if this Agreement had not been entered into; provided, however, an extension of time may be granted upon written request prior to the expiration date of said 5-year period and upon the terms and conditions as specified by the State; such terms and conditions shall be limited to the State's right to extend said period and modify the considerations due the State which shall include, but not be limited to, additional charges for administrative costs and appreciation of land and valuable material.

Should the Grantee, or its assigns, cease to use this easement for the purposes specified herein for a period of two (2) years, it shall notify the State of such nonuse; and the rights granted herein shall revert to the State, its successors or assigns.

Removal of Improvements and Equipment

All improvements, buildings, fixtures and other property erected or permanently affixed upon State lands by the Grantee during the term of said easement, which remain upon said land sixty (60) days from the termination or abandonment of said easement, shall become the property of the State and be considered a part of the land upon which they are located; provided, however, that any time within sixty (60) days after the termination or abandonment of said easement, the Grantee shall be entitled to remove such of said improvements as can be removed without damage to said lands;

or, the State may require the Grantee to remove all improvements, buildings, fixtures and other property affixed upon State lands by the Grantee, at the Grantee's cost.

All tools, equipment and other property not permanently affixed upon the land by the Grantee during the term of said easement shall remain the property of the Grantee but shall be removed within sixty (60) days after the expiration of this easement.

Reservations to State

State reserves for itself, its successors and assigns, the right at all times and for any purpose to cross and recross said right of way at any place on grade or otherwise, and to use said right of way for road purposes, insofar as is compatible with Grantee's operation, and provided such reserved rights shall be exercised in a manner that will not unreasonably interfere with the rights of the Grantee hereunder.

The State reserves to itself, its successors and assigns, the right to develop, improve, and utilize the land and natural resources thereon, within the limits of the right of way granted herein, insofar as such reservations are compatible with the Grantee's operation and insofar as such action will not unreasonably interfere with the rights of the Grantee.

In the event the State, its successors or assigns, elects to act within the reservation, it shall give written notice to the Grantee of such election and will then assume responsibility for allowing no growth or obstruction on the right of way that will be incompatible or interfere with the Grantee's use thereof.

The State may grant to third parties, upon such terms as it chooses, any or all of the rights reserved by it herein; provided that use by such third party shall be subject to the terms and conditions of this easement and shall not unreasonably interfere with the rights granted hereunder.

Compliance with Laws and Regulations

The Grantee shall comply with all applicable laws to the extent that it can legally do so, including all Department of Natural Resources regulations, county and municipal laws, ordinances, or regulations in effect and authorized by law or laws of the State of Washington.

Indemnification

Grantee shall indemnify, defend and save harmless the State, its officials, employees, and agents, while acting within the scope of their duties, from and against all loss, costs, damages, claims, demands, and cause of action of any kind or character, including the cost of defense thereof, for bodily or personal injuries, death, or damage to property arising out of or incident to rights exercised, operations, performance or failure to perform by Grantee, and/or its agents, employees, subcontractors, licensees or representatives under this Agreement; provided, to the extent RCW 4.24.115 is applicable, State agrees that this indemnity provision shall not require Grantee to indemnify State from State's sole or concurrent negligence, if any, Grantee waives its immunity under title 51 RCW to the extent required by this provision.

Damage and Protection from Damage

Grantee, when using the rights granted herein, shall repair or cause to be repaired, at its sole cost and expense, all damage to improvements on State lands occasioned by it, which is in excess of that which it would cause through normal and prudent use of such rights.

During operations under this Agreement, including the construction of roads and facilities, the Grantee shall take such precautions as necessary to minimize, insofar as possible, soil erosion and damage to the soil. Equipment will not be operated when ground conditions are such that excessive damage will result.

All legal land subdivision survey corners and witness objects are to be preserved. If such are destroyed or disturbed by the Grantee, the Grantee shall re-establish them by a registered professional engineer or licensed land surveyor in accordance with U. S. General Land Office standards at his own expense. Corners and/or witness objects that must necessarily be disturbed or destroyed in process of construction must be adequately referenced and/or replaced in accordance with all applicable laws of the State of Washington in force at the time of construction, reconstruction, or development of the right of way including but not limited to chapter 58.24 RCW, and all Department of Natural Resources rules and regulations pertaining to preservation of such corners and/or witness objects. Such references must be approved by the State prior to removal of said corners and/or witness objects.

Preinstallation Requirement

Thirty (30) days prior to the commencement of said operations, the Grantee shall submit to the Regional Manager at Enumclaw, Washington, for written approval, a complete and detailed Plan of Operation for the development of the right of way. The Grantee shall provide for the examination of the right of way, with the State's Regional Manager, before any construction, reconstruction, or development is commenced.

Grantee agrees that no construction will commence until all documents have been signed by all parties and that neither construction nor reconstruction will commence until the written Plan of Operation has been approved by the State's Regional Manager at Enumclaw, Washington.

Installation Specifications

The Grantee shall so place, protect, and/or bury said waterline as to allow the unobstructed movement of any equipment or materials across the surface of the right of way and shall install said waterline at such depth as to not interfere with the normal and usual use of the land.

Provided that the waterline shall be buried at a minimum depth of 36 inches below the surface of said right of way.

Provided, within 30 days after completion of said waterline, the City of Gig Harbor shall provide to the Washington State Department of Natural Resources an as-built survey showing the location of the waterline as constructed.

Response to an Emergency

Nothing contained herein shall prevent the Grantee from responding to an emergency relating to the facilities on the right of way.

Notice of Noncompliance

Grantee is aware that failure to follow installation specifications as per this document shall constitute non compliance with the terms and conditions of this agreement.

The State shall notify the Grantee by United States mail, addressed to the address shown on the application for this easement on file in the office of the Commissioner of Public Lands in Olympia, Washington, of any instance of noncompliance with any of the terms and conditions hereof including installation specifications. Such notice will specifically identify the manner of noncompliance herewith. Upon receipt of such notice the Grantee shall immediately take or cause to be taken effective remedial action.

In the event the Grantee does not undertake, or cause to be undertaken, remedial action within fifteen (15) days following receipt of said notice, the State, acting by and through its Regional Manager at Enumclaw, Washington, may suspend the Grantee's operations on State lands until such time as effective remedial action is taken.

IN WITNESS WHEREOF, the parties hereto have executed this instrument, in duplicate, as of the day and year first above written.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

JENNIFER M. BELCHER
Commissioner of Public Lands

CITY OF GIG HARBOR

By Gretchen Wilbert, Mayor
Title

~~PO Box 145~~ 3105 Judson St.
Gig Harbor, WA. 98335

App. No. 50-054204

02/rightaws/50054204.agr

STATE OF WASHINGTON)
)ss
County of PIERCE)

On this 17th day of October, 19 94, personally appeared before me Gretchen A. Wilbert to me known to be the Mayor of the corporation that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she/was they were authorized to execute said instrument for said corporation and that the seal affixed is the corporate seal of the said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

Molly M Dennler
Notary Public in and for the State of Washington residing at City Hall.

My appointment expires 12/2/95.

STATE OF WASHINGTON)
) ss
County of)

On this ____ day of _____, 19 ___, personally appeared before me JENNIFER M. BELCHER, to me known to be the Commissioner of Public Lands, and ex officio administrator of the Department of Natural Resources of the State of Washington, the Department that executed the within and foregoing instrument on behalf of the State of Washington, and acknowledged said instrument to be the free and voluntary act and deed of the State of Washington for the uses and purposes therein mentioned, and on oath stated that she was authorized to execute said instrument and that the seal affixed is the official seal of the Commissioner of Public Lands for the State of Washington.

IN WITNESS WHEREOF, I have hereunto set my hand and seal the day and year first above written.

_____
Notary Public in and for the State of Washington, residing at _____.

My appointment expires _____.

SE¼ SE¼, SECTION 36, T 22 N, R 1 E

EXHIBIT C

C-4
Water Rights Documentation

Cedar Creek Corrections Center

CCCC Well #1

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 2, 1987	G 2-27061	G 2-27061 P	G 2-27061 C

NAME
Dept. of Natural Resources/Cedar Creek Corrections Center

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. Box 9699; MS: FN-61	Olympia	Washington	98504

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
A well #1

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	70	29.5

QUANTITY, TYPE OF USE, PERIOD OF USE
29.5 acre-feet per year community domestic supply year round as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
1540 feet North and 750 feet West of Southeast corner of Section 11.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W. W.M.	W.R.I.A.	COUNTY
E½SE¼	11	16N	4W	23	Thurston

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The E½ of Section 11 and the W½ of Section 12, T. 16 N., R. 4 W.W.M.

PROVISIONS

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Issuance of this certificate was based on sufficient waters available, at least during portions of the year. However, it is pointed out to the certificate holder that his use of the water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.160.

Given under my hand and the seal of this office at Olympia *Washington, this* 4 *day of* January *19* 89

Christine O. Gregoire, Director
Department of Ecology

ENGINEERING DATA

by Gary E. Hanson
Gary E. Hanson, Water Resources Supervisor

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CCCC #2

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
May 24, 1991	G2-28164	G2-28164	

NAME
Department of Corrections / Cedar Creek - DNR

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 9699 MS-FN-61	Olympia	Washington	98501-9699

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropria the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set o herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	60	76*

QUANTITY, TYPE OF USE, PERIOD OF USE		
16.5 acre-feet per year (primary)	Multiple domestic supply	Year-round, as needed
30 acre-feet per year (Emergency)	Irrigation (15 acres) Fire protection	May 1 to October 1 Year-round, as needed

*29.5 acre-feet per year supplemental to G2-27061 C

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

LOCATION OF DIVERSION/WITHDRAWAL

feet north and 750 feet west of the southeast corner of Section 11.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W.J W.M.	W.R.I.A.	COUNTY
E½ SE¼	11	16	4W	23	Thurston

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

RECORDED PLATTED PROPERTY

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The east half of Section 11, and the west half of Section 12, T. 16 N., R. 4 W.W.M., Thurston County, Vashington.

DESCRIPTION OF PROPOSED WORKS

8" x 200' drilled well. Open hole from 80' to 200'. Will be equipped with a 5 horsepower submersible pump discharging 60 gpm.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1994	July 1, 1995

PROVISIONS

"The total annual withdrawal under this filing (G2-28164), and Certificate No. G2-27061 shall not exceed 76 acre-feet per year".

The water user is advised that quantities recommended, and the number of acres to be irrigated, may be reduced at the time of issuance of a final water right commensurate with the capacity of the installed system, and the number of acres actually irrigated.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

he Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the state in the best public interest. Use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

he Permittee is advised that notice of proof of appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent diversion facilities have been installed, and the system is currently in use. This includes installation of a mainline system capable of delivering the recommended tity of water to an existing or proposed distribution system within the area to be served, and fulfillment of other terms of this permit.

is permit is subject to the implementation of the minimum requirements established in the Interim Guidelines Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation ograms, July 1990.

der RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized the management of the states water resources, and must be considered as a potential new source of water. ccordingly, as part of the terms of this permit, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the partment of Health or the Department of Ecology.

This permit shall be subject to cancellation should the permittee fail to comply with the above velopment schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department menting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

15th *day of* December, *19* 93.

Mary Riveland, Director

Department of Ecology

ERING DATA
me

by *[signature]*

CCCC #1

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No.

(1) OWNER: Name Cedar Creek Corrections Center Address Little Rock, Wa.

(2) LOCATION OF WELL: County Thurston NE ¼ SE ¼ Sec 11 T 16 N. R 4W W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches
Drilled 200 ft. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from +2'9" ft. to 59'8" ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☒ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 13'4" ft. below top of well Date 12-08-86
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 11 gal./min. with 64'7" ft. drawdown after 24 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.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand & gravel fill	0	2
Top soil	2	4
Clay yellow-brown	4	25
Sandy-clay red	25	35
Shale rock redish soft	35	52'4"
Decomposed basalt	52'4"	69
Rock & some clay	69	74
Shale rock red & black medium	74	98
Rock blue medium hard	98	105
Rock blue hard	105	126
Rock blue, green, white medium	126	129
Rock blue & red medium	129	132
Rock blue medium	132	137
Shale rock blue & red medium soft	137	148
Rock blue medium - hard	148	200

WELL #1

Pump #1 set at 120'
pump #2 set at 125'

Work started 12-04 19 86 Completed 12-06 19 86

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Dale McGhee & Sons Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)

Address 3032 Allen Street Kelso, Wa. 98626

[Signed] (Well Driller)

License No. 0298 Date December 24 19 86

(USE ADDITIONAL SHEETS IF NECESSARY)

CCCC #2

well #2

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. [illegible]

Water Right Permit No. ____

(1) OWNER: Name Cedar Creek Correction Center Address Little Rock WA

(2) LOCATION OF WELL: County Thurston NE ¼ SE ¼ Sec 11 T 16 N., R 4 W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Little Rock WA

(3) PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) ____
Abandoned ☐ New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 260 feet. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from 0 ft. to 80 ft.
Welded ☐ Liner installed ☐ Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☑
Type of perforator used ____
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☑
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel ____
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 18' ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 54 ft. below top of well Date Feb 4 93
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☑ No ☐ If yes, by whom? TPC Pump
Yield: 60 gal./min. with 81 ft. drawdown after 24 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
0	90'	0:01	79'	0:02	72'
0:03	66'	0:04	62'	0:05	57'
0:10	45'	0:15	43'	0:25	40.65'

Date of test FEB 4, 1993

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Silty (Yellow - Brown) [redacted]	0	20
Silty Sand [redacted]	20	55
Silty Sand + Gravel [redacted] (Brown)	55	65
Less silty more sand + grav (Brown)	65	75
Black Rock to [redacted] Rock	75	90
Black Rock trace of White Rock	90	155
Black Red white + Red Rock Water Bearing	155	200
Black Rock - Hard	200'	

Post-It™ Fax Note 7671

To Terry Ward	Date 7-18-95 # of pages 2
Co./Dept.	From L Wallace
Phone #	Co. CCCC
Fax # 206-283-3206	Phone #
	Fax #

Work started Feb 2, 19__. Completed Feb 4, 1993

WELL CONSTRUCTOR 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.

NAME Tacoma Pump & Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 30316 Mountain Hwy Graham

Larch Corrections Center

S. F. No. 1361—(Rev. 6-70).

LCC

CERTIFICATE RECORD NO. -, PAGE NO. G 2-00433 C

STATE OF WASHINGTON, COUNTY OF Clark

CERTIFICATE OF GROUND WATER RIGHT

(Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto and the rules and regulations of the Department of Ecology thereunder.)

THIS IS TO CERTIFY That WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

of Olympia, Washington, has made proof to the satisfaction of the Department of Ecology of a right to the use of the public ground waters of the State of Washington from a well

located within SESWNE¼

Sec. 20, Twp. 3 N., R. 4 E. W.M.,

for the purpose(s) of community domestic supply, irrigation and fire protection

under and specifically subject to provisions contained in Ground Water Permit No. G2-00433 P

issued by the Department of Ecology and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the Department of Ecology

G 2-00433 C

and entered of record in Volume - at page /, that the priority of the right hereby confirmed dates from August 13, 1971; that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed 60 gallons per minute; 14 acre-feet per year, during entire year for community domestic supply; 4 acre-feet per year from May 1 to September 30, each year, for irrigation of 2 acres; and as needed for fire protection.

A description of the lands to which such ground water right is appurtenant is as follows:

E½SE¼NW¼ and W½SW¼NE¼ of Sec. 20, T. 3 N., R. 4 E.W.M.

The right to use of water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390 and 90.44.020.

This certificate of ground water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and seal of this office at Olympia, Washington, this 15th day of March, 19 73

JOHN A. BIGGS, Director
Department of Ecology

by R. J. Bollen, Assistant Director

Engineering Data
OK TM

LCC Well 2 & 3

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
May 10, 1994	G2-29044	G2-29044	

NAME
Department of Corrections/Department of Natural Resources

ADDRESS (STREET)	CITY	(STATE)	(ZIP CODE)
15314 NE Dole Valley Road	Yacolt	Washington	98675-9531

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2 & #3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR	QUANTITY, TYPE OF USE, PERIOD OF USE
	115	70.1*	
			*52.1 Acre-feet per year (Primary) Multiple domestic supply Year-round, as needed
			Supplemental to Existing Rights
			14.0 Acre-feet per year Multiple domestic supply Year-round, as needed
			4.0 Acre-feet per year Irrigation Irrigation season
			Fire Protection Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
600 feet East and 600 feet North of the center of Section 20.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W.) W.M.	W.R.I.A.	COUNTY
SW¼ NE¼	20	3	4E	27	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The Southwest quarter of the Northeast quarter of Section 20, T. 3 N., R. 4 E.W.M.

RECEIVED
NOV 01 1996
DEPARTMENT OF CORRECTIONS
CONTRACTS, ENGINEERING, & CAPITAL PROGRAMS

DESCRIPTION OF PROPOSED WORKS

6" well, 7.5 horsepower submersible pump connected to existing water supply system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	June 1, 1997	June 1, 1998

PROVISIONS

"Total combined water use from all wells connected to the LCC water system is not to exceed 115 gpm and 70.1 a-f/y under all water rights issued to Larch Corrections Center."

"Prior to issuance of a certificate, Larch Corrections Center shall properly abandon Well 0 to prevent contamination of the water source in accordance with Chapter 173-160 Washington Administration Code (WAC), Minimum Standards for Construction and Maintenance of Wells."

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data shall be submitted annually, in the month of February, to the Department of Ecology.

"Installation and maintenance of an access port as described in WAC 173-160-355 is required."

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 31st *day of* October, *1996*.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK JP

by Jean Blomstrom

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

LCC Wells 2+3

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
ay 10, 1994	G2-29044		

NAME
epartment of Corrections/Department of Natural Resources

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
314 NE Dole Valley Road	Yacolt	Washington	98675-9531

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
ell #2 & #3

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	115	70.1*

QUANTITY, TYPE OF USE, PERIOD OF USE		
*52.1 Acre-feet per year (Primary)	Multiple domestic supply	Year-round, as needed
pplemental to Existing Rights		
0 Acre-feet per year	Multiple domestic supply	Year-round, as needed
Acre-feet per year	Irrigation	Irrigation season
	Fire Protection	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
feet East and 600 feet North of the center of Section 20.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SW¼ NE¼	20	3	4E	27	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

e Southwest quarter of the Northeast quarter of Section 20, T. 3 N., R. 4 E.W.M.

TOMZ RELEASE FILE

SEP 23 1996

JDSB
MJJ
RAH

DESCRIPTION OF PROPOSED WORKS

" well, 7.5 horsepower submersible pump connected to existing water supply system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	June 1, 1997	June 1, 1998

REPORT

BACKGROUND:

)n May 10, 1994, the Department of Corrections/Department of Natural Resources filed two applications for the Larch Corrections Center, under the provisions of Chapter 90.44 Revised Code of Washington (RCW), to appropriate public ground water from two wells in the amount of 155 gallons per minute (gpm) and 75 gpm ır domestic supply. The applications were accepted for processing and assigned application numbers G2-29044 ıd G2-29045.

A legal notice of the applicants proposed appropriation for both applications were published February 28 and larch 6, 1996 in the Battle Ground Reflector. No objections were received in response to the public notice.

Upon further review of the project plans, the applicant has elected to proceed with a single application. ccordingly, application G2-29045 will be rejected. The intent of application G2-29044 is to increase the ithdrawal rate for the system, and to secure additional primary rights for Well 2 and Well 3 for expansion of the facilities.

ısed on the provisions of Chapters 90.03 and 90.44 RCW, and the following information, I recommend the ıproval of application G2-29044, and issuance of a permit.

TIGATION:

In consideration of this application, I conducted a field examination on April 5, 1996. I met with Jim Tooley : water system operator. I also reviewed the information submitted with the application, relevant reports, and :partment of Ecologys' records. These findings were reviewed by a staff hydrogeologist.

Site Location and Description

l rch Corrections Center (LCC) is located in unincorporated Clark County approximately 17 miles northeast of Vancouver, Washington. LCC is a minimum security prison with an inmate population of 162. Presently, ·ilities at the institution can support a maximum inmate population of 164. A staff of 52 is assigned to the (C.

The institution includes a barracks facility, dining hall and kitchen, administration building, chapel, greenhouse, ' :ehouse and garage, repair shed, boiler facility, gymnasium, and a wastewater treatment plant. According ' :he local USGS topographic map, elevations of the main portion of the institution vary from 1,280 feet to ,320 feet MSL. Cedar Creek, a tributary to the East Fork of the Lewis River, flows immediately west of the nstitution.

drogeologic Environment

applicant submitted no information on the geology, climate, ground water, or surface waters of the area, : he following is based on Ecologys' brief research for the area. The wells are completed in volcanic rock, ıicated on the most recent geology map as "basaltic-andesite and basalt flows" of Oligicene age (Phillips, W. 4, 1987, Geologic Map of the Vancouver Quadrangle, Washington and Oregon, Wa. Div. Geology and Earth : ources Open File Report 87-10). No analysis of the hydraulic properties of this formation is available. The ' log indicated clay at ground surface, probably volcanic saprolite, grading down into partly weathered rock and finally to mostly unweathered, though highly fractured, volcanic rock in the water-bearing ıe hydraulic conductivity and storativity cannot be predicted at any distance from the wells but based ı he pumping tests appears to be adequate to provide the predicted pumping rate and annual quantity of ·r.

Existing Water Right Certificates

The Larch Corrections Center has one Ground Water Right Certificate, No. G2-00438C, for a well that authorizes 60 gpm and 14 acre feet per year (a-f/y) for domestic supply, 4 acre feet per year for irrigation during the irrigation season, and fire protection as needed. This has been designated as Well 0.

Surface Water Right Certificate S2-22209C, was issued as a supplemental supply. Because of the intermittent nature of the stream, the supply pipes and intertie with the facility water system have been recently removed and surface water is not in use. This surface water right should be relinquished and could be considered as mitigation if withdrawal of ground water impacts surface water flows in the zone of contribution for the Larch Corrections Center wells.

Other than the existing LCC water rights, there are no recorded water rights within a 2-mile radius of the Corrections Center. Within that same 2-mile radius, there are six recorded wells, four of which are for the Corrections Center.

Demand Projection

Calculations for water demand are based on permanent inmate populations and 8 hour shifts for the staff population. Staff population is calculated to use approximately 1/3 of the water that a full time inmate uses.

Present water demand requires 75 gpm and approximately 27 acre feet per year. The facility plans to increase the number of inmates to approximately 400 and the number of staff to 132. With additional service staff, a service population of 444 is calculated. Based on a reported 141 gallons per capita per day water demand, 62,604 gallons of water per day will be required. Yearly demand will require 70.1 acre feet of water.

A certificate G2-00438 already authorizes an annual withdrawal of 14 acre-feet per year for domestic supply, the issuance of an additional 52.1 acre-feet per year is needed to meet future demand.

Analysis of Existing Data

There are four wells on the property. Three of these wells are used to supply water to two storage tanks. The storage tanks hold up to 160,000 gallons of water that is gravity fed back to the facility for domestic uses, irrigation, and fire protection.

Well 0, the original well, failed and is not connected to the water supply system, but the well still exists. Well 1 was drilled to replace Well 0 in February of 1980. Well 1 produces approximately 25 gpm for about five hours and then starts drawing air. Well 1 is not a reliable source of water but is maintained, by periodic pumping, as an emergency supply. Well 2 was drilled in April of 1988 and produces 50 gpm. Well 3 was drilled in July of 1993 and produces 35 gpm.

The three wells are screened in different zones between 100 and 200 feet. It appears from well records, static water levels, and limited pumping data, that all of the wells are taking water from the same source. Well 2 and Well 3 are the main supply wells for the LCC water system.

According to the Larch Corrections Center Water Conservation Plan, written by Grey and Osborne, Inc. in November, 1994;

- Well 3 production can be increased from 35 gpm to 65 gpm by installing a larger pump,
- Supply to the storage tanks can be increased by installing larger diameter supply pipes,
- The source aquifer should be able to sustain additional withdrawal without affecting the existing wells on the property.

Larch Corrections Center is approximately 4 miles from the nearest public water supply line operated by Clark Public Utilities. Because of elevation changes between the pipeline and LCC, the new pipeline and pumplift stations required to supply water to LCC would not be cost effective.

CONCLUSION:

Ground water right certificate G2-00438 is issued for 60 gpm and 18 acre feet from one well (14 for domestic, 4 for irrigation and fire protection). Well 1, which replaced well 0, is the point of withdrawal for this water right. Well 0 will be abandoned.

Surface Water Right Certificate No. S2-22209C was issued to the facility as a supplemental supply. LCC is no longer using this surface water supply and has voluntarily agreed to relinquish this water right.

Well 1 is not a reliable source of water, and will be used as an emergency supply. Wells 2 and 3 are to be the main supply wells for the LCC water system; with a combined pumping capacity of 115 gpm.

The ground water source is considered to be the same for all three wells. This water right will be issued for gallons per minute with the understanding that a total of 115 gpm could be supplied to the LCC water from a combination of withdrawal from all wells.

Based on projected demand, a total of 70.1 a-f/y is needed for facility operation. An additional 52.1 a-f/y will meet this demand. This water right will be issued for 52.1 a-f/y primary, not to exceed a total of 70.1 a-f/y combined total withdrawal from all wells.

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and should not impair existing rights or be detrimental to public welfare.

RECOMMENDATION:

Based on the above information and conclusions, I recommend that application G2-29044 be permitted for 115 gpm and 52.1 a-f/y to be used year round as needed for domestic supply from wells 2 and 3. I also recommend that application G2-29045 be rejected. Total combined water use from all wells connected to the LCC water system is not to exceed 115 gpm and 70.1 a-f/y (52.1 primary and 18.0 supplemental) under all water rights issued to Larch Corrections Center.

Provisions

Total combined water use from all wells connected to the LCC water system is not to exceed 115 gpm and 70.1 a-f/y under all water rights issued to Larch Corrections Center."

The water source and/or water transmission facilities are not wholly located upon land owned by the applicant. Issuance of a permit by this department for appropriation of the waters in question does not convey a right of access to, or other right to use, land which the applicant does not legally possess. Obtaining such a right is a matter between applicant and owner of that land.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

"Prior to issuance of a certificate, Larch Corrections Center shall properly abandon Well 0 to prevent contamination of the water source in accordance with Chapter 173-160 Washington Administration Code (WAC), Minimum Standards for Construction and Maintenance of Wells."

"Installation and maintenance of an access port as described in WAC 173-160-355 is required."

"An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly."

"In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record."

"Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format and shall include the following elements:

For Water Use Reporting:

1. Measurement method (ie; totaling meter, acoustic meter, etc.) for each well;

2. Total volume pumped from each well by month in thousands or millions of gallons;

3. Unique Well ID number.

For Water Level Reporting:

Unique Well ID Number;

2. Measurement data and time;

Measurement method (ie; air line, electric tape, pressure transducer, etc.);

Well status (ie; pumping, recently pumped, etc.);

Water level accuracy (ie; to nearest foot, tenth of foot, etc.);

6. Description of the measuring point (ie; top of casing, sounding tube, etc.);

Measuring point elevation above or below land surface to the nearest 0.2 foot;

Land surface elevation at the well head to the nearest foot."

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY: Chris Anderson Date: September 19, 1996

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29044, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and as specified in the foregoing report.

Signed at Olympia, Washington, this 19th day of September, 1996.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

Mission Creek Corrections Center for Women

COPY

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

November 15, 2004

Nancy Winters
Department of Corrections
PO Box 41112
Olympia, WA 98504-1112

Dear Ms. Winters

RE: Water Rights for Mission Creek Corrections Center

The Department of Ecology has reviewed the water right documents for the Mission Creek Correction facility site and concurs with your evaluation.

We agree that both ground water certificates 5724-A issued in the amount of 125 gallons per minute, and 8 acre-feet per year, and certificate G2-21634 issued in the amount of 100 gpm, and 27.3 acre-feet per year are appurtenant to the Mission Creek water system.

Combined the two rights authorize a withdrawal of 15.3 acre-feet per year for domestic supply, and an additional 20 acre-feet per year for the irrigation of 10 acres of lawn area.

It is our understanding that you have filed an Application for Change of Water Rights with the Mason County Conservancy Board, requesting that they change the purpose of use associated with the lawn irrigation to domestic supply. The Department of Ecology is prepared to evaluate the Board's recommendation as soon as they are submitted to us.

If you have any additional questions regarding these water rights, please contact either myself or Jill Walsh at (360) 407-0274.

Sincerely,

Tom Loranger

Tom Loranger
Water Resources Section Manager

TL:JW:th

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
OFFICE OF ADMINISTRATIVE SERVICES
CAPITAL PLANNING AND DEVELOPMENT
P.O. Box 41112 • Olympia, Washington 98504-1112 • (360) 586-6131
FAX (360) 586-8723

November 8, 2004

Ms. Jill Walsh
Department of Ecology
Southwest Regional Office
PO Box 46700
Olympia, Washington 98504-6700

Dear Ms. Walsh: Jill

RE: Water Rights
Mission Creek Corrections Center

The Washington Department of Corrections (DOC) has investigated water rights issues at the Mission Creek Corrections Center (MCCC). We are requesting your concurrence to allow the full use of the existing domestic water at 15.3-acre feet/year from the noted point of withdrawal.

DOC is currently leasing MCCC from the Department of Natural Resources (DNR), the property owner. MCCC was formerly operated by the Department of Social and Health Services (DSHS) for youthful offenders as Mission Creek Youth Camp.

Associated with the property are two water rights:

- Water right 5724
- Water right G2-21634C

It is our assessment that both water rights appear to be for the same point of withdrawal, or at a minimum, are located within the same ¼ - ¼ section.

Water right 5724 with a priority date of October 10, 1960, was issued to the Department of Institutions (predecessor to DSHS and DOC) for 8 acre feet/year (AF/yr) for community domestic supply at Mission Creek Youth Camp. The well was located "60 feet north and 260 feet west of the east quarter corner within SE ¼ NE ¼ of Section 13, Township 23 N, Range 2 WWM." The Application for a Permit indicated that a 6-inch well would be installed to a depth of approximately 150 feet. The well log indicated that the well was drilled to 210 feet, then pulled back and screened between 170 and 180 feet below the ground surface. Hand written

notes on the Proof of Appropriation of Water indicated that the well pumped approximately 7,000 gpd year round (7.8 AF/yr) with a 125 gpm pump capacity . The Application for Permit indicates that a 6-inch deep well turbine pump would be used with a 10 HP electric motor, 208 volt (estimated).

A second water right, G2-21634C, was issued to the DNR (property owner) with a priority date of October 24, 1973. This water right provides for 7.3 AF/yr for community domestic supply and 20 AF/yr for irrigation of ten acres. The location of the point of withdrawal is provided in the Report of Examination and the Application for a Permit as "62 feet west and 256 feet north of the east quarter corner within SE ¼ NE ¼ of Section 13, Township 23 N, Range 2 WWM." No well log was provided with the application package and the Progress Sheet indicates that the requirement for a well log was waived. The application also indicates that the well had already been drilled. Specifically, the application states that the "well is drilled and has a diameter of 8 inches and an estimated depth of 280 feet.

At first glance, the second water right appears to have a point of withdrawal very near the 1960 point of withdrawal and within the same ¼-¼ section. The record is not clear about whether in fact, this second water right applies to the same or a different well. The locations may not have been accurately recorded. This is supported by the fact that applications for both permits have a lined out description of the location, indicating some possible confusion about the methodology for locating. Both permit applications indicate the same ¼-¼ section. From the diagrams that provide the locations of the two wells, one cannot be certain that the wells were not in the same location. To shed light on this issue, the former Mission Creek Youth Camp Plant Manager, John Williams, was interviewed. He worked at the facility from 1971 until 2000 and does not recall that there were ever two wells on the property. Further, he recalls no well installation in the middle 1970's, the time in which the second water right application was submitted.

The former Superintendent at the youth camp, Karen Brunson, recalls that the well may have been refurbished. John Williams also recalls replacement of the bowls. A record (attached) from the Pacific Pumping Company, dated April 11, 1967, would confirm their recollections. The transmittal from Pacific Pumping provides specifications for "Existing Well Pump Revisions," including a "General Electric or equal 15 h.p., three phase, 220 volt, 360 rpm vertical hollow shaft high thrust drip-proof motor with non reverse ratchet," a column assembly consisting of "160 ft. of Byron Jackson 1" line shaft," and a bowl assembly. This documentation appears to provide revisions for the 1960 well.

A second inconsistency in the records is the discrepancy in the diameter and depth of the well(s). The driller's well log from the 1960 well shows a 6-inch diameter and a 180 foot depth. Since no well log was required for the 1973 water right application a conclusive comparison cannot be made. The application indicates a diameter of 8 inches and a depth of 280 feet. While this information differs from the 1960 well, it may have been estimated. According to John Williams and the current Plant Manager, Leo Gleason, one cannot measure the diameter of the existing well due to the placement of the pump. However, both of the plant managers believe that the existing well is 6 inches in diameter. The description of the pump in the 1973 application

matches the description in the Pacific Pumping Company specifications from 1967 (a 15 h.p. General Electric 220 volt pump. One might conclude that the 8-inch diameter and 280 foot well depth presented in the 1973 application may have been the application preparer's best estimate, rather than first hand knowledge.

There are virtually no other records for this period and DSHS engineering staff that may have had knowledge of the site, have long since retired.

Although not entirely conclusive, this investigation strongly suggests that water right 5724 (1960) and water right G2-21634C (1973) apply to the same point of withdrawal, or at least to withdrawal within the same ¼-¼ section. DOC requests your concurrence with this assessment so that we may utilize the combined rights of 15.3 AF/yr for community domestic supply when we open the Mission Creek Correction Center in the Spring of 2005.

Thank you for all of your help in investigating this matter. We await your concurrence, so that our plans for occupancy may proceed. If you have any additional questions, please do not hesitate to call me at (360) 753-6547.

Sincerely,

Nancy

Nancy L. Winters
Assistant Director of Environmental Services

Enclosure(s)
NW:rb
cc: Joseph D. Lehman
Tracy Guerin
Bill Phillips
Pam Jenkins
Dan Pacholke
Leo Gleason

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SUBMITTAL FROM

PACIFIC PUMPING COMPANY

OAKLAND PORTLAND SEATTLE LOS ANGELES DALLAS

#2-19

BELFAIR, WASH. - MISSION CREEK YOUTH FOREST CAMP
EXISTING WELL PUMP REVISIONS

Well Pump:

1 - Byron Jackson six stage, 5.5GH vertical turbine type pumping unit consisting of:

1 - General Electric or equal 15 h.p., three phase, 220 volt, 3600 r.p.m., vertical hollow shaft high thrust drip-proof motor, with non-reverse ratchet.

1 - Discharge Head - Byron Jackson Type GS 4 X 12 discharge head with 4" discharge, flanged. Discharge head to be cast iron construction with bronze packing gland. Headshaft is 416 stainless steel.

1 - Column assembly - 160 ft. of Byron Jackson 1" line shaft; 4" self lubricated column assembly. Shaft to be 1045 steel, column to be standard Schedule 40 steel pipe.

1 - Bowl assembly - Byron Jackson six stage 5.5GH impellers to be of semi-enclosed type with non-overloading characteristics. Bowls are of meehanite cast iron, impellers of bronze, and impeller shaft to be 416 stainless steel.

1 - 4" galvanized cone strainer.

1 - Pre-lube tank, make up water valve, and solenoid valve.

1 - Water level indicator gauge with hand pump, fitting and air line.

Capacity 100 g.p.m. at 327' T.D.H.

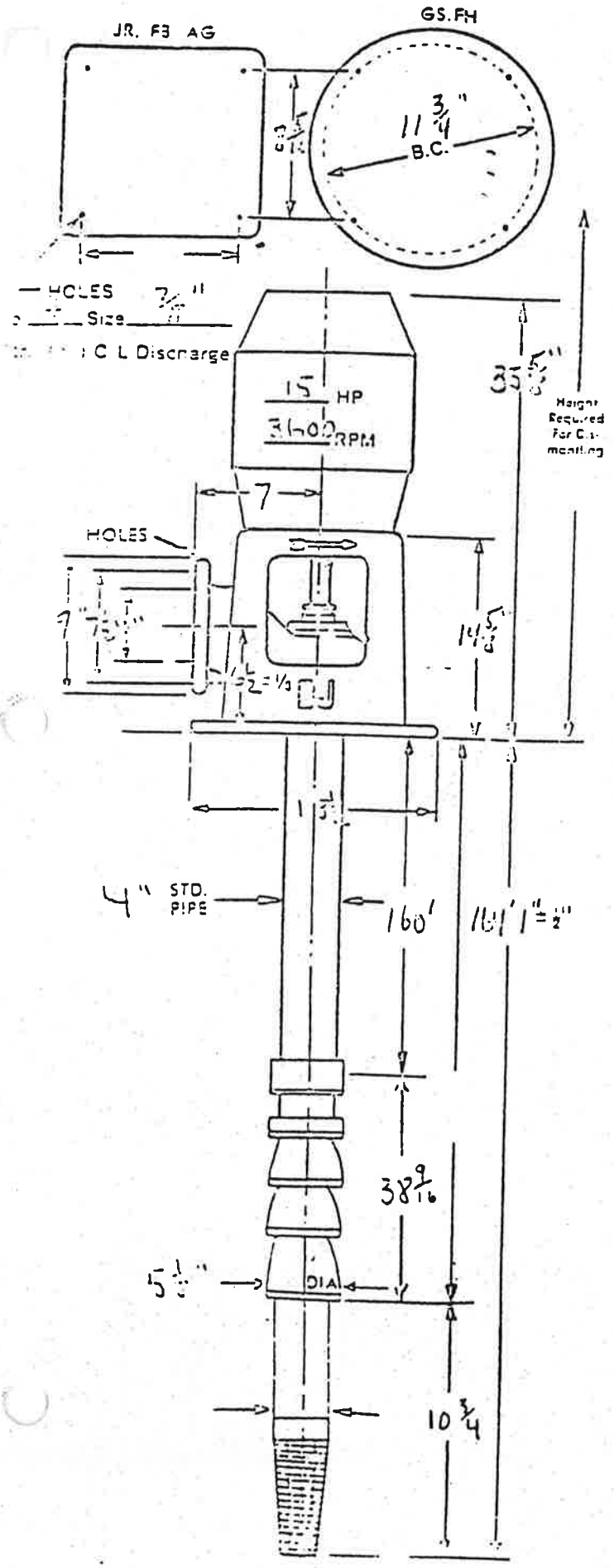
Enclosures:

Byron Jackson Pumps Inc. - - Bulletin 2055:
" " " " - - Performance Curve:
" " " " - - Dimension Print:

4-11-67
RCP:cl

Byron Jackson Pumps, Inc.

DEEPWELL - MOTOR DRIVE Outline



Date 4-12-61

Name of Customer Hunt's

Proposition No.

Order No.

Purchase Order No.

Item No.

No. of Units One

DRIVER: Type VHS

Frame 324 Phase 3 Cycles 60 Volts 220

Manufacturer General Electric

Enclosure Drip Proof

DISCHARGE HEAD: Type & Size GS 6 x 4

Rating 125 # ASA NPT

Lubrication Water

Shaft 1"

BOWLS: Size 5-S Type 6-11 Stages 6

SUCTION PIPE None

STRAINER 4" Galv. Conn.

NOTES:

DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

CERTIFIED CORRECT

DATE

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
OFFICE OF ADMINISTRATIVE SERVICES
CAPITAL PLANNING AND DEVELOPMENT
P.O. Box 41112• Olympia, Washington 98504-1112• (360) 586-6131
FAX (360) 586-8723

August 18, 2004

Mr. Sherri Carroll
Washington State Department of Ecology
Southwest Regional Office
P.O. Box 46700
Olympia, Washington 98504-6700

Dear Ms. Carroll:

RE: Water Right Permit Application
Mission Creek Corrections Center

Enclosed is an application for additional water rights at the Mission Creek Corrections Center, Belfair, Washington, and the $10.00 application fee. The Mission Creek facility was operated by the Department of Social and Health Services as a juvenile rehabilitation camp until it was transferred to the Department of Corrections (DOC) in January 2003. The DOC 2004 Draft Master Plan recommends, and the 10-Year Capital Plan proposes opening the institution as an adult correctional facility at its current 80-bed capacity as soon as feasible. An expansion to 200 offenders is proposed to be completed by June of 2007, with subsequent expansion to 400 offenders by June 2011. This ambitious expansion schedule is necessary to reduce severe overcrowding in the state prison system.

Currently the Department of Natural Resources (DNR) holds a groundwater right of 27 acre-feet/year (7 acre-feet/year for domestic use and 20 acre-feet/year for irrigation, permit number G2-21634). DOC has applied to the Mason County Conservancy Board for a change of use from irrigation to domestic/public supply for the 20 acre-feet/year. This new application requests an additional 40 acre-feet/year to be added to our existing water right to provide water for the proposed expansion. DNR is the property owner and they have been named as the applicant for the new application request, while DOC, the operator, is provided as the contact person.

As you are aware, prisons are considered essential public facilities. The offender population is expected to expand from approximately 17,000 in 2004 to 22,400 in 2014. The Master Plan recognizes the severity of the current overcrowded conditions in the prisons and recommends rapid expansion of our minimum security facilities. Therefore, we are requesting action on this application on an accelerated schedule, if possible.

If you have any questions, please call me at (360) 753-3975, or Nancy Winters at (360) 753-6547.

Sincerely,

Pam Jenkins, P.E.
Director of Environmental Services

NW:rb
Enclosures
cc: The Honorable Tim Sheldon, Senator
Dan Pacholke, Cedar Creek Corrections Center
Paul Penhallegon, Department of Natural Resources
Nancy Winters, Capital Planning and Development
Russel Paxson, Capital Planning and Development
Wes Anderson, Cedar Creek Correction Center

\\Efcp_server\Correspond\2004\Environmental\MCCC Wtr Rt ltr 8 18 04.doc

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use

Fee Paid

Date

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name ___Washington Department of Natural Resources_____ Home Tel:(_360_)_____ - _____

Mailing Address ___P. O. Box 47016_____ Work Tel:(360) 902 - 1604_____

City __Olympia_____ State WA Zip+4 98504+7016 FAX:(360)902 -1789_____

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

Name __ Pam Jenkins (Department of Corrections) _____ Home Tel:(_____)_____ - _____

Mailing Address ___ P.O. Box 41112_____ Work Tel: (360) 753-3975 _____

City__Olympia_____ State_WA__ Zip+4_98504____+_1112__ FAX: (360) 586-8723_____

Relationship to applicant Director of Environmental Services, Dept. of Corrections_____

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than _____100_____ (**X** gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or **X** ground water source (check only one) for the purpose(s) of __Domestic/Public Supply _____. **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (**See instructions**.) *NOTE: A tax parcel number or a plat number is not sufficient.*

See Attachment A

Estimate a maximum annual quantity to be used in acre-feet per year:____40 AF/Yr_____

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ____/____/____ to _____/____/____

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions: _____	A permit is desired for _1 existing_ well(s).
Source flows into (name of body of water):	Size & depth of well(s): 6-inch diameter well, 180 feet deep, 100 gpm

LOCATION						
Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: 62 feet west and 256 feet north of the east quarter corner of Section 13						
						If location of source is platted, complete

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: ___Formerly Mission Creek Youth Camp, renamed Mission Creek Corrections Center (MCCC)

B. Briefly describe your proposed water system. **(See instructions.)**

The existing water system consists of a 180-foot deep 6-inch diameter well drilled in 1960. (See Attachment B Construction Record.) Water was encountered at 140 feet below ground surface. Installed in the well is a six-stage 5.5 GH vertical turbine pumping unit with a 15 HP, three-phase, 220 volt, 3600 rpm vertical hollow shaft high thrust drip proof motor with non-reverse ratchet. The pump capacity is 100 gpm. The pump delivers water to a 30,000-gallon elevated water tower. The water from the tower services a 220,000-gallon tank (required for fire flow) and the buildings. Mission Creek Corrections Center has a backflow prevention system in place. The system will remain in place, with the additional water rights extracting groundwater from the same well. The distribution system to additional housing units will be modified.

C. Do you already have any water rights or claims associated with this property or system? X YES ☐ NO
PROVIDE DOCUMENTATION. **See Attachment C.**

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested:___155 *____ Type of connection _Prison living units _____
(Homes, Apartment, Recreational, etc.)

* Assumes: 40 Af/yr domestic/public supply = 35,707 gpd; City of Shelton, Mason County 1 ERU = 230 pgd; therefore 35,707/230= 155 additional connections (NOTE concerning existing connections: Assumes existing water right of 27 AF/yr becomes domestic/public supply; 27 AF/y = 24,102 pgd/230gpd/ERU = 105 existing connections).

B. Are you within the area of an approved water system? ☐ YES X NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.*

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the
Washington State Department of Health? ☐ YES X NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

DOC is in the process of updating the statewide water system plan that will include this facility. Anticipated submittal to DOH is January 2005. The previous plan did not include Mission Creek because DOC did not own the facility at that time.

D. Do you have an approved conservation plan? ☐ YES X NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

DOC does not currently have a water conservation plan for Mission Creek. The facility is not currently being utilized as a prison. This application will allow us to expand the facility from housing 80 youth (during DSHS ownership) to housing 400 inmates.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION

1. Is the combined acreage greater than 6000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
   If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES x NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

Drive north on from Olympia toward Shelton. Turn off onto State Route 3 towards Belfair. In Belfair, turn left onto State Highway 300; continue through the stop sign. Turn right onto Sand Hill Road and proceed to sign for Mission Creek Youth Camp on left hand side of road. Turn left and follow drive up the hill.

Section 10. REQUIRED MAP

A. Attach a map of the project. **(See instructions.) See Attachment D.**

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? x YES ☐ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

The Department of Natural Resources owns the property, which is leased to the Department of Social and Health Services (DSHS). The Department of Corrections has a Memorandum of Understanding with DSHS. The agreements with both DSHS and DNR are provided in Attachment E.

B. Does the applicant own the land on which the water source is located? x YES ☐ NO
If no, submit a copy of agreement: **See Attachment E.**

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 grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98509-5128
Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ _____ *(date).*	

Ecology staff_____ Date_____

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

June 11, 2004

Mason County Conservancy Board
Attn John Noble, Board Member
1051 SE Hwy 3 Ste G
Shelton WA 98584

Dear Mr. Noble:

This letter is to acknowledge that the Department of Ecology received an Application for Change in the name of Washington Department of Corrections (DOC).

Your assigned number for this application is MASO-04-01. The Department's assigned number is G2-21634C, please include this number in future correspondence and with any inquiries regarding this application with the Department of Ecology. The application acceptance date is June 7, 2004.

If you have any questions regarding this matter, please contact me at (360) 407-0240.

Sincerely,

Sheri Carroll
Water Resources

SC:th

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
02-21634C	02-21634P	02-21634	October 24, 1973

NAME
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
	Olympia	Washington	98504

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	27.3

QUANTITY, TYPE OF USE, PERIOD OF USE

7.3 acre-feet per year	community domestic supply	continuously
20 acre-feet per year	irrigation of 10 acres	May 1 to October 1 each year

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
62 feet west and 256 feet north of the east quarter corner of Sec. 13

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NE¼	13	23	2 W	15	Mason

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

That portion of the SE¼NE¼ AND NE¼SE¼, Sec. 13, T. 23 N., R. 2 W.W.M., AND Government Lots 2 and 3, Sec. 18, T. 23 N., R. 1 W.W.M., included within the limits of the following described tract:
beginning at a point which is west 450 feet from the east quarter corner of said Sec. 13; thence south 200 feet; thence east 980 feet; thence north 865 feet; thence west 980 feet; thence south 665 feet to the point of beginning; LESS roads. Referred to as Mission Creek Youth Camp.

PROVISIONS

The access port as required on your permit, shall be maintained at all times.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 28th *day of* May, *19* 76.

JOHN A. BIGGS, *Director*
Department of Ecology

by E. W. Asselstine

E. W. Asselstine, Regional Manager

ENGINEERING DATA

OR P

FOR COUNTY USE ONLY

MASON COUNTY WATER CONSERVANCY BOARD
1051 SE Hwy 3
Suite G
Shelton, WA 98584

June 3, 2004

Washington State Department of Ecology
Southwest Regional Office
Water Resources Division
PO Box 47775
Olympia, WA 98504

Ladies and Gentlemen

We have accepted a change application for G2-21634C submitted by the Department of Corrections. We have assigned it our number MASO-04-01. Our understanding is that the original application is to be sent to your office, and it is enclosed. Publication of the change has been started as of today.

John B. Noble, Board member

STATE OF WASHINGTON

APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

RECEIVED JUN -7 10 :58

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

Explain: Change use from irrigation to domestic

FOR OFFICE USE ONLY

CHANGE No. G2-21634 WRIA 45

DATE ACCEPTED 6/7/04 BY SC

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.
Washington Department of Corrections (DOC)	( )	( )
ADDRESS: P. O. Box 41112		
CITY: OLYMPIA	STATE: WA	ZIP CODE: 98504-1112

CONTACT NAME (IF DIFFERENT FROM ABOVE)	PHONE NO.	FAX NO.
Pam Jenkins, DOC	(360) 753-3975	(360) 586-8723
ADDRESS: P.O BOX 41112		
CITY: OLYMPIA	STATE: WA	ZIP CODE: 98504-1112

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER	RECORDED NAME(S)
G2-21634C G2-21634P	WA. Department of Natural Resources

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

IF NO, PROVIDE OWNER(S) NAME: WA. Department Of Natural Resources

HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? X 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 #
WELL		**SE**	**NE**	**13**	**23**	**2W**	**W.R.I.A. #15**	

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
WELL		**SE**	**NE**	**13**	**23**	**2W**	**W.R.I.A. #15**	

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

EXISTING: ❑ YES X NO PROPOSED: ❑ YES ❑ NO – IF NO, PROVIDE OWNER(S) NAME: WA. Department Of Natural Resources

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
IRRIGATION OF 10 ACRES		**20**	**MAY1 TO OCTOBER 1 EACH YEAR**

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
COMMUNITY DOMESTIC SUPPLY		**20**	**CONTINOUSLY**

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:
That portion of the SE1/4NE1/4 and NE1/4SE1/4, Sec 13 T. 23N., R. 2 W.W.M., And Government Lots 2 and 3, Sec. 18, T. 23 N., R. 1 W.W.M., included within the limits of the following description tract: beginning at a point which is west 450 feet from the east quarter corner of said Sec. 13: thence south 200 feet; thence east 980 feet; thence north 865 feet; thence west 980 feet; thence south 665 feet to the point of beginning; LESS roads. Referred to as Mission Creek youth Camp.

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:
That portion of the SE1/4NE1/4 and NE1/4SE1/4, Sec 13 T. 23N., R. 2 W.W.M., And Government Lots 2 and 3, Sec. 18, T. 23 N., R. 1 W.W.M., included within the limits of the following description tract: beginning at a point which is west 450 feet from the east quarter corner of said Sec. 13: thence south 200 feet; thence east 980 feet; thence north 865 feet; thence west 980 feet; thence south 665 feet to the point of beginning; LESS roads. Referred to as Mission Creek youth Camp.

¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
SE	***NE***	***13***	***23***	***2W***	***MASON***		

DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? ❑ YES X NO – IF NO, PROVIDE OWNER(S) NAME:
WA State Department Of Natural Resources

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 x NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

The change requested would transfer the irrigation usage to a continuous annual community domestic supply.

This does not represent an expansion of the service area.

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.

Mason County
WATER CONSERVANCY BOARD

Application for Change/Transfer

Report of Examination

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water ☒ Ground Water

DATE APPLICATION RECEIVED	PERMIT NUMBER	CERTIFICATE NUMBER	CHANGE APPLICATION NUMBER
1/1/04		G2-21634C	MASO-04-01

NAME
Department of Corrections (DOC)

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
2417 W 4th Ave	Olympia	WA	98504

Changes Proposed:

☐ Point of Diversion/Withdrawal ☐ Place of Use ☒ Purpose ☐ Temporary ☐ Other

DECISION HISTORICAL SUMMARY

Existing Use						Proposed Use					
QUANTITY, TYPE OF USE, PERIOD OF USE 20 AF irrig May1- Oct 1 7.3 AF Community Domestic Continous						QUANTITY, TYPE OF USE, PERIOD OF USE 27.3 Communty Domestic					
Point of Diversion or Withdrawal						**Point of Diversion or Withdrawal**					
SOURCE Well				TRIBUTARY OF (IF SURFACE WATER) N/A		SOURCE Well				TRIBUTARY OF (IF SURFACE WATER) N/A	
NO.	¼ SE	¼ NE	SECTION 13	TOWNSHIP N. 23	RANGE, 2W	NO.	¼ SE	¼ NE	SECTION 13	TOWNSHIP N. 23	RANGE, 2W
Place of Use						**Place of Use**					
LEGAL DESCRIPTION OF LANDS WHEREWATER IS PRESENTLY USED:) Same plus						LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED Same as certificate of record					
NO.	¼ SW	¼ NW	SECTION 18	TOWNSHIP N. 23	RANGE, 1W	NO.	¼ SW	¼ NW	SECTION 18	TOWNSHIP N. 23	RANGE, (1W

SEPA

The board has reviewed the provisions of the State Environmental Policy Act of 1971, Chapter 43.21C RCW and the SEPA rules, chapter 197-11 WAC and has determined the application is: ☒ Exempt ☐ Not exempt

Water Right Priority Date:(date)

BOARD'S TENTATIVE DETERMINATION

MAXIMUM CUB FT/ SECOND	MAXIMUM GAL/MINUTE	MAXIMUM ACRE-FT/YR	TYPE OF USE, PERIOD OF USE
	100	27.3	Community Domestic

SOURCE	TRIBUTARY OF (IF SURFACE WATER)
Well	N/A

AT A POINT LOCATED: PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE	WRIA	COUNTY.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Same as certificate G2-21634C

PARCEL NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE,

DESCRIPTION OF PROPOSED WORKS

We observed a 300,000-gallon ground-level storage tank that was full. The primary use for the tank was reported as fire suppression. We also observed a 30,000 gallon elevated storage tank that was also full. That tank supplies the regular water system for the facility.
The water source is a well located on a flat terrace a short distance west of the facility and about 40 feet below the facility. The terrace is about 500 feet east of Mission Creek and about 100 feet above the creek at this point. The well is in a large concrete pump house that contains the full set of controls and valving. The pump is reportedly 15 hp and reportedly discharges 100 gpm. There is a flow meter and a depth-to-water airline both inoperable at this time.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	COMPLETE CHANGE AND PUT WATER TO FULL USE BY THIS DATE:
To be determined		

REPORT

See WAC 173-153-130 - The following sections may be expanded onto additional pages.

BACKGROUND

Department of Corrections is assuming the pre-existing DSHS juvenile care site for DOC residential use. Proposed use if for a population ‘er than that of the DSHS facility

COMMENTS AND PROTESTS

No Protests

INVESTIGATION

A field examination was made at the Mission Creek site on June 14, 2004 by board members George Campbell and John Noble. Wes Anderson and Leo Gleason, who are Plant Mangers of the Cedar Creek Correction Facility and the Mission Creek site, respectively, met us there. The Mission Creek site was under previous use by the Department of Social and Health Services as a juvenile care facility. That use had been abandoned. The Department of Corrections who plan unspecified future use as a residential facility presently manages the site.

Currently the site is not utilized but is maintained. We observed a 300,000-gallon ground-level storage tank that was full. The primary use for the tank was reported as fire suppression. We also observed a 30,000 gallon elevated storage tank that was also full. That tank supplies the regular water system for the facility.

The water source is a well located on a flat terrace a short distance west of the facility and about 40 feet below the facility. The terrace is about 500 feet east of Mission Creek and about 100 feet above the creek at this point. The well is in a large concrete pump house that contains the full set of controls and valving. The pump is reportedly 15 hp and reportedly discharges 100 gpm. There is a flow meter and a depth-to-water airline both inoperable at this time. The pump cycled on during our visit , sending water to the elevated storage.

Leo Gleason gave a partial well log copy to us. The log, by Stoican Drilling, shows it to be started on 10/17/1960 and tested on 11/15/1960. The report shows it to be 6-inch diameter, 180 feet deep, and screened from 170 to 180 feet. SWL was 141 feet below ‘ ‘nd. Stoican ran a pump test intermittently for two days totaling about 24 hours at rates up to 160 gpm. Drawdown at 160 gpm was ‘ nated at 16 feet.

Records provided to the Board upon receipt of this application showed a record of pumping during the occupancy of DSHS.

CONCLUSIONS

Pipes and pumps exist to supply 100 gpm to storage. The old irrigation system has been bypassed. Water is available for Community Domestic.

RECOMMENDATIONS

The proposed use qualifies as " Municipal" under HB 1338 because it is a governmental facility. This is under Sec. 1 (4) (b) a water right qualifies as municipal if it is used for ""governmental or governmental propriety purposes". The board recommends that the previously permitted 27.3 AF be allowed for community domestic use only and no irrigation use.

PROVISIONS AND CONDITIONS

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G2-21634C	G2-21634P	G2-21634	October 24, 1973

NAME
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
	Olympia	Washington	98504

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	27.3

QUANTITY	TYPE OF USE	PERIOD OF USE
7.3 acre-feet per year	community domestic supply	continuously
20 acre-feet per year	irrigation of 10 acres	May 1 to October 1 each year

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
62 feet west and 256 feet north of the east quarter corner of Sec. 13

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼NE¼	13	23	2 W	15	Mason

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

That portion of the SE¼NE¼ AND NE¼SE¼, Sec. 13, T. 23 N., R. 2 W.W.M., AND Government Lots 2 and 3, Sec. 18, T. 23 N., R. 1 W.W.M., included within the limits of the following described tract:
beginning at a point which is west 450 feet from the east quarter corner of said Sec. 13; thence south 200 feet; thence east 980 feet; thence north 865 feet; thence west 980 feet; thence south 665 feet to the point of beginning; LESS roads. Referred to as Mission Creek Youth Camp.

PROVISIONS

The access port as required on your permit, shall be maintained at all times.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 28th *day*

of May, *19* 76

JOHN A. BIGGS, *Director*
Department of Ecology

ENGINEERING DATA
OK. D

by E.W. Asselstine
E. W. Asselstine, Regional Manager

FOR COUNTY USE ONLY

CERTIFICATE RECORD NO. 12 PAGE NO. 5826-A

STATE OF WASHINGTON, COUNTY OF Mason

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Water Resources thereunder.

THIS IS TO CERTIFY *That* STATE OF WASHINGTON, DEPARTMENT OF INSTITUTIONS

of Olympia, Washington *; has made proof to the satisfaction of the Department of Water Resources of Washington, of a right to the use of the ground waters of a* well *located within* SW¼ *Sec.* 13 *, Twp.* 23 *N., R.* 2 W. *W.M., for the purpose of* community domestic supply for Mission Creek Youth Forest Camp *under and subject to provisions contained in Ground Water Permit No.* 5726 *issued by the Department of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the Department of Water Resources of Washington and entered of record in Volume* 12 *at page* 5826-A *; that the right hereby confirmed dates from* October 10, 1960 *; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 125 gallons per minute; 0 acre-feet per year, for community domestic supply for Mission Creek Youth Forest Camp.

Special provisions required by the Department of Water Resources:

A description of the lands to which such ground water right is appurtenant:

Begin at a point 450 feet west of quarter corner of Sec. 13, T. 23 N., R. 2 W.W.M., and Sec. 18, T. 23 N., R. 1 W.W.M., thence 90° in an easterly direction for a distance of 980 feet to a point, thence 90° in a northerly direction for a distance of 865 feet to a point, thence 90° in a westerly direction for a distance of 980 feet to a point, thence 90° in a southerly direction for a distance of 665 feet to the point of beginning.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

This certificate of ground water right is specifically subject to relinquishment for nonuse of water as provided in Section 18, Chapter 233, Laws of 1967.

WITNESS the seal and signature of the Assistant Director, Division of Water Management, Department of Water Resources affixed this 9th *day of* October *, 19* 67

P. E. Carlock

Assistant Director
Division of Water Management
Department of Water Resources

$10.00 examination fee should accompany each application.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources

APPLICATION FOR A PERMIT

To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

RECEIVED
DEPARTMENT OF CONSERVATION
OCT 10 1960

Application No. G. W. 5757

A. M. 7 8 9 10 11 12 1 2 3 4 5 6 P. M.

I, STATE OF WASHINGTON, DEPARTMENT OF INSTITUTIONS
(Name of applicant)

of Olympia, Washington
(Complete post office address)

do hereby make application for a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights. This application is made under the provisions of Chap. 263 of the Session Laws of 1945, and amendments thereto of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Water Resources.

1. *The proposed appropriation will be from* WELL
(Well, tunnel, infiltration trench)

located Approximately 4 miles northwest of Belfair
(Give approximate distance and direction from nearest city or town)

Area (Leave blank) *Sub-area* (Leave blank)

Zone (Leave blank)

Applicant's name or number of well or other works, if any

2. *The quantity of water which applicant intends to withdraw for beneficial use is* 150 *gallons per minute;* 242 *acre feet per year.*

3. *The use or uses to which water is to be applied* Domestic Supply
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. *The time during which water will be required each year* Continuous Use

5. *Location of well or other works for withdrawal of water: In county of* Mason

(a) 60' North & 260' West of E¼ Corner of Sec. 13
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the S.E. 1/4 of the ~~S.E. 1/4~~ NE¼ of Sec. 13, Twp. 23 N., Rge. 2 W (E. or W.)
(Give smallest legal subdivision)

or (b) *If within limits of recorded platted property, town or city: Lot* ..., *Block* ...,

of
(Give name of plat or addition) (If within town or city, give name)

(c) *Show this location on accompanying section plat, in duplicate. Other adequate maps or drawings will be acceptable.*

OK RHR

Report of Examination on Ground Water

Received [illegible] Date of exam. 11-28-60 Appl. No. [illegible]

State of Wash., Dept. of Conservation

Name Div. of Engineering & Architecture Address P.O. Box 1162, Olympia, Wash.

Type of works well Dimensions 6"x150'

Progress of works started - pump not installed

Quantity applied for 150 g.p.m. acre-feet per year

Legal sub SE¼SW¼ Sec. 13 Twp. 23 N. Rge. 2 W. County Mason

Use community domestic supply for Mission Creek Youth Forest Camp

Irrigation-acreage: Present Planned Feasible

Municipal: Population as of

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land NONE

Proximity to existing works, springs, wells, or streams none nearby

Area Sub-area Zone

RECOMMENDATIONS

Approved for 150 g.p.m. 240 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.) The installation of an access port to well as described in attached Ground Water Bulletin No. 1 is recommended.

Signed this 17th day of January, 1961.
Division of Water Resources

Ernest E. Lavender
ERNEST E. LAVENDER, Engineer

McNeil Island Corrections Center

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

[X] Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

[ ] Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
February 25, 1987	S2-27135	S2-27135	S2-27135

NAME
State of Washington, Department of Corrections

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Post Office Box 900	Steilacoom	Washington	98388

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Eden Creek Reservoir/Butterworth Reservoir

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
1.55		1329

QUANTITY, TYPE OF USE, PERIOD OF USE		
458.5 acre-feet	Institutional supply	Year-round as needed
27 acre-feet	Community domestic supply	Year-round as needed
18.5 acre-feet	Stockwater	Year-round as needed
825 acre-feet	Irrigation/Butterworth Reservoir	May 1 to October 1

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
Eden Creek Reservoir - 800' north and 700' west of the southeast corner of Section 20.

Butterworth Reservoir - 100' east and 2350' south of the northwest corner of Section 21.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼SE¼Sec.20/SW¼NW¼Sec.21	20 & 21	20	1E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Water will be drawn and utilized on McNeil Island, which is a 4,400 acre island located in T. 20 N., R. 1 E.

PROVISIONS

That portion of this authorization relating to irrigation is classified as a Publicly Owned Land Permit in accordance with Chapter 90.66 (Initiative Measure No. 59).

The amount of water granted is a maximum limit that shall not be exceeded. The water user shall be entitled only to that amount of water within the specified limit that is beneficially used, and that amount of water required for the actual crop grown on the number of acres and place of use specified.

Water available under this authorization may not provide a continual supply throughout each irrigation season.

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through -040.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington,

this 22nd *day of* August, *19* 96.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK ✓

by Gale Norrison

FOR COUNTY USE ONLY

EP WATER RIGHTS

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

October 21, 1999

Department of Corrections
C\o Gray & Osborne, Inc.
2401 Bristol Court SW
Olympia, Washington 98502

Dear Mr. McCauley:

Re: Temporary Use Surface Water Permit S2-~~29975~~ 29875 – McNeil Island

On August 10, 1999, on behalf of the Department of Corrections, you filed the above referenced application to appropriate public surface water from the Eden Creek and Butterworth Reservoirs for the McNeil Island correctional facility.

It is our understanding that the withdrawal rate of 1.55 cfs (696 gpm), authorized by the project's existing water right certificate S2-27135, does not reflect the system's actual intake capacity of 1.5 million gallons per day or 2.34 cfs. Surface water is currently pumped from the Eden Creek Reservoir to the filtration plant by two vertical turbine pumps with the capacity of 1,050 gallons.

In response to your request for permit authorization, this letter constitutes a Temporary Use Permit issued to authorize the Department of Correction's existing diversion rate for the potable water treatment plant.

The system's annual allocation of 1,329 acre-feet per year granted under existing rights, is adequate to serve the facility, and no additional water will be withdrawn. The water will be used beneficially, and as the water system has historically been operating at this withdrawal rate this appropriation will not impact existing rights or be detrimental to the public interest.

Under the provisions of Chapter 90.44.020 RCW, the Department of Ecology may issue a Temporary Permit during the pendency of a water right application.

Accordingly, this letter serves as a Temporary Permit, which is issued subject to existing rights and to the following provisions:

1. The effective date of this permit is October 21, 1999.

2. This Temporary Permit is effective until such a time as a formal water right permit is issued.

3. This permit authorizes a maximum withdrawal rate of 1,050 gallons per minute – 2.34 cfs, under both the existing certificate and this authorization.

4. An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360,

WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

Any person wishing to appeal this action may obtain a review by submitting a written request to the Washington Pollution Control Hearings Board with a copy to the Director of the Department of Ecology, within 30 days from receipt of this letter. These procedures are consistent with the provisions of Chapter 43.21B RCW and associated rules and regulations.

If you have any questions, please call Jill Walsh at (360) 407-0274.

Sincerely,

Jill E Walsh

J. Mike Harris
~~Water~~ Resources Section Supervisor
Southwest Regional Office

JMH:JW:th

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid _____
Date _____

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name State of WA, Dept. of Corrections — Home Tel: (____) N/A - ____
Mailing Address P.O. Box 41112, 417 W. 4th — Work Tel: (360) 753 - 3975
City Olympia State WA Zip+4 98504 + 1112 — FAX: (360) 586 - 8723

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ Same as above

Name Gray and Osborne, Inc. — Home Tel: (____) N/A - ____
Mailing Address 2401 Bristol Ct. SW — Work Tel: (360) 754 - 4266
City Olympia State WA Zip+4 98502 + ____ — FAX: (360) 754 - 4240
Relationship to applicant consulting engineer

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 2.34 (☐ gallons per minute or ☒ cubic feet per second) from a ☒ surface water source or ☐ ground water source (check only one) for the purpose(s) of institutional supply, community domestic supply, stockwater, & irrigation **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.* "See attachment"
Estimate a maximum annual quantity to be used in acre-foot per year: 1,329 acre-ft./year

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: ① Eden Creek Reservoir ② Butterworth Reservoir Number of diversions: 6 (see attachment)	A permit is desired for _____ well(s).
Source flows into (name of body of water): Puget Sound	Size & depth of well(s):

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: ① Eden Creek Reservoir - 800' North and 700' West of Southwest corner of Sec. 20
② Butterworth Reservoir - 100' East and 2350' South of the Northwest corner of Sec. 21.

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: Mc Neil Island Corrections Center

B. Briefly describe your proposed water system. (**See instructions.**)

Water is collected and stored in both the Butterworth and Eden reservoirs. Water is conveyed via two 1050 gpm pumps to the water treatment plant. From there it is pumped via two 700 gpm pumps to the water distribution system and finished water storage.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.

Section 6. DOMESTIC/PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: N/A Type of connection Institutional
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.*

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☒ YES ☐ NO
If yes, when was it approved? June 24, 1998 Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Completed for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: 1176

B. List total number of acres for other specified agricultural uses:

Use _____ Acres _____
Use _____ Acres _____
Use _____ Acres _____

C. Total number of acres to be covered by this application: 1176

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s)

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

Take ferry from Steilacoom to McNeil Island. This is for an existing facility with existing certificate of water rights.

Section 10. REQUIRED MAP

Attach a map of the project. (**See instructions.**)

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☒ YES ☐ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

_____

_____

_____

B. Does the applicant own the land on which the water source is located? ☒ YES ☐ NO
If no, submit a copy of agreement:

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 grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Robert W Bass for DOC _____ 7/29/99 _____

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98509-5128
_____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ _____ *(date).*	

Ecology staff _____ Date _____

Olympic Corrections Center

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

OCC Wells 1+2

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
October 14, 1981	G 2-26035	G 2-26035 P	G 2-26035 C

NAME
CLEARWATER/OLYMPIC CORRECTION CENTER FOR WASH. STATE DEPT. OF NATURAL RESOURCES

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Star Route 1, Box 2500	Forks	Washington	98331

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	50.0

QUANTITY, TYPE OF USE, PERIOD OF USE		
50 acre-feet per year	community domentic supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
800 feet North and 100 feet East of Southwest Corner of Section 28 and 1000 feet North and 100 feet West of Southeast Corner of Section 29 within the SW¼SW¼ of Section 28 and SE¼SE¼ of Section 29.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
		26	11 W.	21	Jefferson

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

13 acres more or less, state forest land situated in the north half of the northwest quarter of Sec. 33, T. 26 N., R. 11 W.W.M., Jefferson County, Washington.

PROVISIONS.

The access port shall be maintained at all times on the well (s).

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia *Washington, this* 5th *day of* September, *19* 85

ANDREA BEATTY RINIKER, Director
Department of Ecology

by Clark Haberman
Clark Haberman, Regional Manager

ENGINEERING DATA
OK RLC

FOR COUNTY USE ONLY

OCC #3

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid
Date

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name WA Dept. of Corrections/Dept. of Nat. Resources Home Tel:( ) -
Mailing Address Star Route 1, Box 2500 Work Tel:(360) 374 - 6181
City Forks State WA Zip+4 98331 + FAX:(360) 374 - 3184

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☒ Same as above

Name Jerry Sullivan - Olympic Correction Center Home Tel:( ) -
Mailing Address Star Route 1, Box 2500 Work Tel:(360) 374 - 6181
City Forks State WA Zip+4 98331 + FAX:(360) 374 - 3184
Relationship to applicant

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 220 (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of Institutional/Domestic use. ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE. (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.*
Estimate a maximum annual quantity to be used in acre-feet per year: 100

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:
From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions:	A permit is desired for _____ well(s).
Source flows into (name of body of water):	Size & depth of well(s): 6" Diameter - 76' Deep

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner:

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below:		
						Lot	Block	Subdivision
NE	SE	29	26N	11W	Jefferson			

For Ecology Use: Date Received: Priority Date:
SEPA: Exempt/Not Exempt FERC License #: Dept. Of Health #:
Date Accepted As Complete By Date Returned By WRIA:

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: Olympic Corrections Center

B. Briefly describe your proposed water system. (See instructions.)

Well No. 3 will be equipped to deliver a peak discharge of 220gpm to the existing water system.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

3 Individuals/Connection

A. Number of "connections" requested: N/A Type of connection State Prison Inmate population = 340 Staff Population = 135
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☐ YES ☒ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.*

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: _____

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no: _____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO
Existing 300,000 gallon concrete reservoir

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

Proceed approximately 15 miles south of Forks, Washington along Highway 101, thence 11.5 miles east along DNR roads H1000 and H1300.

Section 10. REQUIRED MAP

A. Attach a map of the project. (See instructions.)

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☒ YES ☐ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

Department of Correction leases the site for the Correctional facility from Washington State Department of Natural Resources.

B. Does the applicant own the land on which the water source is located? ☒ YES ☐ NO
If no, submit a copy of agreement:

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 grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Vallena M. Winslow-Pratt — July 16, 1996
Applicant (or authorized representative) — Date
Environmental Manager, WDOC

Landowner for place of use (if same as applicant, write "same") — Date

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98509-5128
_____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ *(date).*	

Ecology staff_____ Date_____

To receive this document in alternative format, contact Lisa Newman at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

OCC #3

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

APPLICATION FOR CHANGE OF WATER RIGHT

☐ PURPOSE ☐ DIVERSION OR WITHDRAWAL
☐ PLACE ☒ ADDITIONAL POINT OR POINTS

NAME: Jerry Sullivan
Clearwater/Olympic Correction Center
Washington State Department of Natural Resources

Bus. Tel. (360) 374-6181
Home Tel.
Other Tel.

ADDRESS: Star Route 1, Box 2500 (CITY) Forks (STATE) WA (ZIP CODE) 98331

APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
G2-26035	G2-26035P	G2-26035C

DECREED RIGHT (TITLE OF CASE)

APPROPRIATIONS MADE (GIVE DATE IF PRIOR TO JUNE 7, 1917 IF SURFACE WATER, OR JUNE 7, 1945 IF GROUND WATER)
September 5, 1985

IS THE WATER RIGHT RECORDED IN YOUR NAME? ☒ YES ☐ NO
IF NO, GIVE NAME RECORDED UNDER

1. RIGHT CONSISTS OF

WATERS USED FROM (STREAM, LAKE, WELL, OR TRENCH, ETC.): 2 Wells
GALLONS PER MINUTE OR CUBIC FEET PER SECOND: 100
WATER CURRENTLY USED FOR: Institutional/Domestic
TIME OF USE: Year Round

2. LOCATION OF PRESENT POINT OF DIVERSION OR WITHDRAWAL

ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.
Well No. 1: 800 ft. N 100 ft. East, SW corner Sec. 28
Well No. 2: 1,000 ft. N 100 ft. West SE corner Sec 28

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
NE 1/4 SE 1/4 Sec 29; NW 1/4 SW 1/4 Sec.	28	26	11 W	Jefferson

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OR (GIVE NAME OF PLAT OR ADDITION)

3. LEGAL DESCRIPTION OF LANDS WATER IS USED ON

Description on existing water right:

13 acres more or less, state forest land situated in the north half of the northwest quarter of Sec 33, T 26 N, R 11 WWM, Jefferson County, Washington.

Note: Facility has grown since Oct. 14, 1981 priority date. Facility now encompasses approximately 70 acres in SW quarter Sec 28, SE quarter Sec 29 and NW quarter Sec 33, T 26 N, R 11 W, as shown on attached water right application.

SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
29, 33	36	11 W	Jefferson

(ATTACH SEPARATE SHEET IF NECESSARY)

U THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS ☒ YES ☐ NO
IF NO, EXPLAIN YOUR INTEREST

THE PROPOSED CHANGE

1 point of withdrawal on existing right.

A MINIMUM FEE OF $10.00 MUST ACCOMPANY THIS APPLICATION

CONTINUE ON REVERSE SIDE

CHANGE

4. CHANGE REQUESTED

CHANGE WATER USE TO	TIME OF USE	GALLONS PER MINUTE OR CUBIC FEET PER S
Pt. of Diversion - Well No. 3	Year Round	100 GPM

5. LOCATION OF PROPOSED POINT OF DIVERSION OR WITHDRAWAL

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER.

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.

1,070 ft. N, 20 ft. W SE corner Sec. 29

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
	29	26	11 W	Jefferson

6. IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

ARE YOU THE OWNER OF THE LAND ON WHICH THE PROPOSED POINT OF DIVERSION OR WITHDRAWAL IS TO BE LOCATED

☐ YES ☐ NO

LEGAL DESCRIPTION OF LANDS WATER IS TO BE USED ON

SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	COUNTY

(ATTACH SEPARATE SHEET IF NECESSARY)

ARE YOU THE LEGAL OWNER OF THE ABOVE DESCRIBED LANDS	IF NO, EXPLAIN YOUR INTEREST
☐ YES ☐ NO	

* PLEASE NOTE LEGAL LAND OWNER SIGNATURE AND APPLICANT SIGNATURE ARE BOTH REQUIRED. IF THE LEGAL LAND OWNER AND APPLICANT ARE THE SAME, PLEASE SIGN IN BOTH PLACES. THANK YOU.

LEGAL LANDOWNER (PLEASE PRINT)

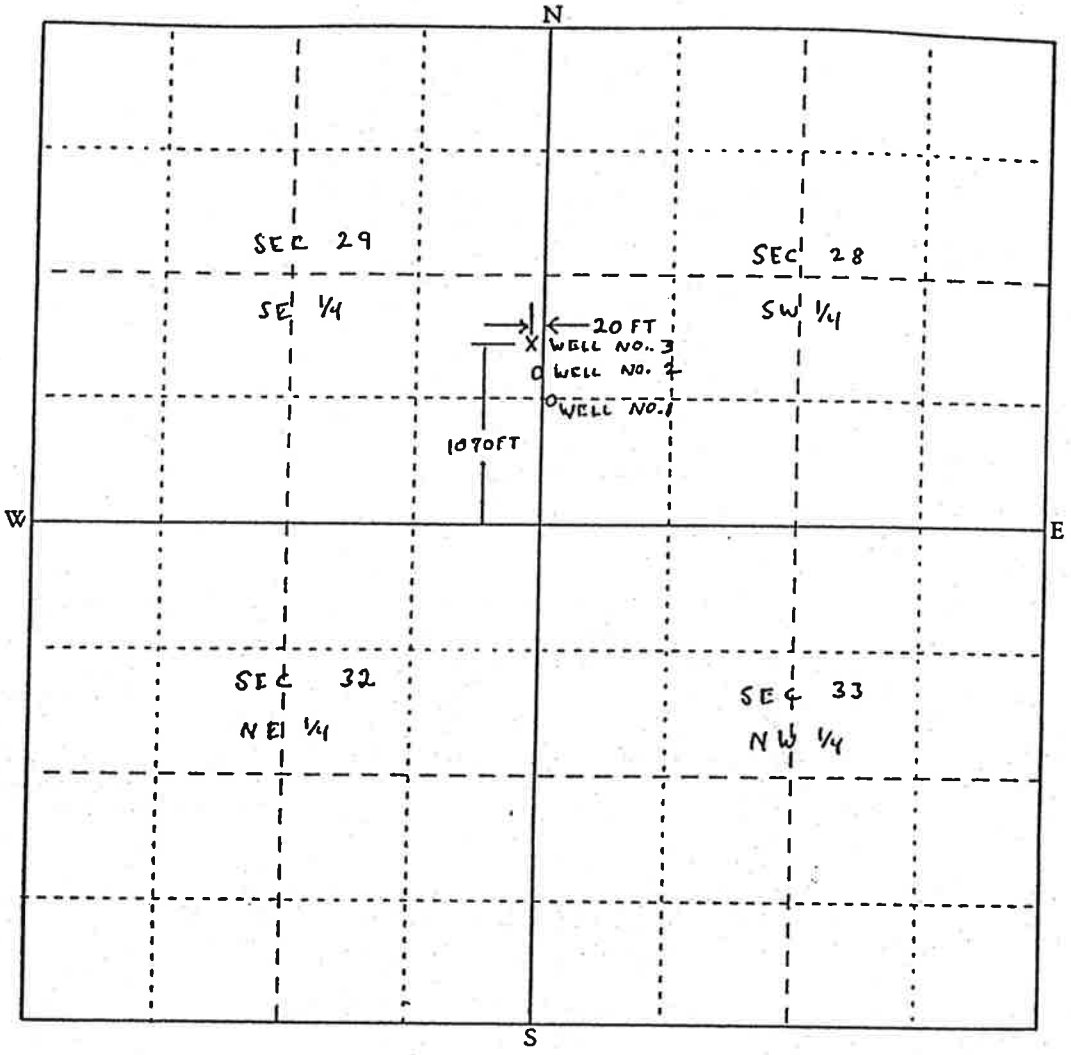
LEGAL LANDOWNER SIGNATURE (OWNER OF PROPERTY DESCRIBED IN ITEM NUMBER 3)

LEGAL LANDOWNER'S ADDRESS

Valerie M. Winslow-Pratt
APPLICANT'S SIGNATURE
Environmental Manager, WDOC
July 16, 1996

SECTION MAP

Sec. 29 Twp. 26 N. R. 11 W



Scale: 1 inch = 800 feet (each small square = 10 acres)

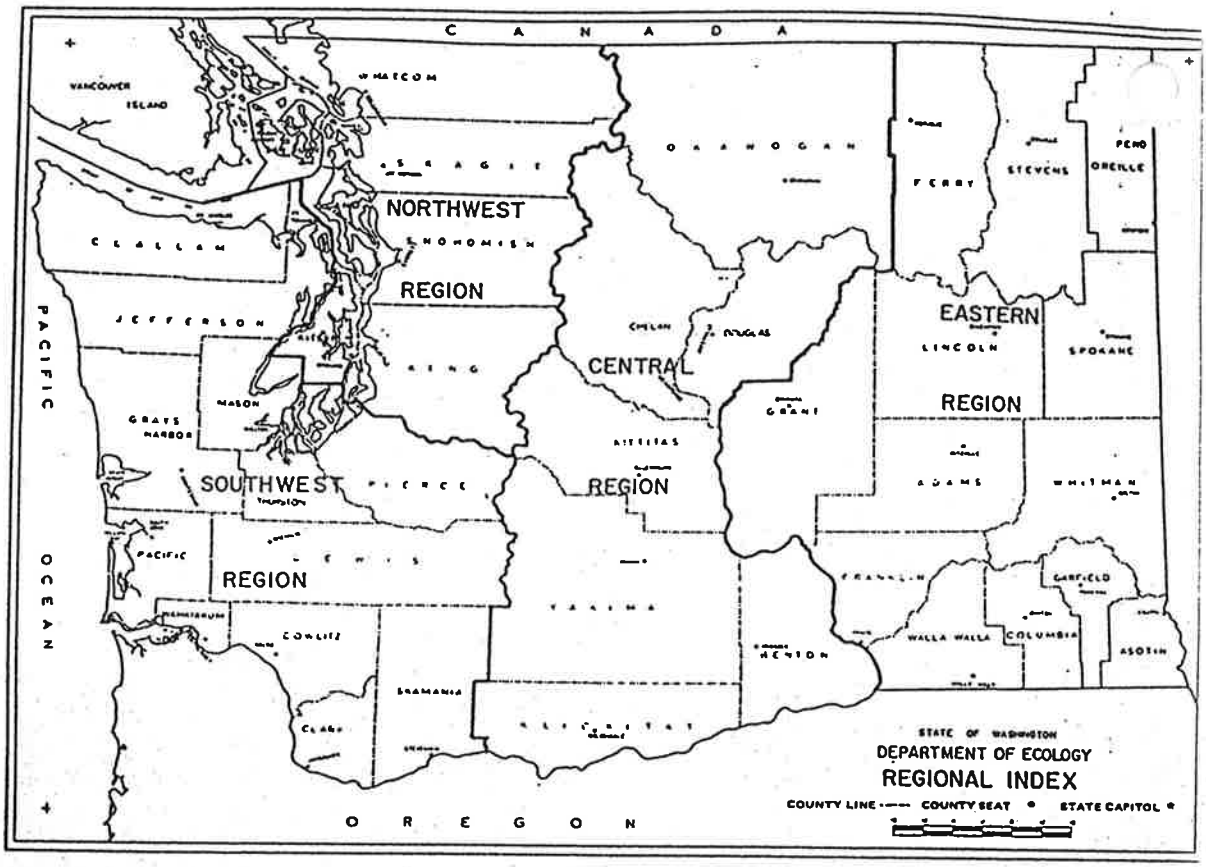
Show by a cross (X) the location of point of diversion (surface water source) or point of withdrawal (ground water source): For ground water applications, show by a circle (O) the locations of other wells or works within a quarter of a mile.
Indicate traveling directions from nearest town in space below.

Proceed approximately 15 miles south of Forks, Washington along Highway 101, thence, 11.5 miles east along DNR roads H1000 and H1300.

Detach here

Fold along scale

Detach this scale at the perforation, fold excess paper under or cut off excess by cutting along the scale line. This scale corresponds to the SECTION MAP above. You can read feet directly from this scale to outline property and locate points of diversion or withdrawal on the SECTION MAP. Enclose this map along with the application and $10.00 examination fee.



Your water right application will be processed by the Regional Office of the Department of Ecology having jurisdiction in the area in which your water works are located. Please submit your completed application form, maps, sketches and $10.00 examination fee to the appropriate Regional Office.

Northwest Regional Office
3190 160TH AVENUE SE
BELLEVUE, WA 98008-5452
(206) 649-7000

Central Regional Office
3601 West Washington
Yakima, Washington 98903-1164
Tel. (509) 575-2491

Southwest Regional Office
7272 Cleanwater Lane
Olympia, Washington 98504-6811
Tel. (206) 753-2353

Eastern Regional Office
N. 4601 Monroe, Suite 100
Spokane, Washington 99205-1295
Tel. (509) 456-2926

The appropriate Regional Office will be happy to answer any further questions you may have.

occ - Env
water
water rights
COPY
Scanned
5/16/07

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

July 19, 2005

CERTIFIED MAIL

State of WA, Dept of Corrections
11235 Hoh Mainline
Forks WA 98331-9432

Dear Sir or Madame:

RE: Ground Water Application No. **G2-29403**

Your application is approved. Enclosed is the Report of Examination (Ecology's Order and Determination) which summarizes our findings and represents our final decision. Please read through this report carefully, as it forms the basis for your permit.

Send permit fee
Your permit will be issued after the required 30-day appeal period, and upon receipt of the **$20.00** permit fee. Please send the following to the Water Resources Program at Ecology's Southwest Regional Office:

- The **$20.00** permit fee; a check or money order made out to the Department of Ecology, and
- The completed Water Right Permit Fee Form (enclosed).
  - If appropriate, make corrections to your name and address in the space provided.

Your right to appeal
You have the right to appeal this Report of Examination to the Pollution Control Hearings Board. Pursuant to chapter 43.21B RCW, your appeal must be filed with the Pollution Control Hearings Board, and served on the Department of Ecology, within thirty (30) days of the date of your receipt of this document. To appeal this action or decision, your notice of appeal must contain a copy of the Ecology order, action or decision you are appealing.

Your appeal must be filed with:
The Pollution Control Hearings Board
4224 - 6th Avenue SE, Rowe Six, Bldg. 2
P.O. Box 40903
Lacey, Washington 98504-0903

Your appeal must also be served on:
The Department of Ecology
Appeals Coordinator
P.O. Box 47608
Olympia, Washington 98504-7608.

RECEIVED
OCT 13 2005
DEPARTMENT OF CORRECTIONS
CAPITAL PLANNING & DEVELOPMENT

OCC ENV ENV
MAJ CAT Water
SUB CAT water rights
K/W
Scanned 5/16/07

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

Sept. 8, 2005

State of Washington
Department of Corrections
11235 Hoh Mainline
Forks WA 98331-9432

Dear Sir or Madame:

RE: Permit No. **G2-29403**

Enclosed is your permit No. **G2-29403,** which includes your Development Schedule.

Completion of Construction form
According to your permit, you are to finish construction on your water project on or before **August 1, 2006.** When the work is completed, you must complete and submit the enclosed "Construction Notice: Completion of Construction" form. Please return the form to the Water Resources Program at Ecology's Southwest Regional Office.

If we do not receive the completed form by **August 1, 2006,** and do not hear from you otherwise, your permit may be cancelled. We understand that occasionally there are extenuating circumstances that may delay the completion of a project. In this case, you **must** contact us, **in writing,** to request an **extension.**

This is the only notice you will receive from us about submitting the "Completion of Construction" form. It is your responsibility to keep track of the development schedule dates specified in your permit.

Completing construction and submitting the "Completion of Construction" form are essential parts of the process towards securing a water right certificate. After submission of that form, your next deadline is associated with putting the water to full beneficial use.

Read your permit
Please read through your entire permit, along with the enclosed water right information sheet, to be sure you fully understand the terms and responsibilities associated with your permit. It is important to remember that this permit is not a *final* water right; it is permission by the state to develop a water right.

RECEIVED
OCT 13 2005
DEPARTMENT OF CORRECTIONS
CAPITAL PLANNING & DEVELOPMENT

COMPLETED FORM 9/16/05

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

October 3, 2005

Jerry Sullivan
Dept of Corrections
Olympic Corrections Center
11235 Hoh Mainline
Forks WA 98331

Dear Mr. Sullivan:

RE: Water Permit No. **G2-29403**

Thank you for submitting your Completion of Construction form in connection with the above-referenced permit. Now that your water system is completed, the next step in developing your water right is to put the water to full beneficial use on or before **January 1, 2015.**

Put water to full beneficial use
Full beneficial use means that water is being used in agreement with the terms of the permit. Once this is done, complete the enclosed "Proof of Appropriation of Water" form. This form must be **notarized** and returned to the Water Resources Program at Ecology's Southwest Regional Office. You may file the Proof of Appropriation form for less water than authorized in the permit, if the project is complete and less water is being used than anticipated.

Keep your permit in good standing
In order to keep your permit in good standing, you must keep to the development schedule on your permit and put the water to beneficial use *and* submit the Proof of Appropriation form on or before **January 1, 2015.** If there are extenuating circumstances that delay putting the water to beneficial use, you **must** contact us **in writing** to request an extension. Refer to the enclosed brochure for more information on extensions.

If we can provide any further assistance, please contact our office at (360) 407-6300.

Sincerely,

Teresa Hanson
Water Resources

TH:th (ccokpa.doc)

Enclosures: "Proof of Appropriation of Water" form
"Important Information About Your Water Right Permit" brochure

Washington Corrections Center

WCC (WELLS 1 AND 2)

S. F. No. 2K1—1-44—3M 83300

CERTIFICATE RECORD No. 11 PAGE No. 5376-A

STATE OF WASHINGTON, COUNTY OF Mason

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY That STATE OF WASHINGTON, DEPARTMENT OF INSTITUTIONS

of Olympia, Washington, has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of xx two (2) wells (No. 2 and No. 3)

located within SE¼NW¼ and NW¼SW¼

Sec. 9, Twp. 20 N., R. 4 W., W.M.

for the purpose of domestic supply for Washington Correction Institution

under and subject to provisions contained in Ground Water Permit No. 6937 issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume 11 at page 5376-A; that the right hereby confirmed dates from April 2, 1964; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 563 gallons per minute; 268 acre-feet per year, for domestic supply for Washington Correction Institution.

Special provisions required by the Supervisor of Water Resources: The total annual withdrawal under this right shall not exceed 268 acre-feet, less any quantity diverted to this use under existing rights.

A description of the lands to which such ground water right is appurtenant:

All of Sec. 9, T. 20 N., R. 4 W.W.M., lying southerly of County Road, EXCEPT the SW¼SW¼, AND EXCEPT the easterly one-half (½) of the SE¼NE¼ AND EXCEPT the easterly half of the NE¼SE¼, and the easterly half of the SE¼SE¼.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 1st day of April, 1966

[signature]

WCC (WELL NO. 3)

G. P. No. 1341—5-60—3M

CERTIFICATE RECORD NO. 10 PAGE NO. 4769-A

STATE OF WASHINGTON, COUNTY OF Mason

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY That STATE OF WASHINGTON, DEPARTMENT OF INSTITUTIONS

of Olympia, Washington, has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a well (No. 1, producing)

located within SW¼NW¼

Sec. 9 Twp. 20 N., R. 4 W. W. M.

for the purpose of Domestic supply for Washington Correction Institution

under and subject to provisions contained in Ground Water Permit No. 5764 issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume 20 at page 4769-A;

that the right hereby confirmed dates from November 16, 1951; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 140 gallons per minute, 224 acre-feet per year for domestic supply for Washington Correction Institution.

Special provisions required by the Supervisor of Water Resources:

A description of the lands to which such ground water right is appurtenant:

All of Sec. 9, T. 20 N., R. 4 W.W.M., lying southerly of county road, comprising 400 acres, more or less.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 27th day of April, 19 62.

M. B. Walker

WCC Well 4

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid
Date

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name Washington Correction Center - WDOC Home Tel:( ) -
Mailing Address West 2321 Dayton-Airport Road Work Tel:(360)426 -4433
City Shelton State WA Zip+4 98584 + FAX:( ) -

Section 2. CONTACT PERSON TO CALL ABOUT THE APPLICATION

☒ Same as above

Name Charlie Hicks Home Tel:( ) -
Mailing Address West 2321 Dayton-Airport Road Work Tel:(360)426 -4433-4659
City Shelton State WA Zip+4 98584 + FAX:( ) -
Relationship to applicant Facilities Manager

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 660 (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of Domestic/Public Supply. ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE. (See instructions.) *NOTE: A tax parcel number or a plat number is not sufficient.*

Estimate a maximum annual quantity to be used in acre-feet per year: 250 Acre-Ft/Year

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:
From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions:	A permit is desired for 2 well(s).
Source flows into (name of body of water):	Size & depth of well(s): 12-inch 0 - 24 Feet 12-inch 0-46 Feet 10-inch 24 - 56 Feet

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner:
2,400 feet south and 625 feet east of northwest corner Section 9 Range 4W Township 20N

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below: Lot	Block	Subdivision
SW	NW	9	20	4W	Mason			

For Ecology Use Date Received: Priority Date:
SEPA: Exempt/Not Exempt FERC License # Dept. of Health #
Date Accepted As Complete By Date Returned By WRIA

ECY 040-1-14
Rev. 9/95 F

APPLICATION

Appl. No.:

Section 5: GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: Washington Correction Center Well #4

B. Briefly describe your proposed water system. (See instructions.)
Water is pumped on demand from a depth of approximately 20 feet to a 300,000 gallon elevated reservoir. Water conservation is being achieved through the installation of low flow fixtures and increased metering.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.

Section 6: DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: N/A Type of connection State Prison 3 individuals/connection
(Homes, Apartment, Recreational, etc.) inmate population = 2,100 staff population = 600

B. Are you within the area of an approved water system? ☐ YES ☒ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.*

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

Section 7: IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: _____

B. List total number of acres for other specified agricultural uses:

Use _____ Acres _____
Use _____ Acres _____
Use _____ Acres _____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no: _____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☒ YES ☐ NO

6.89 Acre-Ft (300,000 gallon) elevated steel reservoir

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.

From Shelton gb West on Shelton - Matlock Road to Highway 101. Go North on Highway 101 approximately 3.4 miles to intersection with Dayton-Airport Road. Turn west (Left) on Dayton-Airport Road. Washington correction center approximately 4.5 miles on left.

Section 10. REQUIRED MAP

A. Attach a map of the project. (See instructions.)

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☐ YES ☐ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

_____

_____

_____

B. Does the applicant own the land on which the water source is located? ☐ YES ☐ NO
If no, submit a copy of agreement:

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 grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Vallena M. Winslow-Pratt — 4/25/96

Applicant (or authorized representative) — Date

WDOC Environmental Manager

Same

Landowner for place of use (if same as applicant, write "same") — Date

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

Section 6C - This is a small water system (1000 connections) and is thus not required to have a water system plan, unless a project is proposed for the water system (WAC 246-290-410). No projects are currently proposed for this system.

Section 6D - A conservation plan is being developed and will be sumbitted to WDOH by May 31, 1996.

We are returning your application for the following reason(s):		
Examination fee was not enclosed		APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98509-5128
Section number (s) _____ incomplete	is/are	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:		
Please provide the additional information requested above and return your application by _____ *(date).*		

Ecology staff_____ Date_____

To receive this document in alternative format, contact Lisa Newman at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

Washington Corrections Center for Women

S. F. No. 7361—(Rev. 6-70).

CERTIFICATE RECORD NO. 15, PAGE 7311-A

STATE OF WASHINGTON, COUNTY OF Pierce

CERTIFICATE OF GROUND WATER RIGHT

(Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto and the rules and regulations of the Department of Ecology thereunder.)

THIS IS TO CERTIFY *That* WASHINGTON STATE DEPARTMENT of NATURAL RESOURCES

of Olympia, Washington, *has made proof to the satisfaction of the Department of Ecology of a right to the use of the public ground waters of the State of Washington from* a well *located within* SE¼SE¼SE¼ of Sec. 36, Twp. 22 N., R. 1 E. W.M., *for the purpose(s) of* community domestic supply and industrial use *under and specifically subject to provisions contained in Ground Water Permit No.* 8955 *issued by the Department of Ecology and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the Department of Ecology and entered of record in Volume* 15 *at page* 7311-A; *that the priority of the right hereby confirmed dates from* October 3, 1968; *that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 107 gallons per minute, 135 acre-feet per year, during entire year for community domestic supply; and 5 acre-feet per year, during entire year, for industrial use.

A description of the lands to which such ground water right is appurtenant is as follows:

That part of the east 2000 feet of the south 2000 feet of SE¼, Sec. 36, T. 22 N., R. 1 E.W.M. lying westerly of State Highway 16 (14).

of

Engineering Data

OK A.J.

2916788

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

(Well #2 - collapsed well)

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 24, 1977	G 2-24678	G 2-24678 P	G 2-24678 C

NAME
STATE OF WASHINGTON, PURDY TREATMENT CENTER FOR WOMEN

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Box 17,	Gig Harbor	Washington	98335

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well #2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	100

QUANTITY, TYPE OF USE, PERIOD OF USE
100 acre-feet per year — community domestic supply — continuously

for the institution

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
750 feet north and 1100 feet west from the Southeast corner of Section 36.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼SE¼	36	22	1 E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

That portion of the ~~E½SE¼~~, Section 36, T. 22 N., R. 1 E.W.M., included within the limits of a tract of land described by metes and bounds as follows:
Beginning at the southeast corner of said Section 36 and running thence, along the south line thereof, south 89°15'07" west 547.45 feet; thence north 50°28'08" west 120.03 feet; thence north 44°28'23" west 282.70 feet; thence north 58°56'53" west 209.11 feet; thence north 87°36'08" west 278.23 feet; thence north 0°40'39" east 153.53 feet; thence north 0°01'23" west 263.12 feet; thence north 6°14'22" west 314.65 feet; thence north 25°29'22" east 183.39 feet; thence north 63°22'07" east 137.03 feet; thence south 82°50'08" east 326.98 feet; thence north 78°38'22" east 568.85 feet, to a point of the westerly right of way line of primary State Highway No. 14; thence, along said right of way line, south 18°48'40" east 440.77 feet, to a point on the east line of said Section 36, and thence along said east line, south 2°21'21" east 1,040.43 feet, to the point of beginning, having an area of 33.39 acres, as shown on the plat thereof on file in the office of the Commissioner of Public Lands at Olympia, Washington.

PROVISIONS

"The total annual quantity under Ground Water Certificate No. 7311 A and this certificate (G 2-24678) shall be limited to 140 acre-feet per year for community domestic supply and i trial use. The 100 acre-feet per year authorized under G 2-24678 shall be an alternate sou, or supplemental supply to Ground Water Certificate No. 7311 A."

The access port as required on your permit shall be maintained at all times.

A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

Irrigation Estimate

62 Ac.
- 27 Ac Bldg & yards
35 Ac Timber / Undeveloped

Irrigation: (27 Ac)(2000 gpd/Ac) = 54,000 gpd

@ 50% 27,000 gpd
@ 25% 13,500 gpd
@ 10% 5,400 gpd

RECEIVED
JUN 26 1979
DOE
CAPITAL PROGRAMS

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 9th day of May, 19 79.

WILBUR G. HALLAUER, DIRECTOR
Department of Ecology

RECORDED

ENGINEERING DATA

C-5
Water Conservation Plans

Cedar Creek Corrections Center

WATER

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
OFFICE OF ADMINISTRATIVE SERVICES
CAPITAL PLANNING AND DEVELOPMENT
P.O. Box 41112 • Olympia, Washington 98504-1112 • (360) 586-6131
FAX (360) 586-8723

June 15, 2004

TO: Dan Pacholke, Superintendent CCCC
Wes Anderson, Plant Manager
Ed Burns, Water System Manager

FROM : Nancy Winters, Assistant Director of Environmental Services

SUBJECT: WATER LIMITATIONS AND CONSERVATION AT CCCC

After several delays, I have completed the pump test report (attached). The report will also be appended to the EES final report.

From our discussion last week, it is clear that we all realize the water limitations at CCCC and the importance of appropriate water management from the point of water withdrawal through its use. You have already begun a commendable program of strict water conservation and are coupling the conservation measures with an aggressive program of stormwater collection and use. Your efforts in the area of water conservation can serve as a model to all of our institutions.

We also discussed the fact that although the existing wells can provide water for the current institutional needs, the gradual, long-term decline in the aquifer indicates that water conservation will need to become a permanent way of life at CCCC. This is confirmed in both the attached pump test report and the EES report. I recommend that as soon as feasible you begin operating Wells 1 and 2 to meet the institutional water supply needs while optimizing the short-term recovery and long-term preservation of the aquifer. EES will provide a conceptual management scheme to tailor the operation of the well pumps and the reservoir transfer pumps. They are also willing to work with you on the details of the management scheme.

Finally, I am recommending that a pump test be conducted for Well 1 during the dry season. To ensure the success of the test, the pump capacity needs to be reduced to provide a lower, but constant rate. The reduced rate (between 35 and 50 gpm) should be the highest rate that is sustainable for 7 to 10 hours (i.e., the duration of the test). The purpose is to demonstrate the highest rate of withdrawal that can be sustained with a constant pumping water level above the well intake. I would be happy to conduct the pump test in late summer or early fall, at your convenience.

Thank you for your willingness to implement water conservation measures and stormwater collection and utilization. Thank you also for your willingness to work with us and EES to optimize well operation to extend the life of the aquifer.

NW:rb
cc: Russell Paxson, w/ Attachment
\\Efcp_server\Correspond\2004\Environmental\CCCC Pump test Memo 6 15 04.doc

Cedar Creek Corrections Center
Water Limitations and
Recommendations for Water Conservation

Prepared by

Nancy L. Winters
Environmental Services
Capital Planning and Development
Department of Corrections

June 2004

Cedar Creek Corrections Center
Water Limitations and Recommendations for Water Conservation

1.0 INTRODUCTION

1.1 Background

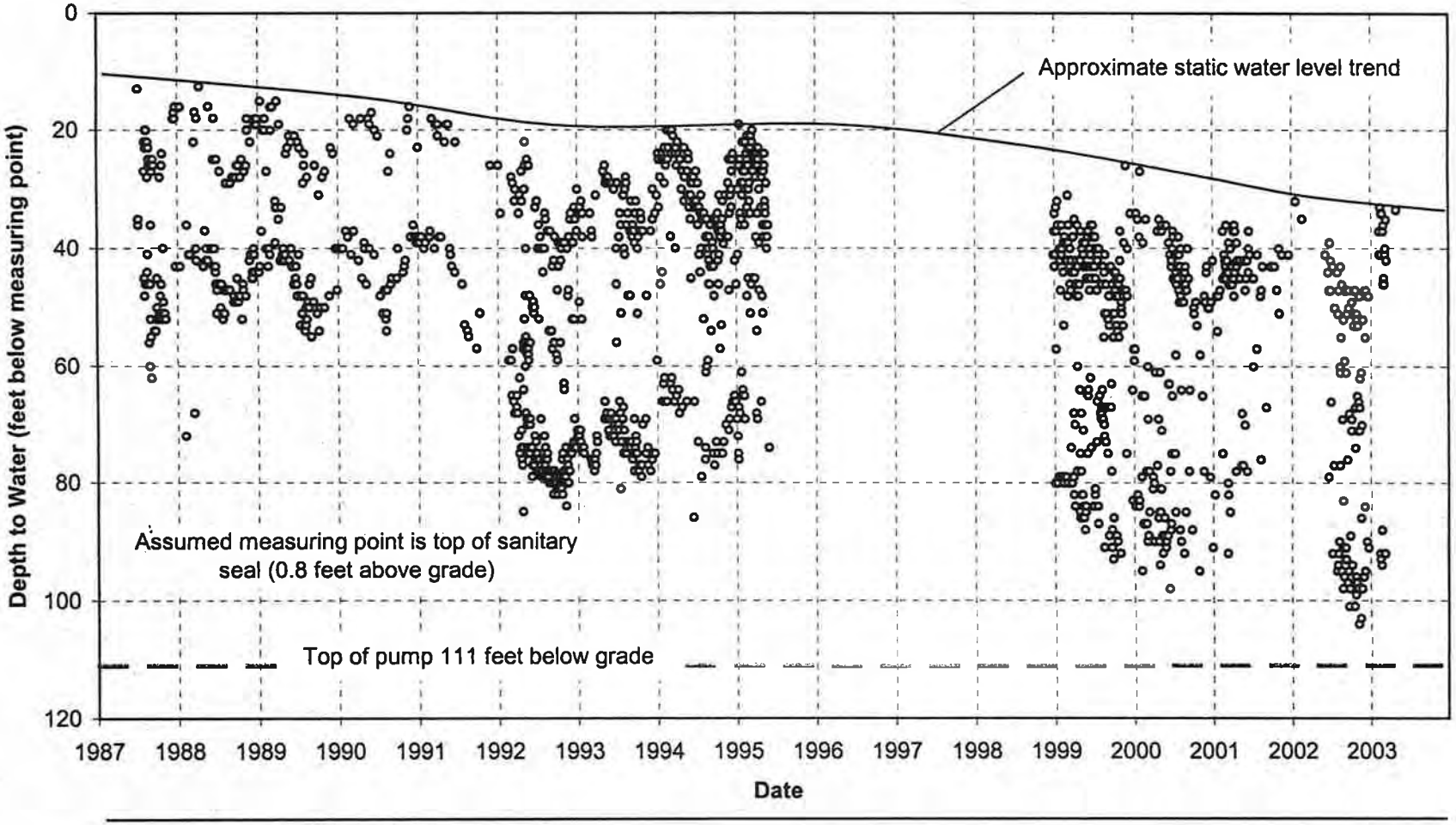
Cedar Creek Corrections Center (CCCC) obtains its water supply from groundwater withdrawn from a fractured basalt aquifer. The two existing wells draw water from the unconfined aquifer that extends from approximately 60 feet to 200 feet below the ground surface (bgs). As a fractured basalt unconfined aquifer, water that infiltrates from the surface is stored in localized pockets or fractures.

Prior to the drought of 2003, the facility reported a declining pumping water level. The water system manager reported that the water level in Well 1 was being drawn down to the extent that the pumps in were in jeopardy of drawing air. He requested assistance to remedy the declining water level situation.

Economic and Engineering Services, Inc. (EES) was contracted to assess the situation and provide recommendations. Their report recognized that the aquifer was being depleted in the long term, noting that the estimated static water level had declined 25 feet, since the 1990s (Figure 1) (EES, 2003). Based on this analysis, the long term recharge (rate of water replenishment) is less than the withdrawal. Their report culminated in a recommendation for meeting the immediate water need at the facility however EES acknowledged that the recommendation was a short-term solution only.

To provide the facility with relief from the predicted drought, the Department of Corrections (DOC) elected to implement the EES recommendations of increasing the pump capacity and lowering the pump in Well 1. Previously, the pumps in the two wells had been set at approximately 120 feet below the ground. Well 1 had two 30 gallon per minute (gpm) pumps, and Well 2 had one 50 gpm pump. DOC purchased a higher capacity pump (70 gpm) to replace the two 30 gpm pumps in Well 1. The new, higher capacity pump was installed at a depth of 170 feet bgs, 50 feet lower than the previous pumps.

The solutions appear to have exacerbated the situation. According to the water system manager, the operation of Well 1 in late summer drew the water to within 5 feet of the lowered pump in Well 1. In fact, the pumping water level was lowered about 65 feet more than prior to installation of the new pump. This rapid decline occurred even though water use in June through August was generally less than it had averaged the three previous summers (Figure 2). The higher capacity pump in Well 1 substantially lowered the water level during pumping jeopardizing the pump and causing a steeper cone of depression. The cone of depression is a function of the ability of the aquifer to transmit water from the formation into the well. This phenomenon should not be confused with the longer-term depletion of the aquifer.

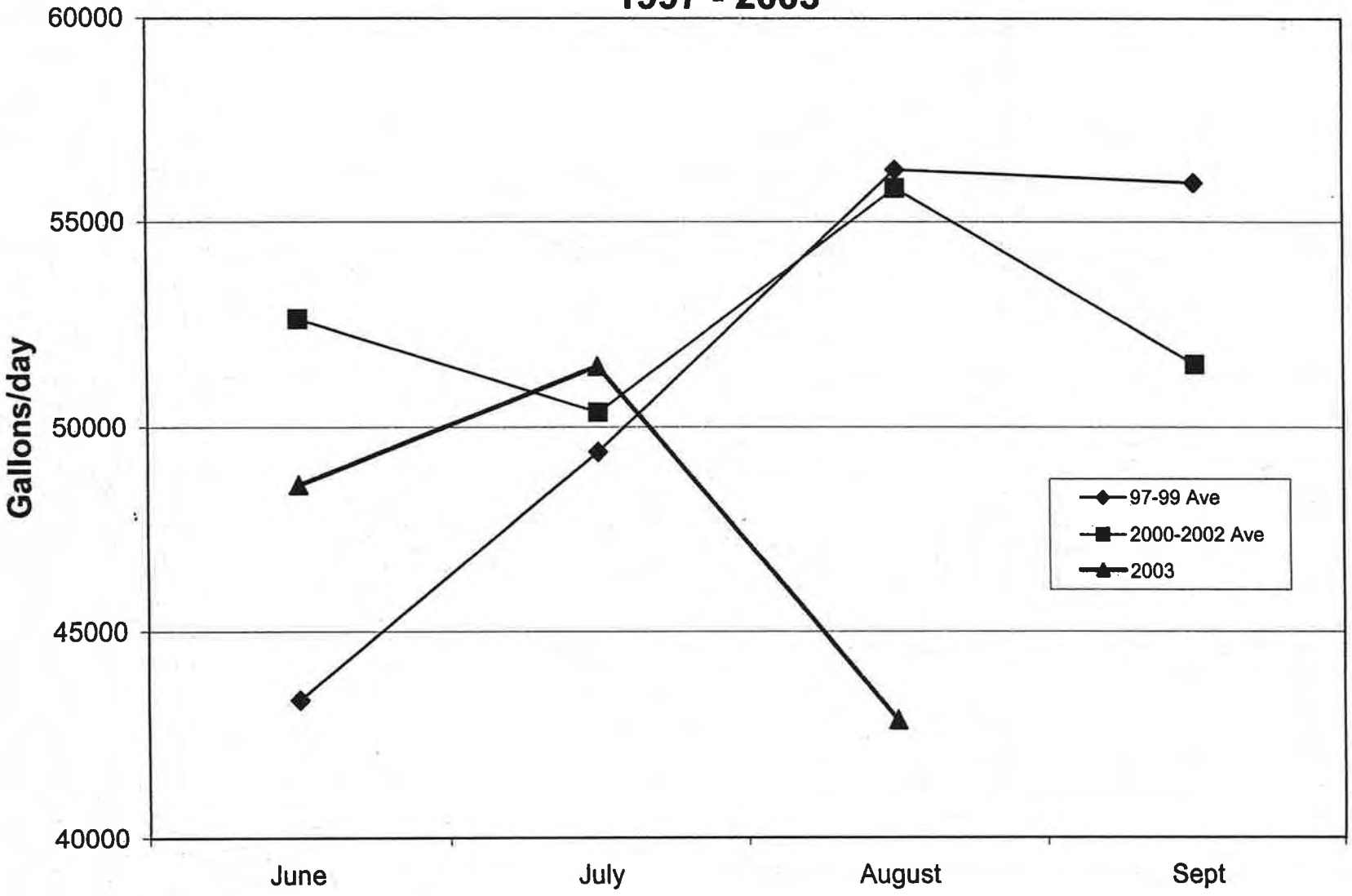


Aspect consulting
IN-DEPTH PERSPECTIVE

Depth to Water in Well #1

Figure 1

Figure 2. Summer Water Usage at CCCC 1997 - 2003



A number of water conservation measures had already been implemented based on the 1996 Gray & Osborne, Inc. (G&O) Water Conservation Plan with a resultant decline in water usage. CCCC implemented additional, more stringent water conservation measures beginning in the summer of 2003 and continuing. Implementation of these measures has resulted in a reduction in monthly water use (Figure 3).

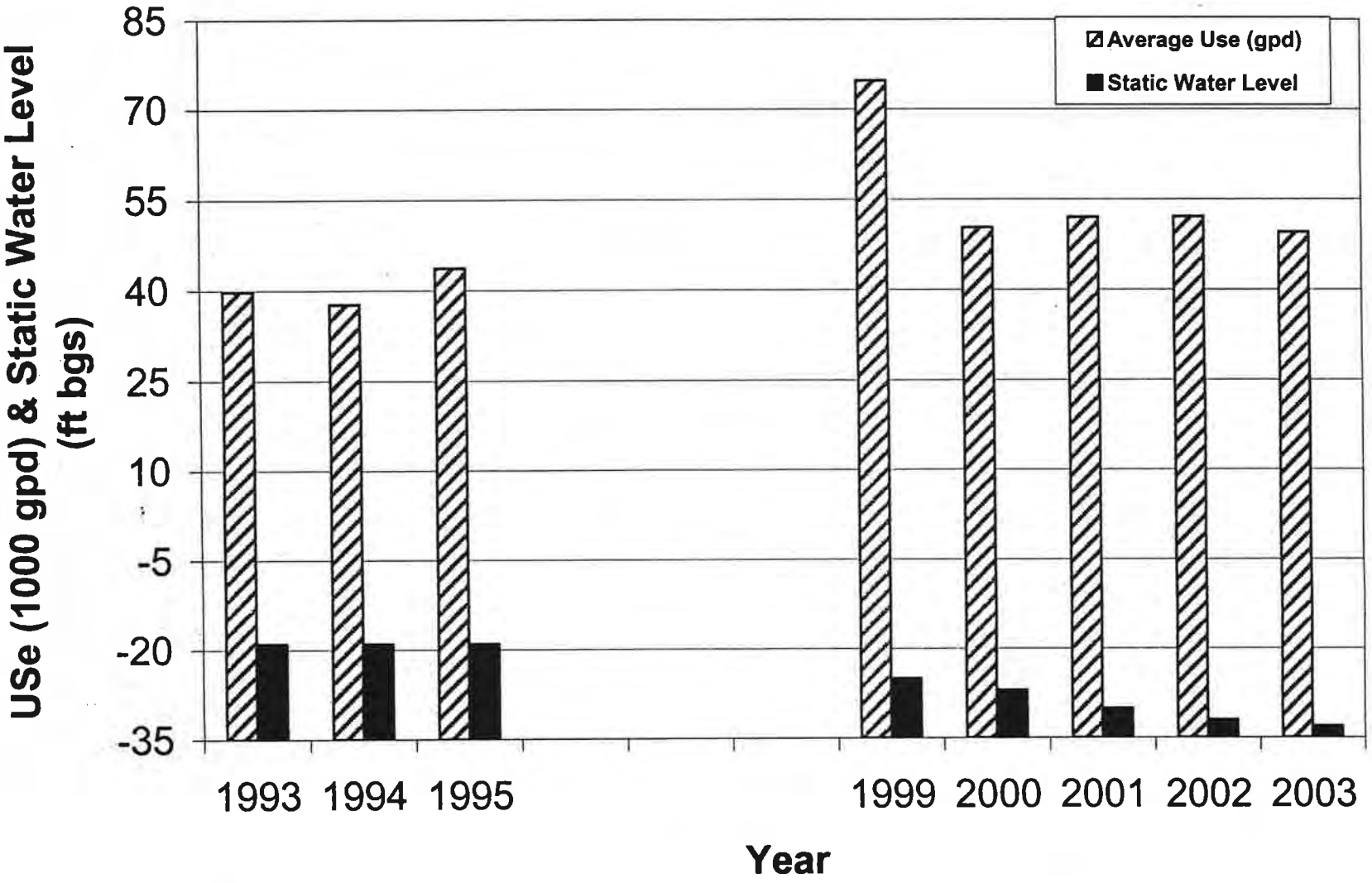
1.2 Purpose

The purpose of this study and report was two pronged. The first objective was to evaluate how the water system might be better operated to ensure a long-term water supply to the institution. Specifically, the objective was to determine a pumping volume, rate, and regime that the aquifer could sustain while providing an adequate water supply to the institution. To accomplish this objective, historic and more recent static water level data were evaluated to assess the long-term aquifer sustainability. A constant rate pumping test was conducted to determine a rate of pumping at which the water in the aquifer could be recharged as quickly as it is withdrawn, and to ascertain the amount of resting time needed for the water in the wells to return to 95 percent of the measured static water level.

The second objective of the study was to evaluate short and long-term options to provide water for the current population level at the institution. This included a discussion of water use and assessment of additional applicable water conservation measures and water re-use.

Section 2.0 of this report assesses historic data regarding static water levels in the aquifer, the rate of decline, and causal factors. Section 3.0 describes the pumping test methods and results. This section also provides an analysis and interpretation of the pumping test data in light of other information available, and provides a recommended pumping regime for the water system. Section 3.0 also identifies potential new sources of water. Section 4.0 of this report describes water conservation measures, many of which have been implemented since undertaking this study. Section 5.0 summarizes the recommendations derived from the study.

Figure 3. Average Water Use & Static Water Level



2.0 ANALYSIS OF STATIC WATER LEVELS

2.1 Static Water Level Decline

EES reported a decline in the static water level of approximately 20 feet since installation of Well 1 in 1986 (EES, 2003). This value was an estimate based on the water levels recorded in the well log at the time of drilling (13 feet below the top of the well) and an estimate derived from data provided by the institution.

As EES noted, a decline in the water level of about 6 feet occurred between 1987 and 1992 (Figure 1). (Measurement data were not available between mid-1995 and early 1999). The report depicts a more pronounced decline in the estimated static water level, which occurred with increased production after 1992. Production increase was associated with an increase in the CCCC population from 200 to 400 offenders in mid-1998. This coincident rise in use and population is illustrated in Figure 3. Average consumption in 1993 was 38,280 gpd, while it had increased to 58,926 gpd by 2000. The increased consumption reflects the increased population, although consumption per inmate was tempered by implementation of some water conservation measures (G&O, 2000). Between 1998 and 2003, the rate of decline of the aquifer went from 6 feet the first five years to slightly double that.

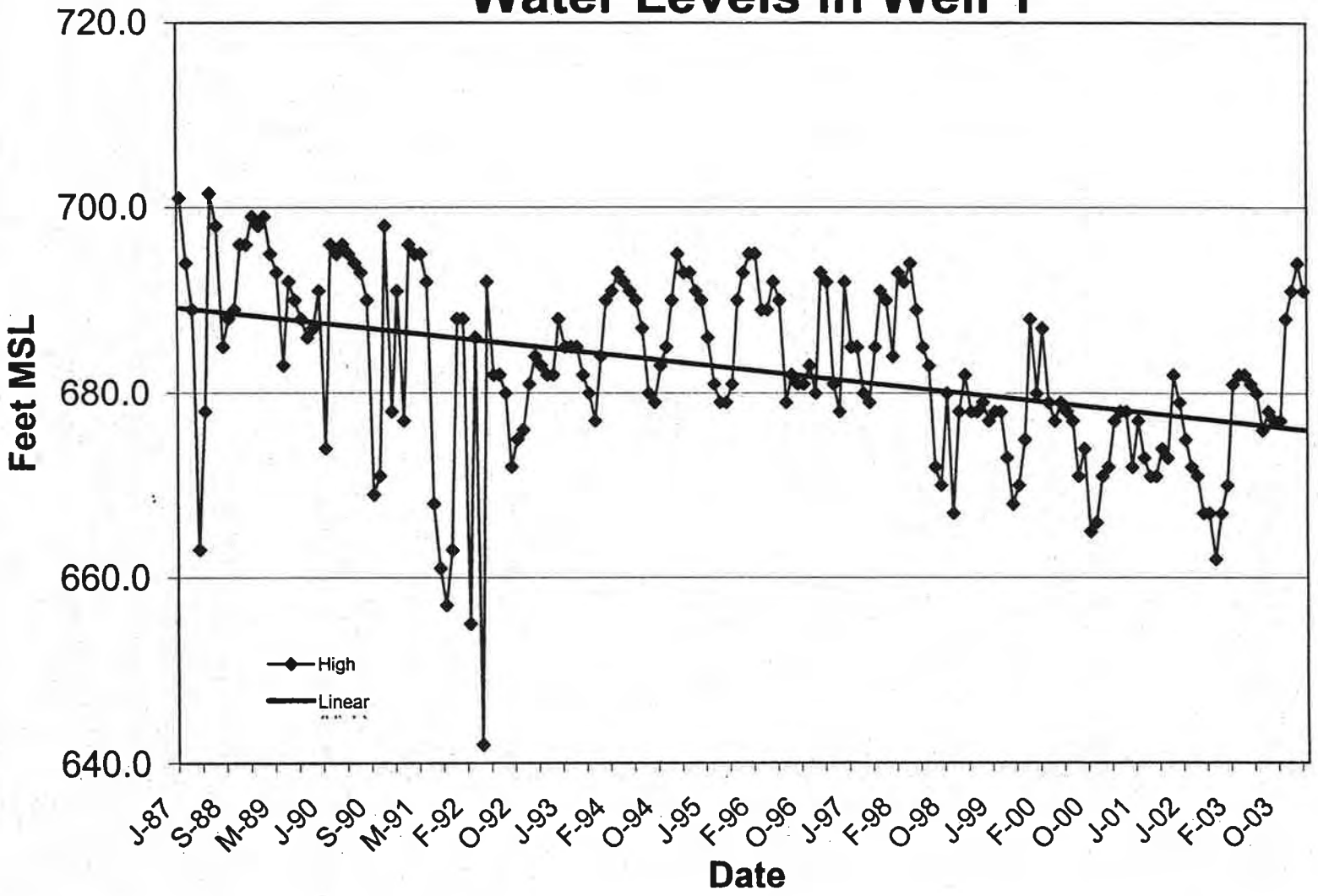
It is noteworthy that even with a 36 percent lower withdrawal rate prior to 1998, water table decline was observed. At the greater daily withdrawal rates required to support a larger offender population, a much greater rate of static water decline occurred.

The data presented in Figure 1 have two flaws. First, data are missing between mid 1995 and 1999. This flaw has been remedied with the recent submittal of the highest monthly water levels recorded between 1987 and the present. These data are illustrated in Figure 4, and confirm the net downward trend in the estimated static water levels since well installation.

The second and more important flaw is the fact that water level readings presented in both Figures 1 and 4 were obtained during various periods of pumping, rather than at the end of an aquifer recovery period. Historically, there was no standardization of water level measurements, (i.e., measurements were obtained at a variety of times during a pumping period). The data obtained resulted in the scatter of points on Figure 1. Despite this flaw, an interesting observation can be made. Not only did the highest recorded water levels decline over time, but the lowest recorded water levels declined as well. This downward trend is particularly evident when comparing mid-1994 to mid-2000 and late 2002. The trend also indicates that water in the aquifer is declining. In other words, in the long-term, water is being withdrawn faster than it can be replenished.

To remedy the second flaw, beginning in December 2003, data are being collected at the same time each day and after a minimum of 2 to 3 hours in which pumps at both wells have been turned off. This standardization of water level measurement will allow trends in the static water level to be determined with greater accuracy. An evaluation of the last few points taken since December 2003 (Figure 4) indicates a static water level between 20 and 23 feet bgs. This would equate to a 7 to 10-foot decline since well installation. Although this decline is less than the

Figure 4. Highest Recorded Monthly Water Levels in Well 1



20-foot decline reported by EES, the data continue to support a gradual loss in aquifer productivity due to higher rate of water withdrawal than recharge. Should the population of the facility increase over the current level of 400 offenders, accompanied by a higher total daily water consumption, the aquifer could be depleted even more rapidly.

On the other hand, with a lower daily usage per inmate through implementation of water conservation measures, the productivity of the aquifer can be extended. In August 2003, the facility implemented some aggressive water conservation measures. At that time, the average daily withdrawal decreased to 42,891 gpd (107 gallons per person per day, assuming 400 offenders), a savings of 16 percent over the 2001 usage of 128 gallons per person per day).

2.2 Causes for the Decline in Static Water Level

A number of causes for the decline in static water levels in the aquifer have been hypothesized. The first and most likely causal factor is utilization by the institution. This factor is supported by the previously discussed data, correlating CCCC population increase and water level decrease.

A second contributing factor considered is water withdrawal by other water users. However, no other major water rights holders are located within five miles of the institution. The Weyerhauser nursery has a large water right, but the nursery is not likely in hydraulic continuity with aquifer at the institution for two reasons. Weyerhauser is quite a distance from CCCC and their nursery withdraws water from the alluvial aquifer, rather than the basalt aquifer. Therefore, this causal factor is not supported by the available information.

Third, reduced recharge due to reduced precipitation was considered another possible causal factor in the declining static water levels. This factor was eliminated from consideration based on a recent memorandum from Department of Ecology (Appendix A). The memorandum provided historical precipitation data that refuted the reduced precipitation hypothesis.

Finally, declining water levels might be attributed to reduced recharge due to land use patterns such as timber clear cutting, or development that would reduce infiltration. The recent Ecology memorandum (Appendix A) cites timber harvest as a potential contributing factor.

While reduced recharge from timber clearing cannot be eliminated as a contributing factor, the explanation which is most directly linked to the long-term decline in water level is withdrawal by the institution.

3.0 PUMP TESTING AND WATER AVAILABILITY

3.1 Pumping Test Methods

A 12-hour constant rate pumping test was conducted on December 17, 2003, by Nancy Winters, Shane Loper, and Doug Raines; all three are DOC, Environmental Services staff. Well 2 was selected as the pumping well, with Well 1 the observation well. (Data describing the two wells are presented in Table 1.) While both pumps operate a constant pumping rate, the 70 gpm rate in

Well 1 had caused rapid and significant drawdown, to the extent that the pumping water level approached the pump intake. Thus, Well 2 was selected for its lower pump rate.

Table 1. Well location information, well and pump statistics, and static water level

Parameter	Well 1	Well 2
Land elevation at well head (ft. MSL*)	718	708
Height of casing above grade (ft)	2.71	2.71
Initial water level (ft. bgs from casing top)	22.94	25.1
Pump level (ft. bgs)	170	120
Pump capacity (gpm)	70	50
Distance between the wells (ft.)	322.85	

*MSL = above mean sea level

Prior to commencement of the pump test, the aquifer was allowed to equilibrate for approximately 16 hours. The pumps in both wells were manually stopped in mid-afternoon on December 16, 2004. The static water levels in the Wells 1 and 2 were 22.94 and 25.10 feet bgs, respectively, prior to the start of the test. Well 2 began pumping at approximately 50 gpm at 7:34 am. Water level measurements were obtained using the digital water level sensor installed in Well 1 and a manual electronic tape in Well 2. Measurements of the water levels in each of the wells were taken simultaneously at the time intervals and for the periods listed below:

- every 30 seconds for 10 minutes
- every 5 minutes for one hour
- every 15 minutes for 3 hours
- every 30 minutes for 2.5 hours
- every hour for 3 hours

The water volume pumped for the interval was also recorded to allow the rate of pumping to be calculated. By 7:22 pm, the water level in Well 2 had remained constant (within 0.5 ft) for 7 hours, and the pump in Well 2 was stopped. As the water levels in both wells recovered, measurements were recorded in each well simultaneously at the time intervals and for the periods listed below:

- every 30 seconds for 10 minutes
- every 5 minutes for 1.5 hour
- every 15 minutes for 45 minutes

When the water level in Well 2 had returned to within 97 percent of its original level, the pumping test was terminated.

3.2 Results

The pumping test curves are presented in Figure 5 for the pumping well (Well 2) and the observation well (Well 1). Expanded graphs and detailed data analyses are provided in Appendix B.

The pumping test demonstrated that at a pump rate of 50 gpm, the water level in Well 2 declines precipitously (67 feet) in the first 10 minutes of pumping. The water level reached equilibrium in Well 2 after approximately 100 minutes and remained at approximately 112 feet bgs (594 ft MSL) for the remainder of the pump test.

The water level in Well 1 declined approximately 9.5 feet over the duration of the test in which Well 2 was pumping. As expected, the water level in Well 1 did not reach equilibrium during the 12 hour test. Generally, the greater the distance between wells drawing from the same aquifer, the slower the water level in the distant well is to respond or be drawn down.

Within 2 hours after pumping ceased, Well 2 recovered to within 97 percent of its static level. Well 1 recovered to only 70 percent of its static level within 2 hours. By extrapolating the recovery curve, 95 percent recovery of the static water level in Well 1 is estimated to require between 6 and 10 hours.

3.3 Pumping Test Analysis

The pumping test demonstrates that the aquifer is capable of supporting a constant pumping rate of 50 gpm at Well 2. Higher pumping rates from a single well (either Well 1 or Well 2) have not been demonstrated to be sustainable. However, one might assume that pumping at 60 gpm is likely to be sustainable in Well 1 based on prior operation of the two, 30 gpm pumps with a drawdown of about 120 feet with the pumps set at 166 feet bgs.

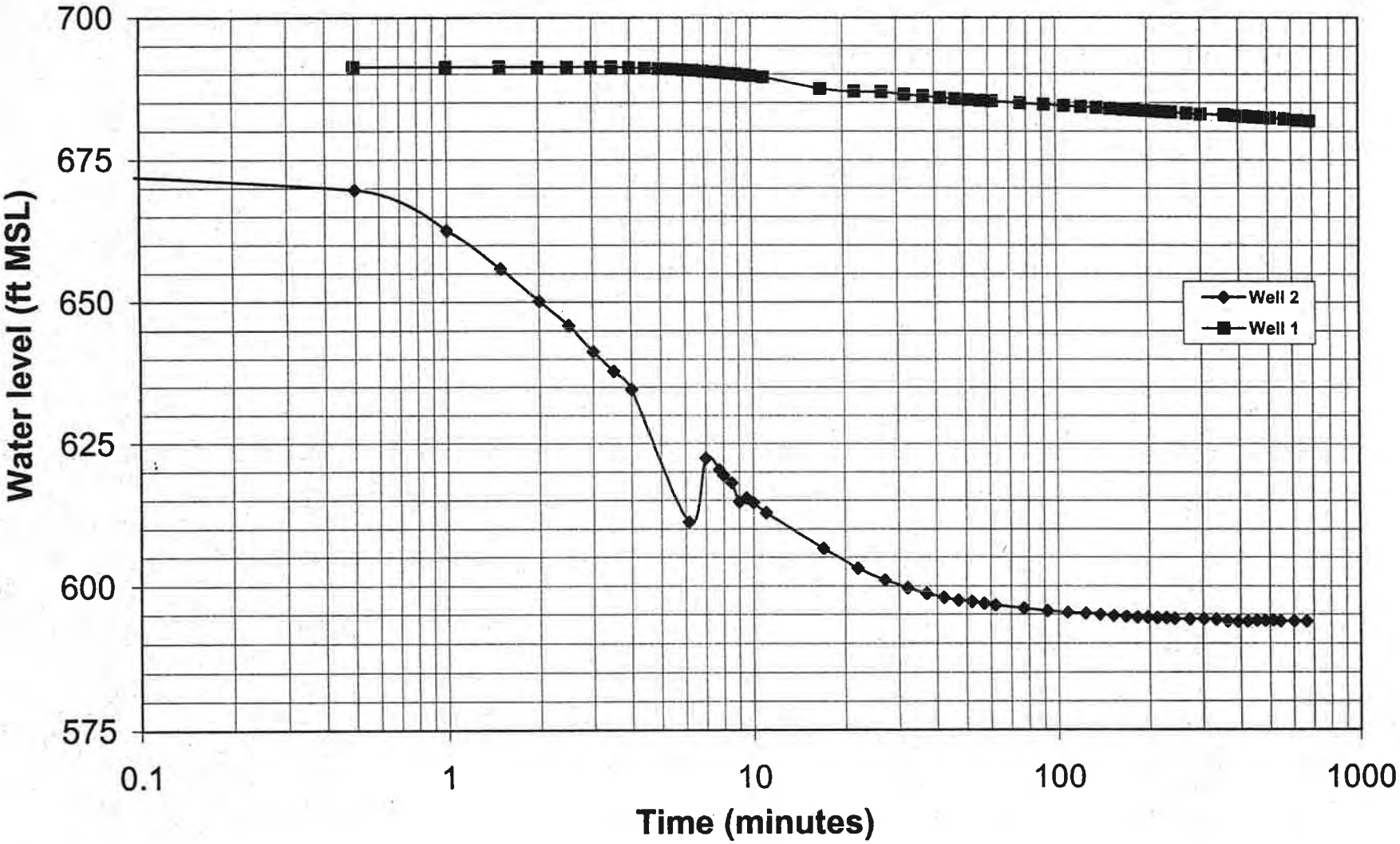
At a 50 gpm pumping rate, Well 2 can supply the institution's average needs of 52,000 gpd in about 17 hours and maintain a constant water level of 113 feet bgs or 592 feet MSL. This is 6 feet above the pump in the well. Well 2 can supply the institutions water needs pumping only 14 hours a day when implementing conservation measures similar to those in effect since December 2003.

Although Well 2 recovered to within 95 percent of the original water level within 2 hours, the aquifer requires a much longer period (as evidenced by the slower recovery in Well 1, Appendix B). On the basis of this pumping test, Well 2 should be operated continuously until the needs for the day are met, and then allowed to rest for the maximum amount of time. Transfer pumps in the reservoirs would need to be adjusted to accomplish this pumping regime.

Calculations described in Appendix B indicate that the aquifer's ability to transmit water (transmissivity) is different between the two locations. At both wells, the transmissivities are below the average range that provide major municipal supplies, but appear adequate for the size of the population at CCCC.

Figure 5. Pumping Test

Pumping - Well 2; Observation - Well 1



The tranmissivity calculations were used to extrapolate drawdown at higher pumping rates. Well 2 would not be expected to support a 70 gpm rate of withdrawal with the pump set at the current level of 120 feet bgs. A similar extrapolation for Well 1 predicts that it might be capable of supporting a flow of 70 gpm. However, this has not been the experience of the well system manager. When the two smaller 30-gpm pumps in Well 1 were replaced with a single 70 gpm pump, which was set substantially lower in the borehole (at 170 feet bgs or 545 ft MSL), the drawdown resulted in a water level within five feet of the pump within two hours of pump startup (E. Burns, pers. comm.). Apparently, there are sufficient differences in the aquifer between the two wells that the current pump test cannot be used to successfully extrapolate to a pumping scenario at Well 1. A pumping test at Well 1should be conducted to gain greater understanding of the proper operation of Well 1.

3.4 Recommendations for Pump Operation and Future Testing

The constant rate pumping test indicated water could be predictably pumped at 50 gpm from Well 2 without severe drawdown that would jeopardize the pump. Currently, Well 1 can only be operated at 70 gpm, when operated alone. This results in severe drawdown and jeopardizes the operation of the pump. Based on this information and the analysis of the pump test, the following recommendations for water system operations are made:

- Well 2 should be operated to provide all of the water needs for the facility, until a pump test can be conducted on Well 1. Well 2 can pump an average of 52,000 gpd in 17 hours which will meet the current water needs of the facility.

- Within each 24-hour period, Well 2 should be operated to allow the aquifer a recovery time of at least two hours between pumping periods. Longer periods of recovery are encouraged.

- The pump test on Well 2 was conducted during December, which is not during the dry season when the aquifer may be under more stress. It is recommended that a step drawdown pump test be conducted in a drier period, when the aquifer receives less recharge from precipitation.

- The pump in Well 1 should be retrofitted with either a variable frequency drive to reduce the pumping rate to a rate the aquifer can sustain (likely between 50 and 60 gpm), or a globe valve should be placed on the discharge to reduce the flow to between 50 and 60 gpm.

- A step drawdown pump test should be conducted on Well 1 after it is retrofitted as described above. This should also be conducted during the dry season.

- Well 1 should be operated alone only in an emergency situation until an appropriate pumping rate can be established for it. This will protect the pump by preventing drawdown that may approach the pump intake. (Simultaneous pumping of Wells 1 and 2 can reduce the withdrawal rate in Well 1 and thereby reduce the drawdown.)

3.5 New Sources Of Water

3.5.1 New Sources of Groundwater

The institution could contract to evaluate options for installation of a new well in a deeper aquifer. Mr. Bob Bergquist, formerly employed by DOC, vaguely recalled that another well was drilled in approximately 1992, possibly in conjunction with the installation of Well 2. The driller selected the top of the hill and drilled to a depth between 400 or 500 feet bgs without locating any water (Bergquist, pers. comm.). Well drilling is an expensive endeavor without the certainty of locating a water supply, and should be undertaken after other options have been explored.

Additionally, the installation of a new well would require a water right. Currently, water right applications at the Department of Ecology Southwest Regional Office are severely backlogged. In the Chehalis watershed, the watershed in which CCCC is located, water right decisions will likely be made only after the Chehalis Basin Partnership completes its Watershed Management Plan. Since about 1999, water rights applicants have had an option to reduce the wait for processing, by hiring a third party consulting firm to conduct the necessary studies. However, the applicant must assume the costs for all applications in the queue prior to theirs. This could become a costly option.

3.5.2 Wastewater Reuse

Wastewater re-use may be the most viable option to identify "new water." This option is particularly attractive because it would support the DOC's Sustainability Plan.

G&O evaluated wastewater re-use in the Water Conservation Plan Update (G&O, 2000). Cost estimates ranged between $720,000 and $800,000, for Class B and Class A reclaimed water, respectively. Both classes can be used for a variety of applications such as landscape irrigation, fire fighting, and equipment washing. These costs do not include storage and distribution and would need to be inflated for current dollars. Costs may not be reflective of current regulations. Thus, the institution should consider evaluation of current costs to use wastewater for landscape irrigation. These costs could be included as a budget item for consideration by the legislature for FY 2005-2007.

4.0 WATER CONSERVATION RECOMMENDATIONS

Several water conservation measures are identified in the following section, grouped according to activity. These measures were either identified in the Water Conservation Plan (G&O, 2000) or developed after a discussion of water use at CCCC in November 2003. These measures are consistent with and support the implementation of the agency's Sustainability Plan (DOC, 2003). Many of these measures have been implemented at the institution since the drafting of this report and are recorded here for completeness. Continued integration of these measures into the on-going culture of CCCC may be able to provide some water for a potential expansion of the facility.

Descriptions of water use in each of the activities at the institution are largely estimates based on the Water Conservation Plan (G&O, 2000). Water metering, either with portable water meters and/or day/night patterns of water use is necessary to determine the areas of largest potential savings.

4.1 Education

Education is the foundation of every successful water conservation program. Patterns of water use are primarily an individual activity based on habits and underlying values. For water conservation to be effective over the long term, use patterns (i.e., behaviors) must be changed, requiring changes in understanding, beliefs, and finally implementation. This is as true for offenders as it is for staff. Thus, implementation of recommendations will support the success of an integrated water conservation and water-reuse program.

- Begin a program of water conservation awareness and education for staff and offenders alike. Classes can provide attendees with an understanding for the need to implement conservation measures, as well as practical examples for their daily duties. Most importantly the education/awareness course should be designed to foster and encourage new ideas from the audiences for further water savings.

- Institute a water conservation committee that assesses the feasibility of water conservation opportunities generated in awareness classes and elsewhere. Water conservation could be integrated as a pivotal part of the site Sustainability Committee, or a subcommittee could be formed to address water conservation/water re-use. One idea is to include offenders as well as staff on the committee; this would foster greater success in implementation. The committee could ensure that feasible water conservation measures are approved at the necessary levels and are implemented. They could track water savings achieved.

4.2 Residences

Showers represent the greatest proportion (25 percent) of known use, according to Gray and Osborne, Inc. (2000). Flow restrictors have been installed limiting flow to 2.5 gallons per minute. Length and number of showers per offender per day has been curtailed in the past with some success. Waterless urinals were installed but were subsequently removed due to what were described as failures in the design of the early technology.

- Permanently restrict showers to 5-7 minutes per offender per day. However, this is only likely to be successful in the long term with an education campaign approach, rather than by mandate.

- Evaluate new technology waterless urinals. This should include an assessment of similar institutions that have recently installed various brands. Determine whether the designs have improved to make purchase and installation cost-effective.

- Repair leaky faucets, showers, and toilets as soon as they begin dripping.

4.3 Laundry

Laundry represented 20 percent of known water use (G&O, 2000). Recently, the commercial washers have been reduced by 35 percent of the normal flow decreasing the proportion of overall use. Water conservation options are presented in order of most water saving:

- Ship all laundry to a neighboring institution for washing (e.g., WCC) routinely, or only during peak use times such as fire fighting season.

- Invest in a complete wash water and rinse re-use system such as the AquaRecycle system ($90,000). Appendix C provides cost details and contact for this system.

- Invest in a system to return rinse water to the wash cycle.

4.4 Grounds Maintenance

The G&O study could only provide approximate estimates for irrigation water use. Seasonally, irrigation represents a significantly greater proportion of the total water use than the 9 percent estimated in the report based on an average over all seasons. Water metering could provide an estimate of the actual water use for the grounds and greenhouse.

During the December pumping test, a hose was observed flowing into the landscape pond adjacent to the Administration Building. In discussions with officers, this practice commonly results in the hose running 24 hours a day seven days per week to maintain the level of the pond. Thus, implementation of conservation measures for grounds maintenance activities is likely to result in a larger water savings than estimated by the G&O plan.

Short-term and continuing water conservation measures include:

- Makeup water for the pond adjacent to the Administration Building should be added only from roof runoff collected during the rainy season. If the pond is being recharged because it leaks, bentonite clay should be added to the bottom (after.removing fish and plants) to prevent leakage.

- Collect roof runoff during the rainy season and use for irrigation and pond make-up water, as needed. Roof runoff can be collected in 2,000 to 4,000 gallon tanks.

- From July through September, completely stop watering lawns. The lawns will green up again in the fall.

- In other seasons, limit all landscape watering to no more than 1 inch per week applied once during the week, and only when precipitation has not provided 1 inch. Water application can be measured using the low tech "tuna can" method.

- Water in the early mornings or late evenings, rather than during the heat of the day, to reduce evaporation.

- Water landscaping plants other than lawns with buckets and only 1 inch per week. If these are native species, they will only require watering the first year.

Long-term measures, which can begin immediately include:

- To the maximum extent possible, replace current landscaped and lawn areas with native species, reducing the high water requirements of these plants. Native plants are attractive and can withstand drought conditions, similar to the summer of 2003, without watering. The G&O report provides a long list of appropriate species which is reproduced in Appendix D. A list of native plant resources and technical contacts are provided in Appendix E.

- Install drip irrigation or another water efficient system in the greenhouse (especially if mosses will be grown commercially) and in the vegetable garden. Ensure water applications do not exceed the weekly needs of the specific species, but not more than 1 inch per week.

- With Department of Ecology, investigate whether CCCC still holds a surface water right for the local stream identified in the G&O water conservation plan. Determine whether or not this water can be used for grounds irrigation.

4.5 Kitchen

While the kitchen use represents less than 3 percent of the total water used at the institution, all means of conserving water should be implemented.

- Install flow restrictors on all faucets and sprays.

- Investigate the feasibility of rinse water re-use for the dishwashers.

- Use dish washer rather than hand washing dishes, whenever possible. If hand washing is necessary, hand wash dishes in batches and only in plugged sinks, rather than individually with running water.

- Repair leaky faucets as soon as they begin dripping.
- Continue to scrape food from dishes prior to rinsing.

4.6 DNR Facilities

Water at the DNR-operated facilities is predominantly used for vehicle washing. Water conservation measures should be implemented by all entities using the limited water supply.

- Install water reuse system for vehicle washing. Request that DNR eliminate vehicle washing during drought seasons.
- Install flow restrictors on all lines.
- Use automatic shutoff nozzles on hoses.
- Repair dripping faucets as soon as they begin dripping.

4.7 Leak Detection and Flow Monitoring

If not already a member, CCCC should become a member of the Evergreen Rural Water Association and request a free audit of the water distribution system that will detect leaks.

CCCC can use the portable flow meters recently purchased by Capital Planning and Development to monitor and maintain records of the water use in various areas. Focus should be given to areas in which high use is suspected (see also G&O, 2000).

5.0 SUMMARY & CONCLUSIONS

Water is extremely limited at CCCC. Although the aquifer provides water for the current institutional needs, the declining static water level of the aquifer would indicate that future water needs may be in jeopardy if use is not reduced to the maximum extent possible. Water conservation measures need to become a permanent way of life at CCCC.

In the short term, Well 2 can be operated to meet the demand and optimize recovery of the aquifer. Well 2 can provide for the water needs of the institution, while awaiting testing at Well 1. Step drawdown pump tests at both Wells 1 and 2 are recommended during the drier periods. The results of this further testing in conjunction with an evaluation of reservoir transfer pump operations can be used to optimize institutional water management.

Long-term solutions include continue implementation of stringent conservation measures, stormwater storage and use, and wastewater re-use. A combination of solutions need to be evaluated to support a population greater than the current population.

6.0 REFERENCES

Bergquist, R. 2004. Personal communication with Nancy Winters, concerning failed well installation.

Burns, E. 2003. Personal communication with Nancy Winters, concerning pumping operations at CCCC.

Driscoll, F.G. 1986. Groundwater and Wells, Second Edition. Johnson Division, St. Paul MN.

EES. 2003. Final Report for Cedar Creek Corrections Center Water System Evaluation Project.

G&O. 2000. State of Washington Department of Corrections Cedar Creek Corrections Center Water Conservation Plan Update.

APPENDIX A

EMAIL COMMUNICATION FROM DEPARTMENT OF ECOLOGY CONCERNING WATER LIMITATIONS AT CEDAR CREEK CORRECTION CENTER

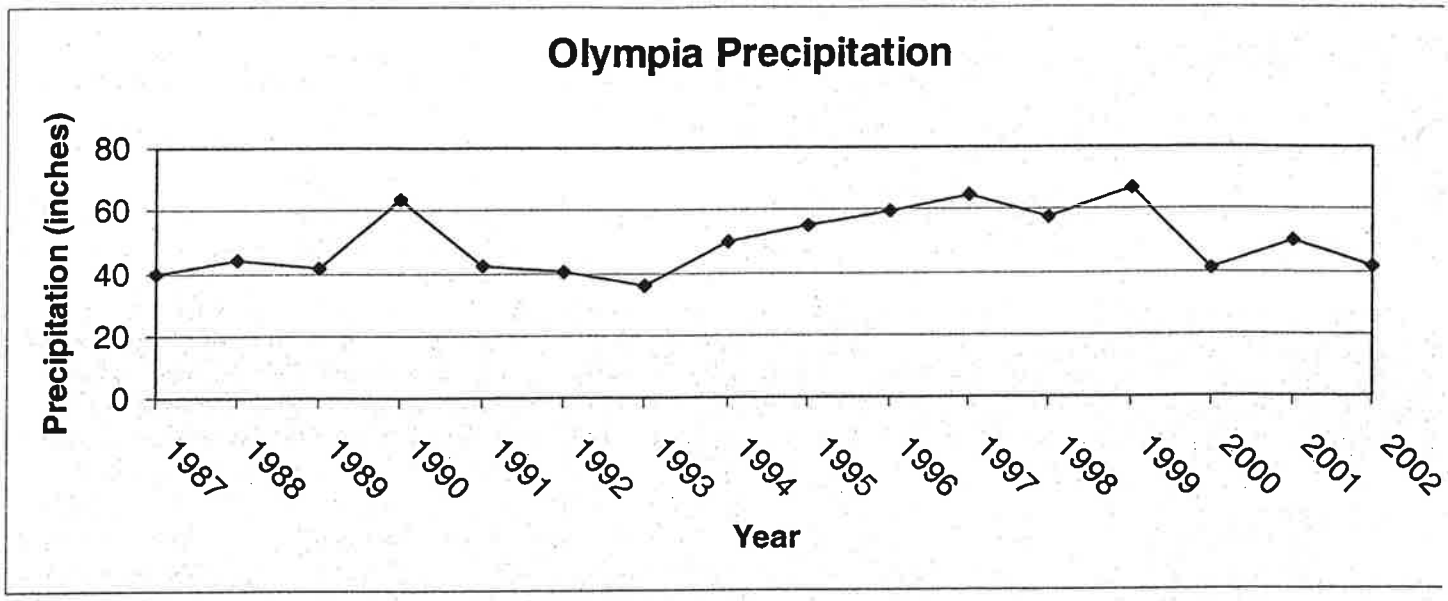
Winters, Nancy L.

From: Culhane, Tom
nt: Friday, September 19, 2003 2:42 PM
: Winters, Nancy L.
Cc: Davidson, Don; Walsh, Jill
Subject: Water level decline in the vicinity of Cedar Creek Correctional Center (CCCC)

I just want to provide you an update on what Jill and I found regarding your concerns about declining ground water levels in vicinity of Cedar Creek Correctional Center (CCCC). When we spoke to you a few days ago I mentioned wondering whether logging in the area might have increased surface water runoff and subsequently decreased ground water recharge. I hypothesized that this could have led to a regional decline of the water level in the aquifer. To get a better idea regarding this Jill and I drove out to the CCCC facility this morning. From the street and parking areas we were able to see several of the facility's wells. We also drove on logging roads several miles to the west and east. The vegetation we saw was a mix of re-planted clear cuts with the clear cut age quite variable (but generally with uniform-age "reprod" in each clear cut), and some mixed-age stands of "reprod". From this very limited sampling of land use it did appear to us that increased surface water runoff would be a major reason for a regional decline.

As a follow up to your concerns regarding possible well interference caused by heavy pumping at the Weyerhaeuser tree farm located off of Mima Mounds Road, we spoke with someone at this facility. That individual indicated that they typical use only a small portion of their allocated Qi, and that their heavy pumping only occurs for frost protection on certain days generally September through November. They do irrigate smaller areas at other times of the year (I believe he said perhaps fields of 25 to 35 acres), but this is generally for periods of only 3 or 4 hours a day. This information suggests that it is unlikely that pumping from the tree farm caused last year's water shortage at the CCCC site. Additionally, as we discussed, the CCCC wells tap fractures in bedrock while the tree farm wells are completed in an extensive alluvial aquifer much ..rther down in the watershed and over 3 miles away. Consequently, I suspect the tree farm pumping has ..ttle to do with the decline experienced at the CCCC. I should also mention that Jill looked at water rights in the area. Close in, say perhaps within about a mile, the CCCC utilizes the only allocated water rights of any significance. Within a broader area of say 3 miles, the tree farm has by far the largest right. As I said, however, I don't suspect that the tree farm pumping has created your problems. Regarding the possible effect of exempt or illegal withdrawals, I looked at Ecology's well log data base. There are no wells indicated within a mile or two of the CCCC other than those belonging to DOC or DNR.

Regarding other possible reasons for your decline, I took a quick look at precipitation. The graph below is for Olympia since 1982 - the year that the CCCC began collecting water level data. While Olympia is some distance away, for long-term trend purposes I think these data represent similar conditions to what has been experienced at the site. As you can see, there has not been any obvious long-term decline in precipitation that would explain the aquifer water-level decline that has produced your problems.



So at this point, the only explanation that comes to my mind regarding a possible cause for the drop in water levels experienced at the CCCC site would be the aggregate effects of pumping by the CCCC itself. In other words, I am wondering if increased production from the CCCC wells has drained the fracture system supplying your wells and that the decline in your "static" measurements reflect this. One way to better evaluate this hypothesis would be to plot pumping data along side declining water level data for the site. If you can get me such pumping records, I would be happy to try to see if this sheds any light.

At any rate, this is about all that I can suggest at this point. Other than that, it would appear that DOC may need to deepen it's existing wells or drill additional ones.

Tom Culhane
Hydrogeologist
Washington State Department of Ecology
Water Resources Program
(360) 407-0297

APPENDIX B

DETAILED DISCUSSION OF AQUIFER TRANMISSIVITY AND COEFFICIENT OF STORAGE AND PUMPING TEST GRAPHS

Figure B-1. Pumping Test
Drawdown at Well 2

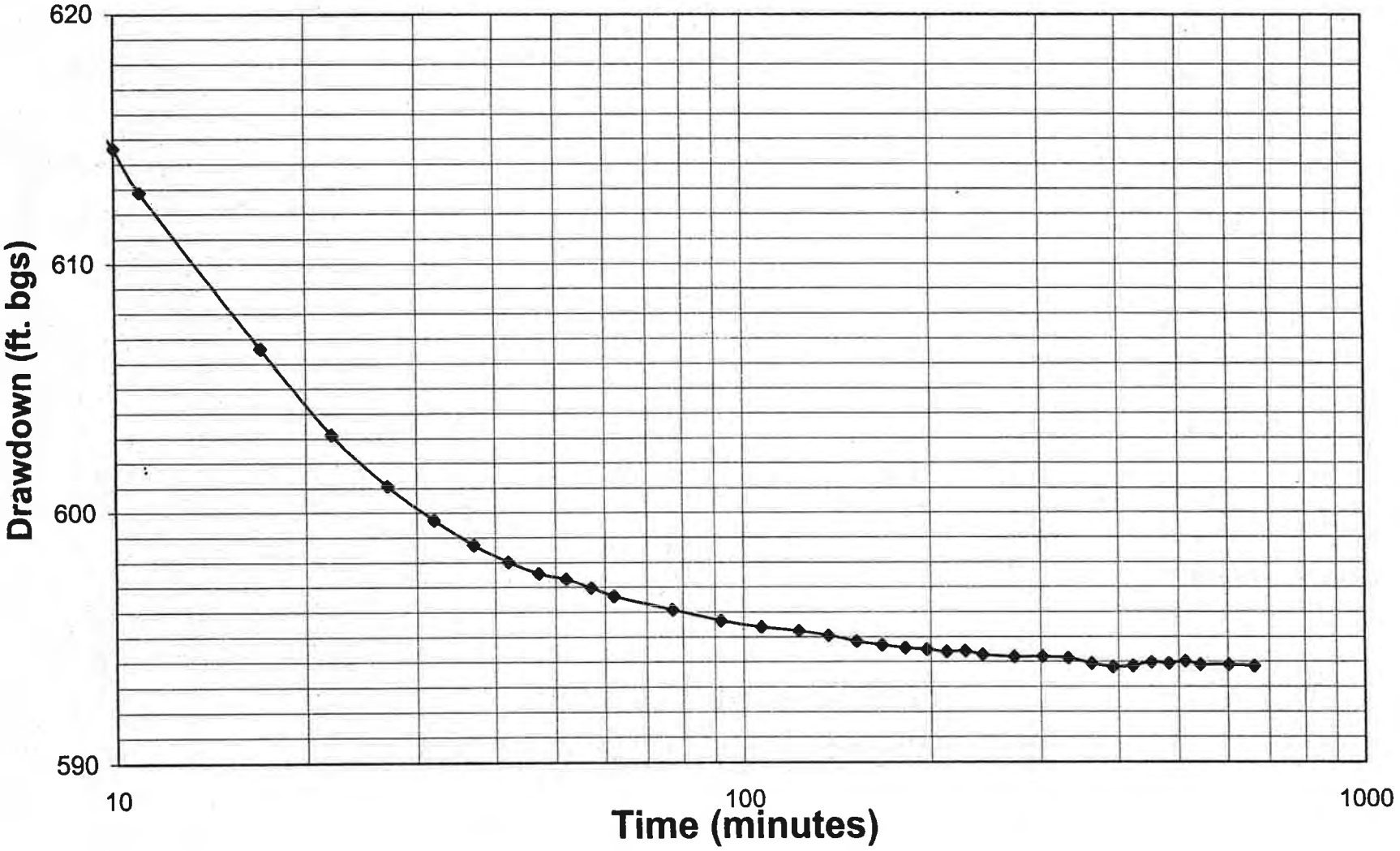


Figure B-2. Pumping Test
Well 2 - Recovery

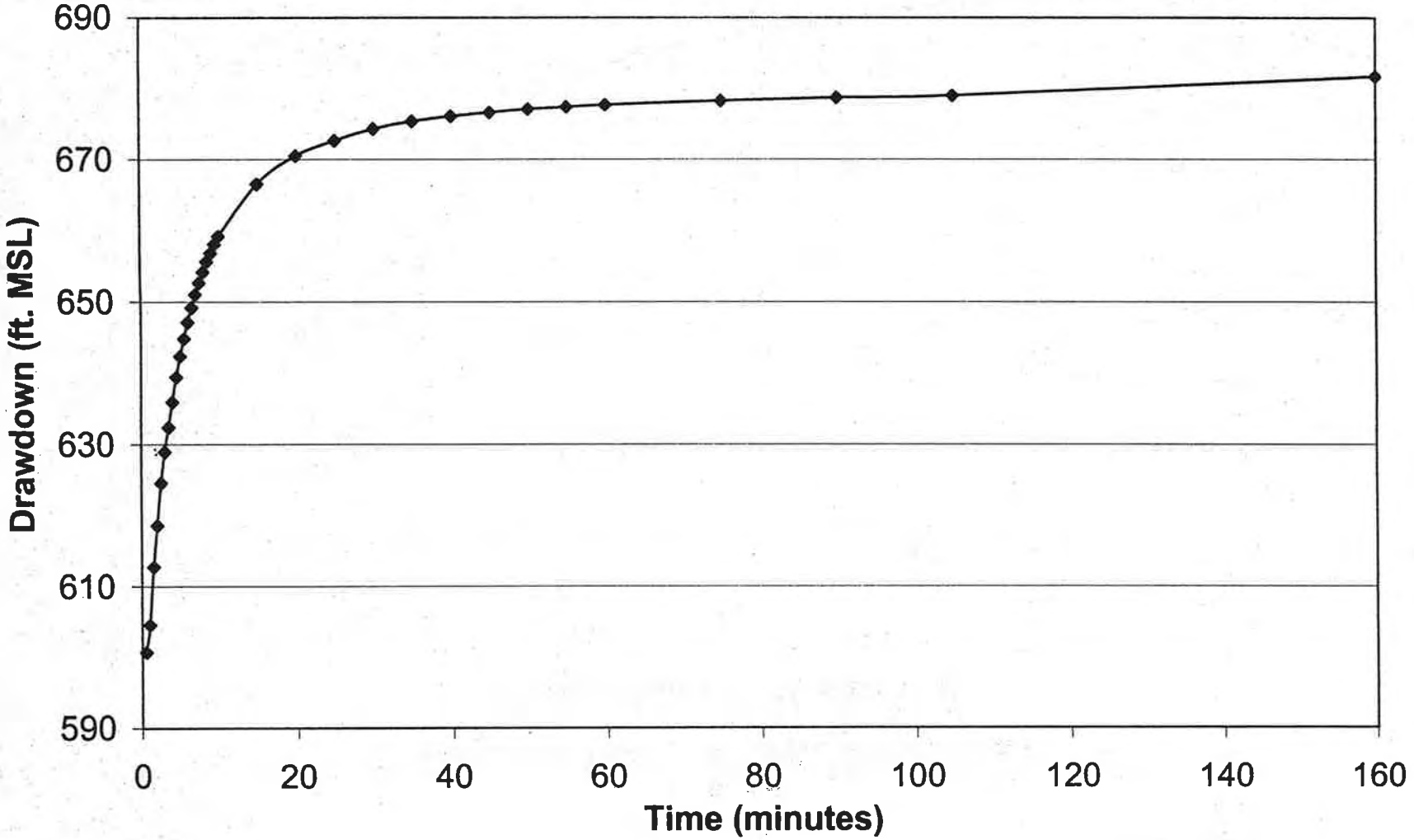
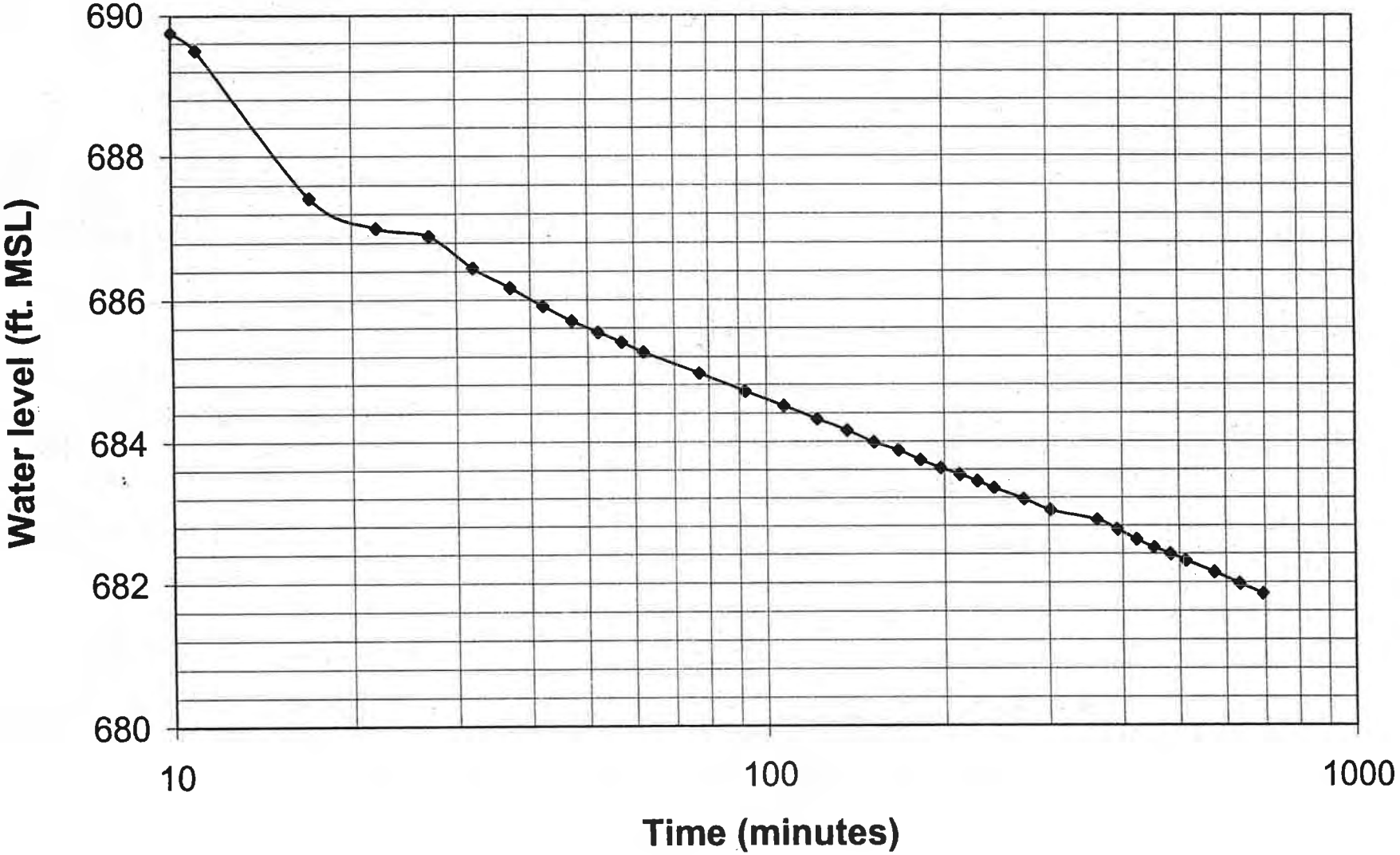
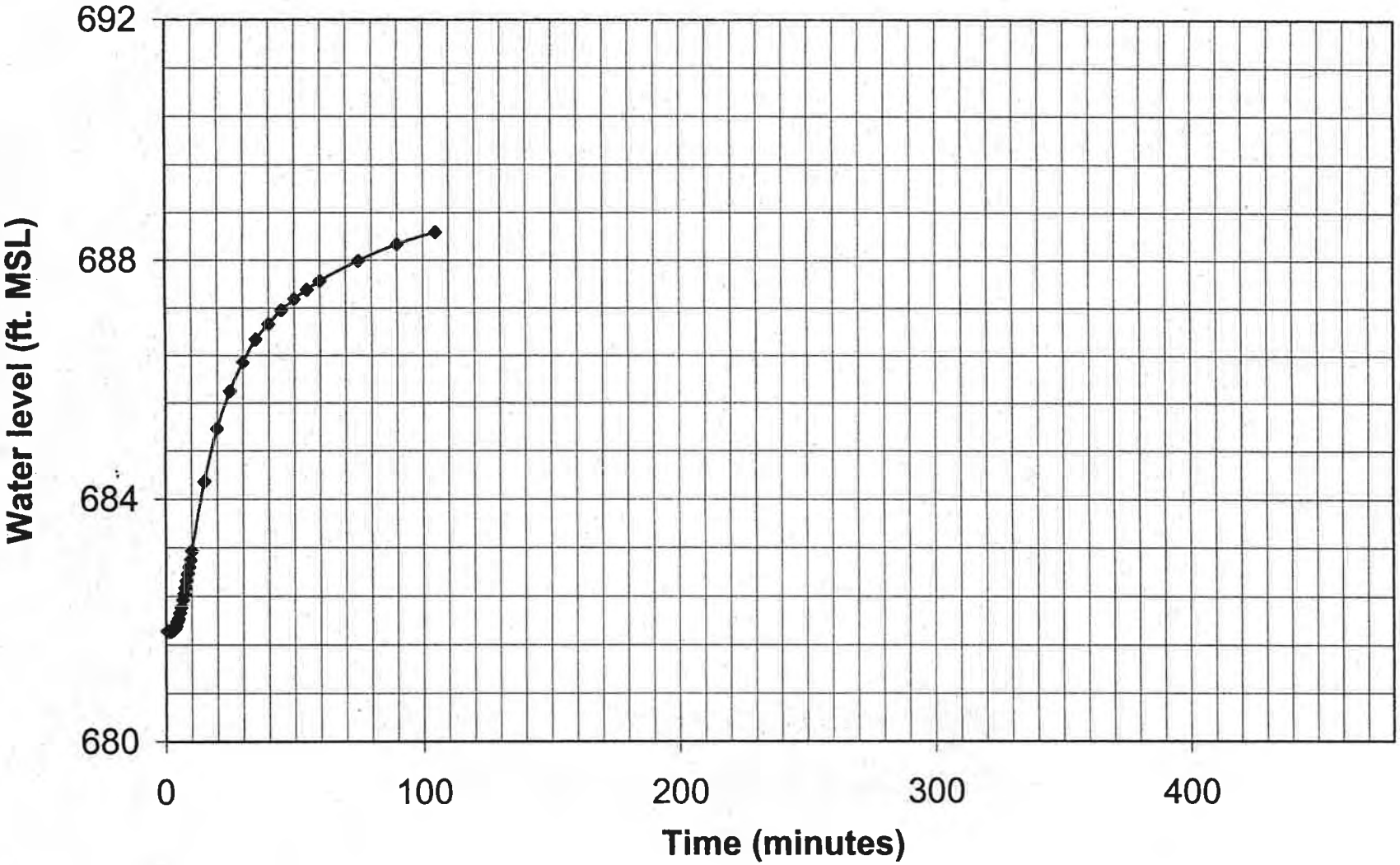


Figure B-3. Pumping Test
Well 1 - Observation Well



Firuge B-4. Pumping Test
Well 1 - Observation Well Recovery



Appendix B
Detailed Discussion of Aquifer Tranmissivity and Coefficient of Storage and Pumping Test Graphs

Transmissivity

Transmissivity of an aquifer is defined as the rate at which water flows through a vertical strip of the aquifer 1 foot wide, over the thickness of the aquifer. Transmissivities less than 1000 gpd/ft can supply only enough water for domestic wells, while transmissivities of 10,000 gpd/ft can provide adequate supply for municipal, industrial or irrigation purposes. Transmissivity (T) was calculated following Driscoll (1986) using the following equation:

$$T = \frac{264\,Q}{\Delta s}$$

Where:

Q is the average flow 51.4 gpm, as measured at the pumphouse pressure transducer

Δs is the difference in water level between minute a log cycle at steady state, in this case between minute 100 and minute 1000, from the graph

Transmissivities were comparable at the two wells; at Well #2, T was 5,654 gpd/ft, and at Well #1 at 3,769 gpd/ft, indicating possible heterogeneities in the aquifer between the two wells. These transmissivities are lower than normally cited for municipal supply; however, CCCC supplies water to a much smaller population than would be served by a normal municipality.

Transmissivity can be used to calculate the predicted drawdown at higher pumping rates. The predicted drawdown in Well #2 at a pumping rate of 70 gallons per minute would be 135.7 feet bgs. This is below the level at which the pump is currently set. Applying a similar calculation at Well #1, but extrapolating from the pumping well curves at Well #2, would indicate a drawdown of 133 feet bgs at 70 gpm. However, this is not supported by operational information. Operation of the Well #1 pump alone at 70 gallons per minute has reported to result in a drawdown approaching 160 feet bgs a few feet above the pressure transducer at 166 ft bgs. Apparently the aquifer in the vicinity of Well #1 cannot recharge at a rate that would support the 70 gpm pumping rate. A pumping test at a reduced pumping rate between 50 and 60 gpm would yield additional information useful for operation of the system.

Well recovery occurred relatively rapidly and returned to within 95 percent of the original static water level within 160 minutes (25 hours) in Well #2. Well #1, located 322.8 feet away from the pumping well, recovered substantially more slowly; it recovered to 70 percent of the original level within 2.5 hours. Extrapolating the recovery curve for Well #1, 95 percent recovery would be anticipated in approximately 20 hours. Thus, aquifer recovery could be enhanced by maximizing the resting (no pump) periods.

Coefficient of Storage

Transmissivity in the observation well can be used to describe the coefficient of storage of the aquifer, S. The coefficient of storage (S) is defined as the volume of water released from a formation per unit storage area of the aquifer and per unit change in head. It is readily calculated from the time drawdown graph by using the zero-drawdown intercept for the straight line as one of the terms in the equation.

$$S = \frac{0.3\, T\, t_o}{r^2}$$

Where:

T is the transmissivity of the observation well

t_o is the intercept of the straight line at zero drawdown, in days

r is the distance between the pumping well and the observation well, in feet.

The coefficient of storage for the aquifer is 2.15×10^{-5}, a unitless number. Storage coefficients for unconfined aquifers generally range between 0.01 and 0.3, and those for confined aquifers range between 10^{-3} and 10^{-5} (Driscoll, 1986). Thus the fractured basalt of the aquifer underlying the CCCC facility demonstrates some characteristics of a confined aquifer.

Mission Creek Corrections Center for Women

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
OFFICE OF ADMINISTRATIVE SERVICES
CAPITAL PLANNING AND DEVELOPMENT
P.O. Box 41112• Olympia, Washington 98504-1112• (360) 586-6131
FAX (360) 586-8723

October 19, 2004

To: Pam Jenkins

From : Nancy Winters

Subject: Suggested Water Conservation Measures for Mission Creek

Occupancy of Mission Creek Corrections Center (MCCC) at the level of 80 offenders will cause stress on the water and sewer systems. Currently, the water rights will support 54 to 65 offenders based on use of 120 to 100 gpid, respectively. Similarly, the sewer capacity is limited by the design of the system which is designed to manage the waste from 65 offenders. In order not to exceed the water rights or sewage system capacity, I suggest implementation of the water conservation measures presented in this memorandum. The water conservation measures suggested are stringent because of the severe limitations of water and sewer capacity. I recommend continued implementation of these until expansion of water rights and sewer capacity can be accomplished to better serve the needs at the 80 offender level. Further expansion to an offender population of 200 to 300 will be contingent on obtaining additional water rights and physical improvements to the sewage treatment system.

SUGGESTED WATER CONSERVATION MEASURES

Laundry

- Ship all laundry to another facility for washing.

- Do not provide individual machines to wash personal laundry. Send all personal laundry off-site.

Restrooms (Offenders and Staff)

- Install low-flow shower heads and timers with a delay cycle that will limit showers to no more than 5 minutes. Educate the custody officers to continuously enforce the 5 minute shower rule.

- Install low-flow, high pressure toilets.

- Install low-flow faucets with motion sensors in sinks.

- Repair all dripping taps immediately.

- Prohibit staff from showering at the facility, except in the event of exposure to bodily fluids or hazardous chemicals.

Kitchen

- Prepare meals at off-site locations and transport to MCCC to re-therm. If possible, return dishes and flatware to place of origin to be washed.

- Install flow restrictors on all faucets and sprays.

- If dishes must be washed on site, install low water use dishwashers. Use dishwasher rather than hand washing dishes, whenever possible.

- Investigate the feasibility of rinse water reuse for the dishwashers.

- If hand washing is necessary, hand wash dishes in batches and only in plugged sinks, rather than individually with running water.

- Limit other cleanup to small buckets of wipe down water.

- Repair all dripping taps immediately.

Landscaping

- Do not water any gardens, lawns, or other landscaping outdoors. If native plants are established they will not require watering. Landscaping can be replaced gradually with low water use plants.

Outdoor Activities

- Prohibit vehicle washing on site. Take vehicles to car washes, if necessary. Minimize other uses of water outdoors.

Leak Detection and Repair

- If not already a member, become a member of the local Rural Water Association and request a free audit of the water distribution system that will detect leaks. Repair all leaks immediately

DNR Activities

- Develop an agreement with DNR to ensure that they understand the seriousness of the water limitation and follow water conservation practices. Currently DNR has offices with bathrooms (toilets and sinks only). These should be retrofitted with low-flow, high pressure toilets, and motion activated sinks.

- Install water meters on DNR lines(s) and MCCC line(s).

Olympic Corrections Center

WASHINGTON STATE DEPARTMENT OF CORRECTIONS

OLYMPIC CORRECTIONS CENTER

WATER CONSERVATION PLAN

G & O NO. 94519.13

NOVEMBER 1995

Gray & Osborne, Inc.
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WASHINGTON STATE
DEPARTMENT OF CORRECTIONS

OLYMPIC CORRECTIONS CENTER
WATER CONSERVATION PLAN
NOVEMBER 1995

GRAY & OSBORNE, INC.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DEPARTMENT OF CORRECTIONS
OLYMPIC CORRECTIONS CENTER

WATER CONSERVATION PLAN

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INTRODUCTION

This Water Conservation Plan summarizes the existing water system facilities, outlines historical water production, presents an analysis of existing water system facilities, indicates data collection requirements for water conservation, and presents a program for water conservation. Water conservation plans are required by the Department of Ecology for water right applications submitted after June 1994. This Water Conservation Plan was prepared according to guidance published in *Conservation Planning Requirements*, (Mar 1994, DOE Pub. # 94-24, DOH Pub. # 331-008).

BACKGROUND

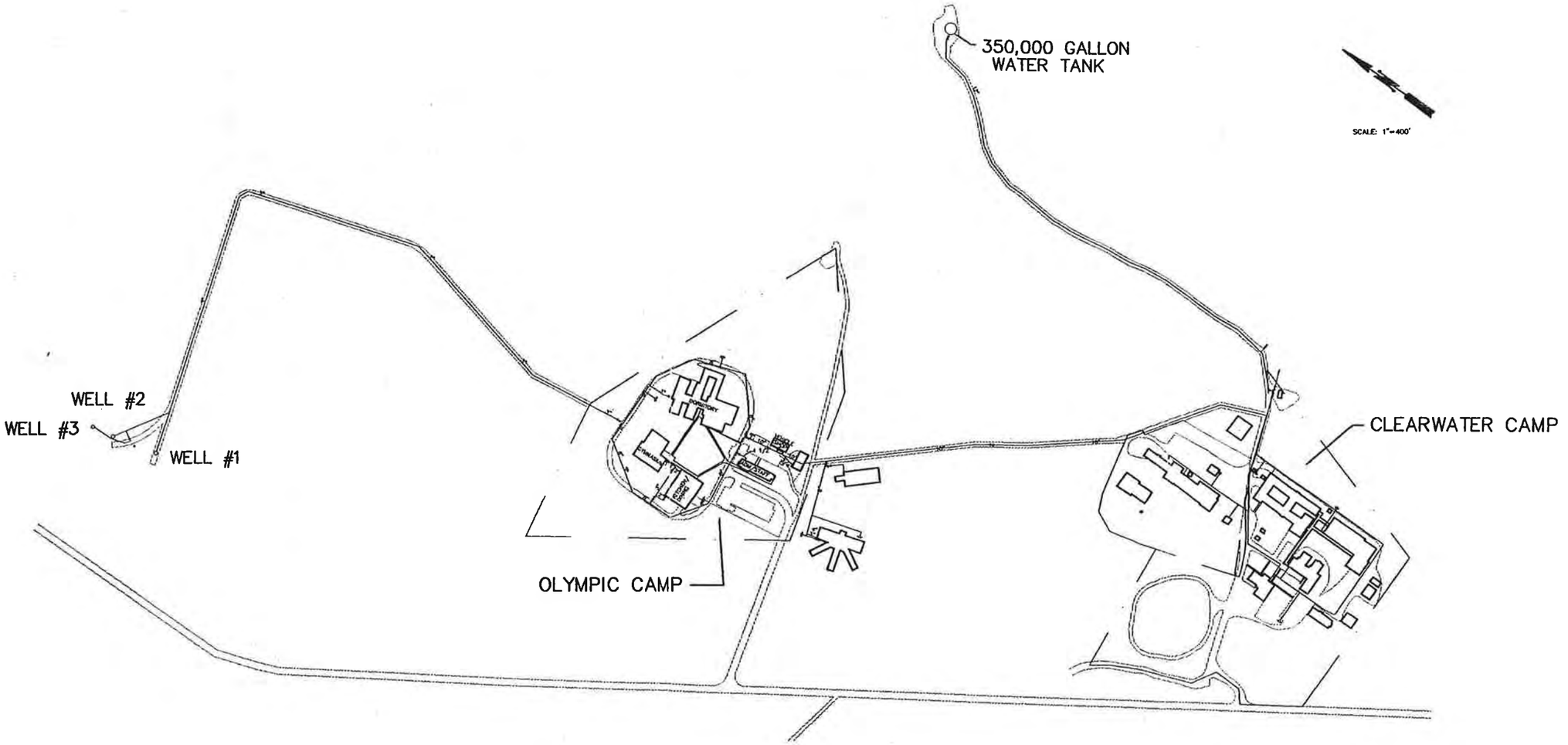
Olympic Corrections Center (OCC) is located in unincorporated, western Jefferson County on the Olympic peninsula in the Snahapish River valley. A site plan for the facility is provided as Figure 1. Currently, there are approximately 345 inmates and about 105 Department of Corrections staff and 30 Department of Natural Resources staff. Staff at OCC work eight hour shifts and there are no staff living on site. Total inmate and staff populations have fluctuated only slightly from month to month since the facility was expanded in 1991.

Olympic Corrections Center consists of two facilities. The Clearwater Camp was constructed in 1967 and is currently used by the DOC and Washington State Department of Natural Resources (DNR). It consists of a DNR shop, administration building, gymnasium, barracks, and a chapel. Approximately 1/4 mile to the north is the Olympic Camp which was built in 1980 and expanded in 1991. This facility consists of the Ozette dorm, gymnasium, cafeteria, administration building, shop area, warehouse, and the Hoh dorm. Both facilities are served by the same utilities, including a potable water system.

Gray & Osborne has previously prepared a Wellhead Protection Plan and a Report on Fireflow Testing for Olympic Corrections Center. The Wellhead Protection Plan, prepared in 1993, delineated wellhead protection zones for OCC's sources. The plan discussed emergency supply and spill response as well as an inventory of potential contamination sources in the various travel time boundaries.

The Report on Fireflow Testing was the result of some fireflow tests done on site at Olympic Corrections Center in 1993. The tests measured the ability of the distribution system to provide a fireflow of 3,500 gpm for three hours according to the Unified Fire Code (UFC) specifications. The report showed that hydrants at the Olympic Camp met fireflow while the hydrants at the Clearwater Camp provided fireflows of less than 1000 gpm at the time of the report. The report recommended system changes to remedy the fireflow deficiency.

According to Mike Ajax, Jefferson County Fire Marshall, the minimum industrial fireflow requirement in Jefferson County is 1000 gpm for 60 minutes while minimum fireflow for



DEPARTMENT OF CORRECTIONS
OLYMPIC\CLEARWATER CORRECTIONS CENTER
FIGURE 1
SITE PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\WR00C\W451813V...

multifamily dwellings is 750 gpm for 60 minutes. The building structures, as defined by the UFC, dictate the required fireflow.

For this report a fireflow of 1,500 gpm for 120 minutes is used. This value is the minimum required for sprinklered buildings under the U.F.C.

EXISTING WATER SYSTEM

Sources of Supply

Currently, OCC has two wells that are operating and a third that is being developed. Copies of the well reports for these wells are included in the Appendix.

Well no. 1 was drilled in 1980 to a depth of 76 feet. The water well report indicates that the casing is perforated from 65 feet to 75 feet. A surface seal of drill cuttings was placed to a depth of 18 feet. The static water level was 36.1 feet below the top of the well in August of 1980. Ground elevation in the vicinity of Well no. 1 is roughly 760 MSL. A bailer test at 102 gpm indicated a drawdown of 3.2 feet after 15 minutes.

Well no. 2 was completed in 1980 to depth of 80 feet. The water well report indicates that the casing is perforated from 67 feet to 77 feet. A surface seal of drill cuttings was installed to a depth of 18 feet. The static water level was 42.5 feet below the top of the well in July, 1980. Ground elevation in the vicinity of the wellhead is estimated at 760 MSL. A pump test on this well indicated an 11 foot 8 inch drawdown after 24 hours of 102 gpm pumping.

Well no. 3 was drilled in 1994. The well has not yet been developed, but is capable of producing 200 gpm according to a pump test.

Olympic Corrections Center has one existing water right certificate for ground water, G2-26035C, priority date of October 14, 1981. The certificate was issued to the Department of Natural Resources (DNR), and allows for the average annual withdrawal of 50 acre-feet (or a maximum withdrawal of 100 gpm) from wells 1 and 2. A copy of the certificate is included in the Appendix.

The wells are currently metered and the meters are recorded on a monthly basis. The water is disinfected by the injection of sodium hypochlorite after which the water is pumped through a 3" PVC line approximately 2800 feet to the OCC system.

Storage Reservoirs

OCC has one storage reservoir on its water system. A 375,000 gallon redwood reservoir was constructed above the Clearwater Camp in 1981. The reservoir rides on the system and has a float system to control inflow. The 40 foot diameter reservoir is 40 feet in

height and is located at an elevation of approximately 1000 feet while facility buildings are located between 800 and 960 feet.

Distribution System

Figure 2 illustrates the water distribution system at OCC. Water at OCC is pumped from the wells to the Olympic Camp through a 3" PVC line. The Olympic Camp is encircled by a 6" PVC line. Each of the buildings at the Olympic Camp have a PRV in their service line to reduce the building pressure.

A 10 " PVC water line connects the Olympic Camp with the Clearwater Camp. The line ties into a 12" PVC water line coming down the hill from the water tank. The 12" line flows into a PRV in a vault just above the Clearwater Camp. The distribution system at the Clearwater Camp consists of various lines of mostly 4", 6", and 8" PVC. An improvement project at the Clearwater Camp in 1994 installed an 8" line in the DNR shop area and a 6" loop around the rest of the compound.

HISTORICAL WATER PRODUCTION

Water production at the wells is metered and recorded on a monthly basis. Table 1 shows the annual production for the years 1989 through 1994, population and staff figures for that period, and a per capita use number. The water use values were calculated by using the meter readings for the beginning and end of the year.

TABLE 1

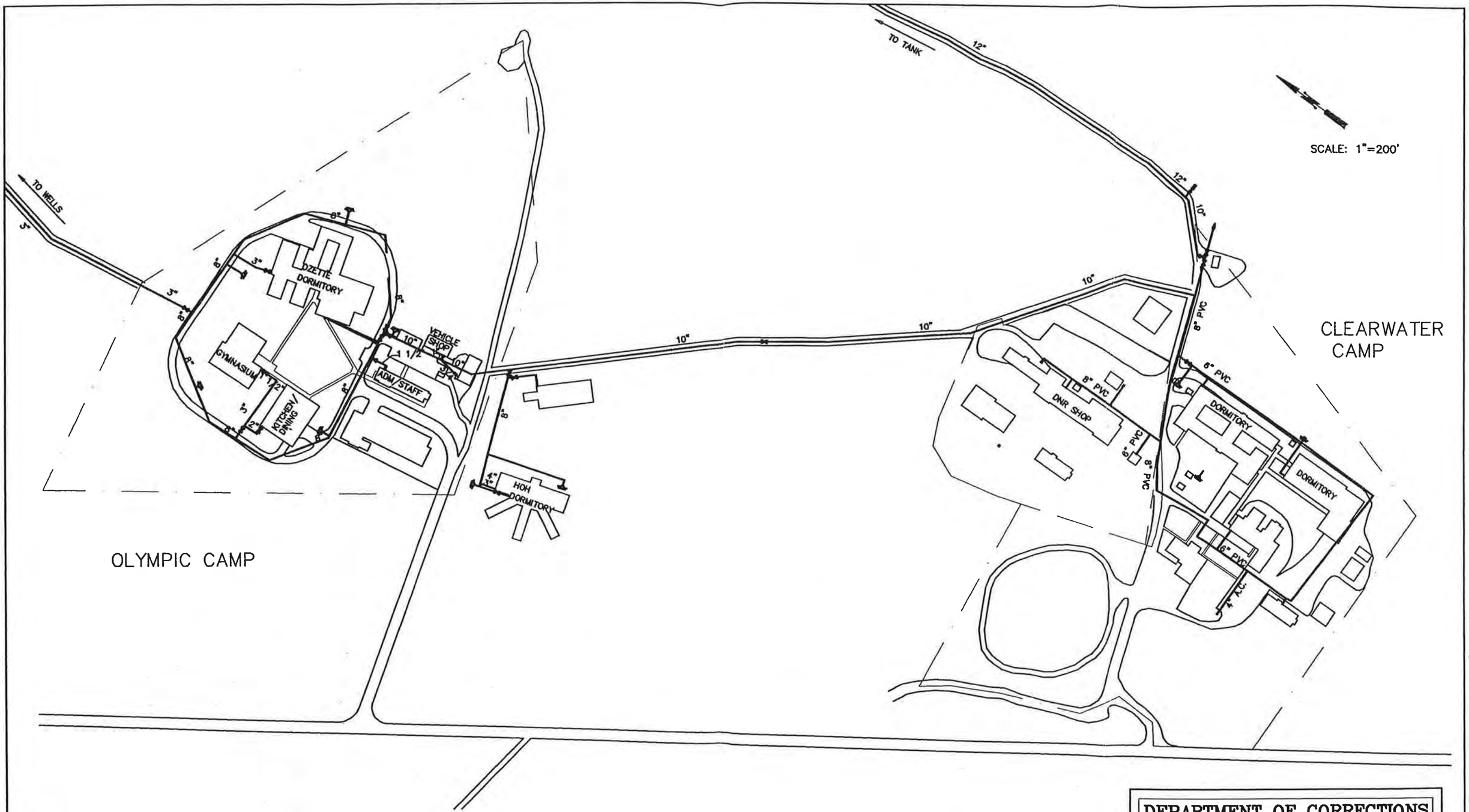
WATER USE AND POPULATION DATA

Year	Water Production (Gallons)	Water Right (Gallons)	Inmate Population	DOC Staff	DNR Staff	Per Capita Use (Gallons per Day)(1)
1989	19,140,000	16,290,000	236	78	30	193
1990	26,490,000	16,290,000	254	78	30	251
1991	28,420,000(2)	16,290,000	293	90	30	234
1992	28,420,000(2)	16,290,000	339	105	30	203
1993	35,700,000	16,290,000	344	105	30	251
1994	27,280,000	16,290,000	341	105	30	194
					Average	221

(1.) Based on water production/(inmate population + DOC staff/3 + DNR staff/3)

(2.) Values for 1991-1992 are a two year average calculated from meter readings for January 1991 and December 1992.

Table 1 indicates that water production has risen with the increase in population and has plateaued at a value of 26,000,000 - 28,000,000 gallons per year with the exception of 1993. The summer of 1993 was unusually wet throughout the Western United States and there was relatively little forest fire activity. Consequently, crews were not dispatched



DEPARTMENT OF CORRECTIONS

OLYMPIC/CLEARWATER CORRECTIONS CENTER

FIGURE 2

DISTRBUTION MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\WSDOC\94\FIG2

from OCC to fight forest fires so the summer population actually staying at the camp was higher than in other years.

The population at the facility was increased during 1991 and 1992 with the opening of the Hoh Dorm while the staff numbers also increased. The actual number of staff at the facility in 1991 is not known and was calculated by interpolating between the staff level prior to expansion and the final staff level of roughly 104 to 107 persons using a an inmate to staff ratio of 3.25:1. It was assumed that each staff member works an eight hour shift at the facility. There have also been approximately 30 employees at any given time at OCC who are employed by Washington State Department of Natural Resources.

In absence of specific data, it was assumed for the purposes of this plan that the peak day demand at OCC is approximately 150,250 gallons. This value was calculated by multiplying a 1.8 peaking factor to the average day value. The 1.8 peaking factor is an accepted number based on national averages (Metcalf & Eddy, *Wastewater Engineering*). The average day water production for the last three years was 83,500 gallons per day.

The per capita use numbers show a relatively high water use for Olympic Corrections Center. At other Department of Corrections' institutions, Gray & Osborne has observed average annual water production rates of 107 to 147 gallons per capita per day. Table 2 presents information on per capita water production at Indian Ridge Corrections Center (prior to its conversion to a youth facility), Pine Lodge Corrections Center, Larch Corrections Center, and Washington Corrections Center. Olympic Correction Center's production is much higher than the other institutions, even institutions of a similar nature such as Larch and Indian Ridge.

TABLE 2

PER CAPITA WATER PRODUCTION AT DEPARTMENT OF CORRECTIONS INSTITUTIONS

Institution	Equivalent Population (1)	Ave. Annual per Capita Use (gpcpd)
Pine Lodge Corrections Center	560	107
Indian Ridge Corrections Center	133	113
Larch Corrections Center	175	141
Washington Corrections Center	1,895	147
Olympic Corrections Center	376	221

1. Equivalent Population = Inmate Population + Staff/3

Olympic Corrections Center has drawn an average of 29,955,000 gallons per year or 92 acre feet from its well sources, an 84% exceedance of its water right. To stay within the

water right, per capita consumption at OCC needs to be below 118 gallons per capita per day. Olympic Corrections Center must apply for additional water rights or reduce per capita consumption to 118 gpcpd.

ANALYSIS OF EXISTING WATER FACILITIES

Sources of supply, storage, and distribution have been analyzed individually to estimate the maximum population that can be supported by the institution's water system. The maximum allowable water service population will be limited by the most stringent criteria. This analysis will provide an indication on where water conservation efforts can most effectively be applied.

Source Quantity

A common source for water system recommendations is the *Recommended Standards for Water Works*, commonly called the "10 State Standards." This resource suggests that groundwater derived water systems have (1) a minimum of 2 sources, (2) total source capacity should equal or exceed the peak day demand, and (3) with the largest source out of service, remaining source capacity should equal or exceed the average day demand. In *Sizing Guidelines*, the Washington State Department of Health recommends a minimum of two sources capable of meeting peak day demand. Olympic Corrections Center currently has two developed sources and one source under development to provide the suggested redundancy in sources.

The second test, that of total source capacity meeting or exceeding peak day demands, is calculated as follows. At OCC, only one pump can operate at a time making the maximum production 100 gallons per minute. Assuming a pump operates for 21 hours, allowing for some downtime and aquifer recharge, the maximum daily production is 126,000 gallons. This value is 24,250 gallons less than the calculated peak day described above.

A third well is currently being developed which has a rated capacity of 200 gpm. Upon final development, the limiting factor in source quantity will be the capacity of the pipeline from the wells to the facility's water system. The pipeline consists of 2800 feet of 3" PVC. The maximum flow through this section of line should be roughly 176 gpm providing a 21 hour peak day flow of 222,070 gallons per day.

The third source criteria requires that the system be able to meet average day demands with the largest pump out of service. Both wells currently on line can meet this criteria easily. Either well is capable of 100 gpm performance and, assuming 21 hours of pumping, can pump 126,000 gallons per day. This production is 28,000 gallons more than the daily average production in the peak year 1993. Assuming the per capita usage seen in Table 1 of 221 gpcpd, under this source criteria an additional 127 inmates could be housed at OCC.

Potable Water Storage

OCC currently has a 375,000 gallon redwood storage tank and is the process of constructing a concrete 440,000 gallon tank providing a total of 815,000 gallons of storage.

The "10 State Standards" determine storage adequacy by analyzing a system's ability to meet fireflow and provide standby storage. Fireflow storage is defined as the required fireflow multiplied by the duration. Standby storage can be considered one day average use.

- As mentioned previously fireflow standards suggest 1500 gpm for

  Fireflow storage = 1500 gpm X 120 minutes
  = 180,000 gallons

- Standby storage equals average day use, or 83,500 gallons.

The total required storage for OCC is about 263,500 gallons. Assuming no changes in the required fireflow, the number of additional persons the storage facility can support, based on additional equalization storage and peak day requirements, is 714 inmates and 283 staff.

Distribution System

Tests were conducted at OCC in 1993 to determine available fireflow at the two facilities. Two hydrants were tested at each facility. The two hydrants at the Olympic Camp, one by the Hoh dorm and one by the Ozette dorm, had fireflow capabilities of 3,603 and 3,594 gpm, respectively, with residual pressures of 90 psi and 88 psi, respectively. These values indicate a flow of more than 2500 gpm in excess of the fireflow requirement delivered at 30 psi, the minimum pressure for domestic use. This value for the flow in the Olympic Camp is roughly 10 times the peak hour flow for the entire institution and suggests the Olympic Camp could house roughly 10 times the number of current inmates, based on the distribution system.

Two hydrants, one near the gym and one near building #3, were tested at the Clearwater Camp. The results of these test showed a fireflow of 875 gpm and 625 gpm, respectively, with residual pressures of 69 psi and 28 psi, respectively. The distribution system at the Clearwater camp at that time was composed mostly of unlooped 4' PVC pipe. A loop around the Clearwater Camp was constructed in 1994 with 6" PVC.

Summary

Source quantity, storage, and distribution were analyzed to determine the maximum population that could be supported by the OCC water system. Currently, future expansion

at the facility is limited by the water right. Without an increase in water right or a substantial decrease in per capita use, expansion of the facilities will be prohibited by State or county regulatory agencies. The results of the analyses are given in Table 3.

TABLE 3

ANALYSIS OF EXISTING SYSTEM FACILITIES

(Current Population 341 Inmates/135 DOC and DNR Staff)

Categories	Existing Requirement	Existing System Capability	Maximum Water Service Population
Source Quantity (As is)			
Average Day	83,500 gal	126,000 gal	515 inmates/204 staff
Peak Day	150,250 gal	126,000 gal	no increase
Source Quantity (w/ Well 3 Development)			
Average Day	83,500 gal	126,000 gal	515 inmates/204 staff
Peak Day	150,250 gal	222,070 gal	504 inmates/200 staff
Storage (w/new tank)	263,500 gal	815,000 gal	*
Distribution	230 gpm	2500 gpm	**

* *The excess storage capacity available is not a limiting factor for growth.*

** *The excess capacity available in the distribution system at the Olympic Camp is large enough that this system at that facility is not a limiting factor for growth.*

DATA COLLECTION REQUIREMENTS FOR WATER CONSERVATION

Guidance published in the Conservation Planning Requirements stipulates that water systems should gather and report specific items of information. Table 4 indicates the information requested for systems under 1,000 direct service connections such as OCC.

TABLE 4

DATA COLLECTION REQUIREMENTS FOR WATER SYSTEMS WITH LESS THAN 1,000 DIRECT SERVICE CONNECTIONS

Type of Data	Frequency of Collection	Remarks
Source of Supply Meter Readings	Annually and Monthly	Separate meters req'd for each well.
Unaccounted for Water (1)	Annually	Can't presently determine.
Service Population and # of Connections	Annually	Information is available.
Conservation Actions	Annually	Not presently recorded.
Service Meter Readings	Monthly	No meters presently installed.

(1) Water that is lost due to leaks, evaporation, or unrecorded usage.

OCC collects a portion of the data listed in Table 4. Information on service population and number of service connections is readily available. Total source production is recorded on a monthly basis. Service meter usage and unaccounted for water cannot be determined because service meters are not installed on each service line. Finally, to date, OCC has not maintained a program specifically directed at water conservation and therefore, has not recorded conservation actions. Measures to ensure full compliance with the requirements in Table 4 are discussed in the following section.

PROGRAM FOR WATER CONSERVATION

The goal of the water conservation plan for Olympic Corrections Center is to more efficiently use water resulting in a lower per capita water use. Additional water rights will likely be contingent upon reducing per capita use. Some of the suggestions contained in this plan are requirements for water conservation plans set forth in *Conservation Planning Requirements* published jointly by Washington State Departments of Health and Ecology. The plan outlines specific strategies and indicates the estimated water savings where appropriate.

Source Meters

Source meters are required for all systems requesting new water rights. Olympic Corrections Center meets this requirements by having meters on Wells 1 and 2 which are

currently used for production. The meters are read monthly and records of the production are kept.

If not having done so already, Olympic Corrections Center should have the meters tested for accuracy. Meter maintenance is important for obtaining accurate results from meter measurements. Large source meters should be tested every 3 to 5 years.

Service Meters

Olympic Corrections Center does not currently meter any services. Installation of meters, either temporary or permanent, at building services would allow for pinpointing of large users and also provide a comparison of meter data from which an assessment of water lost through leakage can be obtained.

Service meters are smaller than source meters and are generally less expensive. A positive displacement style meter is capable of accurately measuring a wide range of flows and is the meter of choice for individual services. Service should be sized according to the data in Table 5 below.

TABLE 5

SERVICE METERS
(POSITIVE DISPLACEMENT STYLE)

Meter Size	Normal Flow Range (gpm)	Rated Continuous Flow (gpm)	Meter Cost (1)
5/8-inch	1 - 20	10	$55
3/4-inch	2 - 30	15	$80
1 - inch	3 - 50	25	$150
1.5-inch	5 - 100	50	$350
2-inch	8 - 160	80	$575

Notes:
(1) Includes cost of shipment to job site.

Where possible, meters should be installed indoors for ease of reading and maintenance. Materials costs for concrete meter boxes with concrete covers and hinged lids range from $40 to $80 (including shipment to job site). Meter setters are approximately $75 for a 5/8-inch size, $115 for a 1-inch, and $400 for a 1.5-inch assuming a 12-inch setter height (includes shipment to the job site). Installation details and catalog cuts for the service

meters, meter boxes, and meter setters are in the Appendix. It is assumed that the service meters will be installed by Olympic Corrections Center personnel. There are roughly 11 service lines at the Clearwater Camp and 9 or 10 at the Olympic Camp. The total cost to install service meters should no exceed $10,000. It is recommended that the service meters be installed no later than 1996. Service meters can indirectly impact water production by allowing OCC to track water usage at each facility. Those with higher usages can be targeted for conservation actions.

Previously, Table 4 indicated that service meter readings should be read and recorded monthly. At least annually, the institution should determine the quantity of unaccounted for water by comparing water production records with service meter records. It is recommended that OCC determine unaccounted for water on a monthly basis to provide quick detection of leaks or meter malfunction.

Leak Detection

If it is discovered after the service meters have been installed that there is a great discrepancy between the source and service meter data a leak detection program should be adopted. Leaks are not expected to be a major problem at the Olympic Camp due to its relatively new construction. Portions of the Clearwater Camp have also been replaced very recently and are not expected to be leaking. However, if unaccounted for water proves to be high, leaks in the distribution system must not be overlooked. If a discrepancy greater than 10% between source and service meters is determined, a leak detection program should be implemented.

Program Publicity

According to *Conservation Planning Guidelines*, public publicity is a required part of a water conservation plan. For typical public water systems, publicizing the need for water conservation efforts has proven to be effective for both short and long term reductions in water usage. The impact at correctional institutions has not been documented. Beginning in 1995, it is recommended that OCC adopt the following methods for publicizing the conservation program, using materials readily available through the DOH:

- Display posters at selected locations.
- Periodic reminders to staff and inmates by OCC managers.

Table 4, Data Collection Requirements, indicated that water conservation activities should be recorded annually. Actions taken to publicize conservation should also be recorded.

Low Flow Showerheads

Standard showerheads use 3-8 gpm while low flow showerheads use 1 - 2.5 gpm. Recent design changes have produced showerheads which provide a better stream than the original flow restricting showerheads and are better accepted by users.

OCC has installed relatively low flow (2.75 gpm) showerheads in, at least, some of its showers. The Hoh dormitory was fitted with such showerheads when it was constructed. A brief inspection by Gray & Osborne staff in June 1995 revealed that roughly half of the showerheads in the two locations investigated had showerheads that had been tampered with. Inmates had removed the center portion of the showerhead which controls the flow, rendering the showerheads useless for conservation.

It is recommended that periodic inspections of showerheads be done by OCC staff and low flow showerheads be installed in all locations where they don't exist or have been tampered with. An estimated 2300 gallons per day is lost through the broken showerheads assuming each inmate showers for 6 minutes and a 5 gpm stream comes through the broken showerheads. OCC should even consider using 1 gpm shower heads to obtain a greater water savings. Assuming each inmate showers once daily for 6 minutes, a 3500 gpd savings could be achieved over the use of 2.75 gpm showerheads.

If inmate vandalism continues to be a problem another conservation that could be implemented is a shower timer. Timers would limit the duration of the inmate's showers, thus promoting water conservation.

Low flow showerheads are inexpensive. Installation is a simple matter of removing the old showerhead and screwing on the low flow showerhead. Material costs for each showerhead are estimated at less than $25. Showerheads should be of sufficient quality to provide an adequate spray pattern so as to reduce inmate dissatisfaction and vandalism.

Low Flush Toilets

Standard toilets use 3.5 to 7 gallons per flush while low flush toilets use 1.6 to 3.5 gallons per flush. An inspection by Gray & Osborne revealed that some flush toilets using 3.3 gallons per flush are installed at the facility. It is recommended that OCC personnel inspect all toilets at the facility and retrofit the toilets with conservation devices where necessary. Toilet bags or bottles can be placed in the toilet tanks to reduce the amount of water used during each flush. These devices can save roughly 1/2 gallon per flush. Assuming 376 equivalent population using the toilet 3 times daily a savings of roughly 550 gallons is realized. Toilets can be retrofitted with toilet bags for roughly $1 each.

Toilets should also be inspected periodically for leaky flapper valves. Dye should be placed in the toilet tank and the toilet allowed to remain unflushed overnight. If dye is apparent in the toilet bowl the flapper valve is leaky and should be replaced. The City of Everett estimated that in household situations a leaking flapper valve can waste as much as 20 gallons per capita per day. New flapper valves and leak detection dye are available for less than $5.

A toilet water conservation program at OCC could be implemented where toilets could be fitted with reservoir devices and tested for leaks for a cost of less than $500. Depending on the number of leaky toilets a water savings of 500 to 1000 gallons would result.

Kitchen Condensing Unit

Currently, the OCC kitchen has a cooling condensing unit which is linked to the potable water system. The unit uses water for cooling and wastes it to drain. OCC personnel have estimated that the unit uses 1500 gallons daily. Replacement of the unit with a closed system would result in a significant water savings.

Water Reuse

As water conservation issues become more important there is an increased interest in the use of reclaimed wastewater for nonpotable uses. OCC currently treats its wastewater at an aerated lagoon facility. The lagoon effluent is sand filtered, UV treated, and released into the Snahapish River. During periods of low stream flow the effluent is sprayed on a 17 acre forested sprayfield.

The Washington State Department of Health has issued standards for water reuse in which reclaimed water is classified and its uses regulated. The highest class, Class A, is wastewater the has been oxidized, coagulated, filtered, and disinfected with a median coliform count of 2.2 cells/100 ml. The highest class attainable by the present OCC system is Class B, defined as having a median coliform level of 2.2 cells/100 ml from a system without coagulation. Class C and Class D waters are defined as having median values of 23 cells/100 ml and 240 cells/100 ml, respectively.

Water reuse for toilets, landscape irrigation in publicly accessible areas, fire hydrants and sprinklers, and spray washing of streets all require Class A reclaimed water and may be applicable depending upon cell count testing for OCC. Vehicle washdown water is not specifically addressed in the current regulations.

Any water reuse at Olympic or Clearwater Camps would require significant infrastructure improvements. Pumping facilities, storage (either a holding pond or tank), at least 2000 feet of transmission line, and a distribution system to points of use could be constructed, but most probably are not cost effective.

There is some possible water reuse at the wastewater treatment facility. Currently, treated, filtered water is reused to backwash the sand filter but potable water is used for all other applications. The amount of potable water used at the Waste Treatment Plant is not known since the facility is unmetered. Filtered water could be used for outdoor pressure washing of the lagoon apron, washdown of buildings and equipment, and possibly for watering plants in the greenhouse.

Spray washing where misting is possible requires at least Class A reclaimed water. To reuse water, OCC would have to ensure that the wastewater plant was operating effectively enough to maintain Class A effluent.

The reuse of water for washdown at the wastewater plant would require a nonpotable system. Such systems generally consist of a set of pumps, a pressure tank, and distribution piping. At the OCC facility, a tank or pond would need to be installed after the UV disinfection to provide a place to install the pumps. A system composed of a 1,000 gallon pumping tank, two 5 H.P. pumps, and a 400 gallon pressure tank would provide a 50 gallon per minute flow at 30 to 70 psi. A system such as this would cost approximately $25,000.

Other Measures

Increased awareness of water conservation by OCC staff can also produce results. Periodic inspections of the facility can reveal sources of wasted water such as drinking fountains and hose bibs left on, leaky valves, and leaky faucets. An inspection by Gray & Osborne personnel in February 1995 revealed a continuous flow of water at the Hoh dormitory boot wash station. The flow was estimated to be 2 gpm which translates to 2900 gallons per day or 8.5 gallons per capita per day. It is important to locate and remedy all such water losses.

SUMMARY AND RECOMMENDATIONS

Summary

Olympic Corrections Center currently operates two wells which produce 100 gallons per minute and are developing a well capable of 200 gallons per minute. Water is currently stored in a 375,000 gallon reservoir and is distributed in PVC mains throughout the institution. A second 440,000 gallon reservoir is under construction. The distribution at the Olympic Camp is known to be able to deliver over 2500 gpm at 30 psi.

OCC currently has roughly 340 inmates and 105 DOC staff and 30 DNR staff. Water production data from the last three years indicates an annual average day water production of roughly 83,500 gallons. Assuming 8 hour staff shifts, per capita water production averaged 221 gallons per person. This figure is much higher than expected compared with other DOC facilities.

Currently, OCC has a water right for 50 acre feet but is using 92 acre feet yearly, an 84% exceedance over their right. Any further growth at the institution will come only through conservation or increased water rights.

Recommendations

The following items concerning water conservation and water rights are recommended at OCC:

1. OCC is currently out of compliance with respect to their water right. OCC should apply for additional water rights.

2. OCC should install low flow showerheads in locations where there are none or existing ones have been disabled. OCC personnel should also implement a toilet conservation plan whereby reservoir devices are installed in toilet reservoirs and flapper valves are checked for leakiness.

3. OCC personnel should periodically inspect the facility for water wasting situations such as leaks, or open faucets.

4. The condensing unit at the kitchen should be replaced with a closed system, resulting in a water savings.

5. OCC should install service meters to monitor water use at each building. Service meters will aid in the detection of system leaks.

6. OCC should publicize the need for water conservation through the use of posters and handouts given to staff.

7. After installing a service meter to determine potable water use at the wastewater treatment plant, OCC should determine the amount of potable water used at that facility and the cost effectiveness of installing a water reuse system for washdown and other uses.

A summary of the conservation plan including costs and expected water savings is given in Table 6.

TABLE 6

SUMMARY OF CONSERVATION EFFORTS

Conservation Action	Estimated Cost	Estimated Daily Water Savings	Estimated Per Capita Savings
Service Meters (1)	$10,000	NA	NA
Low flow showerheads	$500	5800 gal/day	15.4 gal/day
Toilet retrofit	$600	600 gal/day	1.7 gal/day
Kitchen condenser (2)	NA	1500 gal/day	4 gal/day
Publicity	$100	100 gal/day	0.3 gal/day
Leak Testing (3)	NA	NA	NA
Water Reuse	$25,000	NA	NA
Staff inspection	$0	4000 gal/day	10.6 gal/day
Totals	$36,200	11,400 gal/day	32 gal/day

(1) Service meters will not directly affect water consumption. However, their installation will enable a greater understanding of water use and aid in the detection of possible leaks.

(2) The kitchen condenser unit is currently slated for replacement.

(3) Leak detection could be accomplished through either pressure testing or source and service meter data if available.

If the water conservation recommendations are implemented by OCC the per capita daily water use will decrease from 221 gpcpd to 189 gpcpd, a reduction of 14%.

After implementing a Water Conservation Plan, it is recommended that Olympic Corrections Center apply for an increased water right. This water right would allow both expected use and future expansion.

APPENDIX

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
October 14, 1981	G 2-26035	G 2-26035 P	G 2-26035 C

NAME
CLEARWATER/OLYMPIC CORRECTION CENTER FOR WASH. STATE DEPT. OF NATURAL RESOURCES

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
Star Route 1, Box 2500	Forks	Washington	98331

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	100	50.0

QUANTITY, TYPE OF USE, PERIOD OF USE		
50 acre-feet per year	community domestic supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
800 feet North and 100 feet East of Southwest Corner of Section 28 and 1000 feet North and 100 feet West of Southeast Corner of Section 29 within the SW¼SW¼ of Section 28 and SE¼SE¼ of Section 29.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
		26	11 W.	21	Jefferson

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

13 acres more or less, state forest land situated in the north half of the northwest quarter of Sec. 33, T. 26 N., R. 11 W.W.M., Jefferson County, Washington.

PROVISIONS

The access port shall be maintained at all times on the well (s).

At such time that the Department of Ecology determines the regulation and management of the subject waters is necessary and in the public interest, an approved measuring device shall be installed and maintained in accordance with RCW 90.03.360 and WAC 508-64-020 through WAC 508-64-040.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia *Washington, this* 5th *day of* September, 19 85

ANDREA BEATTY RIDDER, Director
Department of Ecology

by Clark Haberman
Clark Haberman, Regional Manager

ENGINEERING DATA
OK RLC

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☑ Surface Water — issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917 and amendments thereto, and the rules and regulations of the Department of Ecology.

☐ Ground Water — issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
S 2-20683 C	S 2-20683 P	S 2-25623	January 4, 1973

NAME
WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES

ADDRESS — CITY — STATE — ZIP CODE
Public Lands Building — Olympia, — Washington — 98504

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown

PUBLIC WATER TO BE APPROPRIATED

SOURCE
an unnamed stream

TRIBUTARY OF (IF SURFACE WATER)
Snohomish River

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
0.25		15

QUANTITY, TYPE OF USE, PERIOD OF USE

0.25 cfs: 8 acre-feet per year	domestic supply	continuously
4 acre-feet per year	irrigation of 2 acres	May 1 to October 1 each year
3 acre-feet per year	fire protection	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

~~south 60°11'24" east 2011 feet from northwest corner of Sec. 33~~

LOT, BLOCK & TRACT OR SUBDIVISION	SECTION	TOWNSHIP N.	RANGE E. OR W.	W.M.	COUNTY
	33	26	11 E	21	Jefferson

RECORDED PLATTED PROPERTY

LOT	BLOCK	NAME OF PLAT OR ADDITION

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Beginning at a point in the S[illegible], Sec. 33, T. 26 N., R. 11 W.W.M. which is south 32°54'06" east 2762.66 feet from the northwest corner thereof, running thence south 14°east 600.0 feet; thence north 76° east 800.0 feet; thence north 14°east 800.0 feet; thence south 76° west 800.0 feet to the point of beginning, referred to as Clearwater Honor Camp.

FAX STAMP
TO: Ros Porter
PAGES + COVER 2
FROM: Steve Witter - DOE
360-407-0283

CERTIFICATE

03/16/95 01:25

PROVISIONS

Nothing in this certificate shall be construed as excusing the certificatee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971..

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180

Given under my hand and the seal of this office at Olympia, Washington, this .... 8th .... *day* of .. November , 19

JOHN A. BIGGS, *Director*
Department of Ecology

ENGINEERING DATA
OK

by ....
R. JERRY BOLLEN, Assistant Director

FOR COUNTY USE ONLY

TO: ROQUE EDUARDO DOC-MB-CP-ERD 15-Jun-95 14:52:46
CAPITAL PROGRAMS
410 WEST 5TH
OLYMPIA WA 98504-1100

FROM: SULLIVAN GERALD DOC-DP-M1-GS6 15-Jun-95 14:33:08
OLYMPIC CORR. CENTER
11235 HOH MAINLINE
FORKS WA 98331-0000

SUBJECT: COOLING WATER IN THE KITC DOC-MB-CP-ERD/MA#5842462

To: SULLIVAN GERALD DOC-DP-M1-GS6
From: ROQUE EDUARDO DOC-MB-CP-ERD
Date: Thursday 15-Jun-95 at 1:47pm
Subject: COOLING WATER IN THE KITCHEN

Jerry, Please let me know what is the quantity of cooling water used in the kitchen. I am refering to condenser cooling water for the kitchenfreezers and coolers. If you can provide me in terms of GPM or GPD or any unit.

..... Message amended by: DOC-DP-M1-GS6 SULLIVAN GERALD
on: Thu 15-Jun-95 at: 2:33pm

Ed - It looks like about 1500 GPD.

..... Routed on: Thu 15-Jun-95 at: 2:33pm .....
From: DOC-DP-M1-GS6 SULLIVAN GERALD
To: DOC-MB-CP-ERD ROQUE EDUARDO

---

* * End of Message * * Printed on 15-Jun-95 at 14:52:47 MA# 5842462

ATTN. Ross Porter & Gray OSBORNE

Post-it® Fax Note 7671	Date 6/19/95	# of pages ▶
To ROSS Porter	From ED ROQUE	
Co./Dept.	Co. DOC	
Phone #	Phone # 753-1503	
Fax #	Fax #	

#1

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No. 82-26385

(1) OWNER: Name STATE OF WASHINGTON Address DEPARTMENT OF CORRECTIONS

(2) LOCATION OF WELL: County JEFFERSON — SE ¼ SE ¼ Sec 29 T. 26 N. R. 11W W.M.

Bearing and distance from section or subdivision corner 1000' N & 50' W of SE COR 29

(3) PROPOSED USE: INST Domestic [X] Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) WELL D
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 76 ft. Depth of completed well 75 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 65 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [ ] " Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [X] No [ ]
Manufacturer's Name JOHNSON
Type SS Model No.
Diam. 8T Slot size 100 from 65 ft. to 75 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal DRILL CUTTINGS
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 36.1 ft. below top of well Date 8/14/80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [X] No [ ] If yes, by whom?
Yield: 102 gal./min. with 3.2 ft. drawdown after ½ 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
Est T = 21,000					

Date of test 8/14/80
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [X] No [ ]

(10) WELL LOG: 26/11W-29R

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
GRAVEL FILL	0	2
BROWN CLAY W/SAND & GRAVEL	2	11
GRAY GRITTY SANDY CLAY	11	60
SAND & GRAVEL, BROWN	60	75
BROWN CLAY	75	76

Log prepared by
ROBINSON & NOBLE, INC.
8/2/85

J. B. Noble

AUG 16 '85 PM 0:30

Work started 8/11 19 80 Completed 8/14 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME STOICAN DRILLING
(Person, firm, or corporation) (Type or print)

Address Stoican Drilling Co Inc

[Signed] P.O. Box 161 Sequim, Wash 98382
(Well Driller)
HAROLD MILLER

License No. 0343 Date 8-15, 19 85

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

#2

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No
Permit No 62-26035

(1) OWNER: Name STATE OF WASHINGTON Address DEPT OF CORRECTIONS

(2) LOCATION OF WELL: County JEFFERSON — SW ¼ SW ¼ Sec 28 T 26 N., R 11W W.M.

Bearing and distance from section or subdivision corner 800' N & 50' E of SW COR 28

(3) PROPOSED USE: Domestic [X] Inst. Industrial [ ] Municipal [ ] Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) Well C
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 80 ft. Depth of completed well 77 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 67 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [ ] " Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [X] No [ ]
Manufacturer's Name JOHNSON
Type SS Model No.
Diam. 8" Slot size 100 from 67 ft. to 77 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal DRILL CUTTINGS
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 42.5 ft. below top of well Date 7/29/80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [X] No [ ] If yes, by whom?
Yield: 102 gal./min. with 11-8 ft. drawdown after 24 hrs.
T = 18,000 on recovery

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.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) WELL LOG: 26/11W - 28N

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
SAND-GRAVEL ARTIFICIAL FILL	0	5
BLUISH-GRAY GRITTY CLAY, FEW PEBBLES	5	49
SAME, BROWNISH GRAY	49	65
SAND & GRAVEL	65	78
BROWN CLAY	78	80

Log prepared by
ROBINSON & NOBLE, INC.
8/2/85
J B Noble

'85 AUG 16 PM 30

Work started 7/28 19 80 Completed 7/30 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME STOICAN DRILLING (Person, firm, or corporation) (Type or print)

Address P.O. Box 161 Sequim, Wash 98382

[Signed] Valier Stoican Secretary Li # 0473 (Well Driller)
Harold Miller

License No. 0343 Date 8-15, 19 85

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050 1-20

Washington Corrections Center

Water Conservation Plan Update

Washington Corrections Center
Shelton, Washington

January 2003

Prepared for:

Washington State Department of Corrections

Prepared by:

Economic and Engineering Services, Inc.
626 Columbia Street NW, Suite 2-A
Olympia, WA 98501
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Acknowledgements

An undertaking of this magnitude is not possible without the efforts of numerous individuals and groups. Economic and Engineering Services, Inc. would like to pay particular tribute to the following individuals, agencies, and companies:

- Washington Corrections Center Staff (of which the following were most instrumental in this effort):
  - Dwight Johnson
  - Larry Lauzon
  - George Campbell
  - Dan Waters
  - Roy Ebert
- Moya McKeehan, Department of Corrections
- Linda Glasier, Department of Corrections
- Western State Design Staff
- Utility Services Associates Staff
- Members of the Department of Health

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Executive Summary

Background and Objectives

This water conservation plan serves as an update to the 1997 Draft Water Conservation Plan (1997 Plan) developed for the Washington Corrections Center (WCC), located in Mason County, near the City of Shelton. The 2003 Water Conservation Plan Update (2003 Plan) identifies and evaluates means of improving the efficiency of water use at the facility, building upon findings and recommendations presented in the 1997 Plan. Through increased water use efficiency, the WCC hopes to achieve the following objectives:

- Remain within limitations imposed by the facility's water rights;
- Avoid the need to obtain additional water supplies;
- Foster good management practices and environmental stewardship.

Water Usage

Metering data from the facility's production wells indicates that the WCC used a total of 76,943,900 gallons in year 2001. This is equivalent to approximately 210,800 gallons per day (gpd) on a year-round average daily basis, and is within the facility's water rights of 268 acre-feet per year (equivalent to 239,072 gpd on an average daily basis). An estimated breakdown of water uses at the facility is presented in Exhibit ES-1.

The largest individual uses are:

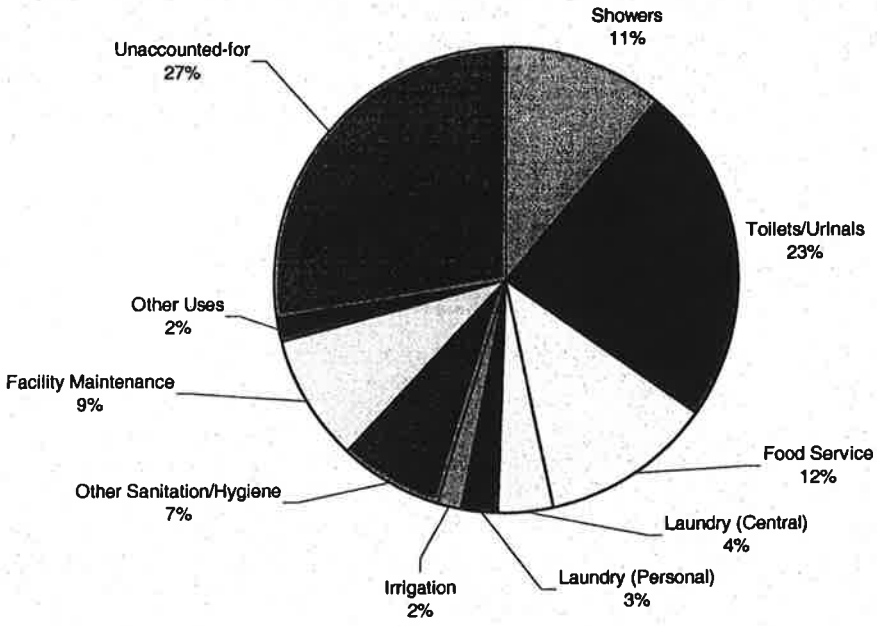
- Toilets/Urinals 23 percent (49,740 gpd)
- Food Service 12 percent (25,000 gpd)
- Showers 11 percent (23,400 gpd)
- Unaccounted-for 27 percent (58,200 gpd)

Approximately 27 percent of the facility's total production is "unaccounted-for". This is likely due in part to the high uncertainties involved in the usage estimates, a result of the lack of service meters to accurately record water consumption. However, it is also suspected that a large portion of this water is lost to leakage in yard hydrant lines.

Water Conservation Opportunities

The water conservation measures described in the 2003 Plan include activities already implemented by the facility, those that are currently under detailed analysis in separate studies concurrent to this effort, and additional measures that are feasible for the facility. A summary of all the water conservation measures applicable to the WCC is presented in Table ES-1.

Exhibit ES-1
Estimated Water Usage by Category for 2001
(as percentages of total production)



Recommendations

The WCC has been active in water conservation over the past five years. Due to their effectiveness in reducing recent water demands, it is recommended that the facility continue to implement all measures that have been exercised prior to the development of the 2003 Plan, as depicted in Table ES-1. The facility has also recently implemented additional activities and projects that will result in reduced water consumption. Once these measures have been fully implemented, it is recommended that Washington Department of Corrections (DOC) take the following steps to further the WCC conservation program:

- ***Monitor the effect of existing conservation activities.*** As discussed in Section 3.1, a project is currently underway that involves the installation of service meters at most buildings. By systematically monitoring water use as measured by these meters, in conjunction with tracking well production as measured by the facility's source meters, facility staff should be able to observe the effects of conservation activities recently implemented. This will guide the facility in determining what additional measures would be beneficial in striving to meet the conservation program objectives.

- ***Further evaluate the opportunity to increase well withdrawals via wastewater reclamation.*** This activity is noted in Table ES-1 as "Wastewater Reuse". As discussed in detail in Section 6.5, there is a potential for WCC to increase its water supply by as much as approximately 60 percent, by being permitted to withdraw water that recharges the ground water aquifer via surface percolation from the facility's wastewater effluent sprayfield. Although such withdrawals would be made via the existing wells, the withdrawals could be considered as separate and distinct from the amount of withdrawal allowed under the water rights associated with the wells. In order for this to occur, DOC must take certain steps, in coordination and consultation with the Washington Department of Ecology. Upgrades to the existing wastewater treatment plant are required in order for the facility to be permitted as a wastewater reclamation facility, and a hydrogeologic study is needed to confirm that the reclaimed water is recharging the same aquifer from which WCC withdraws its water supply. Pending the outcome of this process, WCC could obtain the right to significantly increase its water supply from the existing wells.
- ***Depending upon the outcome of the above activities, further consider additional conservation measures.*** Aside from wastewater reuse, there are other water conservation measures recommended for further consideration, as listed in Table ES-1. These activities should be evaluated in greater detail if the facility is not able to meet its conservation program objectives via existing measures and those activities described above.

Table ES-1
Water Conservation Opportunities

Description	Category [1]	Water Savings (as percentage of total consumption) [2]	Notes
Measures Implemented Prior to the 2003 Water Conservation Plan Update			
Reduce Irrigation – Allow Turf to go Dormant in Summer	O&M	5%	
Reduce Showering Times and Frequencies	O&M	7.5%	
Optimize Central Laundry Practices	O&M	Not Quantifiable Based on Year 2000 Data	
Optimize Vehicle Washing Practices	O&M	Not Quantifiable Based on Year 2000 Data	
Install High-Efficiency Cooling Systems	C	15%	
Find and Repair Plumbing Leaks Inside Buildings	O&M	Not Quantifiable Based on Year 2000 Data	
Install High-Efficiency Showerheads	C	Not Quantifiable Based on Year 2000 Data	
Measures Implemented During Development of the 2003 Water Conservation Plan Update[3]			
Water Use Efficiency in Central Laundry	C	2%	In Design
Wastewater Treatment Plant Effluent for Washdown	C	4.5%	In Design
Replace Personal Washing Machines with High-Efficiency Models	C	0.9%	Being Implemented
Repair Hydrant Line Leaks	C	10%	In Design
Distribution System Leak Detection[6]	C	2%	Completed
Measures Recommended for Future Consideration			
Wastewater Reuse	C	20-60%[4]	
Replace Toilets with High-Efficiency Models	C	NA[5]	
Composting of Food Waste	C	1%	Under Study
Optimize Kitchen Uses of Water	O&M	1.2%	
Install Automated Shower Timers	C	1.1%	

Footnotes:
(1) O&M = Operations & Maintenance Practices; C = Capital Projects/Plumbing Fixtures
(2) For measures already implemented, percentage water savings are based upon year 2000 total production, as most measures were implemented at the end of that year and during 2001. For all other measures, percentage water savings are based upon year 2001 total production, as measures would have an effect on future demands.
(3) This water conservation plan was developed from August 2002 - January 2003. During that time, these conservation activities were initiated.
(4) These percentages indicate the potential amount of additional water allowed to be withdrawn from the facility's wells if the wastewater treatment plant is permitted as a reclamation facility and it is verified that the reclaimed water recharges the same aquifer from which WCC withdraws its water supply. See Section 6.5 for details.
(5) Not calculated in this analysis.
(6) This project included the identification and remedy of leaking check valves at Well Nos. 2 an 4.

Section 1
Background and Objectives

Economic and Engineering Services, Inc. (EES) has developed this water conservation plan as an update to the 1997 Draft Water Conservation Plan (1997 Plan) developed for the Washington Corrections Center (WCC), located in Mason County, near the City of Shelton. The facility is owned and operated by the Washington Department of Corrections (DOC).

The 2003 Water Conservation Plan Update (2003 Plan) identifies and evaluates means of improving the efficiency of water use at the facility, building upon findings and recommendations presented in the 1997 Plan. Through increased water use efficiency, the WCC hopes to achieve the following objectives:

- Remain within limitations imposed by the facility's water rights;
- Avoid the need to obtain additional water supplies;
- Foster good management practices and environmental stewardship.

Research efforts related to this update included a site walkthrough, interviews with on-site personnel, and review of water production data from source meters. The site walkthrough, interviews, and data review occurred during July and August, 2002.

The 2003 Plan contains the following:

- Description of the facility;
- Summary of prior water conservation efforts and measures already employed;
- Historical trends in water usage;
- Estimates of the quantity of water used for different purposes;
- Identification of additional water-efficiency measures applicable to the facility;
- Analysis of the cost and financial benefits of carrying out these measures.

Section 2
Facility Description

2.1 History of Facility

The Washington Corrections Center (WCC) is located approximately five miles northwest of the City of Shelton in Mason County (see Exhibit 2-1). The WCC was opened in 1964 under the management of the Washington Department of Social and Health Services (DSHS). In 1981, the WCC was transferred to the Washington Department of Corrections (DOC) and is currently a multi-custody correctional institution. The facility contains the following categories of offender housing: medium security (Level III), the Training Center (also Level III), an Intensive Management Unit (IMU, a Level V facility), and the Reception Center, for processing of all male offenders receiving state prison sentences, except for "death row" inmates.

The total acreage of state-owned land at the WCC site is approximately 455 acres, with 125 acres developed for correctional facilities. The remainder of the property consists of timberland and open land.

The oldest portion of the WCC was constructed in 1964. This includes the Receiving Units (where those offenders being processed live) and two of the medium security living units (i.e., In-House Units), as well as most administration buildings. The third medium security In-House Unit, Training Center, and IMU were all constructed in the 1980s. The most recent additions to the facility include a gymnasium (1995) and a warehouse operated by Correctional Industries (CI) (1999). Exhibit 2-2 displays a map of the facility, while Table 2-1 lists each individual building, its age and size in square feet.

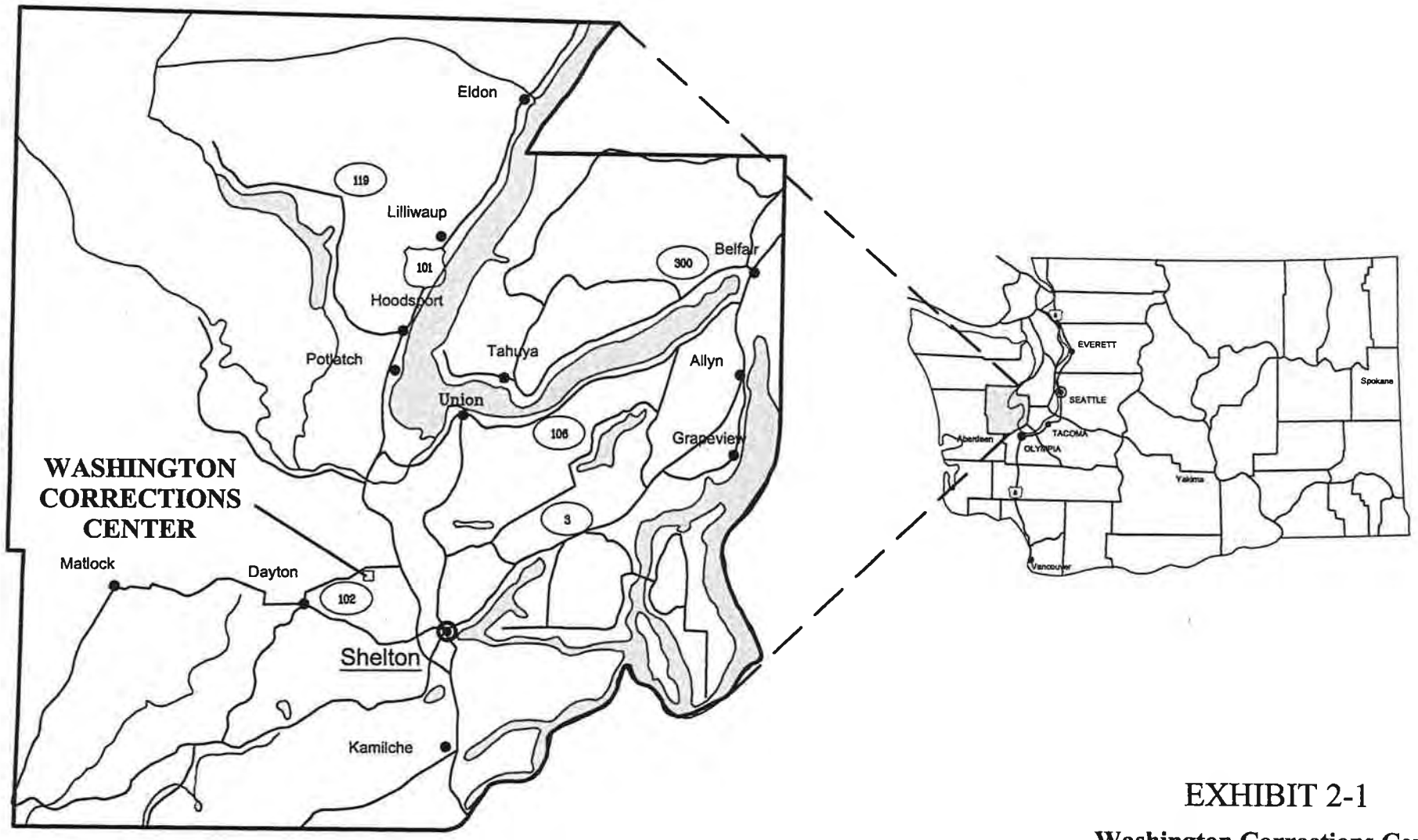


EXHIBIT 2-1

Washington Corrections Center
Shelton, Washington
Water Conservation Plan Update
Vicinity Map

January 2003

ECONOMIC AND ENGINEERING SERVICES, INC.

<EES_OLY>M:\DOC\2-00-230\EXHIBITS\Shelton WCC Location.DWG<Exhibit-1>
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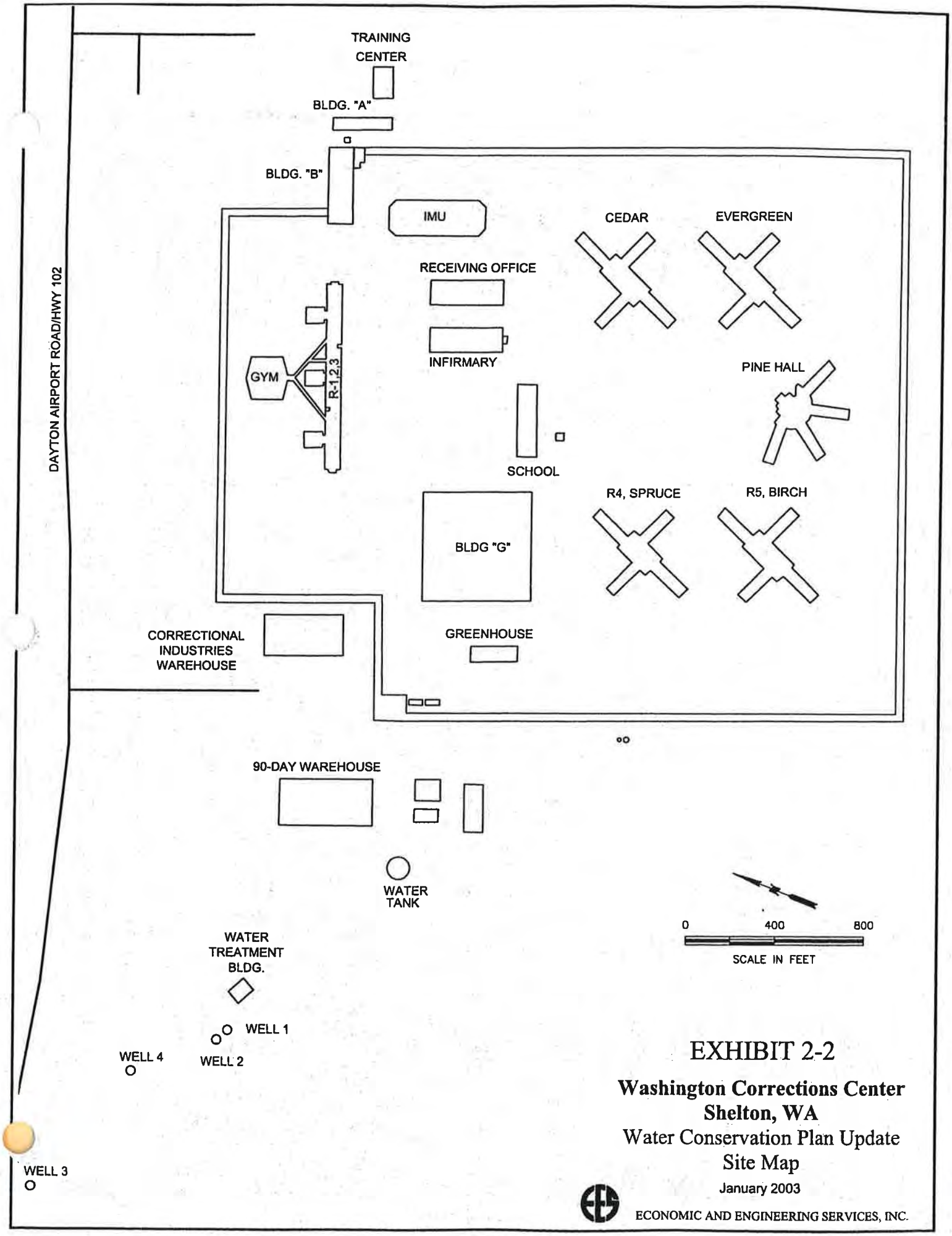


EXHIBIT 2-2

Washington Corrections Center
Shelton, WA
Water Conservation Plan Update
Site Map
January 2003

ECONOMIC AND ENGINEERING SERVICES, INC.

<EES_OLY>M:\DOC\2-02-230\EXHIBITS\Shelton Exhibits.DWG<Exhibit-2>
<EES_OLY>:PLOT DATE:01/27/03 TIME:16:06

Table 2-1
Building Data

Building/Function	Letter Code	Approximate Size (ft^2)	Approximate Construction Date
A - Administration	A	8,000	1964
B – Major Control & Visitation	B	19,200	1964
Receiving Office	C	19,200	1964
Infirmary	D	19,200	1964
IMU		37,800	1985
School		13,200	1964
"G" Building	G	129,600	1964
R-1, 2, 3 – Receiving Units	R-Units	39,000	1964
Gymnasium		16,200	1995
Spruce – Receiving Unit	R-4	30,800	1964
Birch – Receiving Unit	R-5	33,600	1964
Cedar – Living Unit		33,600	1964
Evergreen – Living Unit		33,600	1964
Pine Hall – Living Unit		26,000	1985
Warehouse (90-day)		45,000	1964
Warehouse (Correctional Industries)		24,360	1999
Training Center		700	1987
Steam Plant		4,900	1964
Greenhouse		900	1964

2.2 Water System

The WCC's water supply system consists of four wells, a storage tank, and the distribution system. The primary water supply comes from Well No. 4, with supplemental supply from Well No. 2. Well No. 4 was drilled to a depth of 56 feet in 1984 and Well No. 2 was drilled to a depth of 46 feet in 1963. The rated capacities of Wells Nos. 4 and 2 are 640 and 320 gallons per minute (gpm), respectively. Well No. 1, drilled to a depth of 177 feet in 1962, is currently dedicated to steam plant makeup water, but may also be used as an emergency domestic water supply. Well No. 3, drilled to a depth of 184 feet in 1962, is only used for emergency purposes.

All water pumped is conveyed to a treatment building, where the water is disinfected and pH is adjusted. A single, 230,000 gallon reservoir provides elevated storage for the facility. A new 500,000 gallon reservoir is under design, with construction completion anticipated in 2003.

Except for recent additions at the facility, the distribution system was installed during 1962 and 1963, prior to the opening of the WCC in 1964. Service lines range in size from 2.5 inches to 8 inches, with the majority consisting of 4-inch pipe. Water system static pressure averages about 76 pounds per square inch (psi) throughout the system.

During the site walkthrough, WCC staff provided an estimated count of plumbing fixtures and water-using appliances at the WCC. The most common of these are listed in Table 2-2.

Table 2-2
Inventory of Selected Plumbing Fixtures and Appliances

Location	Toilets	Urinals	Sinks [1]	Showers	Washing Machines [2]
A – Administration	4	2	6	0	0
B – Major Control & Visitation	7	6	11	2	0
Receiving Office	8	4	12	0	0
Infirmary	16	4	24	4	0
IMU	130	4	130	12	0
School	8	4	12	0	0
"G" Building	12	8	18	6	0
R-1, 2, 3 – Receiving Units	240	4	240	36	0
Gymnasium	2	2	3	6	0
Spruce – Receiving Unit	240	4	240	16	0
Birch – Receiving Unit	240	4	240	16	0
Cedar – Living Unit	16	4	24	16	4
Evergreen – Living Unit	16	4	24	16	4
Pine Hall – Living Unit	240	4	240	16	4
Warehouse (90-day)	4	1	6	0	0
Warehouse (Correctional Industries)	4	0	4	0	0
Training Center	4	2	6	2	0
Steam Plant	2	1	3	0	0
Greenhouse	1	0	1	0	0
Heavy Equipment Storage	1	0	1	0	0
Towers (6)	6	0	6	0	0
Restrooms below Towers 3 & 5	2	0	2	0	0
Firing Range	2	0	2	0	0
Total	**1,205**	**62**	**1,255**	**148**	**12**

Footnotes:

(1) For "wet cells", which have combination sink/toilets, the number of sinks is equal to the number of toilets. For buildings with large, common restrooms, the number of sinks is estimated as 1.5 times the number of toilets, based on the general sink:toilet ratio at other institutions. This accounts for restroom sinks and general purpose sinks, but does not include maintenance sinks or sinks in food service areas.

(2) Lists only residential-style washing machines located in living units. Central laundry facilities are discussed elsewhere.

2.3 Water Rights

DOC's annual water right for the WCC facility is 268 acre-feet per year (AF/yr). This is equivalent to 239,072 gallons per day (gpd) on an average daily basis. The instantaneous quantity associated with the facility's water rights is 563 gallons per minute (gpm).

Section 3
Prior Water Conservation Efforts

In the mid-1990s, a regulatory compliance review revealed that water rights were insufficient to meet water demands at the Washington Corrections Center (WCC). The 1997 Draft Water Conservation Plan (1997 Plan) was developed by Gray & Osborne, Inc., in support of an application for additional water rights submitted to the Washington Department of Ecology (Ecology) in May 1996. Washington Department of Corrections's (DOC) strategy to meet current and future water demands at that time was to reduce water usage while also pursuing additional supplies.

The 1997 Plan included a water balance for the facility, with estimates of water used for different purposes. While well meter records provided sound production data, an accurate accounting of water uses was not available because there was no metering of usage. Therefore, estimates were based upon calculations using information received from DOC staff and equipment vendors. From this analysis, the highest water uses were determined to be toilets and urinals, showers, and kitchen uses, comprising 19 percent, 16 percent, and 8 percent of daily water use, respectively. Additionally, it was estimated that the facility had 38 percent unaccounted-for water (i.e., the difference between water production and usage). This water was assumed to be lost through leaks or hydrant and line flushing.

In order to reduce water usage, the 1997 Plan proposed a two-phase conservation program for the WCC. Phase 1 consisted of measures outlined in the *Conservation Planning Requirements* guidelines published by and Ecology the Washington Department of and Health. Phase 2 consisted of supplemental actions to be considered in addition to Phase 1 measures.

A summary of the key elements of the proposed conservation program is provided below, including the degree to which each element has been implemented since 1997.

3.1 1997 Phase 1 Recommendations

- ***Education***. The intent of this element is to make staff and offenders more aware of water use. Key recommended actions include periodic reminders by WCC managers in memos or during staff meetings to inform staff of conservation issues, and enhanced monitoring of areas where excessive water use may occur but can be regulated (e.g., showers, kitchen, irrigation, vehicle washing).
- ***Implementation***. This measure has been successfully implemented over the past five years. WCC staff closely monitor the amount of water withdrawn by the wells, and compare this usage on a monthly basis with the amount of water authorized by water rights. If it is determined that the rate of water usage will lead to an exceedance of the annual water right, WCC maintenance staff initiate various water-saving activities, which involve participation by other staff throughout the facility. This close attention to water usage and communication of the need to conserve water at certain times aided the facility in remaining within its water right limitations during the drought in 2001.

- ***Service Meters***. Service meters can be used to quantify and track the amount of water used for various activities. During the course of the 1997 Plan development, WCC staff were asked to prioritize the facility's buildings in terms of need for service meters.
- ***Implementation.*** This measure is currently being implemented by WCC staff as part of a project to replace interior building piping throughout the facility. Phase 1 of this project has been completed as of January 2003, and included replacement of copper lines in buildings C, D, R-1, R-2, R-3, and the 90-day warehouse. Phase 2 (i.e., piping replacement in the remaining buildings) is yet to be completed. As a part of this project, which is anticipated to be completed by early summer 2003, individual building meters are being installed, in order to provide the ability to track water consumption at the building level.
- ***Irrigation***. Turf and landscape irrigation can consume large quantities of water during the summer months. Reductions in irrigated areas and close monitoring of irrigation practices can result in substantial summertime water savings. Further efficiencies can be gained by ensuring that watering is done during the mornings and evenings.
- ***Implementation.*** At the writing of the 1997 Plan, WCC staff had already decreased the amount of irrigated land to the "mounds" (i.e., grassy areas directly in front of the living units) and landscaped areas along sidewalks and near certain buildings. The remaining areas were allowed to dry up during the summer. This practice was discontinued in some subsequent years (1998-2000). However, in 2001 the facility resumed the practice of no turf irrigation. In general, landscape irrigation (accomplished largely by hoses) is done during morning and evening hours.

3.2 1997 Phase 2 Recommendations

- ***Leak Detection and Repair***. The 1997 Plan estimated that 38 percent of water is unaccounted-for. Some of this water may be lost through leaks in the distribution system. A complete leak detection program at the facility was estimated to cost $2,000.
- ***Implementation.*** A formal leak detection and repair program was implemented during the development of the 2003 Water Conservation Plan Update (2003 Plan). Details are provided in Section 6.4.
- ***Low-Flow Fixtures***. A large portion of water use at the facility is attributed to showers, toilets, and urinals. Installation of low-flow fixtures may significantly reduce water use for these purposes.
- ***Implementation.*** At the writing of the 1997 Plan, WCC staff had fitted all showerheads with ball cocks that were throttled to reduce flows. During preparation of the 2003 Plan, staff indicated that some of the ball cocks have come out of adjustment and are no longer operating in a low-flow manner. No low-flow toilets or urinals have been installed, except for staff areas in Building B (administration).
- ***Laundry.*** The 1997 Plan identified various ways by which to reduce water-use by the laundry operations. One option is to optimize the wash/rinse programs of the commercial machines in order to minimize cycles and water used per cycle. Other options involve replacement of existing machines with more efficient models (e.g., replacing commercial machines with machines that recycle water, and replacing the residential-style machines with more efficient models).

- ***Implementation.*** Since 1997, the operations in the commercial laundry have been optimized. The number of cycles has been reduced and a minimum amount of water is used, per equipment specifications. Additional water savings are being investigated in a separate study being conducted concurrent to the 2003 Plan.
- ***Kitchen.*** The 1997 Plan recommended replacement of a food grinder with a "HeliClean" food waste dewatering unit, in order to reduce water usage and organic loadings to the wastewater treatment plant.
- ***Implementation.*** The HeliClean unit was installed in 1997. The system has not worked efficiently, requiring periodic washdown by hand-held hoses.
- ***Wastewater Reuse.*** As of the writing of the 1997 Plan, the WCC planned to upgrade its wastewater treatment plant and add a sprayfield for effluent disposal. Upon completion of these upgrades, it was recommended that DOC further consider using wastewater treated to Class A reclaimed water standards for various non-potable purposes throughout the facility.
- ***Implementation.*** The plant upgrades and sprayfield have been completed and are operational. A separate study is being performed concurrent to the 2003 Plan, evaluating the feasibility of utilizing reclaimed wastewater for washdown purposes at the treatment plant.

3.3 Additional Conservation Measures Already Employed

In addition to the items listed above, the WCC implemented other conservation measures between 1997 and 2001 that have resulted in substantial water savings. These items are discussed below.

3.3.1 Changes in Showering Practices

Historically, offenders in the Receiving Units[1] were allowed to shower once every day. Offenders in the In-House Units were essentially allowed to shower whenever they desired, with no limits on showering times. In an effort to reduce water usage, changes to the showering practices were instituted at the beginning of 2001. Offenders in Receiving Units were allowed to shower only once every other day, while offenders in the In-House Units were restricted to showering once per day. Based upon these changes reported by staff, by staff Economic and Engineering Services, Inc. (EES) estimates that this had the effect of reducing the amount of water used for showering by approximately 50 percent.

3.3.2 Installation of a Closed-Loop Water-Cooled Refrigeration System

The facility's old refrigeration process for the kitchen utilized a once-through water-cooled compressor system. Upon installation of a replacement, closed-loop system in late 2000, WCC staff noted an immediate reduction in daily water usage. This system has continued to operate in a water-efficient manner.

[1] See Section 2.1 for definition of Receiving and In-House Units.

Section 4
Breakdown of Water Uses

4.1 Historical Water Use

Water production at the Washington Corrections Center (WCC) is measured by source meters on each well. Production data for years 1995-2001 is summarized in Table 4-1 and Exhibit 4-1. Data regarding offender population for years 1999-2001 are also presented in the table and exhibit.

From this data, several observations can be made. Total usage generally increased slightly from 1995 to 2000. However, there was a substantial decrease in usage between years 2000 and 2001. There are multiple reasons for this change in water production, including a drop in offender population (approximately 9 percent). Beginning in the late 1990s, greater attention was paid to water usage, as the facility became aware that annual usage had historically been exceeding the amount allowed by its water rights. More frequent monitoring of well meters and water consumption activities began to take place. In 1997, the Draft Water Conservation Plan (1997 Plan) was developed, which identified areas of high water use and strategies for reducing consumption, as discussed in Section 3. In response to these activities and in light of the high amount of water used in 2000, three important factors were addressed at the end of year 2000 and during 2001, resulting in considerably less water consumption facility-wide during the latter year. These key factors, which were discussed in Section 3, are:

- ***Installation of a closed-loop water-cooled refrigeration system.*** The facility's old refrigeration process for the kitchen utilized a once-through water-cooled compressor system. Upon installation of the replacement, closed-loop system for the kitchen in late 2000, WCC staff noted an immediate reduction in daily water usage. Based upon comparison of monthly usage for December of 1999 and December of 2000 (during which months the population was similar), the amount of water savings attributable to this equipment replacement is on the order of 50,000 gallons per day (gpd). This system has continued to operate in a water-efficient manner.

- ***Changes in shower practices.*** As described in Section 3, offenders were allowed to shower more often and for longer periods of time prior to 2001. In an effort to reduce water consumption, showering times were reduced by approximately 50 percent in 2001, providing a similar reduction in water use.

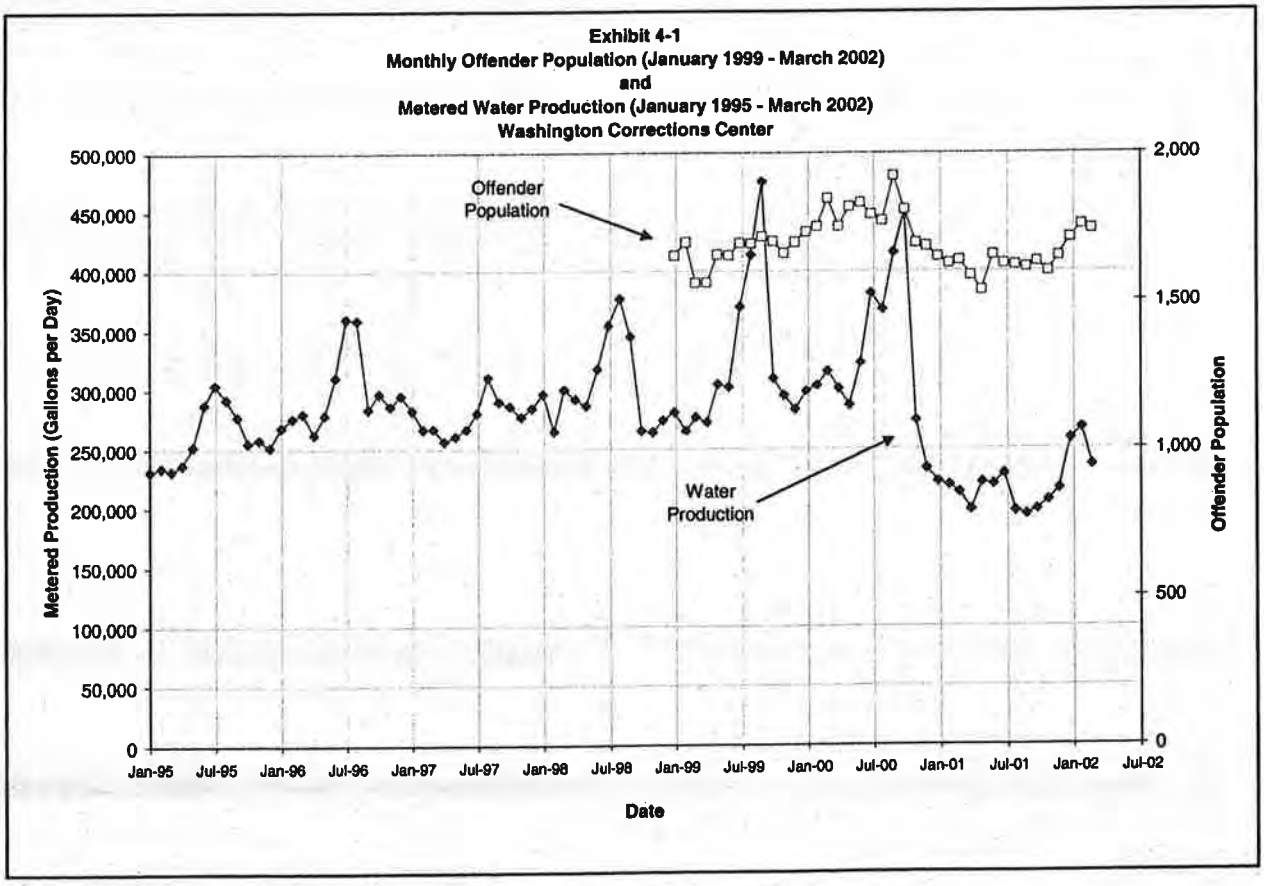
- ***No turf irrigation.*** Historically, the facility attempted to maintain green turf areas throughout the summer months, using hose-mounted sprinklers and two water cannons to apply substantial amounts of water. In 2001, no turf irrigation was performed, aside from that used on the mounds in front of the living units, resulting in no substantial peak in summertime water usage, as compared to previous years.

Table 4-1
Aggregate Historical Water Use

Year	Total YearlyUse (Gallons) [1]	Average Daily Use (gpd) [2]	Base Use (gpd) [3]	Summer Use (gpd) [4]	Average Offenders [5]	Average Daily Use per Offender (gpcd) [6]
1995	94,688,000	259,419	243,868	290,393	ND	ND
1996	108,511,000	296,478	281,506	328,730	ND	ND
1997	101,190,000	277,233	272,481	286,697	ND	ND
1998	110,571,000	302,934	280,144	348,328	ND	ND
1999	116,999,000	320,545	285,716	389,918	1,661	192
2000	120,331,000	328,773	308,770	371,311	1,783	184
2001	76,943,900	210,805	211,383	209,655	1,618	130

Note: gpd = gallons per day; gpcd = gallons per capita per day; ND = No Data
(1) Based on well meter data.
(2) Calculated as total use divided by 365 days (366 days for leap years 1996 and 2000).
(3) Calculated as use during October-May, divided by 243 days. Base consumption is not seasonal in nature, and therefore occurs year-round.
(4) Calculated as use during June-September, divided by 122 days.
(5) Based on administrative records.
(6) Calculated as average daily use divided by number of offenders.

Exhibit 4-1
Monthly Offender Population (January 1999 - March 2002)
and
Metered Water Production (January 1995 - March 2002)
Washington Corrections Center



Another observation from the water usage data is that water consumption has historically had a strong seasonal component, with an increase during the June through September summer season. This is true for all years except for 1997 and 2001. The low summer use in 1997 was due to the lack of turf irrigation. This practice, along with stricter observance of showering practices, also resulted in the low summertime usage in 2001.

The data in Table 4-1 also highlight that over the past three years, there has been a decrease in per offender water use. A 4 percent reduction occurred between 1999 and 2000, while a more substantial drop of 30 percent occurred between 2000 and 2001.

4.2 Categories of Water Use

The total quantity of water consumed was used to develop a water balance for the WCC. In the absence of water meters to measure water usage, the results of the on-site walkthrough, interviews, and standard estimates from the literature on water conservation (see Bibliography) were used to estimate the quantity of water used for different purposes. The water balance was developed for both years 2000 and 2001, since significant changes in water use practices were made between these two years, as noted in the previous section. The assumptions, calculations, and results of the water balance are summarized in Table 4-2. The following sections describe each major category of water use at the facility.

4.2.1 Sanitation and Hygiene

Sanitation and hygiene includes water used for showering, hand washing, toilets, and laundry (personal and central). For purposes of this analysis, these uses were further subdivided into estimates of water used by offenders, and water used by staff, due to the different characteristics of these uses. For example, offenders in the living units were assumed to shower once per day, while it was assumed that staff showering is essentially zero. Water use estimates were derived from a number of studies in the northwest and nationwide, including conservation studies produced by the American Water Works Association, Seattle Public Utilities, and Portland Water Bureau. These figures were combined with data on the number of inmates and staff at the WCC.

The total estimated water used for personal sanitation and hygiene was approximately 135,500 gpd in 2000. This amount was reduced to approximately 102,600 gpd in 2001. Key components are discussed below.

- ***Toilets and Urinals.*** Toilets and urinals are wall-hung units which operate directly off the system pressure. Many toilets in the institution are combination sink/toilets in "wet cells". The amount of water per flush ranges from 3.5 to 5 gallons for the toilets and from 1.5 to 2.0 gallons for the urinals.
- ***Showers.*** All showers at the WCC are hand-operated and do not have timers (i.e., they are manually turned off). A 1996 pollution prevention plan listed shower use as the largest contributor to wastewater flow; therefore, an effort has been made to reduce water usage in the showers. All showerheads have been fitted with ball cocks, which have throttled the flow rates to approximately 2.0 gallons per minute (gpm), according to WCC staff. However, staff also report that some of the ball cocks have come out of adjustment and are no longer operating in a low-flow manner.

Table 4-2
Water Balance Worksheet [1]

Category	Assumptions/ Comments	Calculations	Year 2000 Results (gpd)	Year 2001 Results (gpd)
Turf and Landscape Irrigation				
Estimate of all irrigation in year 2000, year-round average [2]	Difference between summer consumption and remainder of year is assumed to be total irrigation; 122 days of irrigation	Summer consumption less base consumption; total summer use divided by 365 days in full year	20,904	NA
Estimate of landscape irrigation in year 2001, year-round average [3]	2.5 acres of flower beds and "mounds"; average 0.14 inches per day; 122 days of irrigation	Acres x (inches per day/12 inches per foot) x 325,851 gallons per acre-foot x 122 days of irrigation/365 days	NA	3,177
		Total, Turf and Landscape Irrigation:	**20,904**	**3,177**
Sanitation and Hygiene				
Toilet flushing - offenders	6 flushes per day (fpd); average 4 gallons per flush (gpf)	Offenders x fpd x gpf	42,792	38,832
Toilet flushing - staff	2 fpd; average 4 gpf	Staff x fpd x gpf	5,112	5,112
Urinal flushing - offenders	1 fpd; average 2 gpf	Offenders x fpd x gpf	3,566	3,236
Urinal flushing - staff	2 fpd; average 2 gpf	Staff x fpd x gpf	2,556	2,556
Showers - offenders - receiving units [4]	10 minutes every day (2000); 10 minutes every other day (2001); 2.0 gpm	Offenders x minutes x gpm/2 (to account for every-other-day practice)	21,260	8,980
Showers - offenders - in-house units [4]	20 minutes every day (2000); 10 minutes every day (2001); 2.0 gpm	Offenders x minutes x gpm	28,800	14,400
Central laundry	Average 1.44 gal/pound of laundry (from Alternatives Analysis for Laundry System Water Use Efficiency); laundry processed: 2000=2,190,575 lbs; 2001=2,056,130 lbs; assume additional 10% leakage of older machines	Pounds x gal/pounds / 365 days + leakage	8,973	8,428
Laundry – offenders personal	12 machines; 15 loads per machine per day; 30 gal. per load	machines x loads per day x gal. per load	5,400	5,400
Faucets – offenders (personal hygiene)	3.5 minutes per day; 1.7 gpm	Offenders x minutes x gpm	10,609	9,627
Faucets – staff (personal hygiene)	2.0 minutes per day; 1.7 gpm	Staff x minutes x gpm	2,173	2,173
Water coolers and air-cooled ice machines (separate from food service areas)	Assume staff and offenders consume one quart per person per day, including losses; and cooling uses 100 gpd	(staff plus offenders) x (¼ gal.) plus 100 gpd	706	664
Leakage, etc. from domestic plumbing fixtures	Appear minimal (no leaks observed). Assume 2 gal. per offender per day. (one-fifth national average for domestic)	Offenders x gpd	3,566	3,236
		Total, Sanitation and Hygiene:	**135,512**	**102,644**

Table 4-2 (cont)
Water Balance Worksheet [1]

Category	Assumptions/ Comments	Calculations	Year 2000 Results (gpd)	Year 2001 Results (gpd)
Food Service				
Dishwashing - 3-tank washers [5]	3 units; 275 gal/hour; 4 hours/day	Units x gal/hour x hours/day	3,300	3,300
Dishwashing - 1-tank washers [5]	2 units; 230 gal/hour; 4 hours/day	Units x gal/hour x hours/day	1,840	1,840
Kettle cleaning [5]	General cleaning	NA	3,500	3,500
Kitchen sink usage [5]	General usage	NA	3,600	3,600
Heliclean cleaning	Hose operation (approx. 10 gpm); 3 hours per day	Gpm x hours x 60 minutes/hour	1,800	1,800
Water consumed at meals (used to make food and drink) [5]	Assume 2 gal/meal served; 3 meals/offender; 1 meal/staff	Number of meals x gal per meal	11,976	10,986
		Total, Food Service:	**26,016**	**25,026**
Facility Maintenance and Cleaning				
Daily floor mopping	510,500 square feet in facility; One 5-gal. bucket per 2,500 square feet; average mopped 1.5 times per day	Bucket volume x number of buckets x number of times per day	1,532	1,532
Other interior cleaning (inmate cells, counter tops, etc.)	Assume quantity similar to quantity used for mopping.	N/A	1,532	1,532
Vehicle washing	Summer: 5 bus washings/week; Winter: 10 bus washings/week; 10 gpm hose; 20 min. per vehicle	Minutes x gpm x washes per year/365 days (assume 4 summer months, 8 winter months)	241	241
Boiler water makeup (steam system leaks)	Based on metered source data (Well #1 is dedicated to boiler makeup)	Yearly total/365 days	5,447	4,696
Boiler maintenance-flooding	Two boilers (2,312 gal capacity) flooded to 3,391 gal. One boiler (2,760 gal capacity) flooded to 4,003 gal. Assume this is performed 3 times per year for each boiler.	Additional flooding volume for each boiler x number of floodings/365 days	28	28
Boiler maintenance-refill	Each boiler is drained and refilled once per year.	Boiler volumes x 1 filling per year, divided by 365 days/year	20	20
Wastewater treatment plant	Estimated based upon staff comments	NA	10,000	10,000
Water used as coolant in once-through cooling systems for refrigeration at Building G	Estimated based upon comparison of December 1999 and December 2000 water usage; a closed-loop system was installed in November 2000	NA	50,000	0
Miscellaneous maintenance and cleaning	Assume 500 gpd, average	NA	500	500
		Total, Maintenance and Cleaning:	**69,299**	**18,548**

Table 4-2 (cont)
Water Balance Worksheet [1]

Category	Assumptions/ Comments	Calculations	Year 2000 Results (gpd)	Year 2001 Results (gpd)
Other Uses				
Infirmary - sink use	Assume each of 24 sink faucets run five minutes per hour (8-hour day) at 1.7 gpm		1,632	1,632
Infirmary - shower use	Assume equivalent of five showers per day, 10 minutes, 2.0 gpm		100	100
Greenhouse	Assume 2 5.0 gpm hoses operate 1 hour per day, 6 days per week		513	513
Miscellaneous or intermittent uses	Assume 1,000 gpd, averaged over entire year		1,000	1,000
		Total, Other Uses:	**3,245**	**3,245**
		Total of estimated uses:	**254,976**	**152,640**
		Total metered production:	**329,674**	**210,805**
		Unaccounted-for consumption:	**74,698**	**58,165**

Footnotes:
(1) This worksheet summarizes water balance assumptions, calculations and results. It should be noted that for many uses calculations are based on assumptions or limited data, and the certainty of the results is therefore limited. Uncertainty is estimated to be on the order of plus/minus 15% in each water use category. Values are rounded.
(2) The calculation methodology includes all irrigation (turf and landscape).
(3) In year 2001, turf was not irrigated; however, landscape irrigation was performed.
(4) Showering policies are altered as needed to reduce water usage. More showering occurred in 2000 than in 2001. On average, offenders in the receiving units were allowed to shower once a day in 2000 and prior years, but were only allowed to shower every other day in 2001. Offenders in the in-house units were allowed to shower whenever they chose in 2000 and prior years, but were restricted to certain times of the day during 2001. It is estimated that this latter policy has had the effect of reducing in-house offender showering by approximately 50%.
(5) Based upon data obtained for the 1997 Draft Water Conservation Plan. Confirmed by EES as still being accurate for the 2003 Water Conservation Plan Update.

In addition, showering practices are altered when water use approaches water right limitations. This is highlighted in the differences between estimated water usage in showering between years 2000 and 2001 in Table 4-2. More showering took place in 2000 than in 2001. Offenders in the Receiving Units were allowed to shower once every day in 2000. Offenders in the In-House Units were essentially allowed to shower whenever they desired. As a result, some offenders would shower multiple times per day and at extended periods of time or with multiple showerheads operating. In an effort to reduce water usage, changes to the showering practices were instituted at the beginning of 2001. Offenders in Receiving Units were allowed to shower only once every other day, while offenders in the In-House Units were restricted to showering once per day. It is estimated that this had the effect of reducing the amount of water used for showering by 50 percent.

- ***Personal Laundry.*** There are 12 household-type washing machines located in the In-House Units. WCC staff report that these machines receive heavy use. It is assumed that each machine washes 15 loads of laundry per day.
- ***Central Laundry.*** The facility currently maintains a laundry service operated by offenders. Eight commercial machines are operated Monday through Friday. The amount of water used varies between the machines and is also dependent upon the content of the loads. On average, the commercial machines use 1.44 gallons per pound of laundry, as currently programmed. Records indicate that 2,190,575 pounds of laundry were processed in 2000,

while 2,056,130 pounds were processed in 2001. Including leakage of the older machines, this equates to approximately 8,973 gpd and 8,428 gpd in 2000 and 2001, respectively.

- ***Plumbing Fixture Leaks.*** This category also includes an estimate of leakage from plumbing fixtures such as toilets, faucets, and showers (average of 3,400 gpd; or 2.4 gpm for the entire facility). This estimate is at the low end of the range for leakage estimates nationwide, based on on-site observations. No leaking fixtures were observed on the day of the site walkthrough. Consistent with this observation, facility personnel reported that leaking fixtures are generally reported immediately and repaired promptly.

4.2.2 Food Service

All kitchen and dining areas are located in Building G. Water-using activities include general food preparation and washing, food waste disposal through sink drains and via a HeliClean machine, dishwashing machines, additional wash-up of pots and pans in sinks, water served as a beverage, and ice machines.

The total estimate of water used for food service was approximately 26,000 gpd in 2000 and 25,000 gpd in 2001. Key components are discussed below.

- ***Food Preparation and Consumption.*** The amount of water assumed to be consumed each day (i.e., water used for food and beverage preparation) was 2.0 gallons per meal served, based on estimates presented in the 1997 Plan.
- ***Dishwashing.*** There are five large commercial washers in the kitchen: three 3-tank units and two 1-tank units. Each dishwasher operates for approximately four hours per day. Manufacturer information for the washers indicates that the 3-tank washers use approximately 275 gallons for each hour of use, while the 1-tank washers use approximately 230 gallons for each hour.
- ***HeliClean Maintenance.*** In 1997, the WCC replaced a garbage disposal system that grinded food scraps and flushed them to the sewer with a steady stream of water, thus using a substantial amount of water. The newer process, a HeliClean system, dewaters food waste, with the compacted food being disposed of as solid waste. This process requires periodic cleaning by hose washdown, and has therefore continued to consume substantial amounts of water. WCC staff indicated that the offenders tasked with cleaning the unit often leave the hose running constantly during the machine's operation. Assuming that a hose is used for three hours per day to clean the machine, the total water consumption associated with this process is 1,800 gpd.

4.2.3 Turf and Landscape Irrigation

The WCC contains large areas of turf and landscaped flower beds and "mounds". The mounds are raised grassy areas located directly outside of the living units and are used for offender recreation. For purposes of this analysis, it is assumed that irrigation occurs primarily during the four-month period from June through September of each year. For year 2000, an estimate of the quantity of water used for irrigation was developed based on the differential between base use

and peak season use during this four-month period. This differential is approximately 62,500 gpd. Irrigation use averaged throughout the entire year was approximately 20,900 gpd.

No turf irrigation was performed during 2001; therefore, a different method was used to estimate the amount of water used for landscape irrigation, typically accomplished by manually-operated hoses. Assuming that the 2.5 acres of landscaped areas are irrigated approximately 1-inch per week (i.e., 0.14 inches per day) for 122 days of the year, a total of 1,159,600 gallons were used during 2001 for this purpose. On an average daily basis, this is equal to 3,177 gpd.

4.2.4 Facility Maintenance and Cleaning

Several activities are encompassed in this category. Most areas within the buildings are mopped daily, with some areas mopped two to three times each day. Inmate cells are also cleaned daily, with some attendant water use.

The WCC's steam system experiences daily losses which can easily be quantified through review of boiler makeup records (i.e., Well No. 1 meter data). In addition, each of the three boilers undergo a flooding procedure approximately three times each year, as well as being drained and refilled once a year.

Water is used at the wastewater treatment plant for hosing down the headworks and clarifiers. Staff estimate that total usage at the plant is approximately 10,000 gpd.

Vehicle washing is assumed to be minimal, based upon staff comments. During the winter, it is estimated that there are ten bus washings per week. In the summer, this usage is curtailed to approximately five bus washings per week. Cars and trucks are washed very rarely.

Also included in this category is water usage associated with the old once-through water-cooled refrigeration system for Building G. This usage is estimated as 50,000 gpd for 2000, based upon comparison of monthly usage for December 1999 and December 2000. The water savings associated with this change in equipment has probably been greater during the hotter, summer months, but no data exists to clearly identify these savings; therefore, for the purposes of this water balance, the savings are assumed to be constant throughout the course of the year at 50,000 gpd.

On the whole, water usage in this category was estimated to be 69,300 gpd in 2000. Usage in 2001 was substantially less at 18,500 gpd due primarily to the replacement of the once-through refrigeration cooling system.

4.2.5 Other Uses

Several activities are encompassed in this category, including water use at the infirmary and greenhouse, as well as other intermittent uses.

- ***Infirmary.*** The WCC has an on-site infirmary providing medical, pharmaceutical, and dental services to offenders. There are 24 sinks and 4 showers in the facility. Assuming the sinks are used five minutes per hour each day and that approximately five showers occur per day,

water use within the infirmary is estimated to be 1,732 gpd (this estimate is subject to considerable uncertainty).

- ***Greenhouse.*** The WCC has a greenhouse, available for use by the offenders. Minor watering of plants and flowers is assumed to consume 513 gpd.
- ***Miscellaneous or Intermittent Uses.*** Certain water uses are not accounted for in the uses described above, or do not occur on a regular, daily basis. For example this may include unusual cleaning events, or major leaks that are repaired quickly. To account for these types of uses and events, a single estimate of 1,000 gallons per day was used. This represents all such uses combined, averaged over the 365-day year.

4.2.6 Unaccounted-for Water

Unaccounted-for water is defined for the WCC as the difference between the metered amount of water produced by the facility's wells and the estimated amount of water used for the various purposes discussed above. An accurate accounting of water usage is not available because there are no service meters. Therefore, there is substantial uncertainty in the consumption estimates for each category of use, and therefore this category as well. Given the estimated usage and measured production records, the amount of unaccounted-for water at the WCC is estimated as 23 and 26 percent of total production for years 2000 and 2001, respectively.

This unaccounted-for water likely includes a substantial amount of water associated with leaks in hydrant lines. WCC staff indicated that recent testing of galvanized steel hydrant lines has revealed multiple leaks. Without better data, it is difficult to determine what portion of the unaccounted-for water may be comprised of such leaks. However, staff indicate that the leaks likely represent approximately 10 percent of total production. This category may also include water lost to leaks in other portions of the distribution system as well as water line flushing.

Section 5
Water Conservation Measures

Based on the review of prior water conservation efforts and water-using activities at the Washington Corrections Center (WCC), this section identifies current conservation activities that could be continued and additional water-efficiency measures that could be employed at the facility to increase water savings. These measures include both capital projects and changes in standard operating procedures or maintenance practices. Based on a qualitative screening of potential water savings and costs, an initial list of measures was narrowed down to six additional measures for more detailed analysis, excluding those measures that are already being implemented or are under consideration in separate studies being conducted concurrent to the 2003 Water Conservation Plan Update (2003 Plan). This section presents the initial set of measures and results of the qualitative screening. Section 6.0 presents the cost analysis for the six measures described in detail.

For each of the water uses identified in Section 4.0, there are various techniques that could be used to improve efficiency. For some water uses, either capital investments or operational modifications could result in water use efficiencies. In some cases, measures that target the same type of water use overlap in their effects. In other cases, alternative measures are mutually exclusive.

It should be noted that some water-saving measures may have important implications for security, relationships with the offender population, and staff morale. For example, changes in operational procedures could potentially create dissatisfaction, resulting in poor performance. On the other hand, in some cases improvements in efficiency may improve morale, by fostering staff and offender perceptions of a well-managed operation. In general, morale and security issues should be considered with regard to any water-efficiency measures that are candidates for implementation.

5.1 Initial Screening of Potential Water Conservation Measures

Table 5-1 lists 26 candidate water conservation measures that were identified initially, grouped into two main categories:

- Operations & Maintenance (O&M) Practices, and
- Capital Projects/Plumbing Fixtures.

Within each of these two categories, measures are ranked, first by relative water savings (high, medium or low), and then by relative cost per unit of water saved (low, medium, or high). For example, a measure that ranks high in water savings and low in unit cost would be preferred over another measure that ranks medium in water savings and high in unit cost.

Table 5-1 was used as a screening tool to identify those conservation measures that are already being implemented and those that appear to be most cost-effective for future use at the WCC. As

noted repeatedly throughout this document, the WCC been active in water conservation over the past five years. Table 5-1 contains many water conservation measures that have already been employed and which should continue to be utilized. In addition, some listed items are under detailed consideration in separate but concurrent studies. These measures were not considered for further evaluation in the 2003 Plan, as their feasibility and cost-effectiveness are being determined in separate studies.

It should also be noted that this table was first developed in August 2002. In the time leading up to finalization of the 2003 Plan, some items were implemented, as discussed further in Section 6.

Table 5-1
Screening Matrix - Water Conservation Measures

Code	Category	Description	Relative Volume of Water Savings	Relative Cost Per Unit of Water Saved	Comments
Operations & Maintenance (O&M) Practices					
OM-1	Turf/landscape	Reduce watering, allow turf to go dormant for summer	H	L	Already implemented
OM-2	Sanitation/hygiene	Reduce showering times/frequency	H	L	Already Implemented
OM-3	Maintenance/cleaning	Install high-efficiency cooling systems	H	H	Already Implemented
OM-4	Sanitation/hygiene	Optimize central laundry practices	M	L	Already implemented
OM-5	Sanitation/hygiene	Reduce personal laundry usage	L	L	Offender dissatisfaction
OM-6	Food Service	Optimize kitchen uses of water	M	L	Potential staff dissatisfaction
OM-7	Maintenance/cleaning	Optimize vehicle washing practices	L	L	Already implemented
OM-8	Maintenance/cleaning	Find and repair plumbing leaks inside buildings	L	L	Already implemented
OM-9	Turf/landscape	Optimize irrigation scheduling, application, and soil characteristics.	L	L	Soil type may limit savings
OM-10	Maintenance/cleaning	Optimize boiler maintenance/cleaning	L	L	
OM-11	Maintenance/cleaning	Optimize mopping practices and scheduling	L	L	Health and safety considerations
OM-12	Maintenance/cleaning	Optimize general cleaning practices and scheduling	L	L	

Table 5-1 (cont)
Screening Matrix - Water Conservation Measures

Code	Category	Description	Relative Volume of Water Savings	Relative Cost Per Unit of Water Saved	Comments
Capital Projects/Plumbing Fixtures					
C-1	Sanitation/hygiene	Water use efficiency in central laundry (e.g. install reuse system)	H	H	Under evaluation
C-2	Sanitation/hygiene	Replace personal clothes washers with high-efficiency models	M	M	Energy savings
C-3	Maintenance/cleaning	Repair hydrant line leaks	H	M-H	Cost depends on whether WCC staff or private contractor performs work
C-4	Various	Wastewater reuse for various purposes throughout facility	H	H	
C-5	Sanitation/hygiene	Replace toilets with high-efficiency models – special "combination" toilets in wet cells	H	H	
C-6	Food Service	Install composting facility to reduce water used for food waste disposal	M	H	Under consideration
C-7	Maintenance/cleaning	Wastewater reuse for washdown purposes at WWTP	M	M	Under consideration
C-8	Maintenance/cleaning	Distribution system leak detection	M	M	
C-9	Sanitation/hygiene	Install automated shower timers	M	M	Offender dissatisfaction
C-10	Sanitation/ hygiene	Replace toilets with high-efficiency models – standard toilets	L	M	
C-11	Sanitation/hygiene	Install/maintain ball cocks in showerheads to throttle flow	L	L	Already implemented, but settings need to be checked/adjusted
C-12	Sanitation/hygiene	Install/maintain faucet aerators	L	L	Most faucets already have aerator
C-13	Food Service	Replace dishwashing equipment with high-efficiency models	M	H	
C-14	Sanitation/hygiene	Lavatory faucet timers/ pneumatic control	L	M	

Note:
WWTP = wastewater treatment plant

The qualitative information on water savings and unit cost were used jointly to screen the measures. It was assumed that conservation measures yielding "low" water savings did not warrant detailed analysis (although some of these measures may be desirable for implementation). Similarly, measures with a "high" unit cost were not analyzed in detail. Based on this approach, all measures meeting the paired criteria shown in Table 5-2 were selected for more detailed analysis of cost-effectiveness.

Table 5-2
Paired Criteria for Screening Additional Conservation Measures

	Relative Volume of Water Savings	Relative Cost per Unit of Water Saved
a.	High	Low
b.	High	Medium
c.	Medium	Low
d.	Medium	Medium

The following five measures meet these paired criteria, and were not already implemented as of August 2002 (the time of draft development of the 2003 Plan), nor are they under detailed consideration in another study:

- ***O&M Practices***
  - OM-6 Optimize kitchen uses of water
- ***Capital Projects/Plumbing Fixtures***
  - C-2 Replace personal clothes washers with high-efficiency models
  - C-3 Repair hydrant line leaks
  - C-8 Distribution system leak detection
  - C-9 Install automated shower timers

Each of these measures is described in greater detail in the following section, together with quantitative estimates of water savings and cost of each measure.

Section 6
Description and Evaluation of Selected Conservation Measures

This section describes in greater detail each of the five measures identified in Section 5. An estimate of water savings and cost is presented for each measure. In addition, the financial benefits or "avoided cost" of each measure is presented. The net benefit of each measure is the benefit (avoided cost) less the implementation cost. The implementation status of each activity is also discussed.

6.1 Implementation Costs

Based on the measure descriptions and assumptions presented in Section 6.4, an estimate was developed of the implementation cost of each measure. This implementation cost is summarized in Table 6-1. To facilitate comparisons, all costs are standardized in terms of cost per 1,000 gallons of water saved, over a ten-year period. Costs are in year 2002 dollars.

Table 6-1
Calculation of Implementation Cost
Selected Water Conservation Measures

Measure		Daily Water Savings (year-round) (gpd)	10-yr. Water Savings (1,000 gal.)	Capital Cost ($$ in Year 1)	Annual O&M Cost ($$/yr.)	10-yr. Cost ($$/10 yrs.)	10-yr. Unit Cost ($$/1,000 gal.)
Operations & Maintenance (O&M) Practices							
OM-6	Optimize kitchen uses of water	2,500	9,125	$0	$0	$0	$0.00
Capital Projects/Plumbing Fixtures							
C-2	Replace personal washing machines with high-efficiency models	1,800	6,570	$9,000	$500	$14,000	$2.13
C-3	Repair hydrant line leaks	21,000	76,650	$25,000	$0	$25,000	$0.32
C-8	Distribution system leak detection and repair	4,200	15,330	$5,000	$0	$5,000	$0.33
C-9	Install automated shower timers	2,338	8,534	$49,700	$0	$49,700	$5.82

To determine the cost-effectiveness and payback period associated with each measure, the implementation costs shown in Table 6-1 must be compared with the financial savings that accrue from reduced water consumption. These financial savings, or "avoided costs" are described in Section 6.2 below.

6.2 Avoided Cost Analysis

In financial terms, the benefit of a conservation measure can be estimated as the dollar savings associated with reducing water consumption. This is termed the "avoided cost" associated with conservation actions. For each unit of water saved (e.g. 1,000 gallons), the Washington

Corrections Center (WCC) experiences cost savings. Appendix A contains information on calculation of these avoided cost components. The main components of these cost savings are:

- Reduced energy and chemical treatment costs associated with production from WCC wells. This is estimated to be $0.09 per 1,000 gallons of water saved (assuming $0.04 per kWh).
- Reduced energy and chemical treatment costs associated with WCC wastewater treatment plant operation. This is estimated to be $0.37 per 1,000 gallons of water saved (assuming $0.04 per kWh).
- Reduced energy costs for heating water (this applies only to conservation measures that reduce consumption of hot water). This is estimated to be $4.57 per 1,000 gallons of hot water saved. However, for those uses that involve a mix of hot and cold water, a value of $2.29 per thousand gallons is used, representing equal proportions of hot and cold water.

Costs were based on estimated pump run times and recent natural gas bills provided by WCC staff. It should be noted that utility charges are subject to change.

Generally, outdoor uses of water will mainly involve the first category only (cost of water production). Indoor uses will generally include production costs and wastewater costs, and may also involve energy savings associated with hot water. The cost components are shown in Table 6-2 (values are rounded).

Table 6-2
Components of Avoided Cost
(bolded rows are applied directly to the cost effectiveness calculations in Section 6.4)

	Type of Avoided Cost	Avoided Cost ($ per 1,000 gal.)
a.	**Well production component**	**$0.09** [1]
b.	Wastewater component	$0.37 [1]
c.	Hot water component (at 140° F)	$4.57 [2]
d.	**Production and wastewater combined**	**$0.46**
e.	**Production, wastewater and hot water combined**[3]	**$2.75**

Footnotes:
(1) Assumes energy cost of $0.04 per kilowatt-hour (kWh).
(2) See Appendix A for assumptions and calculations. Value reported is for hot water, unmixed with cold water.
(3) Various end uses mix hot and cold water in different ratios. Value reported here assumes 50 percent hot and 50 percent cold water. Therefore, the hot water component of avoided cost is halved to $2.29 per 1,000 gallons, before being added to item "d".

For each of the five measures described in Section 6.4, the appropriate avoided cost was applied to the cost-effectiveness analysis.

6.3 Additional Benefits of Conservation Measures

Implementation of conservation measures at the WCC will yield other benefits that will likely be considered of greater value than the avoided-costs calculated in Section 6.2. As stated previously, two of the objectives of water conservation at the WCC are to remain within limitations imposed by the facility's water rights and to avoid the need to obtain additional water supplies. In the absence of conservation, the facility's water demand exceeds its water rights, as demonstrated in past years. Therefore, the facility will be required to obtain additional sources

of supply, likely in the form of new water rights or purchasing of water from the City of Shelton, and may face building moratoriums, if conservation measures are not implemented. The "avoided costs" associated with developing additional supplies are highly complex and are therefore not quantified for this analysis; however, the benefit of avoiding the need for such supplies should be taken into consideration along with the quantifiable cost-effectiveness when determining which conservation measures to implement. For example, a certain measure may not meet a strict test of cost-effectiveness, but may result in substantial water savings and therefore yield a sizeable benefit in terms of meeting the facility's overall water conservation objectives.

6.4 Savings and Costs of Selected Water Conservation Measures

This section describes the six measures that passed the initial screen, and summarizes water savings, costs, and cost-benefit information. In order to provide a consistent basis for comparison, all costs were calculated on the basis of water savings and financial costs over a ten-year period.

6.4.1 OM-6: Optimize Kitchen Uses of Water

Because food service represents a significant component (estimated 12 percent) of daily water usage at the WCC, examining other operations and maintenance (O&M) practices is likely to yield additional savings. For example, ensuring dishwashers are run at full capacity, reducing flow levels or faucet run times for certain types of sink uses, and monitoring the maintenance of the HeliClean unit may permit additional reductions in food-service water uses. This measure (or collection of practices) would require discussion with food-service personnel, and training of staff.

For purposes of this analysis, it is assumed that review and modification of O&M practices could reduce these uses by 10 percent, or roughly 2,500 gallons per day (gpd).

The cost of this measure is essentially zero in financial terms. However, this measure would require training, and could potentially cause dissatisfaction among food-service personnel asked to modify long-standing practices

The water uses involved in this measure would likely involve a combination of hot and cold water. Assuming 50 percent hot and 50 percent cold water, the avoided cost from Table 6-2 (line "e") would be $2.75 per 1,000 gallons. Because the financial cost of the measure is zero, the payback period is also zero. In other words, financial savings would begin immediately upon implementation of this measure.

Costs and benefits are summarized as shown on Table 6-3. As of January 2003, this measure has not been implemented.

Table 6-3 OM-6: Optimize Kitchen Uses of Water	
Measure Cost (per 1,000 gal.)	$0.00
Measure Benefit (Avoided Cost, per 1,000 gal.)	$2.75
Net Benefit (per 1,000 gal.)	$2.75
Payback Period (years)	Immediate

6.4.2 C-2: Replace Personal Clothes Washers with High-efficiency Models

Offenders in the In-House living units are allowed to wash their own personal laundry in residential-style machines located in the living units. Staff report that these machines experience very heavy use. One conservation option is to replace the existing machines with high-efficiency models. Average residential-style washing machines typically use 40 gallons of water per load when set for large loads, while high-efficiency machines use approximately 30 gallons of water for large loads. Some offenders may wash only a few items of clothing at a time, and, therefore, use small or medium settings on the washing machines. To account for this variability, it was assumed that the machines use 30 gallons of water per load (i.e., approximately the amount used by residential-style machines on medium load settings). Water use by high-efficiency machines set on medium load levels is approximately 20 gallons per load. Therefore, installation of such machines would result in water savings of 10 gallons per load, or approximately 1,800 gpd.

The cost of this measure was estimated based on the assumption that all 12 personal laundry machines would be replaced at a cost of $750 per machine. Annual maintenance costs are estimated at $500 per year. Spread over a ten-year time period, this results in a total estimated cost of $2.13 per 1,000 gallons saved (see Table 6-1).

This measure involves an avoided cost associated with production of well water and wastewater disposal, as well as hot water energy savings. The appropriate avoided cost comparison is therefore $2.75 per 1,000 gallons, from Table 6-2 (line "e"). Based on this comparison, this measure is cost-effective with a net financial savings of $0.62 per 1,000 gallons of water saved. At an up-front capital cost of $9,000, the payback period is estimated to be approximately 22 years. Costs and benefits of this measure are summarized as shown on Table 6-4.

Table 6-4 C-2: Replace Personal Clothes Washers with High-Efficiency Models	
Measure Cost (per 1,000 gal.)	$2.13
Measure Benefit (Avoided Cost, in per 1,000 gal.)	$2.75
Net Benefit (per 1,000 gal.)	$0.62
Payback Period (years)	22

It should also be noted that there are additional avoided costs not captured in this analysis. High-efficiency washing machines require less detergent and spin clothes up to 30 percent dryer than traditional machines; therefore, detergent costs and energy costs associated with dryer times will be reduced upon installation of high-efficiency machines.

After this measure was identified in August 2002, the Washington Department of Corrections (DOC) pursued implementation. Twelve high-efficiency residential-style washing machines are anticipated to be purchased by summer 2003.

6.4.3 C-3: Repair Hydrant Line Leaks

Based on the year 2001 water balance developed for the facility, it is estimated that 27 percent of total water production is unaccounted-for. WCC staff have indicated that aging galvanized steel water lines extending from distribution mains to yard hydrants are leaking substantially and that these leaks likely account for approximately 10 percent of water production.

While some lines have been fixed, staff have identified approximately 6,000 lineal feet of 1.5-inch diameter lines that remain to be fixed or replaced. This conservation measure involves the replacement of these lines with PVC pipe. The cost of this measure is variable, dependent upon whether WCC staff and offenders perform the work, or if a private contractor is hired for the project. Assuming the in-house labor and equipment is utilized, the estimated cost of this pipe replacement project is approximately $25,000. This is based on a pipe material unit cost of $3 per foot of pipe, plus the costs associated with tapping the distribution system and reconnecting to the yard hydrants. Utilizing a private contractor, the capital cost is estimated to increase to approximately $65,000.

Assuming that the lower cost method is chosen and water savings of 10 percent are realized, based on WCC staff comments, the estimated cost over a ten-year time frame is $0.32 per 1,000 gallons saved (see Table 6-1).

This measure involves an avoided cost primarily associated with production of well water. Since the water saved comes directly from the distribution system without being heated and is currently lost to soil infiltration, there are no associated avoided costs with hot-water heating or wastewater treatment. The appropriate avoided cost comparison is therefore $0.09 per 1,000 gallons, from Table 6-2 (line "a"). Costs and benefits of this measure are summarized as shown on Table 6-5.

Table 6-5
C-3: Repair Hydrant Line Leaks

Measure Cost (per 1,000 gal.)	$0.32
Measure Benefit (Avoided Cost, in per 1,000 gal.)	$0.09
Net Benefit (per 1,000 gal.)	$-0.23
Payback Period (years)	NA

DOC pursued implementation of this measure after it was identified in August 2002. As of January 2003, this project was underway, consisting of the abandonment of the aging steel lines.

6.4.4 C-8: Distribution System Leak Detection and Repair

Aside from the hydrant line leaks addressed above, another component of the unaccounted-for water is likely to be leaks throughout the rest of the distribution system. Staff indicate that the ductile iron distribution system is in good shape; however, leaks would go unnoticed, as they have with the hydrant line leaks, due to infiltration.

Professional leak detection services by a contractor could be used to assess the magnitude of this potential loss of water and identify leak locations. It is assumed that identified leaks could be fixed by WCC staff.

The cost of this measure is estimated at $5,000 (i.e., $2,000 for a leak detection study and $3,000 for repairs). Assuming water savings are on the order of 2 percent of total production (approximately 4,200 gpd), this results in a total estimated cost of $0.33 per 1,000 gallons saved (see Table 6-1).

This measure involves an avoided cost associated only with production of well water. Since the water saved comes directly from the distribution system without being heated and is currently lost to soil infiltration, there are no associated avoided costs with hot-water heating or wastewater treatment. The appropriate avoided cost comparison is therefore $0.09 per 1,000 gallons, from Table 6-2 (line "a"). Costs and benefits of this measure are summarized as shown on Table 6-6.

Table 6-6
C-8: Distribution System Leak Detection

Measure Cost (per 1,000 gal.)	$0.33
Measure Benefit (Avoided Cost, in per 1,000 gal.)	$0.09
Net Benefit (per 1,000 gal.)	$-0.24
Payback Period (years)	NA

This conservation measure was implemented after its identification in August 2002. A leak detection study conducted in September 2002 confirmed that the ductile iron distribution system was not leaking, but verified that portions of the steel hydrant lines were leaking, as were the check valves at Well Nos. 2 and 4. These valves were repaired in December 2002. Appendix B contains the final report of the leak detection study.

6.4.5 C-9: Install Automated Shower Timers

Showering accounts for an estimated 11 percent of water consumption at the WCC. Therefore, it represents a significant potential for water savings.

Facility staff reported that all showerheads have been fitted with throttling valves to reduce flow rates, but that some of these ball cock valves have come out of adjustment. Therefore, while low-flow showerheads are not considered here as a conservation opportunity, it is recommended that WCC maintenance staff inspect all showerheads and readjust if needed to maintain a flow rate of approximately 2.0 gallons per minute (gpm).

Installation of shower timers may provide additional water savings. However, they have the potential to cause dissatisfaction among inmates, leading to vandalism and associated maintenance needs.

This measure assumes that showers throughout the facility are retrofitted with shower timers. It is assumed that timers are set in such a way as to reduce the overall volume of showering by 10 percent on a daily basis. This would yield 2,338 gpd in water savings.

The cost of retrofitting with shower timers is estimated to be $350 per shower, based on analyses at other institutions. Based on this cost, it would cost $49,700 to retrofit all 142 showers at the facility. On a unit basis, this is equal to $5.82 per thousand gallons (see Table 6-1). Water saved would be a combination of hot water and cold water. It is assumed that the water saved would be approximately 50 percent hot water and 50 percent cold water. Based on these assumptions, the avoided cost from Table 6-2 (line "e") would be $2.77 per 1,000 gallons. The costs and benefits of this measure are summarized as shown on Table 6-7.

Table 6-7
C-9: Install Automated Shower Timers

Measure Cost (per 1,000 gal.)	$5.82
Measure Benefit (Avoided Cost, per 1,000 gal.)	$2.77
Net Benefit (per 1,000 gal.)	$-3.05
Payback Period (years)	NA

Although this measure does not pass the avoided cost analysis, it should still be considered due to the other substantial benefits discussed in Section 6.3, including remaining within water right limitations, and therefore avoiding building moratoriums and/or the need to obtain additional water supplies. While this measure should still be considered, it is not as attractive as other options, due to its higher relative cost and greater potential for offender dissatisfaction compared with other measures.

6.5 Additional Measures Not Analyzed in Detail

In addition to the five measures analyzed in detail above, there are two measures from Table 5-1 that are not currently under separate consideration and were rated as potentially yielding "high" water savings, but that did not meet the criteria of "low" or "medium" costs. These measures are:

- C-4: Wastewater reuse for various purposes throughout facility
- C-5: Replace toilets with high-efficiency models (specialty combination toilets in "wet cells")

These measures may be worthy of further consideration, even though they are unlikely to meet a strict test of financial cost-effectiveness. Measure C-4 is of particular interest, as one of the potential "uses" of reclaimed wastewater at WCC is ground water recharge via surface percolation, which could in turn allow the facility to withdraw an additional amount of water from the aquifer. This is allowed under the Revised Code of Washington (RCW) as the owner of a wastewater reclamation facility has the exclusive right to any water generated by the facility (RCW 90.46.120). Therefore, if treated effluent is allowed to percolate to a ground water aquifer, such water may be subsequently withdrawn and used for potable purposes, as long as water quality and time of travel (i.e., distance from point of recharge to point of withdrawal) criteria are met. Although they would occur via the use of existing wells, such withdrawals could be considered as separate and distinct from the amount of withdrawals allowed under the water rights associated with the wells.

Such projects are evaluated by the Washington Department of Ecology (Ecology) on an individual, case-by-case basis; therefore, it is difficult to state with certainty whether such an activity would be permitted. Although other such cases are being considered throughout Washington, no final determinations have been made on any proposals as of January 2003. To pursue such an activity, the following steps would have to be taken:

- ***Upgrade of wastewater treatment plant to be permitted as a reclaimed water facility.*** A review of the existing wastewater treatment plant is needed to identify improvements required for the facility to be permitted as a Class A reuse facility. The key upgrade would likely be addition of redundant filtration facilities.
- ***Conduct hydrogeologic study.*** A study is needed to: 1) determine the amount of treated effluent applied via the existing sprayfield that recharges the ground water aquifer; 2) verify that the aquifer recharged is the same one from which water is withdrawn by the existing wells; 3) determine the time of travel for ground water movement between the sprayfield and the wells; and, 4) evaluate water quality of treated effluent. Considering that approximately 80 percent of water pumped by WCC's wells is converted to wastewater, and assuming losses to evaporation and transpiration are between 25 and 75 percent, it is estimated that between 20 and 60 percent of the water pumped by the wells may eventually be returned to the ground water aquifer via the wastewater reclamation process, and may therefore be available for subsequent withdrawal.
- ***Obtain water reuse permit from Ecology.*** Once the wastewater treatment plant is upgraded and the appropriate studies are completed, DOC would pursue a water reuse permit with Ecology, which would allow the treated effluent to be used for ground water recharge purposes. Furthermore, DOC would request that Ecology allow the facility to withdraw this water and consider it as separate and distinct from the existing water rights.

If the permitting process for this project were successful, the facility would be able to bolster its potable water supply by a significant amount (i.e., by as much as 60 percent). DOC should consider exploring this option further prior to obtaining additional sources of supply.

6.6 Measures Under Consideration in Separate Studies

In addition to the conservation measures already implemented at the institution and those analyzed in detail above, there are three measures listed in Table 5-1 that are currently the focus of separate studies.

An analysis of alternative water use efficiency measures for the central laundry facility was underway during the course of development of the 2003 Water Conservation Plan Update. The objective of this analysis was to identify and evaluate options for reducing water use in the central laundry. Alternatives included changes to operational practices, replacement of equipment with high-efficiency machines, and installation of a water reuse system. Based upon this evaluation, a rinse water recycle and heat recovery system was selected for design and implementation. This project is anticipated to be completed by July 2003. Anticipated water savings are on the order of 50 percent of total central laundry water use, which equates to approximately 2 percent of total water production for the facility.

A project is underway to reuse wastewater treatment plant effluent for washdown purposes at the wastewater treatment plant. This measure may result in water savings of 9,250-9,500 gpd, based upon staff estimates of water used for this purpose. This equates to approximately 4.5 percent of total production. As of January 2003, the design of this system is underway.

As of January 2003, another study is underway to determine the feasibility of composting biosolids, food wastes, and landscape trimmings at the facility. While the primary focus is upon reducing solid waste and associated costs with disposal, there will likely be water savings as well. The composting of kitchen wastes may eliminate the need for the HeliClean machine, which would in turn eliminate the water used to clean and maintain the equipment (approximately 1,800 gpd).

Section 7
Conclusion

Table ES-1 in the Executive Summary provides a summary of the conservation measures that have been implemented by the Washington Corrections Center (WCC), those that are currently under detailed analysis, and the additional measures recommended for further evaluation. Due to their effectiveness in reducing recent water demands, it is recommended that the facility continue to implement all measures that have been exercised prior to the development of the 2003 Water Conservation Plan Update. The facility has also recently implemented additional water conservation activities and projects. Once these measures have been fully implemented, it is recommended that the Washington Department of Corrections take the following steps, which are discussed in greater detail in the Executive Summary, to further the WCC conservation program:

- Monitor the effect of existing conservation activities;
- Further evaluate the opportunity to increase well withdrawals via wastewater reclamation;
- Depending upon the outcome of the above activities, further consider additional conservation measures.

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Washington Corrections Center for Women

Technical Memorandum

Water Conservation Audit
Washington Corrections Center for Women
Pierce County, Washington

January 2002

ECONOMIC AND ENGINEERING SERVICES, INC.

ENERGY • RESOURCE • MANAGEMENT • CONSULTANTS

Technical Memorandum

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1.0 Background and Objective

Economic and Engineering Services, Inc. (EES) performed a water conservation audit at the Washington Corrections Center for Women (WCCW), located in Pierce County, Washington, near Gig Harbor. This facility is operated by Washington State Department of Corrections (DOC).

The purpose of the audit was to identify and evaluate means of improving the efficiency of water use at the facility. The water conservation audit included a site walkthrough, interviews with on-site personnel, and review of water consumption data from meters recording total water consumption at the WCCW. The site walkthrough, interviews, and data review occurred during 2001.

This technical memorandum presents results of the water audit, including:

- estimates of the quantity of water used for different purposes,
- identification of water-efficiency measures applicable to the facility, and
- analysis of the cost and financial benefits of carrying out these measures.

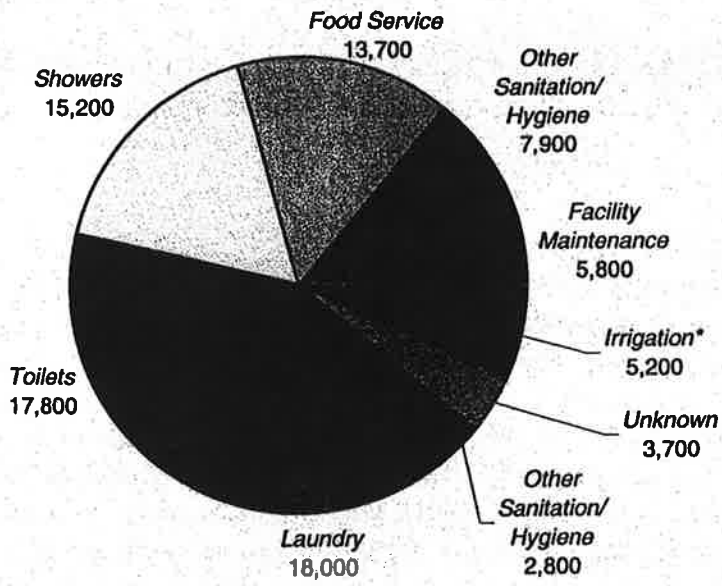
This information is intended to be used in designing an effective conservation program for the WCCW. Additional work products will be completed subsequent to this memo. These additional work products include an approach to using expanded metering to monitor water consumption and inform decisions on capital projects and operations; and an implementation plan for the WCCW water conservation program.

2.0 Summary of Findings

2.1 Water Uses

Metering data indicates that the WCCW uses an average of 90,051 gallons per day on an average, year round basis. Summer consumption is higher than non-summer consumption. An estimated breakdown of water uses at the facility is presented in Exhibit 1.

Exhibit 1
Estimated Water Usage by Category
(gallons per day)



*Irrigation uses occur mainly in summer. The value presented here is averaged over the entire year, for comparison with other uses.

The largest individual uses are:

- Laundry 18,000 gpd
- Toilets 17,800 gpd
- Showers 15,200 gpd
- Food Service 13,700 gpd

Together, these four uses account for 64,700 gpd, or approximately 72 percent of all water used at the facility.

Turf and landscape irrigation also involves significant volumes of water consumption, but this use is concentrated in the four month irrigation season. During the peak season, irrigation accounts for approximately 15 percent of the facility's consumption. On a year-round basis, however, irrigation accounts for just 6 percent of total water use.

2.2 Water Conservation Opportunities

Twenty-nine individual water conservation measures were identified for the WCCW for preliminary screening. These measures were characterized in terms of potential water savings and cost. Based on this characterization,

seven of the measures were selected for more detailed analysis of cost effectiveness. Results for these seven measures are shown in Table 1:

Table 1
Cost-effectiveness of Selected Conservation Measures

Code	Measure	Water Saved (gpd)	Net Benefit [1] per 1,000 Gal.	Payback Period [2] (yrs.)
Operations & Maintenance (O&M) Practices				
OM-1	Reduce watering; allow some or all turf to go dormant for part of summer	2,900 [3]	$0.20	Immediate
OM-2	Reduce or eliminate water as food waste disposal practice:	1,200	$3.06	Immediate
OM-3	Optimize irrigation scheduling, areal application and soil characteristics	1,300	- $1.38 [4]	N/A [4]
OM-4	Optimize laundry practices	2,700	$8.45	Immediate
OM-5	Optimize other kitchen uses of water	1,800	$8.45	Immediate
Capital Projects/Plumbing Fixtures				
C-4	Install automated shower timers	1,520	$1.51	8.3
C-5	Replace toilets with high-efficiency models	5,800	$3.52	3.4

[1] Net Benefit is the financial savings from reduced energy costs, reduced wastewater costs, etc., less the cost of implementing the measure.
[2] Payback period is calculated as the length of time needed for the net benefits to equal the initial cost of the measure, based on the accrual of water savings over time.
[3] Year-round average. Savings are approximately three times higher in summer months.
[4] The negative benefit indicates the measure costs more to implement than it saves in avoided costs. Therefore there is no financial payback.

It is important to note that some measures that do not pass a strict cost-effectiveness standard or payback-period threshold may still be worthwhile to implement, due to non-financial benefits.

In addition to the seven measures analyzed in detail above, there are three measures that were rated as potentially yielding "high" water savings, but that did not meet the criteria of "low" or "medium" costs. These measures are:

- C-1 Replace decentralized laundry machines with centralized laundry facility
- C-2 Replace dishwashing equipment with high-efficiency models
- C-3 Replace clothes washers with high-efficiency models

These measures may be worthy of further consideration, even though they are unlikely to meet a strict test of financial cost-effectiveness.

3.0 Facility Description

The WCCW occupies approximately 30 acres, and contains 29 separate buildings. It includes a Main Institution comprising medium- and high-security areas; a Minimum Security Compound; and administrative and maintenance facilities located outside the fences. The oldest portion of the WCCW is the Main Institution, constructed in 1971. Several structures were added to the Main Institution during the 1970s through 1990s. The Minimum Security Compound was constructed in 1994. Exhibit 2 displays a map of the facility, while Table 2 lists each individual building, its age and size in square feet. A new Special Needs Unit (SNU) building was under construction at the time this audit was performed; and is therefore not included.

EES reviewed data on the offender population from 1997 through 2000. The population varies from month to month, but has generally risen from 597 in July 1997 to 758 in January 2001. The peak population during this time period was 780 offenders in February 2000. For purposes of this water conservation audit, a population of 760 offenders was used. The staff level has generally increased along with population. Staffing data provided by DOC indicates a staffing level of approximately 450. The facility is staffed 24 hours a day, seven days a week.

Two water wells are located at the WCCW. However, from September 1995 through August 2000 these wells generally were not used, and DOC purchased all water for the facility from the City of Gig Harbor. In September 2000 the two wells were reactivated. DOC intends to use the wells as the primary source of supply in the future, with City water remaining available as an emergency backup supply. Wastewater from the WCCW is conveyed to the City of Gig Harbor wastewater treatment plant.

The WCCW is heated with steam generated at a central boiler plant. With one exception (a medical clinic) the buildings are not air-conditioned.

The WCCW contains several areas with irrigated turf, totaling approximately 116,000 square feet (2.7 acres). In addition, there are ornamental plantings comprising approximately 7,000 square feet (0.16 acre). Both the turf and ornamental plantings are watered using an automated, buried irrigation system.

Other specialized activities at the WCCW include two food service buildings; daily vehicle washing; a small child-care area; the medical/dental clinic; and the Prison Pet Program, which includes 28 kennels housed in a separate building.

During the site walkthrough, EES staff counted plumbing fixtures and water-using appliances at the WCCW. The most common of these are listed in Table 3.

DOC/2-00-339/exhibit1&2.cdr
July 17, 2001

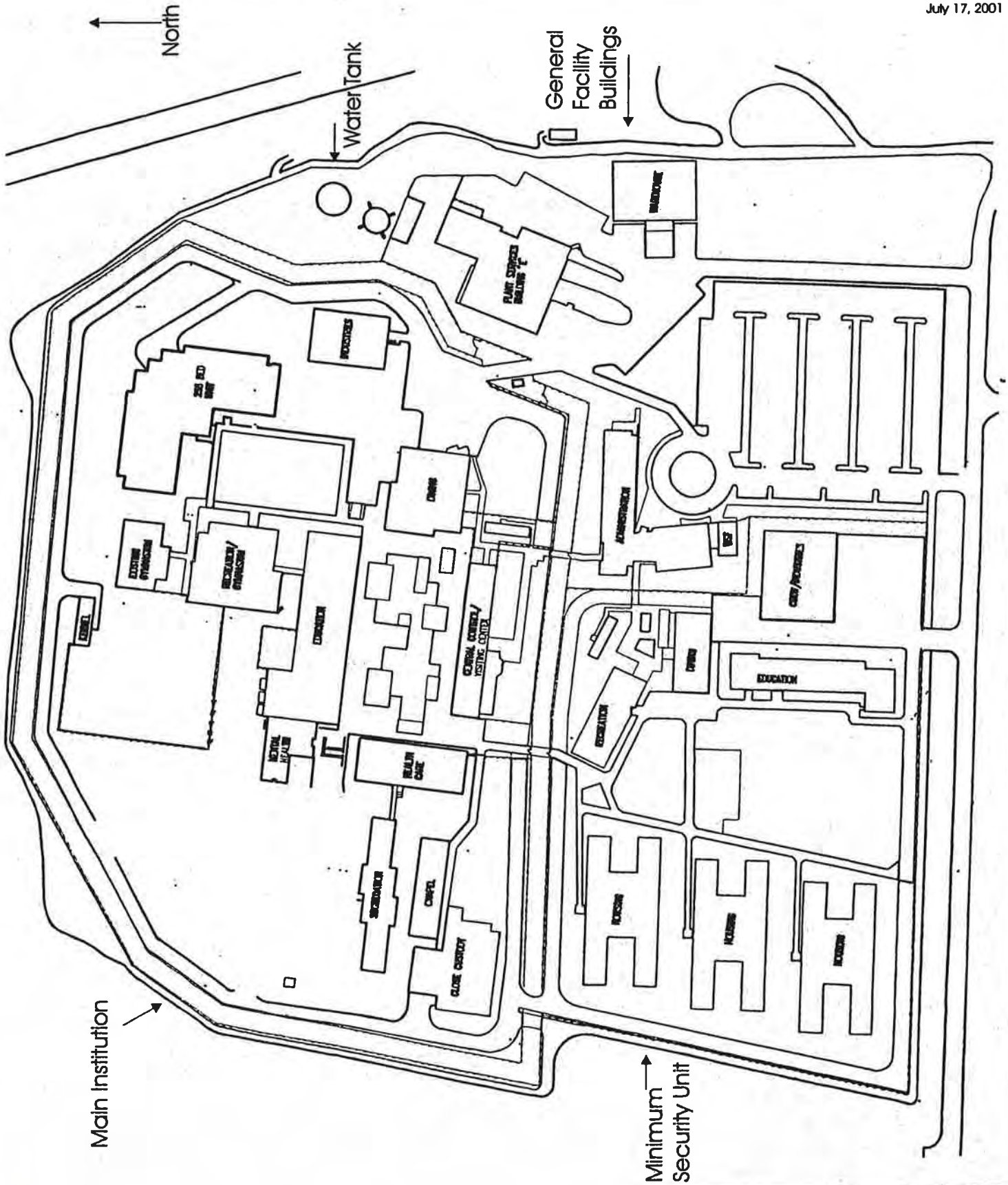


Exhibit 2
Site Layout
Washington Corrections Center for Women

Table 2
Building Data
Washington Corrections Center for Women

Building	Letter Code	Approximate Size (ft^2)	Approx. Construction Date	Approx. Date of Major Renovation (if applicable)
Main Institution:				
Administration	A	10,200	1971	1996 (addition)
Clinic	B	9,807	1971	
Education	C	21,094	1971	
Food Service	D	12,990	1971	
Segregation Unit	F	8,319	1971	
Mental Health	H	4,360	1996	
Industries	I	7,000	1984	1985 (improvements)
Visit Trailer	Q-1	830	1994	
Gymnasium	U	12,320	1996	
Existing SNU (TEC)	W	6,171	1976	
Medium-Security Unit (MSU/256)	X	40,742	1997	
Closed Custody Unit	CCU	21,265	1994	
Prison Pet Program	PPP	6,610	1996	
Chapel	---	4,352	1996	
DSHS Custody	---	1,100	1997	
Minimum Security Compound:				
Living Unit #1	J	15,240	1994	
Living Unit #2	K	15,240	1994	
Living Unit #3	L	15,240	1994	
Offices/Meeting Rm.	M	6,240	1994	
Food Service	N	5,184	1994	
School/Child Care	O	10,180	1994	
Industries	P	11,520	1994	
Visit Trailer	Q-2	830	1994	
General Facility:				
Maintenance	E	14,699	1971	
Administration	R	14,122	1994	
Warehouse	S	8,914	1996	
Armory	Y	1,400	1997	
Paint Shop	---	1,449	1978	
Guard Shack	T	134	1994	
Well No. 1	---	68	1971	
Well No. 2	---	100	1979	

Table 3
Inventory of Selected Plumbing Fixtures and Appliances

Location	Standard Toilets	Combination Toilets [1]	Urinals	Sinks [2]	Showers	Washing Machines
Main Institution	82	94	1	122	60	17
Minimum-Security Compound	69	0	1	76	44	15
Administration & Maintenance [3]	13	0	4	19	6	1
Total	164	94	6	217	110	33

[1] Combination toilets combine a toilet and sink in a single metal unit in the offender's cell. They are used in high-security units such as the Segregation Unit and Closed Custody Unit.

[2] Includes all restroom sinks and general purpose sinks. Does not include maintenance sinks or sinks in food service areas.

[3] Includes the five buildings located outside the fences (not counting guard shack and well houses).

4.0 Breakdown of Water Uses

Consumption of City water is measured by two side-by-side meters located on the City water main that services the WCCW[1]. EES reviewed water meter records provided by DOC and covering the time period July 1997 through September 2000. During this time period, all water consumed at the facility was purchased from the City. Therefore the meter records provide a useful record of total consumption. Table 4 summarizes the results of this review. Exhibit 3 displays demand information together with data on the offender population.

Table 4
Aggregate Water Use
Washington Corrections Center for Women

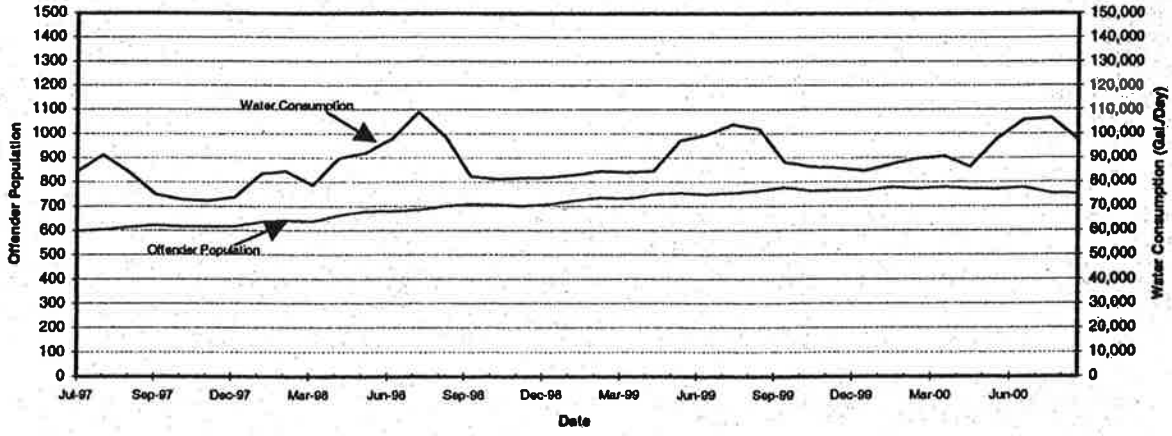
Description	Comments	Consumption	Units
Total Consumption Averaged Over 365 Days	Based on metered city water in 1999 (1999 used because 100% of water came from City of Gig Harbor)	90,051	gpd
Base Consumption [1] (Oct. – May)	Metered city water, 1999.	84,813	gpd
Summer Consumption (June – Sept.)	Metered city water, 1999.	100,527	gpd
Total Consumption Per Offender	Based on average of 760 offenders.	118	gpcd

[1] Base consumption is not seasonal in nature, and therefore occurs year-round.

Units: gpd = gallons per day; gpcd = gallons per capita per day

[1] One meter is located on the water main. The second meter measures flow through a smaller pipe that bypasses the first meter and then rejoins the water main within a single utility vault.

Exhibit 3
Monthly Population and Metered Water Consumption
July 1997 - September 2000
Washington Corrections Center for Women
(note differing scales for the two variables)



From this data several observations can be made. Water consumption has a strong seasonal component, with an increase during the June through September summer season. Base usage (i.e. usage outside the peak season) has risen gradually as the offender population has grown. Per capita usage has fallen during this period from 131 to 120 gallons per offender per day. This may be due to the fact that the offender population has risen, but the facility has not expanded physically during this time period.

The total quantity of water consumed was used to develop a water balance for the WCCW. EES used the results of the on-site walkthrough, interviews, and standard estimates from the literature on water conservation (see Bibliography) to estimate the quantity of water used for different purposes. The assumptions, calculations, and results of the water balance are summarized in Table 5. The following sections describe each major category of water use at the facility.

4.1 Turf and Landscape Irrigation

The WCCW contains approximately 1.6 acres of irrigated turf and 0.15 acre of irrigated landscaping. For purposes of this analysis, it is assumed that irrigation usage occurs primarily during the four-month period from June through September of each year. An estimate of the quantity of water used for irrigation was developed based on the differential between base use and peak season use during this four-month period. This differential is approximately 15,700 gpd (see Table 5). Irrigation use averaged throughout the entire year is approximately 5,200 gpd.

Table 5
Water Balance Worksheet[1]
Washington Corrections Center For Women (WCCW)

Category	Assumptions/Comments	Calculations	Results (gpd)
Turf and Landscape Irrigation			
Estimate of all irrigation uses in summer months only	Difference between summer consumption and remainder of year is assumed to be irrigation.	Summer consumption less base consumption[2]	15,700
Estimate of irrigation uses, year-round average	N/A	Total summer season use (15,700 gpd x 122 days) divided by 365 days in full year	5,200
Personal Sanitation and Hygiene			
Toilet flushing - offenders	7 flushes per day (fpd); average 2.5 gallons per flush (gpf)	Offenders x fpd x gpf	13,300
Toilet flushing - staff	4 fpd; average 2.5 gpf	Staff x fpd x gpf	4,500
Showers - offenders	10 minutes per day; 2.0 gpm	Offenders x minutes x gpm	15,200
Laundry – offenders and staff	600 loads per day (per DOC estimate); 30 gal. per load	loads per day x gal. per load	18,000
Faucets – offenders (personal hygiene)	3.5 minutes per day; 1.7 gpm (with aerators as observed)	Offenders x minutes x gpm	4,500
Faucets – staff (personal hygiene)	2.0 minutes per day; 1.7 gpm (with aerators as observed)	Staff x minutes x gpm	1,500
Water coolers and air-cooled ice machines (separate from food service areas)	Assume staff and offenders consume one quart per person per day, including losses; and cooling uses 100 gpd	(staff plus offenders) x (¼ gal.) plus 100 gpd	400
Leakage, etc. from domestic plumbing fixtures	Appear minimal (no leaks observed). Assume 2 gal. per offender per day. (one-fifth national average for domestic)	Offenders x gpd	1,500
		Total, Personal Sanitation and Hygiene:	58,900

Table 5 (cont)
Water Balance Worksheet[1]
Washington Corrections Center For Women (WCCW)

Category	Assumptions/Comments	Calculations	Results (gpd)
Food Service			
Total Estimated Food Service	Assume 5 gal. per meal served. Offenders 3 meals per day. Staff one meal per day.	Number of meals x gal. per meal	13,700
Facility Maintenance and Cleaning			
Daily floor mopping	285,000 square feet in facility (per DOC data); One 5-gal. bucket per 2,500 square feet; average mopped 1.5 times per day	Bucket volume x number of buckets x number of times per day	900
Other cleaning (inmate cells, counter tops, etc.)	Assume quantity similar to quantity used for mopping.	N/A	900
Vehicle washing	3,000 vehicle washes per year (per DOC estimate); assume use 5 gpm hose; 20 min. per vehicle	Minutes x gpm x washes per year divided by 365 days	800
Boiler water makeup (steam system leaks)	Staff report makeup of 2,000 gpd in cooling season; 1,200 gpd summer	2,000 gpd for 8 months, 1,200 gpd for 4 months	1,700
Annual boiler flushing/cleaning	Three boilers each have capacity of 2,500 gal. Dump one boiler every three months. Assume one-hour flushing w/fire hose equates to two additional volumes.	7,500 gal. X 4 flushings per year, divided by 365 days/year	80
Water main leakage	Assumed low. Staff report leak detection in early '90s found minimal leakage. Oldest part of facility built 1971. Much of facility built 1994 and later. Assume one percent of total annual use.	1 % x facility average daily consumption	900
Building cooling	Clinic only water-cooled system. Closed loop. Add 20 gal. to system, once per year.		0
Miscellaneous maintenance and cleaning	Assume 500 gpd, average		500
		Total Maintenance and Cleaning:	5,780

Table 5 (cont)
Water Balance Worksheet[1]
Washington Corrections Center For Women (WCCW)

Category	Assumptions/Comments	Calculations	Results (gpd)
Pet Program			
Pet bathing	5 animals bathed per day; 30 gallons per bath; 5 days out of seven	Baths x gal. Per bath x 5 days/7 days	100
Daily kennel cleaning	28 kennels washed each day; 10 gallons per kennel; 6 days out of seven	Kennels x gallons per kennel x 6/7	200
Pet drinking water	One quart per animal per day; 28 animals	Quantity per day x number of animals	10
Laundry	Assume two loads per week; 40 gallons per load	Loads x volume x divided by seven days per week	10
Miscellaneous uses	Assume 100 gpd		100
		Total Pet Program:	420
Medical Clinic			
Sinks	Assume each of the 16 sink faucets runs five minutes per hour (8-hour day) at 1.7 gpm.	Faucets x minutes x gpm	1,100
Laundry	Assume one 40-gal. load of laundry per day.		40
Bathing	Assume equivalent of two showers per day, 10 minutes, 2.0 gpm.		40
Miscellaneous uses	Assume 500 gallons		500
		Total Medical Clinic:	1,680
Child Care	Assume 8 children present 5 days per week; 5 flushes per day per child; 2.5 gpf; one laundry load per day total; 40 gal. per load. 50 gallons miscellaneous uses.	(children x flushes x gpf x 5/7) plus 40 gpd plus 50 gpd	200
Miscellaneous or Intermittent Uses	Assume 500 gpd, averaged over entire year		500
		Total of estimated uses:	**86,380**
		Total metered consumption	**90,051**
		Unaccounted-for consumption:	**3,671**

(1) This worksheet summarizes water balance assumptions, calculations and results. It should be noted that for many uses calculations are based on assumptions or limited data, and the certainty of the results is therefore limited. Uncertainty is estimated to be on the order of plus/minus 15 % in each water-use category. Values are rounded.

(2) Base consumption is usage during the non-peak season.

Units: gpd = gallons per day; gpf = gallons per flush; fpd = flushes per day; gpm = gallons per minute

4.2 Personal Sanitation and Hygiene

Personal sanitation and hygiene includes water used for showering, hand washing, toilets, and laundry. For purposes of this audit, these uses were further subdivided into estimates of water used by offenders, and water used by staff, due to the different characteristics of these uses. For example, offenders were assumed to shower once per day, while it was assumed that staff showering is essentially zero. Water use estimates were derived from a number of studies in the northwest and nationwide, including conservation studies produced by the American Water Works Association, Seattle Public Utilities, and Portland Water Bureau. These figures were combined with data on the number of inmates and staff at the WCCW. Most of the toilets at the WCCW appear to be relatively new models. No old style toilets (e.g. 5 – 7 gallon per flush) were observed during the site walkthrough. There are very few urinals at the WCCW (see Table 3).

A breakdown of personal sanitation and hygienic uses is presented in Table 5. The total consumption in this category is estimated to be 58,900 gpd. The largest individual uses within this category appear to be:

- Toilets (17,800 gpd including both offenders and staff)
- Showers (15,200 gpd for offenders only), and
- Laundry (18,000 gpd for both offenders and staff).

This category also includes an estimate of leakage from plumbing fixtures such as toilets, faucets and showers (average of 1,500 gpd; or 1 gpm for the entire facility). This estimate is at the low end of the range for leakage estimates nationwide, based on on-site observations. No leaking fixtures were observed on the day of the site walkthrough. Consistent with this observation, facility personnel reported that leaking fixtures are generally reported immediately and repaired promptly.

4.3 Food Service

There are two food services at the WCCW: one in the Minimum Security Facility and one in the Main Institution. Both staff and offenders receive meals at the food service areas. Water-using activities include general food preparation and washing, food waste disposal through sink drains equipped with a disposal system, dishwashing machines, additional wash-up of pots and pans in sinks, water served as a beverage, ice machines, and laundry processed within the food service areas. In addition, the Main Institution food service has a water-using "cook-chill" system used both for cooking foods and for bringing cooked food down to refrigeration temperatures. The kitchen refrigeration systems are air-cooled, and are therefore not considered

further. Ice machines are also air-cooled and therefore use water only for direct production of the ice. There are restrooms in both food-service areas. However, sanitary and hygienic uses are addressed separately, in Section 4.2, and are therefore not included in the Food Service category.

At this time, a detailed assessment of individual water uses within the food service areas has not been conducted. A general estimate of water use in these areas was prepared, based on national data from the restaurant industry. An average value of 5 gallons per meal served was used, based on documentation from other studies. It was assumed that each offender eats three meals per day, and each staff person one meal per day. The resulting estimate of food service water use was 13,700 gpd.

4.4 Facility Maintenance and Cleaning

Several activities are encompassed in this category. Most areas within the buildings are mopped daily, with some areas mopped two to three times each day. Inmate cells are also cleaned daily, with some attendant water use.

The WCCW's steam system experiences daily losses which can easily be quantified through review of boiler makeup records. In addition, each of the three boilers are cleaned and flushed annually. As with any water system, a certain quantity of leakage from buried water mains is expected. WCCW staff reported that water mains were tested for leaks during the early 1990s, and leakage was found to be minimal.

Only one building at the facility (the clinic) is air conditioned, and this building uses a closed-loop water cooling system. Because the system is already closed-loop, water consumption is minimal.

On the whole, water usage in this category was estimated to be 5,780 gpd.

4.5 Pet Program

The WCCW has a Prison Pet Program, housed in a separate building with a floor area of approximately 6,600 square feet. The Pet Program includes boarding of dogs owned by members of nearby communities. There are 28 individual dog kennels, which are washed daily, six days a week. Approximately five animals receive baths each day, five days a week. There is also a washing machine in the Pet Program building.

Water use in the Pet Program building is estimated to be approximately 420 gpd.

4.6 Medical Clinic

The WCCW has an on-site clinic providing medical, pharmaceutical, and dental services to offenders. The building occupies approximately 9,800 square feet. It includes one restroom for staff and another for offenders, with one sink and one toilet in each restroom. There is a dentist office with four sinks, seven examining rooms containing a total of 8 sinks and 3 toilets, three additional rooms with one sink and toilet in each, and a room with a shower and bathtub. The Clinic also has a small laundry room with one washing machine, as well as a break room for staff use. There are two autoclave units for sterilizing equipment, but these use bottled, distilled water rather than water from the WCCW water system. Water use within the Clinic is estimated to be 1,680 gpd (this estimate is subject to considerable uncertainty).

4.7 Child Care

The Minimum Security Unit includes a child-care facility. At the current time, the childcare facility provides care for approximately eight children. For purposes of this audit, however, it was assumed that on average there are five children cared for, five days a week. Including laundry and toilet use, the water use associated with childcare activity was estimated to be 200 gallons per day.

4.8 Miscellaneous or Intermittent Uses

Certain water uses are not accounted for in the uses described above, or do not occur on a regular, daily basis. For example this may include occasional, high-volume flushing of fire hydrants; unusual cleaning events, or major leaks that are repaired quickly. To account for these types of uses and events, a single estimate of 500 gallons per day was used. This represents all such uses combined, averaged over the 365-day year.

4.9 Summary of Major Uses

Based on the estimates presented in Table 5, the largest uses of water at the WCCW include:

- Toilet flushing (17,800 gpd);
- Showers (15,200 gpd);
- Laundry (18,000 gpd); and
- Food Service (13,700 gpd).

Together, these four uses account for 64,700 gpd, or approximately 72 percent of water consumption at the facility, on an average, year round basis.

Turf and landscape irrigation also involves significant volumes of water consumption, but only during the four-month irrigation season. Therefore the impact is reduced in looking at total, year-round consumption. During the peak season, irrigation accounts for approximately 15 percent of the facility's consumption. On a year-round basis, however, irrigation accounts for just 6 percent of total facility use.

5.0 Water Efficiency Measures

Based on the review of water-using activities at the WCCW, this section identifies potential water-efficiency measures that could be employed at the facility. These measures include both capital projects and changes in standard operating procedures or maintenance practices. Based on a qualitative screening of potential water savings and costs, an initial list of measures was narrowed down to seven measures for more detailed analysis. This section presents the initial set of measures and results of the qualitative screening. Following this section, Section 6.0 presents the cost analysis for the seven measures described in detail.

For each of the water uses identified in Section 4.0, there are various techniques that could be used to improve efficiency. For some water uses, either capital investments or operational modifications could result in water-use efficiencies. For example, water consumption for laundry purposes can be reduced in at least two ways: 1.) by replacing conventional washing machines with high-efficiency machines; or 2.) by modifying loading practices as necessary to ensure that machines are fully loaded when run, since partially loaded machines may use water less efficiently than fully loaded machines. In some cases, measures that target the same type of water use overlap in their effects. In other cases, alternative measures are mutually exclusive.

In the discussion and tables presented in this Task Memorandum, various alternatives are listed, some targeting the same type of water use. This should be considered at such time as specific measures are selected and an implementation program is developed.

It should be noted that some water-saving measures may have important implications for security, relationships with the offender population, and staff morale. For example, changes in operational procedures could potentially create dissatisfaction, resulting in poor performance. Reduction in the number of laundry loads washed may affect the daily routine of offenders and this should be considered. Allowing turf in some areas to go dormant for a period of time may affect the morale of some offenders and staff. On the other hand, in some cases improvements in efficiency may improve morale, by fostering staff and offender perceptions of a well-managed operation. In general, morale and security

considerations should be considered with regard to any water-efficiency measures that are candidates for implementation.

WCCW personnel reported that changes have been instituted in year 2001 that will reduce water usage, partly in response to DOC's efforts to reduce energy consumption. For example, limits have been placed on the time of day offenders can shower, to reduce showering during peak energy-consumption hours (e.g. 8-10 a.m. and 4-5 p.m.). Irrigation of turf is also being reduced. Laundry is currently being washed only using cold water. At this time it is not known whether these changes will become permanent.

5.1 Initial Screening of Potential Efficiency Measures

Table 6 lists 29 candidate measures that were identified initially, grouped into two main categories:

- Operations & Maintenance (O&M) Practices, and
- Capital Projects/Plumbing Fixtures.

Within each of these two categories, measures are ranked, first by relative water savings (high, medium or low), and then by relative cost per unit of water saved (low, medium, or high). For example, a measure that ranks high in water savings and low in unit cost would be preferred over another measure that ranks medium in water savings and high in unit cost.

Table 6 was used as a screening tool to identify those efficiency measures that appear to be most cost effective for the WCCW. The qualitative information on water savings and unit cost were used jointly to screen the measures. It was assumed that conservation measures yielding "low" water savings did not warrant detailed analysis (although some of these measures may be desirable for implementation). Similarly, measures with a "high" unit cost were not analyzed in detail. Based on this approach, all measures meeting the paired criteria shown in Table 7 were selected for more detailed analysis of cost-effectiveness:

Table 6
Screening Matrix
Water Conservation Opportunities
Washington Corrections Center for Women

Code	Category	Description	Relative Volume of Water Savings	Relative Cost Per Unit of Water Saved	Comments
OPERATIONS & MAINTENANCE (O&M) PRACTICES					
OM-1	Turf/ landscape	Reduce watering, allow turf to go dormant for part of summer	H	L	Aesthetics issue
OM-2	Food Service	Reduce or eliminate water as food waste disposal practice	H	L	Education / supervision
OM-3	Turf/ landscape	Optimize irrigation scheduling, application, and soil characteristics.	M	L	Soil type may limit savings
OM-4	Sanitation/ hygiene	Optimize laundry practices	M	L	Education/ supervision
OM-5	Food Service	Optimize other kitchen uses of water	M	L	
OM-6	Kennel	Reduce or optimize kennel cleaning practices	L	L	Health and safety considerations
OM-7	Kennel	Reduce or optimize animal bathing practices	L	L	Health and safety considerations
OM-8	Maintenance/ cleaning	Optimize vehicle washing practices	L	L	
OM-9	Maintenance/ cleaning	Optimize boiler maintenance/ cleaning	L	L	
OM-10	Maintenance/ cleaning	Optimize mopping practices and scheduling	L	L	Health and safety considerations
OM-11	Maintenance/ cleaning	Optimize general cleaning practices and scheduling	L	L	
OM-12	Maintenance/ cleaning	Find and repair plumbing leaks	L	L	Routine inspection and replacement already occurs
OM-13	Child Care	Optimize water uses	L	L	
OM-14	Clinic	Optimize water uses	L	L	May conflict with health & safety
OM-15	Food Service	Reduce or eliminate cook/chill system; replace with alternative practices	L	M	Significant operational change; may also require capital projects

Table 6 (cont)
Screening Matrix
Water Conservation Opportunities
Washington Corrections Center for Women

Code	Category	Description	Relative Volume of Water Savings	Relative Cost Per Unit of Water Saved	Comments
CAPITAL PROJECTS/PLUMBING FIXTURES					
C-1	Sanitation/ hygiene	Replace decentralized laundry machines with central laundry facility	H	H	Eliminate shipping bedding offsite; may increase water needs
C-2	Food Service	Replace dishwashing equipment with high-efficiency models	H	H	
C-3	Sanitation/ hygiene	Replace clothes washers with high-efficiency models	H	H	Energy savings
C-4	Sanitation/ hygiene	Install automated shower timers	M	M	Have tried successfully
C-5	Sanitation/ hygiene	Replace toilets with high-efficiency models – standard toilets	M	M	Facility has mix of new and old toilets
C-6	Sanitation/ hygiene	Replace toilets with high-efficiency models – special "combination" toilets in wet cells	M	H	New SNU will use high-efficiency toilets
C-7	Food Service	Replace cook-chill system with alternate technology (also see above as O & M)	M	H	
C-8	Maintenance/ cleaning	Steam lines	M	H	Energy savings
C-9	Sanitation/ hygiene	Install/maintain high-efficiency showerheads	L	L	Efficient showerheads installed early '90s
C-10	Sanitation/ hygiene	Install/maintain faucet aerators	L	L	Most faucets already have aerator
C-11	Sanitation/ hygiene	Lavatory faucet timers/ pneumatic control	L	M	Target high-use areas
C-12	Sanitation/ hygiene	Toilets – frequency-of-flush regulators	L	M	Main benefit is security-related
C-13	Maintenance/ cleaning	Find and repair water main leaks	L	H	Tested in 90's. Leakage minimal.
C-14	Maintenance/ cleaning	Purchase vehicle washing equipment	L	H	Environmental benefits.

Table 7
Paired Criteria for Screening Conservation Measures

	Relative Volume of Water Savings	Relative Cost per Unit of Water Saved
a.	High	Low
b.	High	Medium
c.	Medium	Low
d.	Medium	Medium

The following seven measures meet these paired criteria:

- *O & M Practices*

  OM-1 Reduce watering; allow some or all turf to go dormant for part of summer

  OM-2 Reduce or eliminate water as food waste disposal practice

  OM-3 Optimize irrigation scheduling, areal application and soil characteristics

  OM-4 Optimize laundry practices

  OM-5 Optimize other kitchen uses of water (i.e., besides food waste disposal)

- *Capital Projects / Plumbing Fixtures*

  C-4 Install automated shower timers

  C-5 Replace toilets with high-efficiency models

Each of these measures is described in greater detail in the following section, together with quantitative estimates of water savings and cost of each measure.

6.0 Description and Evaluation of Selected Conservation Measures

This section describes in greater detail each of the seven measures identified above. An estimate of water savings and cost is presented for each measure. In addition, the financial benefits or "avoided cost" of each measure is presented. The net benefit of each measure is the benefit (avoided cost) less the implementation cost. The net benefits of all seven measures were summarized previously in Table 1.

6.1 Implementation Costs

Based on the measure descriptions and assumptions presented in Section 6.3, an estimate was developed of the implementation cost of each measure. This implementation cost is summarized in Table 8. To facilitate comparisons, all costs are standardized in terms of cost per 1,000 gallons of water saved, over a ten-year period. Costs are in year 2001 dollars.

Table 8
Calculation of Implementation Cost
Selected Water Conservation Measures
Washington Corrections Center for Women

	Measure	Daily Water Savings (year-round) (gpd)	10-yr. Water Savings (1,000 gal.)	Capital Cost ($$ in Year 1)	Annual O&M Cost ($$/yr.)	10-yr. Cost ($$/10 yrs.)	10-yr. Unit Cost ($$/1,000 gal.)
Operations & Maintenance (O&M) Practices							
OM-1	Reduce irrigation; allow turf to go dormant for part of summer	2,900	10,579	$0	$0	$0	$0.00
OM-2	Reduce or eliminate water as food waste disposal practice	1,200	4,378	$0	$720	$7,200	$1.64
OM-3	Optimize irrigation scheduling, areal application and soil characteristics	1,300	4,742	$0	$750	$7,500	$1.58
OM-4	Optimize laundry practices	3,600	13,133	$0	$0	$0	$0.00
OM-5	Optimize other kitchen uses of water	1,800	6,566	$0	$0	$0	$0.00
Capital Projects/Plumbing Fixtures							
C-4	Install automated shower timers	1,520	5,545	$38,500	$0	$38,500	$6.94
C-5	Replace toilets with high-efficiency models	5,800	21,158	$25,000	$0	$25,000	$1.18

To determine the cost-effectiveness and payback period associated with each measure, the implementation costs shown in Table 8 must be compared with the financial savings that accrue from reduced water consumption. These financial savings, or "avoided costs" are described in Section 6.2 below.

6.2 Avoided-Cost Analysis

In financial terms the benefit of a conservation measure can be estimated as the dollar savings associated with reducing water consumption. This is termed the "avoided cost" associated with conservation actions. For each unit of water saved (e.g. 1,000 gallons), the WCCW experiences cost savings. Appendix A contains information on calculation of these avoided cost components. The main components of these cost savings are:

- Reduced energy and chemical treatment costs associated with production from WCCW wells. This is estimated to be $0.20 per 1,000 gallons of water saved (assuming $0.05 per kwh).
- Reduced wastewater fees paid to the City of Gig Harbor, for water that would be discharged as wastewater (this applies only to conservation measures affecting water that would be discharged to the sanitary sewer system). This is estimated to be $4.50 per 1,000 gallons of water saved.
- Reduced energy costs for heating water (this applies only to conservation measures that reduce consumption of hot water). This is estimated to be $7.50 per 1,000 gallons of hot water saved. However, for those uses that involve a mix of hot and cold water, a value of $3.75 per thousand gallons is used, representing equal proportions of hot and cold water.

Costs were based on recent utility bills provided by WCCW staff. It should be noted that utility charges are subject to change. In particular, costs of electricity are expected to rise due to recent events in regional electricity markets. To account for this, the electric rate used in the analysis ($0.05/kwh) is 66 percent higher than current rates ($0.03/kwh).

Generally, outdoor uses of water will mainly involve the first category only (cost of water production). Indoor uses will generally include production costs and wastewater costs, and may also involve energy savings associated with hot water. The cost components are shown in Table 9 (values are rounded).

Table 9
Components of Avoided Cost
(bolded rows are applied directly to the cost effectiveness calculations in Section 6.2)

	Type of Avoided Cost	Avoided Cost ($$ per 1,000 gal.)
a.	**Well production component**	**$0.20** [1]
b.	Wastewater component	$4.50 [2]
c.	Hot water component (at 140° F)	$7.50 [3]
d.	**Production and wastewater combined**	**$4.70**
e.	**Production, wastewater and hot water combined**[4]	**$8.45**

[1] Assumes energy cost of $0.05 per kilowatt-hour (kWh). This is higher than current rate of $0.03 per kwh, in anticipation of likely rate increases due to regional energy markets.
[2] Based on City of Gig Harbor rate. Consumption per unit charge is $3.36 per hundred cubic feet, which equates to $4.50 per 1,000 gallons.
[3] See Appendix for assumptions and calculations. Value reported is for hot water, unmixed with cold water.
[4] Various end uses mix hot and cold water in different ratios. Value reported here assumes 50% hot and 50% cold water. Therefore, the hot water component of avoided cost is halved to $3.75 per 1,000 gallons, before being added to item "d".

For each of the seven measures described below, the appropriate avoided cost was applied to the cost-effectiveness analysis.

6.3 Savings and Costs of Selected Water Conservation Measures

This section describes the seven measures that passed the initial screen, and summarizes water savings, costs, and cost-benefit information. In order to provide a consistent basis for comparison, all costs were calculated on the basis of water savings and financial costs over a ten- year period.

OM-1 Reduce Watering; Allow Some or All Turf to go Dormant for Part of Summer

One measure involving landscape irrigation at the WCCW is reduction of water applications on turf areas, to the minimum needed to keep grass alive. Turf grasses have a natural adaptation that allows them to go dormant during periods of low moisture. In western Washington, the period of lowest rainfall typically occurs from July through September of each year. The fullest implementation of this measure would involve reducing irrigation to very low levels (not zero) during these three months. As developed here, this would not include ornamental landscaping. Ornamental landscaping would receive a full allotment of irrigation throughout the dry months[2].

This measure offers flexibility, both in terms of the areas where watering is reduced, and the time period involved. For example, one permutation could be reduced watering in one-half of the turf areas (to be selected based on facility priorities); for only one-half of the time period (e.g. from August 15 through September 30). Of course, this scaled-down example would reduce the water savings achieved.

For purposes of this analysis, it was assumed that irrigation uses on turf during the period covered represent two-thirds of irrigation applied to turf. Based on the respective areas devoted to turf and ornamental landscaping, it was assumed that 95 percent of irrigation use is applied to turf. It was further assumed that the turf areas would still receive irrigation at a level of 10 percent, compared with current application during the dry months. Based on these assumptions, this measure would reduce daily water consumption (year-round average) by approximately 2,900 gpd. Savings would be considerably higher (approximately 8,700 gpd) during the irrigation season. All water saved would be cold water, and there would be no wastewater benefits.

The cost of this measure in financial terms is zero. It would require a modest increase in attention from facility staff, to modify the irrigation schedule at the beginning and end of the months selected. The avoided cost yielded by

[2] One measure that has not been discussed is modification of some turf areas to permanent, drought-tolerant ornamental landscaping. This represents an additional option, that would depend on specific facility needs.

this measure is $0.20 per 1,000 gallons (line "a" from Table 9). Because the financial cost of the measure is zero, the payback period is also zero. In other words, financial savings would begin immediately upon implementation of this measure. Costs and benefits are summarized as follows:

OM-1 Reduce Watering	
Measure Cost (per 1,000 gal.)	$0.00
Measure Benefit (Avoided Cost, per 1,000 gal.)	$0.20
Net Benefit (per 1,000 gal.)	$0.20
Payback Period (years)	Immediate

This measure would reduce the amount of green turf at the facility, and could affect morale and perceptions by staff, offenders and visitors. This consideration, however, could be managed by carefully selecting the areas and timing of the irrigation reduction, as discussed previously.

OM-2 Reduce or Eliminate Water as Food Waste Disposal Practice

Use of water for disposing of food waste is a common practice in institutions, restaurants, hotels and homes. In both food service areas at WCCW, sinks equipped with waste disposal equipment are used for this purpose. Water carrying food waste is then discharged to the sanitary sewer system.

This practice, if eliminated, would likely produce a significant reduction in kitchen water uses. This measure would involve switching to a solid waste alternative for disposal of food wastes. For example, dishes and cooking equipment would be scraped into trash receptacles, reducing or eliminating part of the rinsing process prior to dishwashing. Another alternative could involve developing on-site composting suitable for handling food wastes (together with landscaping wastes). Some water would still be required for disposal of a limited quantity of food waste (e.g. liquids and semi-liquids). It should be recognized that this would generate an increase in solid waste generated at WCCW.

As part of this water conservation audit, total water use by the two food service areas is estimated to be 13,700 gpd. It is assumed that food waste disposal accounts for 10 percent of this use, or approximately 1,370 gpd. If the use of water for food waste disposal were reduced by 90 percent, this would yield average daily savings of approximately 1,200 gpd.

The cost of this measure with regard to operations within the kitchen is essentially zero in financial terms. However, as noted above, there would be

a net increase in solid waste disposal costs. This increase is difficult to estimate, since the volume of food-waste disposed in this way is not known. A recent bill from American Disposal indicates a monthly cost of $1,247 for disposal of solid waste. If the volume of solid waste increased by 5 percent, this would increase costs by roughly $60 per month, or $720 per year. This equates to $1.97 per day. Based on the estimated water savings at 1,200 gpd, the cost of added solid waste disposal is therefore estimated to be $1.64 per 1,000 gallons. This estimate has a high-level of uncertainty.

This measure would require training of staff and offenders assigned to food service, and could potentially create dissatisfaction among food service personnel asked to change long-standing practices involving cleanup duties.

This measure would provide a financial benefit, in terms of the avoided cost of water used in current food-waste disposal practices. It is assumed that all water saved by this measure would be cold water. Therefore, the avoided cost includes production costs and wastewater disposal costs, but does not include hot water costs. From Table 9 (line "d"), the avoided cost is therefore $4.70 per 1,000 gallons of water saved. Comparing this value with an estimated cost of $1.64 per thousand gallons (see above) indicates this measure would be cost effective. Since there is no up-front capital cost, the payback period is zero. In other words, financial savings would begin immediately upon implementation of this measure. Costs and benefits are summarized as follows:

OM-2 Reduce or Eliminate Water as Food Waste Disposal Practice	
Measure Cost (per 1, 000 gal.)	$1.64
Measure Benefit (Avoided Cost, per 1,000 gal.)	$4.70
Net Benefit (per 1,000 gal.)	$3.06
Payback Period (years)	Immediate

OM-3 Optimize Irrigation Scheduling, Application and Soil Characteristics

The WCCW has an in-ground, automated irrigation system covering approximately 116,000 square feet (2.7 acres) of turf and an additional 7,000 square feet (0.16 acre) of ornamental landscaping. These systems can be highly efficient if they are properly calibrated and maintained. However, several factors can cause inefficient water usage, such as sprinkler heads that are aimed improperly or located in the wrong place, a watering schedule that is inappropriate for the soil moisture conditions prevailing during a given month; watering that occurs during or soon after rainfall episodes; and uneven application rates that provide too little water in some areas and too much in others.

In addition to these factors with regard to the irrigation system, soil characteristics and maintenance practices affect water consumption. Practices such as top-dressing turf with organic material, aerating soil annually, modifying mowing practices, and modifying fertilizer types and application all can reduce the quantity of moisture taken up by turf.

Similar practices, including adding organic matter and mulching, use of perennial plants instead of annuals, and use of plants that tolerate dry conditions in summer, can reduce the quantity of water needed by ornamental landscaping.

This measure would involve contracting with an irrigation professional for annual or biennial inspection of the sprinkler system for the purpose of optimizing the timing and application rates. In addition, this measure would involve annual additions of organic matter to soil in irrigated areas, together with modification of mowing and other practices, in consultation with a landscape professional.

Based on estimates that have been developed for other, similar conservation studies, it is assumed that this measure can reduce summer irrigation usage by 25 percent. This represents a year round average of approximately 1,300 gpd. During the summer irrigation season, savings would be considerably higher: estimated at approximately 3,900 gpd. All savings would be cold water, and there would be no wastewater benefits.

Costs of this measure are based on the following assumptions: $500 every other year, for services of outside contractors (irrigation and landscape professionals); and $500 every year for soil amendments. This results in an average annual O & M cost of $750. The avoided cost is $0.20 per 1,000 gallons of water saved (Table 9, line "a"). Based on these assumptions, the unit costs (from Table 8) and benefits (from Table 9), averaged over a ten-year period, are estimated to be:

OM-3 Optimize Irrigation Scheduling, etc.	
Measure Cost (per 1,000 gal.)	$1.58
Measure Benefit (Avoided Cost, per 1,000 gal.)	$0.20
Net Benefit (per 1,000 gal.)	-$1.38
Payback Period (years)	N/A

Based on this information, this measure is not cost-effective. It will cost more to conserve water using this measure, than the water costs to produce, and therefore the payback period does not apply. This does not necessarily

mean the measure should not be implemented. It simply means this measure should not be implemented solely on the basis of expected cost-savings. It is worth noting that the annual cost is relatively low. Furthermore, this measure, if implemented as designed, would result in essentially no change in perceptions on the part of staff, offenders or visitors regarding the quality of turf and ornamental landscaping at the WCCW.

OM-4 Optimize Laundry Practices

Currently laundry at the WCCW is washed in decentralized machines located throughout the facility. Offenders wash their own laundry and some staff uniforms. Some bedding is shipped offsite for laundering at McNeil Island. In addition to personal clothing, linen and uniforms, laundry includes items from various specialized activities such as the Clinic, child-care, pet program, food service, etc.

Because of the decentralized nature of laundering, it is likely that laundry practices do not use water as efficiently as possible. One solution might be construction of a centralized laundry facility. This measure is listed in the initial screening matrix (Table 6), but was not analyzed in detail due to the high cost involved. A different solution would be altering laundry practices within the decentralized system, to improve overall efficiency of water use. The main way of accomplishing this is to minimize running of washing machines with partial loads. In some areas of the facility, it is likely that partial loads are typical, while in other areas full loads may be typical. This measure would involve identifying these differences and altering practices to reduce or eliminate partial washing machine loads.

For purposes of this analysis, it is assumed that implementation of this measure could reduce water consumption for laundering by 15 percent. Total water use for laundering is estimated to be 18,000 gpd. A 15 percent reduction is equivalent to approximately 2,700 gpd.

The cost of this measure is essentially zero in financial terms. However, this measure would require training, and could potentially cause dissatisfaction among staff and offenders asked to modify long-standing practices or experience inconvenience related to laundered items. In addition, facility staff indicated that the WCCW's steam-based system for heating water is not currently capable of producing hot water meeting health department standards for laundering of mixed loads (i.e., loads including clothing from more than one person). This issue would need to be addressed as part of a review of laundry optimization, and may involve costs to correct.

The water uses involved in this measure would likely involve a combination of hot and cold water. Assuming 50 percent hot and 50 percent cold water, the avoided cost from Table 9 (line "e") would be $8.45 per 1,000 gallons. There would likely be additional cost savings from reduced use of detergent. Because the financial cost of the measure is zero, the payback period is also zero. In other words, financial savings would begin immediately upon implementation of this measure.

Costs and benefits are summarized as follows:

OM-4 Optimize Laundry Practices	
Measure Cost (per 1,000 gal.)	$0.00
Measure Benefit (Avoided Cost, per 1,000 gal.)	$8.45
Net Benefit (per 1,000 gal.)	$8.45
Payback Period (years)	Immediate

OM-5 Optimize Other Kitchen Uses of Water

Because food service represents a significant component (estimated 15 percent) of daily water usage at the WCCW, examining other O & M practices is likely to yield additional savings. For example, ensuring dishwashers are run at full capacity, ensuring washing machines in the food service area are run at full capacity, reducing flow levels or faucet run times for certain types of sink uses, and reviewing use of the cook-chill system may permit additional reductions in food-service water uses. This measure (or collection of practices) would require discussion with food-service personnel, and training of staff.

For purposes of this audit, it is assumed that other water uses (not food waste disposal) account for 90 percent of all water used in the food service areas (i.e. an estimated 12,330 gpd). It is further assumed that review and modification of O & M practices could reduce these uses by 15 percent, or roughly 1,800 gpd.

The cost of this measure is essentially zero in financial terms. However, this measure would require training, and could potentially cause dissatisfaction among food-service personnel asked to modify long-standing practices

The water uses involved in this measure would likely involve a combination of hot and cold water. Assuming 50 percent hot and 50 percent cold water, the avoided cost from Table 9 (line "e") would be $8.45 per 1,000 gallons. Because the financial cost of the measure is zero, the payback period is also

zero. In other words, financial savings would begin immediately upon implementation of this measure.

Costs and benefits are summarized as follows:

OM-5 Optimize Other Kitchen Uses of Water	
Measure Cost (per 1,000 gal.)	$0.00
Measure Benefit (Avoided Cost, per 1,000 gal.)	$8.45
Net Benefit (per 1,000 gal.)	$8.45
Payback Period (years)	Immediate

C-4 Install Automated Shower Timers

Showering accounts for an estimated 17 percent of water consumption at the WCCW. Therefore it represents a significant potential for water savings.

Facility staff reported that low-flow showerheads were installed on all showers in the facility during the early 1990s, as part of a conservation initiative from the City of Gig Harbor. Therefore, low-flow showerheads are not considered here as a conservation opportunity.

Facility staff reported that they have experimented with shower timers, which can be pre-set to run for a given length of time. These appear to be successful. However, they have the potential to cause dissatisfaction among inmates, leading to vandalism and associated maintenance needs.

This measure assumes that showers throughout the facility are retrofitted with shower timers. It is assumed that timers are set in such a way as to reduce the overall volume of showering by ten percent on a daily basis. This would yield 1,520 gpd in water savings.

The cost of retrofitting with shower timers is estimated to be $350 per shower. Based on this cost, it would cost $38,500 to retrofit all 110 showers at the facility. On a unit basis, this is equal to $6.94 per thousand gallons (see Table 8). Water saved would be a combination of hot water and cold water. It is assumed that the water saved would be approximately 50 percent hot water and 50 percent cold water. Based on these assumptions, the avoided cost from Table 9 (line "e") would be $8.45 per 1,000 gallons. Therefore, this measure is cost effective at the WCCW. The payback period would be approximately 8.3 years. The costs and benefits of this measure are summarized as follows:

C-4 Install Automated Shower Timers	
Measure Cost (per 1,000 gal.)	$6.94
Measure Benefit (Avoided Cost, per 1,000 gal.)	$8.45
Net Benefit (per 1,000 gal.)	$1.51
Payback Period (years)	8.3

C-5 Replace Toilets with High-efficiency Models

Water consumption related to toilets can be reduced by replacing older toilets with high-efficiency models that use only 1.6 gallons per flush (gpf). Most toilets at the facility are flushometer–type toilets. Older models typically use 2.5 to 5 gallons per flush.

Toilets manufactured and sold in the U.S. since 1993 are high-efficiency models. The WCCW includes a mix of buildings constructed before 1993 and since 1993 (see Table 2). In addition, it is likely that many of the toilets in older buildings at the facility have been replaced due to normal aging and turnover. This turnover will continue to occur over time, so that eventually all of the toilets in the facility would be high-efficiency models (assuming the Plumbing Code continues to require high-efficiency models). The new SNU building currently under construction will have 105 wet cells, each with a high-efficiency combination toilet. Given this, a program to replace older toilets with high-efficiency models would essentially accelerate a trend that is already in progress at the facility.

As noted previously, there are approximately 150 standard toilets at the WCCW, and an additional 94 "combination" toilets in the wet cells of the Main Institution's Segregation Unit and Closed Custody Unit. Most of these combination toilets will be eliminated when the new SNU is completed and offenders are transferred to the new building. Therefore, the 94 offenders in those units were subtracted from the 760 offenders in the facility. It was assumed that the remaining offenders each flush toilets seven times per day, and that the 450 staff each flush toilets four times per day. It was assumed that installation of tank displacement devices would reduce flushes by an average of 0.9 gpf. This was based on the assumption that the mix of old and new toilets currently at the facility results in an average of 2.5 gpf, and that installation of high-efficiency models would reduce this figure to 1.6 gpf. Based on these assumptions, average daily water savings are estimated to be approximately 5,800 gpd.

The cost of this measure was estimated based on the assumption that 100 toilets require retrofitting at a cost of $250 per toilet. Spread over a ten-year

time period, this results in an estimated cost of $1.18 per 1,000 gallons saved (see Table 8).

This measure involves an avoided cost associated with production of well water and wastewater disposal. Hot water is not involved in this measure, so there are no hot-water energy savings included in the avoided cost. The appropriate avoided cost comparison is therefore $4.70 per 1,000 gallons, from Table 9 (line "d"). Based on this comparison, this measure is cost effective with a net financial savings of $3.52 per 1,000 gallons of water saved. At an up-front capital cost of $25,000, the payback period is estimated to be approximately 3.4 years. Costs and benefits of this measure are summarized as follows:

C-5 Replace Toilets with High-Efficiency Models	
Measure Cost (per 1,000 gal.)	$1.18
Measure Benefit (Avoided Cost, in per 1,000 gal.)	$4.70
Net Benefit (per 1,000 gal.)	$3.52
Payback Period (years)	3.4

This measure raises issues with regard to potential dissatisfaction among offenders and staff. It should be noted that some toilet models perform better than others. If this measure is implemented, careful attention should be given to selecting the appropriate brand and model for effective performance.

6.4 Additional Measures Not Analyzed in Detail

In addition to the seven measures analyzed in detail above, there are three measures from Table 6 that were rated as potentially yielding "high" water savings, but that did not meet the criteria of "low" or "medium" costs. These measures are:

C-1	Replace decentralized laundry machines with centralized laundry facility
C-2	Replace dishwashing equipment with high-efficiency models
C-3	Replace clothes washers with high-efficiency models

These measures may be worthy of further consideration, even though they are unlikely to meet a strict test of financial cost-effectiveness.

7.0 Role of Water Metering

Installation of water meters at WCCW and other DOC facilities has been identified as a potential capital project for future years. As part of this overall project, EES is also tasked with developing a program for management and use of water metering data. This program will be included in a separate deliverable.

A well-designed metering program at WCCW could greatly improve quantification of water consumption, and thereby contribute to implementation and ongoing management of conservation initiatives. For example, metering data could be used to track water consumption before and after specific conservation measures are implemented. Water uses that are location-specific, such as those in the food services and clinic, can be measured to a fairly high degree of precision. Estimates of uses that are diffused throughout the facility will continue to be difficult to isolate, but estimates can be greatly improved from current estimates, when meters are in place.

8.0 Implementation Program

As part of this overall project, EES is also tasked with developing an implementation plan for the conservation measures that are selected for implementation. This plan will be included in a separate deliverable, after DOC staff have reviewed this memorandum and identified the measures which are most likely candidates for implementation.

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Appendix A
Avoided Cost Calculations

Utility Fee Summary For WCCW

Electric

Peninsula Light Company
Total bill: $17,762 Billing period reviewed: April 2001
Electric Basic Charge – Remains constant with conservation
Demand Charge = demand rate (peaking charge*, variable upon usage) x $4.83 (constant)
Demand charge will reduce with conservation
KWH Energy Consumption = $0.03175 (constant) x KWH
Will reduce with conservation

Notes:
* A meter at the facility reads the kilowatts used every 15 minutes. The meter is then checked monthly and the highest 15 min. reading for the month is considered the peak charge or demand rate.

- ❑ In general, will save $0.03/KWH of reduced power consumption.

Gas

Puget Sound Energy
Total bill: $37,104 Billing period reviewed: April 2001
Distribution Charge - first 1,000 therms @ $.1955(constant)
Remain constant with 10 percent conservation
Distribution Charge – (remaining therms over 1,000) @ $.12624 (constant)
Will reduce with conservation
Cost of Gas – total therms used x $.6638(constant)
Will reduce with conservation
Gas Conservation Program Charge – total therms used x .00089
Will reduce with conservation

Notes:
- ❑ WCCW used a total of 46,672 therms in April.
- ❑ In general save $0.79 per therm saved.

Sewer

City of Gig Harbor
Total bill: $8,584 Billing period reviewed: March and April 2001
Flat rate - $150.00 (constant)
Consumption per unit charge – hundred cubic feet (CCF) x $3.36 (constant)
Will reduce with conservation

Solid Waste

American Disposal (food scraps, etc.)
Total bill: $1,247 Billing period reviewed: May 2001
(1) 6-yard container is $286.19 per month for weekly pickup
(1) 4-yard container is $210.37 per month for weekly pickup

Notes:
- ❑ In May (2) 6-yard containers and (3) 4-yard containers were picked up weekly
- ❑ 10 percent reduction would be 2.4 yards, or less than (1) 4-yard container

WCCW Estimated cost for pumping water from Well 2R.

A. Assumptions

Water Use

90,051 Annual Average Daily Demand (gallons)
32,868,615 Total Annual water use (gallons)

Annual pump operating time

100 Pump Capacity (gpm)
328,686 Minutes
5,478 Hours
228.25 Days
62.5% Percent of time operating

Pump Characteristics

25 Pump Horsepower
18.75 Pump kW

Annual Operating Activities

102,714 kWh per year

B. Total Costs for Operating Pumps

(at differing costs per kWh)

Energy Unit Cost[1]	Annual Energy Cost	Annual Chemicals Cost[2]	Total Annual Cost	Cost/1,000 gallons
$0.03/kWh	$ 3,081.43	$ 1,000.00	$ 4,081.43	$ 0.124
$0.05/kWh	$ 5,135.72	$ 1,000.00	$ 6,135.72	$ 0.187
$0.10/kWh	$ 10,271.44	$ 1,000.00	$ 11,271.44	$ 0.343

[1] Current rate from Peninsula Light is $0.03/kwh
[2] Estimated

Methodology for Estimating Natural Gas Savings in Hot Water Applications

Dziegielewski et al. (1993) provide calculations for estimating energy savings associated with hot water usage. The following formula was adapted from their work:

$$ES = 8.34 * (T_f - T_i) * (1/e)$$

Where:

ES = energy savings, in BTU per gallon

8.34 = energy (BTU) required to raise one gallon of water by 1° F

T_f = final temperature of heated water (° F)

T_i = initial temperature of unheated water (° F)

e = percent efficiency of water-heating, expressed as a unit-less decimal

For purposes of this water conservation audit, the following assumptions and conversions were applied:

$T_f = 140°$ F

$T_i = 55°$ F

e = 75 %

(Note: Dziegielewski et al. suggest e = 79% for gas-fired water heaters. This value was reduced slightly to account for loss of efficiency in heat exchangers that transfer heat from steam lines at the facility.)

BTU's were converted to therms, using a conversion factor of 1 therm = 100,000 BTU

Finally, the results were converted to therms per 1,000 gallons.

Application of this methodology yielded an estimate of 9.45 therms per 1,000 gallons of water heated to 140° F.

C-6
Coliform Monitoring Plans

Cedar Creek Corrections Center

COLIFORM MONITORING PLAN

System Information

WATER SYSTEM NAME			COUNTY	SYSTEM I.D. NUMBER
Cedar Creek Corrections Center			Thurston	11882-7
PEAK POPULATION SERVED: 400			SERVICE CONNECTIONS	
SOURCE	DOH SOURCE NUMBER: S01	CATEGORY: Well		WELL DEPTH: 200'
TREATMENT	TREATMENT PROCESS: Cl2	PURPOSE: Disinfection	STORAGE	STORAGE CAPACITY: 173,000

Sampling Information

NUMBER OF ROUTINE SAMPLES REQUIRED MONTHLY BY REGULATION		NUMBER OF SAMPLE SITES NEEDED TO REPRESENT THE DISTRIBUTION SYSTEM	

	TYPE	SITE #	LOCATION
D SAMPLE SITE GROUP	ROUTINE	A206	Kitchen
	REPEAT	A406	EFV
	REPEAT	A306	Medical
	REPEAT	A106	AIP we
J SAMPLE SITE GROUP	ROUTINE	A912	ADMIN
	REPEAT	A908	Cascade
	REPEAT	A914	Olympic
	REPEAT	A913	Warehouse
7 SAMPLE SITE GROUP	ROUTINE	D3	DNR Foreman Hut
	REPEAT	D4	DNR Carpentry Shop
	REPEAT	D10	White House
	REPEAT	D2	Black Hills Office

Additional Sampling Information

WATER SYSTEM NAME: CEDAR Creek Corrections Center

	TYPE	SITE #	LOCATION
P SAMPLE SITE GROUP	ROUTINE	T906	MAINTENANCE
	REPEAT	T206	T-LINE
	REPEAT	T106	GYM
	REPEAT	T806	W.W.T.P
SAMPLE SITE GROUP	ROUTINE		
	REPEAT		
	REPEAT		
	REPEAT		
SAMPLE SITE GROUP	ROUTINE		
	REPEAT		
	REPEAT		
	REPEAT		
SAMPLE SITE GROUP	ROUTINE		
	REPEAT		
	REPEAT		
	REPEAT		
SAMPLE SITE GROUP	ROUTINE		
	REPEAT		
	REPEAT		
	REPEAT		

PAGE #____

For maximum coverage of different branches of the distribution system, a decision to rotate the required routine sample(s) among different sample sites may be made. It is recommended that ROUTINE sampling sites be tested about 4 times per year or more often.

ROTATION SCHEDULE

MONTH	SAMPLE SITE(S)	MONTH	SAMPLE SITE(S)
JANUARY	ADMIN	JULY	DNR
FEBRUARY	MAINT	AUGUST	Kitchen
MARCH	DNR	SEPTEMBER	ADMIN
APRIL	Kitchen	OCTOBER	MAINT
MAY	ADMIN	NOVEMBER	DNR
JUNE	MAINT	DECEMBER	Kitchen

The month after a coliform positive sample, five follow-up samples must be submitted. Describe below the method of selecting the follow-up sites. Sites designated as other sampling sites may be also used. List any sites which will routinely be used as follow-up sites.

MONTH AFTER FOLLOW-UP SAMPLE SITES
We will sample from our entire distribution System The Month following A Coliform Positive sample. Our five follow up Sample collection sites will be ADMIN, MAINT, DNR, Kitchen and W.W.T.P This a looped system.

PREPARATION INFORMATION

SYSTEM NAME	DATE PLAN COMPLETED	DATES MODIFIED
Cedar Creek Correction Center	Feb 18, 1998	
NAME OF PLAN PREPARER / POSITION		DAYTIME PHONE # ( )
STATE REVIEWER	DATE LAST REVIEW	

PAGE # ___

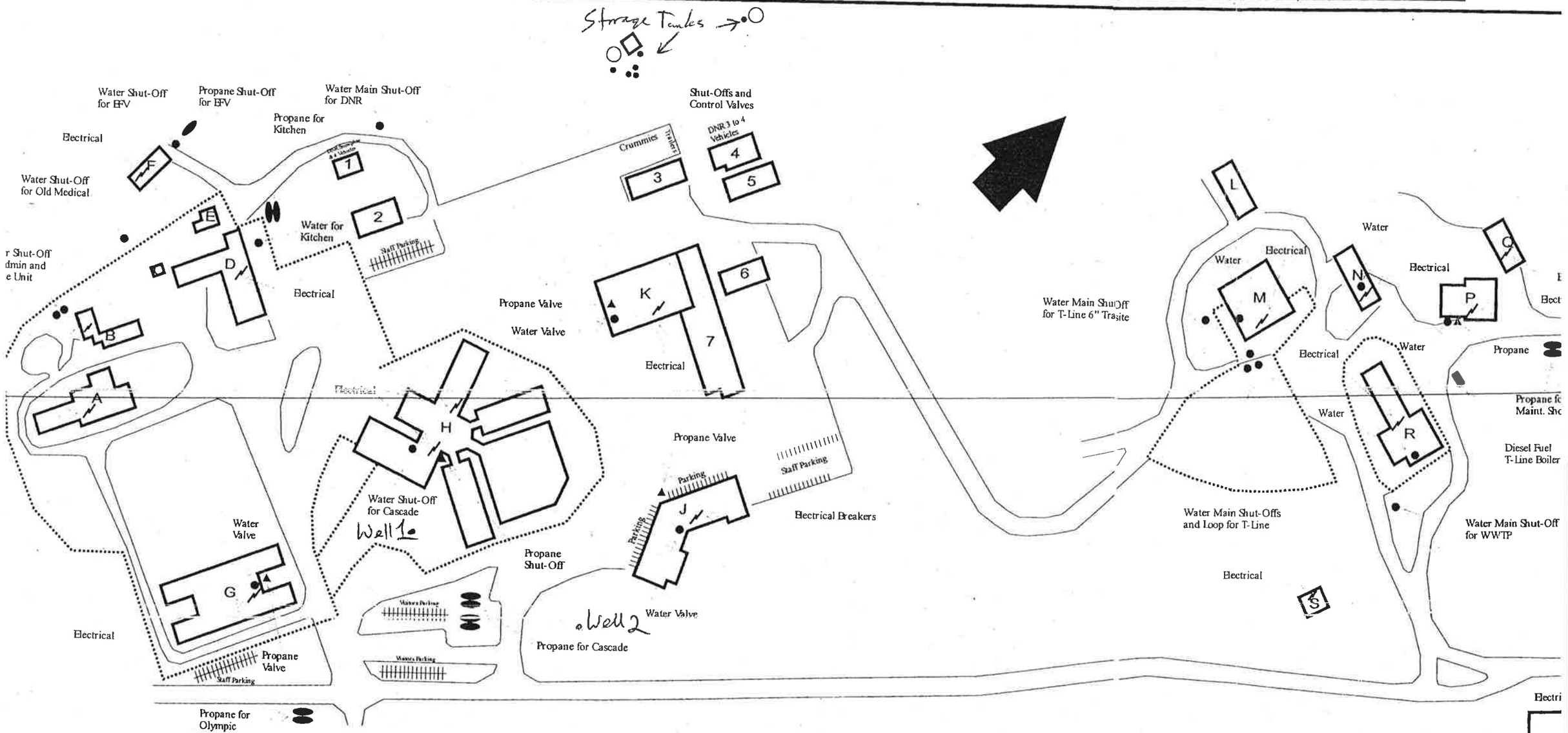
F. Family Visiting

Electrical Shut-Off: Panels in each unit
Hot Water Shut-Off: Pipechase (back of unit)

Water Shut-Off: Meter Box outside south and Warehouse Rm. 100
Hot Water Shut-Off: South end of warehouse mezzanine
Gas Shut-Off: Valve outside S. End Warehouse 100 / Laundry 101

S. Chapel

T. Waste Water Treatment



Larch Corrections Center

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
LARCH CORRECTIONS CENTER

CLARK COUNTY WASHINGTON

LCC Env. Drink Water

COLIFORM MONITORING PLAN

G & O #99846.02

DECEMBER 1999

Gray & Osborne, Inc.
CONSULTING ENGINEERS
701 DEXTER AVENUE NORTH SUITE 200
SEATTLE, WASHINGTON 98109 • (206) 284-0860

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
LARCH CORRECTIONS CENTER

CLARK COUNTY **WASHINGTON**

COLIFORM MONITORING PLAN

12-22-99

EXPIRES: 2-14-2000

G & O #99846.02

DECEMBER 1999

Gray & Osborne, Inc.
CONSULTING ENGINEERS
701 DEXTER AVENUE NORTH SUITE 200
SEATTLE, WASHINGTON 98109 • (206) 284-0860

COLIFORM MONITORING PLAN

The following is the Coliform Monitoring Plan for the Larch Corrections Center (LCC) Water System, Washington State Department of Health (WSDOH) ID #NR4403, owned by the Washington State Department of Corrections (WSDOC). This Coliform Monitoring Plan is intended to provide guidance to the water system operator at the Larch Corrections Center and to WSDOC regarding routine coliform requirements and follow-up actions required in the event of a coliform detection.

This Coliform Monitoring Plan meets the requirements of WAC 246-290-300 (3) (b) and the WSDOH document entitled "Preparation of a COLIFORM MONITORING PLAN" revised February 1992. Pursuant to WAC 246-290-300 (3) (b) this plan must be kept on file at the water system, made available for inspection by WSDOH on request, revised or expanded as needed or as directed by WSDOH and submitted to WSDOH for review and approval when requested or as part of a water system plan.

This plan includes basic system information, the routine coliform bacteria sampling requirements, follow-up requirements in the event of a coliform detection or a maximum contaminant level violation, routine sample site locations and schedule, repeat sample site locations, a map of sample site locations and forms for public notification in the event of coliform contamination.

SYSTEM INFORMATION

The following table summarizes water system information pertinent to this Coliform Monitoring Plan:

Water System Name		**Larch Corrections Center**	
WSDOH Water System ID No:		NR4403	
Residential Population: 400		Non-Residential Population: 110	
Source	WSDOH Source No.	Depth	Treatment
Well #1	S01	124 ft.	Chlorination
Well #2	S02	160 ft.	Chlorination
Well #3	S03	200 ft.	Chlorination

COLIFORM BACTERIA SAMPLING REQUIREMENTS

Sampling requirements for bacteria are dependent on the population served by the water system. The number of samples required based on system population is summarized in the following table. **LCC is required to take 1 routine coliform sample per month so long as no coliforms were detected in any samples during the preceding month and five routine samples if any coliforms were detected in any samples during the previous**

take four repeat samples any time a routine sample is positive. The following table summarizes repeat sample requirements.

No. of Routine Samples Collected Each Month	No. of Samples in a Set of Repeat Samples	Locations for Repeat Samples (Collect at least one sample per site)
1	4*	• Site of previous sample with a coliform presence • Within 5 active services upstream of site of coliform presence • Within 5 active services downstream of site of coliform presence • At any other active service
>1	3	• Site of previous sample with a coliform presence • Within 5 active services upstream of site of coliform presence • Within 5 active services downstream of site of coliform presence

*Number of repeat samples required for LCC.

COLIFORM BACTERIA SAMPLING REQUIREMENTS FOR LCC

Conditions	Samples Required
Minimum Number of Routine Monthly Samples for LCC	1
Minimum Number of Repeat Samples When Coliforms Are Detected	4
Minimum Number of Routine Monthly Samples During a Month when ANY samples with a coliform presence were collected during the previous month	5

SAMPLE SITE LOCATIONS

Following are the routine and repeat sampling location for LCC. A map showing the sample site locations is included in Appendix B of this report.

Routine Sample Site Number	Repeat Sample Site Number and Location	Routine Sample Site Number	Repeat Sample Site Number and Location
1	1 - Upper Program Area	3	3 - Admin. / DNR Offices
	5 - Lower Program Area		7 - Kitchen
	6 - Boiler Room		8 - Silver Star Living Unit
	2 - Wastewater Treatment Plant		2 - Wastewater Treatment Plant
2	2 - Wastewater Treatment Plant	4	4 - Elkhorn Living Unit
	5 - Lower Program Area		8 - Silver Star Living Unit
	1 - Upper Program Area		9 - DNR Shop
	4 - Elkhorn Living Unit		2 - Wastewater Treatment Plant

MAXIMUM CONTAMINANT LEVEL (MCL) VIOLATIONS

In the event that any two samples taken during the same month are positive for any type of coliform this will constitute an MCL violation. There are two types of coliform MCL violations; Acute and Non-Acute. These are further described in the table below:

Type of MCL	Description
Non-Acute	ANY TWO or more coliform samples taken in one month are positive for Total Coliform and NO samples are positive for Fecal Coliform or E-Coli
Acute	Fecal Coliform or E. coli are present in a repeat sample, OR *any* coliform are present in a repeat sample collected as a follow-up to a sample with fecal coliform or E. coli presence.

As the names imply, the acute coliform violation is more serious than the non-acute coliform violation. Either type of MCL violation requires immediate follow-up action.

FOLLOW-UP ACTIONS, MCL VIOLATION

Any time there is a Coliform MCL violation the water purveyor must take the following actions:

- Contact WSDOH Southwest Regional Office in accordance with WAC 246-290-480 (f), (i), and (ii).
- Provide **Public Notification** as required by WAC 246-290-495

WSDOH Contact Names, Phone Numbers and Addresses:

General Information:	(360) 664-0768
Sandra Brentlinger, Coliform Program Manager	(360) 753-5090
Denise Lahmann, P.E., Regional Engineer	(360) 586-8733
Bill Liechty, P.E., Regional Office Manager	(360) 753-5953

Southwest Regional Office
Washington State Department of Health
2411 Pacific Avenue
P.O. Box 47823
Olympia, Washington 98504-7823

WAC 246-290-300 Monitoring requirements.

(1) General.

(a) The monitoring requirements specified in this section are minimums. The department may require additional monitoring when:

(i) Contamination is present or suspected in the water system;

(ii) A ground water source is determined to be a potential GWI;

(iii) The degree of source protection is not satisfactory;

(iv) Additional monitoring is needed to verify source vulnerability for a requested monitoring waiver;

(v) Under other circumstances as identified in a departmental order; or

(vi) Additional monitoring is needed to evaluate continuing effectiveness of a treatment process where problems with the treatment process may exist.

(b) Special purpose samples collected by the purveyor shall not count toward fulfillment of the monitoring requirements of this chapter unless the quality of data and method of sampling and analysis are acceptable to the department.

(c) The purveyor shall ensure samples required by this chapter are collected, transported, and submitted for analysis according to department-approved methods. The analyses shall be performed by the state public health laboratory or another laboratory certified by the department. Qualified water utility, certified laboratory, or health department personnel may conduct measurements for pH, temperature, residual disinfectant concentration and turbidity as required by this chapter, provided, these measurements are made in accordance with "standard methods."

(d) Compliance samples required by this chapter shall be taken at locations listed in Table 3 of this section.

(e) Purveyors failing to comply with a monitoring requirement shall notify:

(i) The department in accordance with WAC 246-290-480; and

(ii) The water system users in accordance with WAC 246-290-495.

(2) Selling and receiving water.

(a) Source monitoring. Purveyors, with the exception of those that "wheel" water to their consumers (i.e., sell water that has passed through another purchasing purveyor's distribution system), shall conduct source monitoring in accordance with this chapter for the sources under their control. The level of monitoring shall satisfy the monitoring requirements associated with the total population served by the source.

(a) The purveyor shall be responsible for collection and submittal of coliform samples from representative points throughout the distribution system. Samples shall be collected after the first service and at regular time intervals each month the system provides water to consumers. Samples shall be collected that represent normal system operating conditions.

(i) Systems providing disinfection treatment shall, when taking a routine or repeat sample, measure residual disinfectant concentration within the distribution system at the same time and location and comply with the residual disinfection monitoring requirements under WAC 246-290-451.

(ii) Systems providing disinfection treatment shall assure that disinfectant residual concentrations are measured and recorded on all coliform sample report forms submitted for compliance purposes.

(b) Coliform monitoring plan.

(i) The purveyor shall prepare a written coliform monitoring plan and base routine monitoring upon the plan. The plan shall include coliform sample collection sites and a sampling schedule.

(ii) The purveyor shall:

(A) Keep the coliform monitoring plan on file with the system and make it available to the department for inspection upon request;

(B) Revise or expand the plan at any time the plan no longer ensures representative monitoring of the system, or as directed by the department; and

(C) Submit the plan to the department for review and approval when requested and as part of the water system plan required under WAC 246-290-100.

(c) Monitoring frequency. The number of required routine coliform samples is based on total population served.

(i) Purveyors of **community** systems shall collect and submit for analysis no less than the number of routine samples listed in Table 2 during each calendar month of operation;

(ii) Unless directed otherwise by the department, purveyors of **noncommunity** systems shall collect and submit for analysis no less than the number of samples required in Table 2, and no less than required under 40 CFR 141.21. Each month's population shall be based on the average daily population and shall include all residents and nonresidents served during that month. During months when the average daily population served is less than twenty-five, routine sample collection is not required when:

(A) Using only protected ground water sources;

TABLE 2

MINIMUM MONTHLY ROUTINE COLIFORM SAMPLING REQUIREMENTS

Population Served [1] During Month			Minimum Number of Routine Samples/Calendar Month	
			When NO samples With a coliform presence were collected during the previous month	When ANY samples with a Coliform presence were collected during the previous Month
1	-	1,000	1[2*]	5
1,001	-	2,500	2*	5
2,501	-	3,300	3*	5
3,301	-	4,100	4*	5
4,101	-	4,900	5	5
4,901	-	5,800	6	6
5,801	-	6,700	7	7
6,701	-	7,600	8	8
7,601	-	8,500	9	9
8,501	-	12,900	10	10
12,901	-	17,200	15	15
17,201	-	21,500	20	20
21,501	-	25,000	25	25
25,001	-	33,000	30	30
33,001	-	41,000	40	40
41,001	-	50,000	50	50
50,001	-	59,000	60	60
59,001	-	70,000	70	70
70,001	-	83,000	80	80
83,001	-	96,000	90	90
96,001	-	130,000	100	100
130,001	-	220,000	120	120
220,001	-	320,000	150	150
320,001	-	450,000	180	180
450,001	-	600,000	210	210
600,001	-	780,000	240	240
780,001	-	970,000	270	270
970,001	-	1,230,000[3]	300	300

[1] Does not include the population of a consecutive system that purchases water. The sampling requirement for consecutive systems is a separate determination based upon the population of that system.

[2] Noncommunity systems using only protected ground water sources and serving less than 25 individuals, may collect and submit for analysis, one sample every three months.

[3] Systems serving populations larger than 1,230,000 shall contact the department for the minimum number of samples required per month.

WAC 246-290-310 Maximum contaminant levels (MCLs).

(1) General.

(a) The purveyor shall be responsible for complying with the standards of water quality identified in this section. If a substance exceeds its maximum contaminant level (MCL), the purveyor shall take follow-up action in accordance with WAC 246-290-320.

(b) When enforcing the standards described under this section, the department shall enforce compliance with the primary standards as its first priority.

(2) Bacteriological.

(a) MCLs under this subsection shall be considered primary standards.

(b) Notwithstanding subsection (1) of this section, if coliform presence is detected in any sample, the purveyor shall take follow-up action in accordance with WAC 246-290-320(2).

(c) Acute MCL. An acute MCL for coliform bacteria occurs when there is:

(i) Fecal coliform presence in a repeat sample;

(ii) *E. coli* presence in a repeat sample; or

(iii) Coliform presence in any repeat samples collected as a follow-up to a sample with fecal coliform or *E. coli* presence.

(d) Nonacute MCL. A nonacute MCL for coliform bacteria occurs when:

(i) Systems taking less than forty routine samples during the month have more than one sample with coliform presence; or

(ii) Systems taking forty or more routine samples during the month have more than 5.0 percent with coliform presence.

(e) MCL compliance. The purveyor shall determine compliance with the coliform MCL for each month the system provides drinking water to the public. In determining MCL compliance, the purveyor shall:

(i) Include:

(A) Routine samples; and

(B) Repeat samples

(ii) Not include:

(A) Samples invalidated under WAC 246-290-694 (1)(c); and

(e) Water facilities inventory form (WFI).

(i) Purveyors of **community** and **NTNC** systems shall submit an annual WFI update to the department;

(ii) Purveyors of **TNC** systems shall submit an updated WFI to the department as requested;

(iii) Purveyors shall submit an updated WFI to the department within thirty days of any change in name, category, ownership, or responsibility for management of the water system, or addition of source or storage facilities; and

(iv) At a minimum the completed WFI shall provide the current names, addresses, and telephone numbers of the owners, operators, and emergency contact persons for the system.

(v) Purveyors shall provide in the WFI total annual water production and use, including:

(A) Total annual water production for each source;

(B) Monthly and annual totals for water purchased from or sold to other purveyors; and

(C) For purveyors with more than one thousand service connections, monthly and annual totals for purveyor consumer classes. Monthly data may be estimated if the water system bills less frequently than monthly.

(f) Bacteriological.

(i) The purveyor shall notify the department of the presence of:

(A) Coliform in a sample, within ten days of notification by the laboratory; and

(B) Fecal coliform or E. coli in a sample, by the end of the business day in which the purveyor is notified by the laboratory. If the purveyor is notified of the results after normal close of business, then the purveyor shall notify the department before the end of the next business day.

(ii) When a coliform MCL violation is determined, the purveyor shall:

(A) Notify the department within twenty-four hours of determining acute coliform MCL violations; and

(B) Notify the department before the end of the next business day when a nonacute coliform MCL is determined.

(g) Systems monitoring for unregulated VOCs in accordance with WAC 246-290-300 (8)(b), shall send a copy of the results of such monitoring and any public notice to the department within thirty days of receipt of analytical results.

(3) Distribution.

(a) Purveyors of community and NTNC systems with violations of a primary MCL, treatment technique, or variance or exemption schedule shall provide:

(i) Newspaper notice to water system users as defined in (e) of this subsection, within fourteen days of violation;

(ii) Direct mail notice or hand delivery to all consumers served by the system within forty-five days of the violation. The department may waive the purveyor's mail or hand delivery if the violation is corrected within forty-five days. The waiver shall be in writing and made within the forty-five day period;

(iii) Notice to radio and television stations serving the area within seventy-two hours of violation of an acute coliform MCL under WAC 246-290-310 (2)(c), a nitrate MCL under WAC 246-290-310(3), occurrence of a waterborne disease outbreak or other acute violation as determined by the department; and

(iv) Repeat mail or hand delivery every three months until the violation is corrected.

(b) Purveyors of community and NTNC systems shall provide newspaper notice as defined in (e) of this subsection, to water system users within three months of the following:

(i) Violation of a monitoring requirement or testing procedure;

(ii) Receipt of a departmental order;

(iii) Receipt of a category red operating permit; or

(iv) Granting of a variance or exemption.
Purveyors shall also provide repeat notice by mail or hand delivery to all consumers served by the system every three months until the situation is corrected or for as long as the variance or exemption remains in effect.

(c) Purveyors of TNC systems shall post a notice or notify consumers by other methods authorized by the department within fourteen days of the following:

(i) Violation of a primary MCL;

(ii) Violation of a treatment technique requirement; or

(iii) Violation of a variance or exemption schedule. If the violation is acute, the department shall require posting within seventy-two hours.

(d) Purveyors of TNC systems shall post a notice or notify consumers by other methods authorized by the department within three months of the following:

(i) Violation of a monitoring requirement or testing procedure;

(ii) Receipt of a category red operating permit; or

(a) Availability of results. After receipt of the first analysis results, the purveyor of a community or NTNC water system shall notify persons served by the system of the availability of the results and shall supply the name and telephone number of a contact person. Purveyors with surface water sources shall include a statement that additional monitoring will be conducted for three more quarters.

(i) The purveyor shall initiate notification within three months of the purveyors receipt of the first analysis results. This notification is only required one time.

(ii) Notification shall occur by any of the following methods:

(A) Inclusion in the first set of water bills issued after receipt of the results;

(B) Newspaper notice that shall run at least one day each month for three consecutive months;

(C) Direct mail;

(D) Posting for at least one week if an NTNC system; or

(E) Any other method approved by the department.

(iii) Within three months of receipt of analysis results, purveyors selling water to other public water systems shall provide copies of the analysis results to the purchasing system.

(iv) Within thirty days of receipt of analysis results, purveyors purchasing water shall make results available to their consumers. The purveyor's notification shall occur by the method outlined under (a)(ii) of this subsection.

(b) Consumer information.

(i) The purveyor shall provide consumer information within twenty-one days of receipt of confirmation sample results when:

(A) A regulated chemical is confirmed at a concentration greater than an MCL, and the level will not cause the running annual average to exceed the MCL; or

(B) The department determines that an unregulated chemical is confirmed at a level greater than a SAL.

(ii) Consumer information shall include:

(A) Name and level of chemical detected;

(B) Location where the chemical was detected;

(C) Any health effects that the chemical could cause at its present concentration;

APPENDIX B

COLIFORM MONITORING SITE PLAN

WASTEWATER TREATMENT PLANT

WASTEWATER TREATMENT POND

CEDAR CREEK

UPPER PROGRAM AREA

LOWER PROGRAM AREA

KITCHEN DINING

MAINTENANCE

BOILER ROOM

DNR WAREHOUSE & GARAGE

ELKHORN LIVING UNIT

FUELING STATION

ADMINISTRATION BUILDING

SILVERSTAR LIVING UNIT

WELL #3 SANITARY CONTROL AREA

WELL #3

WELL #2 SANITARY CONTROL AREA

WELL #2

WELL #1

WELL #1 SANITARY CONTROL AREA

DNR SHOPS

WAREHOUSE

WELL HOUSE

130,000 GALLON CONCRETE RESERVOIR

30,000 GALLON CONCRETE RESERVOIR

100' 0' 100' 200'

LEGEND:

(#) COLIFORM SAMPLING SITES

WSDOC

LARCH COLIFORM MONITORING PLAN

FIGURE 1

SITE PLAN

Gray & Osborne, Inc.

CONSULTING ENGINEERS

Appendix C

Public Notification Forms

(See WSP Appendix C-11)

Health

NOTICE TO WATER SYSTEM USERS

FECAL COLIFORM & E. COLI MAXIMUM CONTAMINANT LEVEL (MCL) EXCEEDED - ACUTE MCL

The _____ Water System, I.D. _____, located in _____ County submitted coliform drinking water samples to a certified laboratory for the month of _____. The test results indicated that at the time of the sampling there was a contamination problem in the system.

The United States Environmental Protection Agency (EPA) sets water standards and has determined that the presence of fecal coliforms or E. coli is a serious health concern. Fecal coliforms or E. coli are generally not harmful themselves, but their presence in drinking water is serious because they are usually associated with sewage or animal wastes. The presence of these bacteria in drinking water is generally a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any associated headaches and fatigue. These symptoms, however, are not just associated with disease causing organisms in drinking water. EPA has set an enforceable drinking water standard for fecal coliforms and E. coli to reduce the risk of these adverse health effects. Drinking water which meets this standard is usually associated with little or none.of the risk and should be considered safe.

The problem has been under investigation and the following steps have been or are being taken at this time:

At this time:

- ☐ The problem is under control and no action is required by the users.
- ☐ Until further notice, water users should boil water for consumption at a rolling boil for 3 - 5 minutes.
- ☐ Other _____

_____ _____ _____

MANAGER'S NAME | DAY TELEPHONE | DATE

To Be Completed by Water System

This notice was:

- ☐ Mailed to all water users on (date) _____.
- ☐ Hand delivered to all water users on (date) _____.
- ☐ Published in newspaper (copy attached)
- ☐ Posted at _____ on (date) _____. (By Department Approval Only)
- ☐ Other _____

_____ _____

SIGNATURE | DATE

(Send a copy of this completed public notification to: Department of Health, Southwest Drinking Water Operations, PO Box 47823, Olympia, WA 98504-7823, Phone: 360-753-5090 to be credited for this action.)

Mission Creek Corrections Center for Women

Coliform Monitoring Plan

Mission Creek Corrections Center for Women

Plant Maintenance

System Information

Water System Name	County	System I.D. Number
Mission Creek Corrections Center For Women	Mason	55325Y
Peak Population Served	**Service Connections**	
305 + Staff / 137 ERUs	7	

Source	DOH Source Number	Category	Well Depth
	S01	Well	160 ft
	~~S02~~ S03	Well	~~181 ft~~ 168 ft
Treatment	**Treatment Process**	**Purpose**	**Storage Capacity**
	None	N/A	225,000 gallons

Sampling Information

Number of Routine Samples Required Monthly by Regulation	1	Number of Sample Sites Needed to Represent the Distribution System	7

All sample locations are listed below and labeled on the attached Site Diagram.

Preparation Information

Water System Name	Date Plan Completed	Dates Modified
Mission Creek Corrections Center For Women	04/14/11	
Name of Plan Preparer	**Position**	**Daytime Phone**
Leo Gleason	Plant Manager 3	360-277-2483
State Reviewer	**Date of Last Review**	
Arlene Hyatt	4/14/2011	

Rotation Schedule

Month	Sample Site(s)	Month	Sample Site(s)
January	1	July	7
February	2	August	1
March	3	September	2
April	4	October	3
May	5	November	4
June	6	December	5

The month after a coliform positive sample, five follow-up samples must be submitted. Describe below the method of selecting the follow-up sites. Sites are designated as other sampling sites may be also used. List any sites which will routinely be used as follow-up sites.

Sample Site Groups

Site Number	Location		
1	Mission Creek - Main Dorm and Admin Building (Hotshot Sink)	Routine:	1-15-15
	Notes: Sink in room.	Repeat Date:	
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
2	Bear Creek - Dayroom Sink	Routine:	2-13-15
	Notes:	Repeat Date:	2-10-14
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
3	Gold Creek - Dayroom Sink	Routine:	3-14-15
	Notes:	Repeat Date:	
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
4	Education Building - Staff Restroom Sink	Routine:	
	Notes:	Repeat Date:	
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
5	Gymnasium - Visitor Restroom Sink	Routine:	5-15-15
	Notes:	Repeat Date:	
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
6	Maintenance - Work Area Deep Sink	Routine:	6-14-15
	Notes:	Repeat Date:	
		Repeat Date:	
		Repeat Date:	
Site Number	Location		
7	Ramirez Building	Routine:	
	Notes:	Repeat Date:	
		Repeat Date:	
		Repeat Date:	

McNeil Island Corrections Center

Coliform Monitoring Plan for: MCNEIL ISLAND CORRECTION CENTER

A. System Information

Water System Name	County	System I.D. Number
McNeil Island Correction Center	Pierce County	52900E
Attach copy of current WFI		
Number of Routine Samples Required Monthly by Regulation: 3	Number of Sample Sites Needed to Represent the Distribution System: 7	

B. Routine and Repeat Sample Locations

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X1.	1-1.
Note: SEE Page 9 FOR ROUTINE AND REPEAT SAMPLE LOCATION	1-2.
	1-3.
	1-4.
X2.	2-1.
	2-2.
	2-3.
	2-4.
X3.	3-1.
	3-2.
	3-3.
	3-4.

If the number of Routine samples needed to cover the distribution system requires that more than three Routine sites are needed, attach additional sheets as needed.

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	1-2-3	July	5-6-7-
February	4-5-6	August	1-2-3
March	7-1-2	September	4-5-6
April	3-4-5	October	7-1-2
May	6-7-1	November	3-4-5
June	2-3-4	December	6-7-1

D. Month Following Unsatisfactory Samples

Description of Sample Collection Locations for Month Following Unsatisfactory Samples
NOTE: SEE PAGE 9 FOR MONTH FOLLOWING UNSARISFACTORY SAMPLES

E. Preparation Information

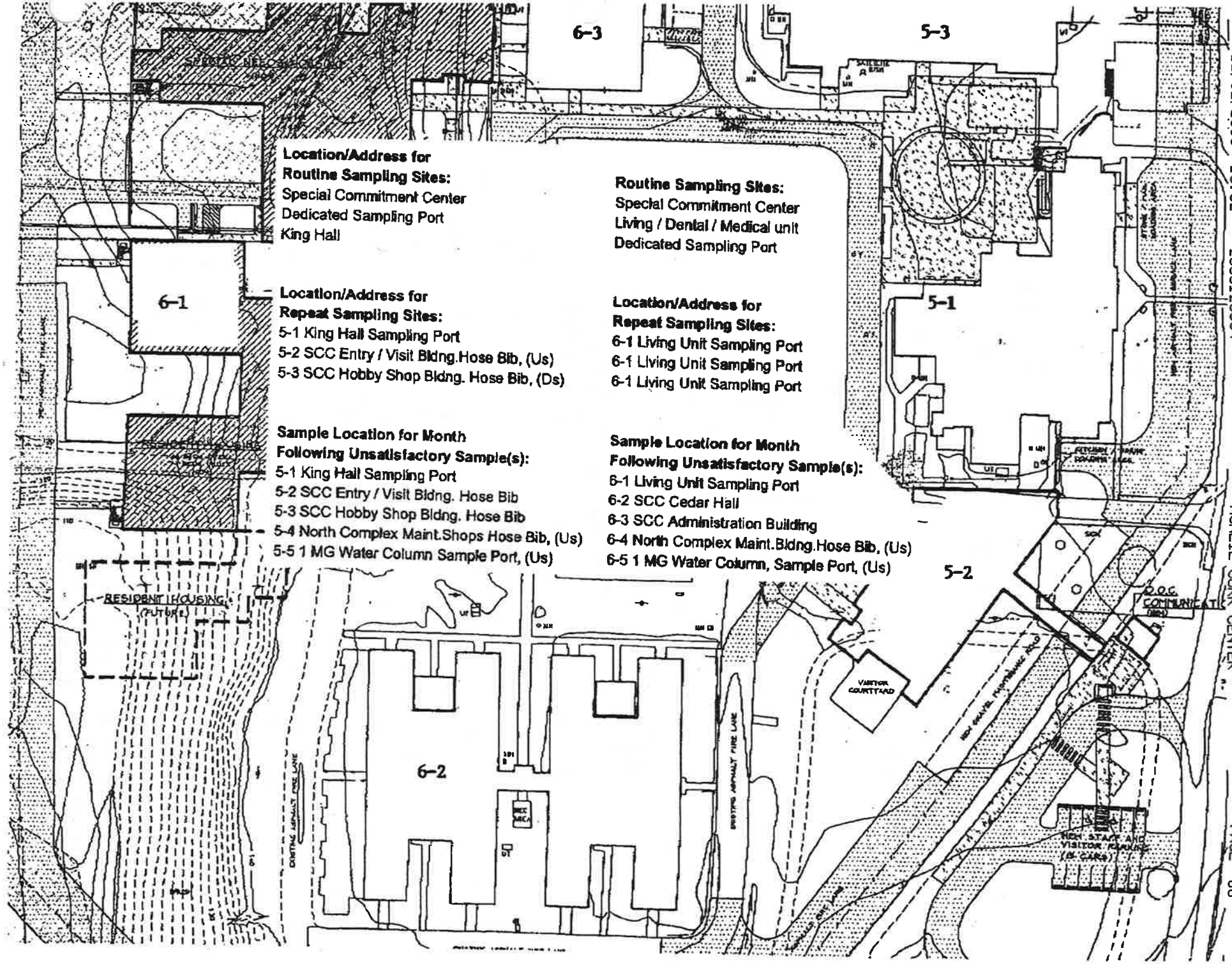
System Name: McNeil Island Correction Center	Date Plan Completed 12-02-05	Dates Modified
Name of Plan Preparer: John Kessler MICC Environmental Services Manager		Daytime Phone # (253) 512-6556
State Reviewer	Date Last Review	

F. System Map

Part B: Routine and Repeat Sample Locations

Location/Address for Routine Sampling Sites:	Location/Address for Repeat Sampling Sites:	Sample Location for Month Following Unsatisfactory Sample(s):
X # 1	1-1 100 Block Main Line Sample Port	100 Block Main Line, Sample Port
100 Block Main Line	1-2 Residence #101, Hose Bib (Ds)	Residence # 101, Hose Bib
Dedicated Sampling Port :	1-3 Residence # 102, Hose Bib (Us)	Residence # 102, Hose Bib
		1-4 Harriot Taylor Community Center, Hose Bib (D
		1-5 Residence # 103, Hose Bib (Us)
X # 2		
300 Block Main Line	2-1 300 Block Main Line, Sample Port	300 Block Main Line, Sample Port
Dedicated Sampling Port:	2-2 Residence # 307, Hose Bib, (Us)	Residence # 307, Hose Bib
	2-3 Residence # 308, Hose Bib, (Ds)	Residence # 308, Hose Bib
		2-4 Residence # 314, Hose Bib, (Us)
		2-5 Residence # 317, Hose Bib, (Us)
X # 3		
Living Unit C: Dedicated	3-1 C-Unit Sampling Port	C-Unit Sampling Port
Sampling Port.	3-2 B-Unit, Officer's Station Sink, (Us)	A-Unit,Officer's Station Sink, (Us)
	3-3 D-Unit, Officer's Station Sink, (Ds)	B-Unit,Officer's Station Sink, (Us)
		3-4 D-Unit,Officer's Station Sink, (Ds)
		3-5 E-Unit,Officer's Station Sink, (Ds)
X # 4		
Health Services Building:	4-1 Health Services Sampling Port:	Health Services Sampling Port
Water Main Line	4-2 B-Unit, Officer's Station Sink, (Us)	A-Unit, Officer's Station Sink
Dedicated Sampling Port:	4-3 C-Unit, Officer's Station Sink, (Ds)	B-Unit, Officer's Station Sink
		4-4 C-Unit, Officer's Station Sink, (Ds)
		4-5 D-Unit, Officers Station Sink, (Ds)
X # 5		
Special Commitment Center	5-1 King Hall Sampling Port	King Hall Sampling Port
Dedicated Sampling Port	5-2 SCC Entry / Visit Bldng.Hose Bib, (Us)	SCC Entry / Visit Bldng. Hose Bib
King Hall	5-3 SCC Hobby Shop Bldng. Hose Bib, (Ds)	SCC Hobby Shop Bldng. Hose Bib
		5-4 North Complex Maint.Shops Hose Bib, (Us)
		5-5 1 MG Water Column Sample Port, (Us)
X # 6		
Special Commitment Center	6-1 Living Unit Sampling Port	Living Unit Sampling Port
Living / Dental / Medical unit	6-2 SCC Cedar Hall, Hose Bib, (Us)	SCC Cedar Hall
Dedicated Sampling Port	6-3 SCC Admin.Building, Hose Bib, (Ds)	SCC Administration Building
		6-4 North Complex Maint.Bldng.Hose Bib, (Us)
		6-5 1 MG Water Column, Sample Port, (Us)
X # 7		
Correctional Industries	7-1 C.I. Meat Plant Sampling Port	C.I. Meat Plant Sampling Port
Meat Processing Plant:	7-2 Residence # BOQ, Hose Bib, (Ds)	Residence # BOQ, Hose Bib
Dedicated Sampling Port.	7-3 Warden's Reservoir, Grab Sample, (Us)	Warden's Reservoir, Grab Sample
		7-4 Living Unit F, Officer's Station Sink, (Ds)
		7-5 Living Unit E, Officer's Station Sink, (Ds)

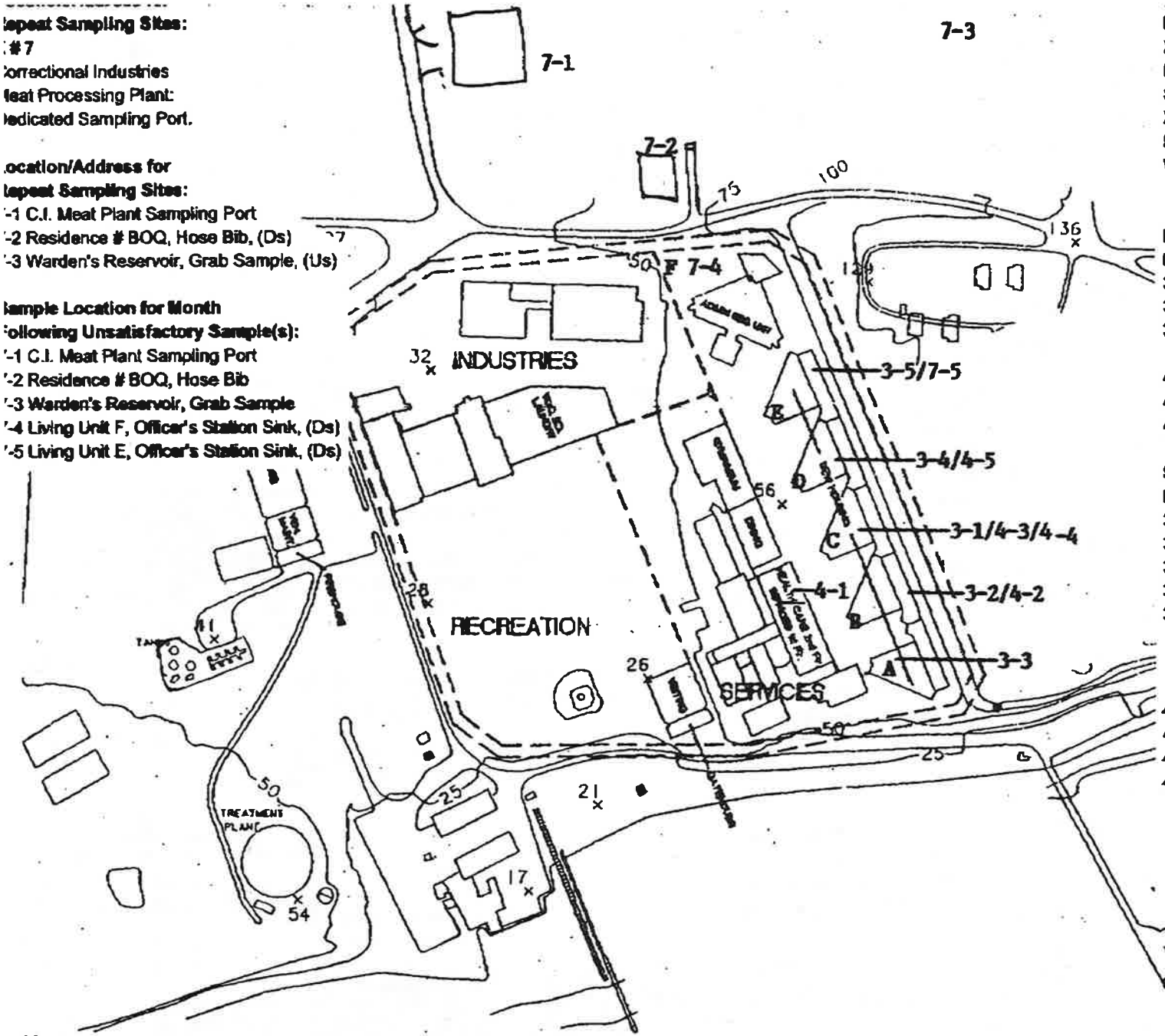
EXHIBIT C1
Washington Department of Corrections
MICC - Hydraulic Model
April 2005
HDR | mees
Water Storage Tanks
Water Treatment Plant
7-3
7-1
7-2
2-5
2-4
2-3
2-2
2-1
1-5
1-1
1-2/1-3
6-4
6-5
SCALE IN FEET
0
1000
2000



Repeat Sampling Sites:
 # 7
Correctional Industries
Meat Processing Plant:
Dedicated Sampling Port.

Location/Address for
Repeat Sampling Sites:
7-1 C.I. Meat Plant Sampling Port
7-2 Residence # BOQ, Hose Bib, (Ds)
7-3 Warden's Reservoir, Grab Sample, (Us)

Sample Location for Month
Following Unsatisfactory Sample(s):
7-1 C.I. Meat Plant Sampling Port
7-2 Residence # BOQ, Hose Bib
7-3 Warden's Reservoir, Grab Sample
7-4 Living Unit F, Officer's Station Sink, (Ds)
7-5 Living Unit E, Officer's Station Sink, (Ds)



Routine Sampling Sites:
X # 3
Living Unit C: Dedicated
Sampling Port.
X # 4
Health Services Building:
Water Main Line
Dedicated Sampling Port:

Location/Address for
Repeat Sampling Sites:
3-1 C-Unit Sampling Port
3-2 B-Unit, Officer's Station Sink, (Us)
3-3 D-Unit, Officer's Station Sink, (Ds)

4-1 Health Services Sampling Port:
4-2 B-Unit, Officer's Station Sink, (Us)
4-3 C-Unit, Officer's Station Sink, (Ds)

Sample Location for Month
Following Unsatisfactory Sample(s):
3-1 C-Unit Sampling Port
3-2 A-Unit,Officer's Station Sink, (Us)
3-3 B-Unit,Officer's Station Sink, (Us)
3-4 D-Unit,Officer's Station Sink, (Ds)
3-5 E-Unit,Officer's Station Sink, (Ds)

4-1 Health Services Sampling Port
4-2 A-Unit, Officer's Station Sink
4-3 B-Unit, Officer's Station Sink
4-4 C-Unit, Officer's Station Sink, (Ds)
4-5 D-Unit, Officers Station Sink, (Ds)

Olympic Corrections Center

A. System Information

Water System Name Olympic Correction Center	County Jefferson	System I.D. Number 13560D
Attach copy of current WFI		
Number of Routine Samples Required Monthly by Regulation: 1	Number of Sample Sites Needed to Represent the Distribution System: 3	

B. Routine and Repeat Sample Locations

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X1. Clearwater bathroom (west side)	1-1. Hoh bathroom 1-2. Kitchen 1-3. ~~Well field tap~~ S01 s/t 1-4. Tanks 1-5 S02 s/t
X2. Hoh bathroom (B tier)	2-1. Clearwater bathroom 2-2. Kitchen 2-3. ~~Well field tap~~ S01 s/t 2-4. Tanks 2-5 S02 s/t
X3. Kitchen (hand washing station)	3-1. Hoh bathroom 3-2. Clearwater bathroom 3-3. ~~Well field tap~~ S01 s/t 3-4. Tanks 3-5 S02 s/t

If the number of Routine samples needed to cover the distribution system requires that more than three Routine sites are needed, attach additional sheets as needed.

s/t - sample tap
S01 - well 1
S02 - well 2

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X1
February	X2	August	X2
March	X3	September	X3
April	X1	October	X1
May	X2	November	X2
June	X3	December	X3

D. Month Following Unsatisfactory Samples

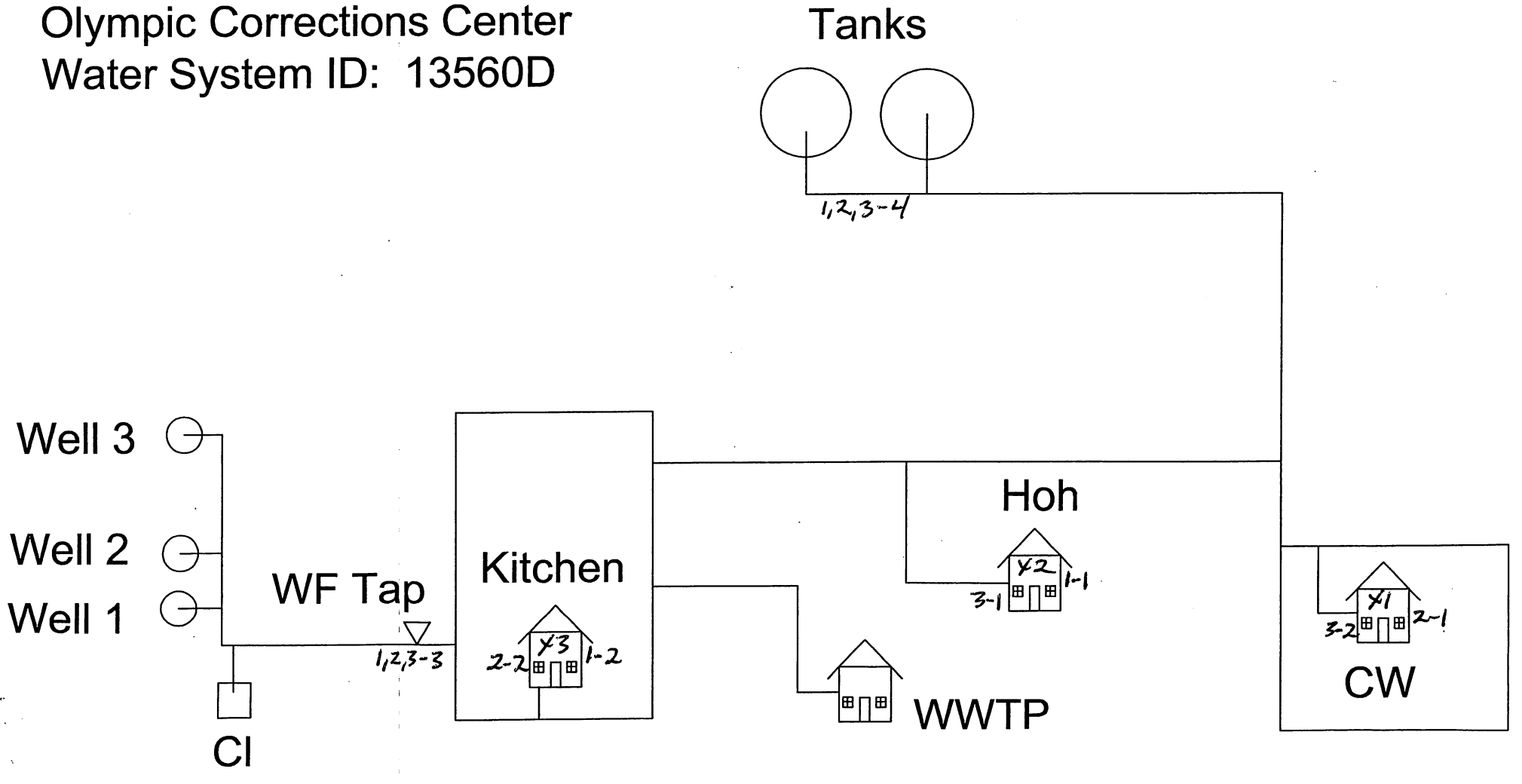
Description of Sample Collection Locations for Month Following Unsatisfactory Samples
The month after a coliform positive sample, five (5) follow-up samples will be submitted,
marked as "Routine" type samples. We will collect these samples from the three (3)
Routine sample sites, as well as from two (2) of the Repeat sample sites. Which Repeat
sites are used will depend on where the contamination occurred. Do Not use well tap as a 'Routine' sample.

E. Preparation Information

System Name	Date Plan Completed	Dates Modified
Olympic Correction Center	12/27/04	8/21/13
Name of Plan Preparer	**Position**	**Daytime Phone #**
Mike Henry	WWTPO2	(360)374-8327
State Reviewer	**Date Last Review**	
Arlene Hyatt	8/21/13	

Coliform Monitoring Plan

Olympic Corrections Center
Water System ID: 13560D



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

Date Updated: 01/15/2004
Date Printed: 06/02/2004

WATER FACILITIES INVENTORY (WFI) FORM

WFI Printed For: On-demand
Submission Reason: Annual Update

ONE FORM PER SYSTEM

RETURN TO: Southwest Regional Office, PO Box 47823, Olympia, WA, 98504

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
13560 D	OLYMPIC CORRECTIONS CENTER	JEFFERSON	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS

JERRY SULLIVAN TITLE: MANAGER
11235 HOH MAINLINE
FORKS, WA 98331-9492

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

7. OWNER NAME & MAILING ADDRESS **8. Owner Number** 001090

OLYMPIC CORRECTIONS CENTER
JERRY SULLIVAN TITLE: OWNER ORG -
11235 HOH MAINLINE
FORKS, WA 98331-9492

STREET ADDRESS IF DIFFERENT FROM ABOVE

ATTN
ADDRESS
CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 374-6181		Owner Daytime Phone: (360) 374-6181	
Primary Contact Mobile/Cell Phone:		Owner Mobile/Cell Phone:	
Primary Contact Evening Phone:		Owner Evening Phone:	
Fax:	E-mail:	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
- [ ] Commercial / Business
- [ ] Day Care
- [x] Food Service/Food Permit
- [ ] 1,000 or more person event for 2 or more days per year
- [ ] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [ ] 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
- [ ] Investor
- [ ] Private
- [ ] Special District
- [x] State

14. STORAGE CAPACITY (gallons)

675,000

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATAGORY										USE				TREATMENT						DEPTH		SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL (FEET)	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL C #1 ACM523		X												X			X					65	120	SE SE	29	26N	11W
S02	WELL D #2 WW				X								X					X					67	120	SW SW	28	26N	11W
S03	WELL F #3 WW				X								X					X					60	120	NE SE	29	26N	11W
S04	WF (S02 & 3)			X									X			N	X						60	240			00N	00E

Washington Corrections Center

Coliform Monitoring Plan Template

Coliform Monitoring Plan for: Washington Corrections Center

A. System Information

Plan Date: 6/2/14

Water System Name **Washington Corrections Center**	**County** **MASON**	**System I.D. Number** **93063k**
Name of Plan Preparer **DWIGHT JOHNSON**	**Position** **FACILITIES MANAGER**	**Daytime Phone #** **(360) 432-1508**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	01 Well 1, (Not connected to distribution system) 02. Well 2, 46 ft., 320 gallons per minute (gpm) 03. Well 3, 184 ft., 144 gpm 04. Well 4, 56 ft., 640 gpm 05. S02 and SO4 well-field	
Storage: List and Describe	Tank 1 – 500,000 Gallons Tank 2 – 300,000 Gallons	
Treatment: Source Number & Process	Water Treatment for all sources (SO2, SO3, & SO4) is as follows: Chlorine is injected for disinfection and Soda Ash is injected for pH control.	
Pressure Zones: Number and name	One Pressure Zone	
Population by Pressure Zone	2223	
Number of Routine Samples Required Monthly by Regulation: 2	**Number of Sample Sites Needed to Represent the Distribution System:**	
***Request DOH Approval of Triggered Source Monitoring Plan?** **Yes** ☐ **No** ☒		

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name **Thurston County Environmental Health Division**	**Office Phone #** **(360) 867-2631** **Email: www.co.thurston.wa.us**
Address **2000 Lakeridge Drive SW** **Olympia, WA 98502-6045**	**After Hours #** **None**
Hours of Operation **8:00AM – 5:00PM MON – WED** **8:00AM – 12:30PM THU**	
Contact Name **MIKE CLARK, BIOL0GIST**	
Emergency Laboratory Name	**Office Phone #**

DRAGON ANALYTICAL LABORATORY	**(360) 866-0556**
Address **530A RonLee Lane (Mud Bay) NW** **OLYMPIA WA 98502**	**After Hours #** **(360) 866-4825**
Hours of Operation **8:00AM – 5:00PM, MON – THU** **8:00AM – 12 NOON, FRI**	
Contact Name **Robert Lewis**	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
Water System Name: _____ Contact Name: _____ Telephone Numbers: _____		
Water System Name: _____ Contact Name: _____ Telephone Number: _____		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Sources for **Triggered Sample Sites****
X1. Motorpool Restroom Sink	**1-1. Motorpool Restroom Sink**	**S02**___
	1-2. Reargate Shack Restroom Sink	**S03**___
	1-3. Warehouse Restroom Sink	**S04**___
	1-4. Steam Plant Sample Tap – Entry to Distribution System (Us)	**S05**___
X2. "A"- Bldg. Staff Breakroom Sink	**2-1. "A" Bldg Staff Breakroom Sink**	**S02**___
	2-2. Armory/Training Bldg Men's Restroom Sink	**S03**___
	2-3. "B" Bldg Staff Restroom Sink	**S04**___
	2-4. Steam Plant Sample Tap – Entry to Distribution System	**S05**___
		S___
X3. R-6 Staff Restroom Sink	**3-1. R-6 Staff Restroom Sink**	**S02**___
	3-2. Evergreen Hall Staff Restroom Sink	**S03**___
	3-3. R-5 Staff Restroom Sink	**S04**___
	3-4. Steam Plant Sample Tap – Entry to Distribution System (Us)	**S05**__
		S___

X4. G Bldg Plumbing Shop Hand Sink	**4-1. G Bldg Plumbing Shop Hand Sink**	**S02___**
	4-2. Greenhouse Utility Sink	**S03___**
	4-3. Education Building Officer Restroom Sink	**S04___**
	4-4. Steam Plant Sample Tap – Entry to Distribution System	**S05___**
		S___

*NOTE: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

1. **Strive to collect samples as early in the month and week as possible.**
2. **Carefully consider whether or not to take samples during a week when there are holidays or a key staff member is on leave.**
3. **If a sample site is no longer a good sample site, substitute an acceptable site in the same area.**
4. **Always review the lab results for you coliform sample.**

Reduced Triggered Source Monitoring Justification (add sheets as needed):

E. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X3
February	X2	August	X4
March	X3	September	X1
April	X4	October	X2
May	X1	November	X3
June	X2	December	X4

F. Five Routine Sample Locations – Month after an Unsatisfactory Sample

Location/Address for Routine Sample Site(s) Unsatisfactory the Previous Month	Location/Address for the five Routine Sample Sites
X1. Motorpool Restroom Sink	**1. X1 – Motorpool Restroom Sink**
	2. X2. "A"- Bldg. Staff Breakroom Sink
	3. X3. R-6 Staff Restroom Sink
	4. X4. G Bldg Plumbing Shop Hand Sink
	5. Steam Plant Sample Tap – Entry to Distribution System
X2. "A"- Bldg. Staff Breakroom Sink	**1. X2. "A"- Bldg. Staff Breakroom Sink**
	2. X3. R-6 Staff Restroom Sink
	3. X4. G Bldg Plumbing Shop Hand Sink
	4. X1 – Motorpool Restroom Sink
	5. Steam Plant Sample Tap – Entry to Distribution System
X3. R-6 Staff Restroom Sink	**1. X3. R-6 Staff Restroom Sink**
	2. X4. G Bldg Plumbing Shop Hand Sink
	3. X1 – Motorpool Restroom Sink
	4. X2. "A"- Bldg. Staff Breakroom Sink
	5. Steam Plant Sample Tap – Entry to Distribution System
X4. G Bldg Plumbing Shop Hand Sink	**1. X4. G Bldg Plumbing Shop Hand Sink**
	2. X1 – Motorpool Restroom Sink
	3. X2. "A"- Bldg. Staff Breakroom Sink
	4. X3. R-6 Staff Restroom Sink
	5. Steam Plant Sample Tap – Entry to Distribution System

G. *E. coli*-present response plans

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered samples as per Part. D. Collect additional investigative samples as necessary.
3. Inspect water system facilities, including treatment plants for proper operation.
4. Interview appropriate maintenance staff to determine whether anything unusual was happening in the water system, especially since the previous month's sample(s).
5. Review any construction activities, water main breaks, or pressure outages that may have occurred in the previous month.
6. Review Cross-Connection Control Program Status
7. Discuss whether Health Advisory (HA) is warranted based on the finding of steps 3-6. Issue advisory if necessary.
8. Await repeat sample results and respond appropriately.
    - Repeats all satisfactory. Lift HA, if one was issued.
    - Any repeat unsatisfactory: Issue: HA if not already in place. Host DOH for a system inspection and respond appropriately to inspection findings.

E. coli-Present Triggered Source Sample Response Plan – Source 02___

If we have *E. coli* in Source 02_ water we will immediately:

1. Call DOH.
2. Distribute required notice, including conservation notice.
3. Begin water conservation measures
4. Interview appropriate staff
5. Begin compliance monitoring per DOH directions.

E. coli-Present Triggered Source Sample Response Plan – Source 03___

If we have *E. coli* in Source 03_ water we will immediately:

1. Call DOH.
2. Distribute required notice, including conservation notice.
3. Begin water conservation measures
4. Interview appropriate staff
5. Begin compliance monitoring per DOH directions.

E. coli-Present Triggered Source Sample Response Plan – Source 04___

If we have *E. coli* in Source 04_ water we will immediately:

1. Call DOH.
2. Distribute required notice, including conservation notice.
3. Begin water conservation measures
4. Interview appropriate staff
5. Begin compliance monitoring per DOH directions.

E. coli-Present Triggered Source Sample Response Plan – Source 05___

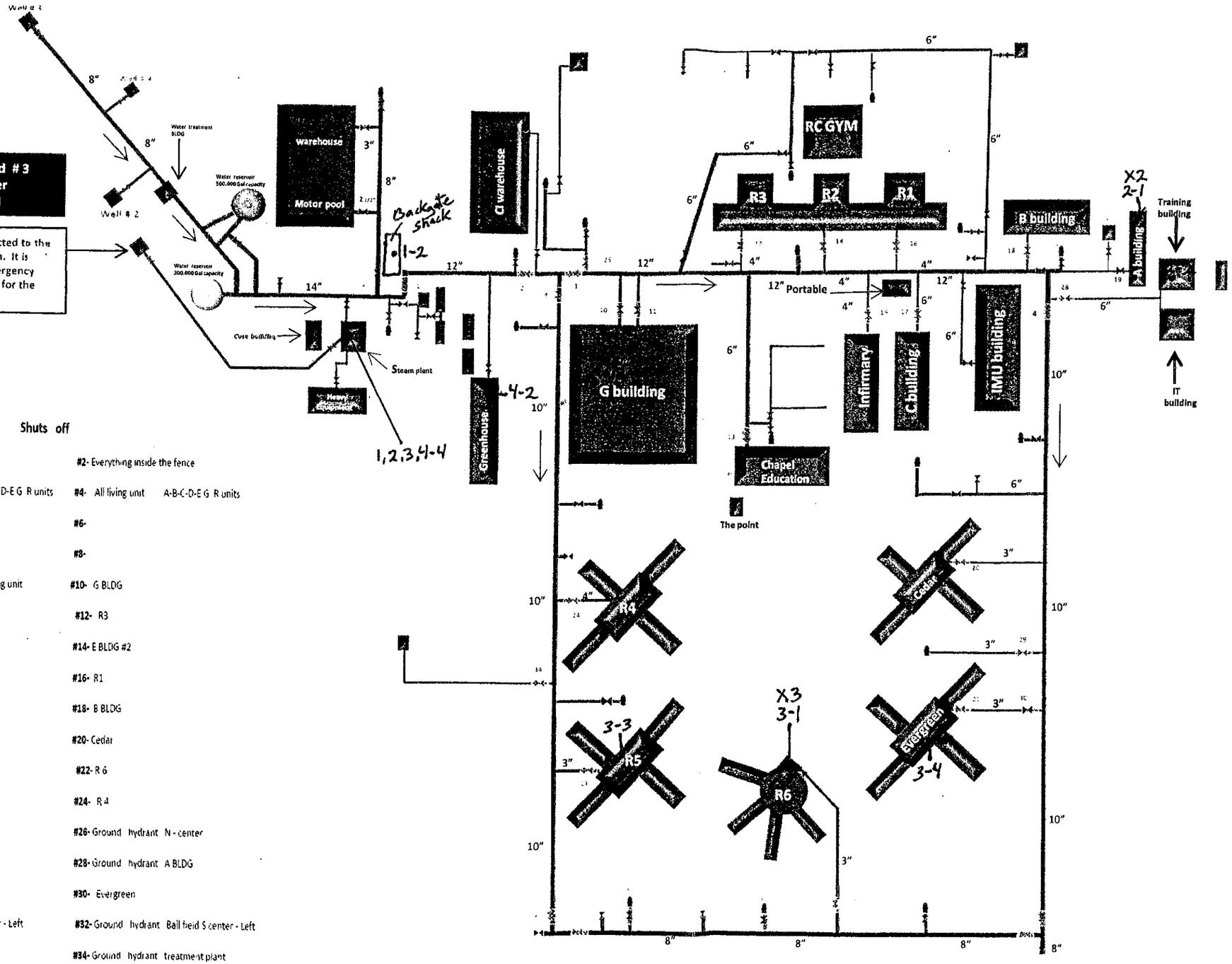
If we have *E. coli* in Source 04_ water we will immediately:

1. Call DOH.
2. Distribute required notice, including conservation notice.
3. Begin water conservation measures
4. Interview appropriate staff
5. Begin compliance monitoring per DOH directions.

H. System Map

See attachment

Well # 1 178' / 179 GPM
Well # 2 46' / 320 GPM
Well # 3 184' / 320 GPM
Well # 4 56' /540 GPM



#1 -Everything inside the fence

#2- Everything inside the fence

#3 - Everything inside the fence A-B-C-D-E G R units

#4- All living unit A-B-C-D-E G R units

#5-

#6-

#7-

#8-

#9- Everything inside the fence All living unit

#10- G BLDG

#11- G BLDG fire Sprinkler

#12- R3

#13- E BLDG

#14- E BLDG #2

#15- D BLDG

#16- R1

#17- C BLDG

#18- B BLDG

#19- A BLDG

#20- Cedar

#21- Evergreen

#22- R 6

#23- R 5

#24- R 4

#25- Ground hydrant N w

#26- Ground hydrant N - center

#27- Ground hydrant S-R-Units

#28- Ground hydrant A BLDG

#29- Ground hydrant S W

#30- Evergreen

#31- Ground hydrant Ball field S center - Left

#32- Ground hydrant Ball field S center - Left

#33- Ground hydrant West

#34- Ground hydrant treatment plant

Washington Corrections Center for Women

Coliform Monitoring Plan for: Washington Corrections Center for Women

A. System Information

Water System Name: Washington Corrections Center for Women	County: Pierce	System ID Number: 69945J
Attach copy of current WFI:	Attached	
Number of Routine Samples Required Monthly by Regulation: 1	Number of Sample Sites Needed to Represent the Distribution System: 3	

B. Routine and Repeat Sample Locations

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X1. Z-Bldg Staff Restroom	1-1. Z-Bldg Staff Restroom
	1-2. TBD
	1-3. TBD
	1-4. TBD
X2. MSU Staff Restroom	2-1. MSU Staff Restroom
	2-2. TBD
	2-3. TBD
	2-4. TBD
X3. Education Bldg Staff Restroom	3-1. Education Bldg Staff Restroom
	3-2. TBD
	3-3. TBD
	3-4. TBD

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X1
February	X2	August	X2
March	X3	September	X3
April	X1	October	X1
May	X2	November	X2
June	X3	December	X3

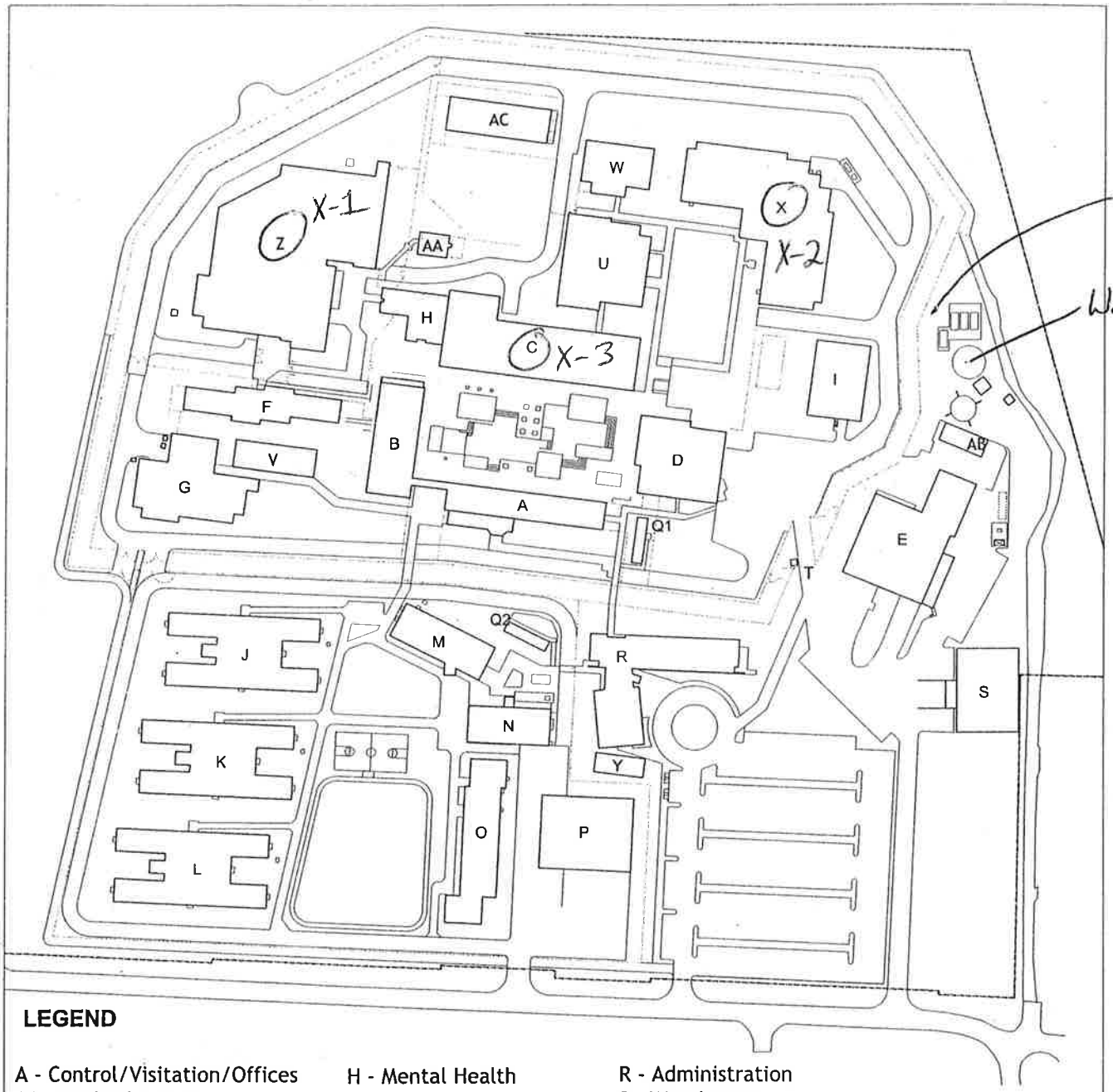
D. Month Following Unsatisfactory Samples

Description of Sample Collection Locations for Month Following Unsatisfactory Samples:
The month after a positive sample, five (5) follow-up samples will be submitted. They will be marked as "Routine" type. We will collect those samples from the three (3) Routine sample sites, as well as from two (2) of the Repeat sample sites. Which Repeat sample sites are used will depend on where the contamination occurred.

E. Preparation Information

System Name: Washington Corrections Center for Women	Date Plan Completed: 05/01/05	Dates Modified:
Name of Plan Preparer:	Position:	Daytime Phone #:
State Reviewer:	Date Last Review:	

F. System Map (attached)



LEGEND

A - Control/Visitation/Offices
AA - Medical Annex
AB - Maintenance Operations
AC - Kennel
B - Health Care
C - Education
D - MI Kitchen/Dining
E - Plant Services
F - Storage
G - Close Custody Housing
H - Mental Health
I - Industries
J - Min. Security Housing
K - Min. Security Housing
L - Min. Security Housing
M - MSC Offices
N - MSC Kitchen/Dining
O - Education
P - Industries/ Crew
Q1 & Q2 - Family Visit
R - Administration
S - Warehouse
T - Sally Port
U - Gymnasium
V - Chapel
W - Industries
X - Medium Security Housing Unit
Y - Key Vault/Weapon Storage/MDF Phone Room
Z - Special Needs Unit
Receiving/Segregation/TEC

WASHINGTON CORRECTIONS CENTER FOR WOMEN
SITE PLAN

Updated: 01/25/05

C-7
Source Protection Programs

Cedar Creek Corrections Center

CCCC Drinking H_2O

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
CEDAR CREEK CORRECTIONS CENTER

THURSTON COUNTY WASHINGTON

PROJECT No. 98-380

WELLHEAD PROTECTION PLAN

G & O #97754.61

SEPTEMBER 1999

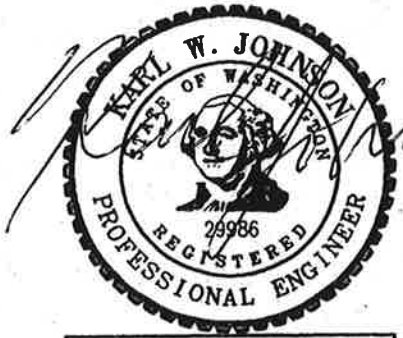
Gray & Osborne, Inc.
CONSULTING ENGINEERS
701 DEXTER AVENUE NORTH SUITE 200
SEATTLE, WASHINGTON 98109 • (206) 284-0860

STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
CEDAR CREEK CORRECTIONS CENTER

THURSTON COUNTY WASHINGTON

PROJECT No. 98-380

WELLHEAD PROTECTION PLAN



9-30-99

EXPIRES: 2-14-2000

G & O #97754.61

SEPTEMBER 1999

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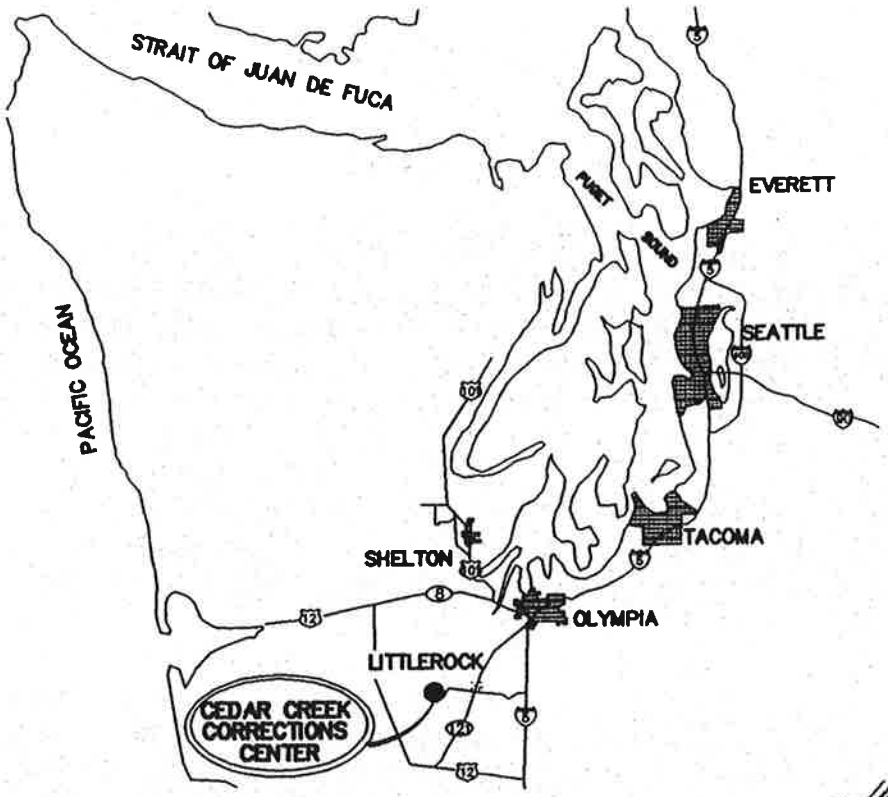
CHAPTER 1

INTRODUCTION

Gray & Osborne, Inc. was retained by the Washington State Department of Corrections to prepare a Wellhead Protection Plan (WHPP) for the Cedar Creek Corrections Center (CCCC). The CCCC is a minimum security facility located in Southwest Thurston County approximately 16 miles from Southwest Olympia, 7 miles west of the unincorporated community of Littlerock and 2½ miles North of the unincorporated community of Gate as shown in Figure 1. The facility is entirely within the Capitol Forest which is owned by the State of Washington and managed by the Washington State Department of Natural Resources (DNR). CCCC is located on property leased from DNR.
The Cedar Creek Correction Center (CCCC) relies on a well water source for its domestic supply. To protect groundwater supplies, the Environmental Protection Agency (EPA) and the Department of Health (DOH) now require public water utilities to develop WHPPs.

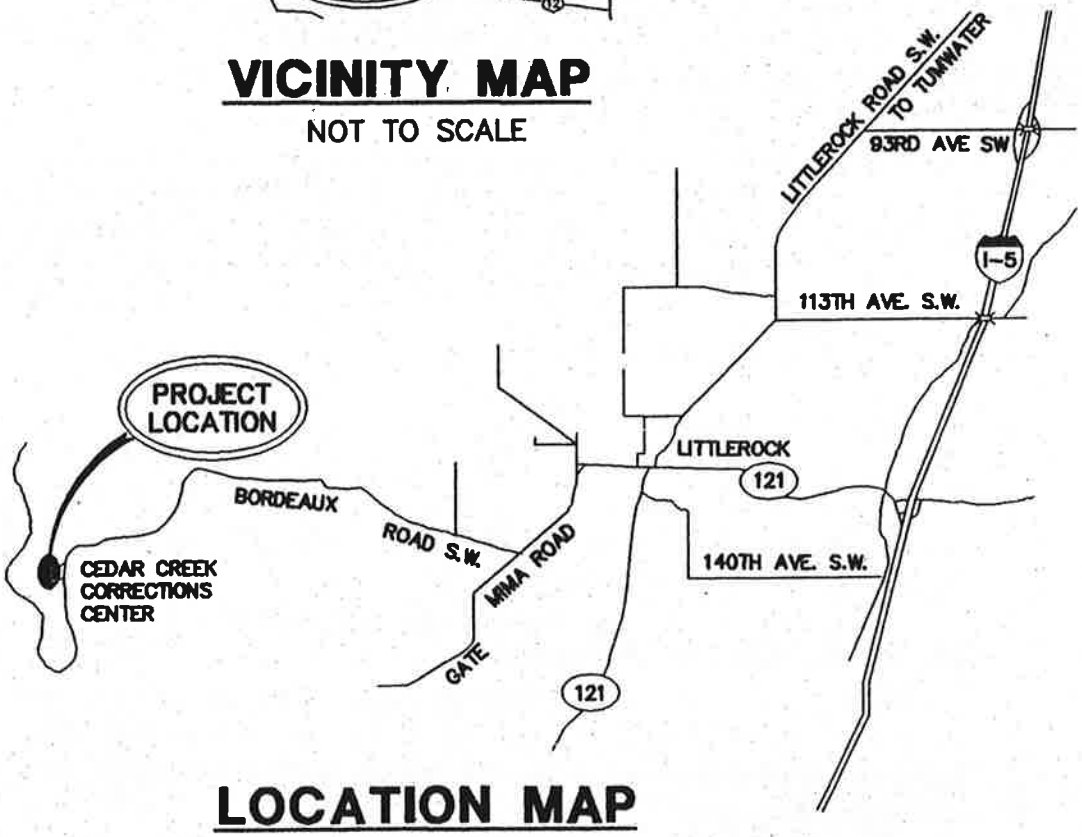
Water from underground aquifers, commonly referred to as groundwater, forms the primary source of drinking water for an estimated 65 percent of Washington state residents. The purpose of a WHPP is to provide local utilities with a pro-active program for preventing groundwater contamination. The major components of the plan are described below and form the basis of the following chapter.

- A *Susceptibility Assessment* determining the susceptibility to contamination.
- A *delineated wellhead protection area (WHPA)*, for each well indicating the 6 month, 1 year, 5 year and 10 year time of travel zones to each well based on all reasonably available hydrogeologic information, including the Susceptibility Assessment.
- An *inventory* within each WHPA of potential sources of contamination (potential sources of contamination).
- Documentation of the purveyor's *notification to all owners and operators of actual or potential sources of groundwater contamination* within each WHPA.
- Documentation of the purveyor's *notification to regulatory agencies* regarding the location and dimensions of the WHPA and the inventory of the potential sources of contamination within the WHPA.
- A *spill response plan* for each WHPA containing documentation for coordination with local first responders.
- *Contingency plans* for providing alternate sources of drinking water in the event that contamination does occur and management recommendations to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.



VICINITY MAP

NOT TO SCALE



LOCATION MAP

NOT TO SCALE

W. S. D. O. C.

FIGURE 1

CEDAR CREEK CORECTION CENTER

VICINITY & LOCATION MAP

Gray & Osborne, Inc.

CONSULTING ENGINEERS

FACILITY DESCRIPTION

The Cedar Creek Corrections Center Water System, Washington State Department of Health (DOH) ID #118827, is owned and operated by the Washington State Department of Corrections (DOC) and provides water service solely to the CCCC. The population of the CCCC is approximately 384 inmates and 114 staff. Staff, including DOC and DNR staff are generally on site for 8 hour shifts.

CCCC is supplied by two groundwater sources. There are two wells located on the CCCC site. Well #1 was drilled in 1986 by Dale McGhee & Sons Well Drilling, Inc. out of Kelso to a finished depth of 200 feet. The first 74 feet is in unconsolidated materials and the last 126 feet is in rock. It is cased with an 8 inch welded steel casing to a depth of approximately 60 feet, below which the well is an open hole. There is no well screen. The water well report indicates the well had a static water level of 13' 4" below ground level at the time the well was drilled and was pump tested at 70 gpm with 64' 7" of drawdown after 24 hours. Well #2 was drilled in 1993 also to a finished depth of 200 feet, the first 75 feet of which is unconsolidated material and the last 125 feet of which is rock. It is cased with an 8 inch welded steel casing to a depth of 80 feet, below which the well is an open hole. Well #2 also has no well screen. The water well report indicates the well had a static water level of 54' below ground level at the time the well was drilled and was pump tested at 60 gpm with 81' of drawdown after 24 hours. Each well is capable of producing approximately 50 gpm as presently equipped.

The water right for Well #1 allows it to be pumped up to 70 gpm and 29.5 AF/Y. The water right for Well #2 allows it to be pumped up to 60 gpm and 76 AF/Y, 46.5 AF/Y of which is primary right and 29.5 AF/Y of which is supplemental to the water right for Well #1. The combined annual water right for the two wells is 76 AF/Y. In the year from August 1, 1998 through July 31, 1999 the total water use was 66 AF/Y.

The output of the two wells is chlorinated and pumped directly to a 16,000 gallon reservoir, which is connected to a 42,000 gallon reservoir. The water is pumped again to a higher level reservoir of 115,000 gallon capacity. From the higher level reservoir water then gravity feeds the water distribution system. Table 1 is a summary of major water system components.

TABLE 1
Major Water System Components at CCCC

Source Water Components	Well #1	Well #2
Well Status	In Use	In Use
Well Capacity (gpm)	30 - 50	50
Well Logs Available	Yes	Yes
Well Pump Type	Submersible	Submersible
Pump Horsepower	2 pumps, 3 hp each	5 hp
Average Daily Hours of Operation	9.8 hours	9.8 hours
Drawdown Information Available	Yes	Yes
Emergency or Backup Power	Generator with automatic transfer switch	

Reservoir Components	Reservoir #1	Reservoir #2	Reservoir #3
Capacity, gallons (173,000 total)	16,000	42,000	115,000
Year Built	~ 1965	~ 1965	1992
Material	Concrete	Concrete	Concrete

SUSCEPTIBILITY ASSESSMENT

A susceptibility assessment for the CCCC wells was completed and submitted to the Department of Health in 1994. A copy of this susceptibility assessment is included in the appendix. Susceptibility assessments are an important initial step in selecting appropriate delineation methods to define the WHPA boundaries. Drinking water supplies vary in their susceptibility to contaminants discharged at the surface. Wells that have been poorly constructed or have been improperly cased have an increased susceptibility. Additionally, sources located in an unconfined aquifer with no confining layer (layer of low permeability) between the aquifer and surface have a much higher susceptibility than those drawing water from confined aquifers deep below the ground surface.
After review of the susceptibility assessment, the CCCC wells were given a low susceptibility rating by the Department of Health. A copy of the susceptibility rating is also included in the appendix.

CHAPTER 2

WELLHEAD PROTECTION AREA DELINEATION

The first step in developing a WHPP is to establish the land areas around each well from which ground water may be flowing to the well. These are areas from which pollutants, if they reached the groundwater, could get to the well and are referred to as zones of contribution (ZOCs). ZOCs require proper land use management to minimize the possibility of contaminants entering the groundwater system.

A WHPA is an area in which special attention is focused on prevention of groundwater contamination. Activities which could cause groundwater contamination are not strictly prohibited in the WHPA, but they are discouraged and, if permitted, are closely monitored. This is to be differentiated from the sanitary control area. The sanitary control area is the area within 100 feet from the well, unless a different size area has been approved by DOH. In the sanitary control area, no sources of contamination are allowed without approval of the water purveyor and DOH. A WHPA is generally larger than a sanitary control area. The size varies depending on the aquifer characteristics and water use rates. A WHPA is also less restrictive than a sanitary control area.

The WHPA is generally divided into 4 ZOCs. These are based on estimated time of travel to the well. ZOCs commonly used are 6 month, 1 year, 5 year and 10 year time of travel zones. The purpose of dividing the area into ZOCs is to give a graphical representation of the likely travel time of any contaminant from a contamination site to the public water supply well and to establish appropriate types of land use controls within various zones. For example one might want to restrict spreading of raw manure within the 6 month time of travel ZOC because any pathogens which could be in the manure could potentially live up to 6 months in the environment and thereby reach the well. However in the 5 to 10 year time of travel ZOC it is unlikely that any pathogens would survive long enough to reach the well, so manure spreading in this ZOC might not be as much of a concern to the water system so long as application rates are managed so as not to create other groundwater contamination problems.

METHODS OF DELINEATION

Estimation of groundwater flow direction and velocity is a very complicated science. So long as water is flowing through an aquifer of uniform porous media and infinite extent in all directions with no other water withdrawals or inputs then it is fairly simple to estimate the flow. But in the real world, groundwater flows through media which is not uniform, is quite limited in extent in various directions, and is generally poorly defined. Often there are no more than a few wells in the vicinity on which to base estimates as to the makeup of the aquifer and little of no information on water table levels in the area. To obtain such information requires surveying, test drilling and water level monitoring over time. The more test wells that can be drilled and monitored, the better an estimate of groundwater flow that can be obtained.

The degree of sophistication used for an estimate of the WHPA for a given water system will depend on several factors. These include:

a) The complexity of the geology in the vicinity of the water supply well.
b) The degree of threat posed by local land use activities in the vicinity of the water supply well.
c) The degree to which there is a need to focus groundwater protection resources to the specific areas of concern.
d) The financial capabilities of the water utility.

The most commonly accepted tools for delineating wellhead protection zones are the calculated fixed radius method, analytical models, and numerical models. These methods are discussed below.

Calculated Fixed Radius Method

The simplest groundwater model is the Calculated Fixed Radius (CFR) method. This is the estimate based on the assumption that the aquifer is uniform and infinite and has no other withdrawals. In this method, ZOCs are delineated by concentric areas around each well, usually several hundred feet in radius. In the Calculated Fixed Radius method, the delineation is calculated based on pumping data and known or assumed aquifer characteristics. If there is no need to closely delineate the WHPA, or if the aquifer is nearly uniform with few other withdrawals in the area, or if the utility has a minimal amount of money to spend on WHPA designation, then the CFR method would be appropriate.

Analytical Models

The analytical model requires the incorporation of basic hydrological information and certain physical characteristics of the aquifer and source. The most common analytical model is the CFR with a groundwater flow superimposed on it. The result is elliptical or pie-shaped WHPAs, depending on the groundwater flow rate relative to the well pumping rate. Major assumptions and simplifications to the hydrogeologic regime occur in analytical modeling, but the incorporation of the hydraulic gradient and hydrogeologic boundaries allows for a more realistic representation of the ground water flow regime than in the calculated fixed radius method. The analytical model is appropriate when there is a need to somewhat more clearly define the WHPA, especially when there is reason to believe that the groundwater may have a substantial natural flow, when there is existing background information on the geology in the area and where there is a need to better focus wellhead protection activities where they are needed. Costs are somewhat higher than for a CFR method, but not so high as numerical methods.

Numeric Method

The Numeric method requires significantly more data. In numeric modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters which are estimated from data collected from a variety of sources. The sources may include well logs, borings, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge and meteorological data.

The Numeric method generates more accurate results than the Fixed Radius or Analytical methods. However, Numeric models are very costly to develop. Consequently, Numeric models are more commonly used by large utilities with complex aquifers who have the resources to collect the extensive model input required.

ANALYSIS

The CFR Method was used to analyze the source protection area ZOCs for the CCCC wells. This method was chosen because there are no known potential sources of contamination in the general vicinity of the CCCC water system wells other than the CCCC facility itself. Also land use throughout the general area around the CCCC facility is uniform and there is no plans for any development in the area. In these circumstances the CFR method is adequate and minimizes the cost of the WHPP.
The ZOCs for the CCCC wells were calculated using the CFR equation provided in Figure 2 of DOH's *Wellhead Protection Program Guidance Document:*

$$r = (Qt/\pi nH)^{1/2}$$

where:

r = the radius of the CFR ZOC
Q = annual average rate in cubic feet per year
n = aquifer porosity
H = Open Interval or length of well screen
t = time of travel in years (6 months, 1 year, 5 years and 10 years)

The annual water rights limit of 29.5 AF/Y for Well #1 and 46.5 AF/Y for Well #2 for a combined water right of 76 AF/Y (3,310,560 ft^3/Y) were assumed to be the highest potential annual average water use. An aquifer porosity of n = 0.22 was used.[1] Both wells have an open interval at the bottom of the well instead of well screen, so a well screen interval of 10 feet was used.[1] Since both wells pump from the same aquifer and are near each other the WHPA should be based on the combined annual demand of both wells and should be centered at a point half way between the two wells.[1] Radius values calculated for the various times of travel are presented in Table 2 below. Figures 2 and 3 present the delineation's of the six month, one, five, and ten year ZOCs.

[1] As recommended in the *Wellhead Protection Program Guidance Document*, DOH, 1995

TABLE 2

CCCC Source Protection ZOCs (CFR Method)

Time of Travel	ZOC Radius (feet)
6 month	489
1 year	692
5 years	1550
10 years	2190

CHAPTER 3

CONTAMINANT SOURCE INVENTORY

An essential element of source protection is an inventory of all potential sources of groundwater contamination in and around the delineated protection areas. The purpose of the inventory is to identify past, present and proposed activities that may pose a threat to the source or surrounding area. The inventory can also help to plan management strategies such as provide notification to owners of potential sources of contamination located within the WHPA.

POTENTIAL CONTAMINANT SOURCES

An internet search of the Washington State Department of Ecology database of known contamination sites, hazardous materials handlers and underground storage tanks was conducted. The only sites identified within 5 miles of the CCCC wells were Rhodes Chemical Company about 3 miles Southwest from the CCCC site near Gate, and the CCCC site itself. A site visit was conducted by G&O personnel on August 11, 1999 to review and document potential groundwater contamination sources at the CCCC site. Locations of potential contaminant sources within the WHPA for the CCCC wells are shown in Figures 2 and 3. Descriptions of the potential contamination sources are listed in Table 3. The only potential sources of contamination within the CCCC WHPA are at the CCCC site itself and the road in front of the site. The only property owner within the WHPA is DNR. The CCCC facility itself is on leased DNR land, and the only DNR operations in the WHPA other than road maintenance are at the CCCC site. Facilities at the CCCC site include DOC facilities and DNR facilities.

TABLE 3

Potential Contaminant Sources in CCCC WHPA

Site Map Location	Potential Contaminant Source	Description
Zero to Six Month Zone of Contribution		
A	Chemical Shed	Contains motor oils and small quantities of fuels. Information per personal communication with CCCC Staff, internet search and site visit.
B	Auto Shop	Contains motor oils, machine cutting oils and degreasing solvents. Information per personal communication with CCCC Staff, internet search and site visit.
C	Abandoned fueling station	Underground storage tank removed. Information per personal communication with CCCC Staff.
D	Diesel Generator	In frequently used during power outages. Contained in a double walled vaulted tanks. Information per personal communication with CCCC Staff and site visit.
E	E-Line Road	Very low volume public road. Primarily CCCC staff, supplies for CCCC and recreational users. Information per map review and site visit.
Six Month to One Year Zone of Contribution		
F	Abandoned Underground Fuel Tank	Underground storage tank removed. Information per personal communication with CCCC Staff.
E	E-Line Road	See above.
One Year to Five Year Zone of Contribution		
G	Abandoned Wood Preserving Site (Creosote)	Site is in latter stages of remediation process. Contaminated soils have been removed. No groundwater contamination. Information per internet search and personal communication with CCCC Staff.
E	E-Line Road	See above.
I	Diesel Generator	See above.
K	Vehicle Fueling Facility	Above ground automotive fuel storage in concrete vaulted tank. Information per personal communication with CCCC Staff and site visit.
Five Year to Ten Year Zone of Contribution		
H	Wastewater Treatment Plant	The CCCC wastewater treatment plant has a surface water discharge downstream from CCCC.
E	E-Line Road	See above.
J	Diesel Generator	See above.

The Chemical Shed, identified as A in Figure 2, is a small room at the eastern end of the Auto Shop/Warehouse building next to the Vehicle washing facility. At the time of the site visit the room contained several drums of oil of various types and small containers of fuel. The room has a concrete slab floor with a concrete curb about 6 inches high all around for secondary containment. Potential contaminants from this site include waste oil and fuel.

The Auto Shop, identified as B in Figure 2, is a large warehouse type building with a concrete slab floor containing facilities for routine vehicle maintenance. The building contains several vehicle lifts, waste oil drain tanks, drums of new oil, degreaser tanks, various machine tools including lathes, a milling machine, various punches and breaks, and a welding shop. Potential contaminants from this site include waste oils, antifreeze, solvents, acids, paints and soaps.

The Abandoned Fueling Station, identified as C in Figure 2, was not inspected during the site visit. DOC staff stated that the fuel tanks at the site have been removed and that they are not aware of any contamination problem at the site. The potential contaminants from this site include gasoline, diesel and waste oil.

The Diesel Generators Facility, identified as D in Figure 2, and I and J in Figure 3, were identified during site visit and personal communication with DOC Staff. The Generators are contained in a double walled vaulted tanks. They are used during power outages, which is very infrequent. The potential contaminant from these site includes diesel fuel.

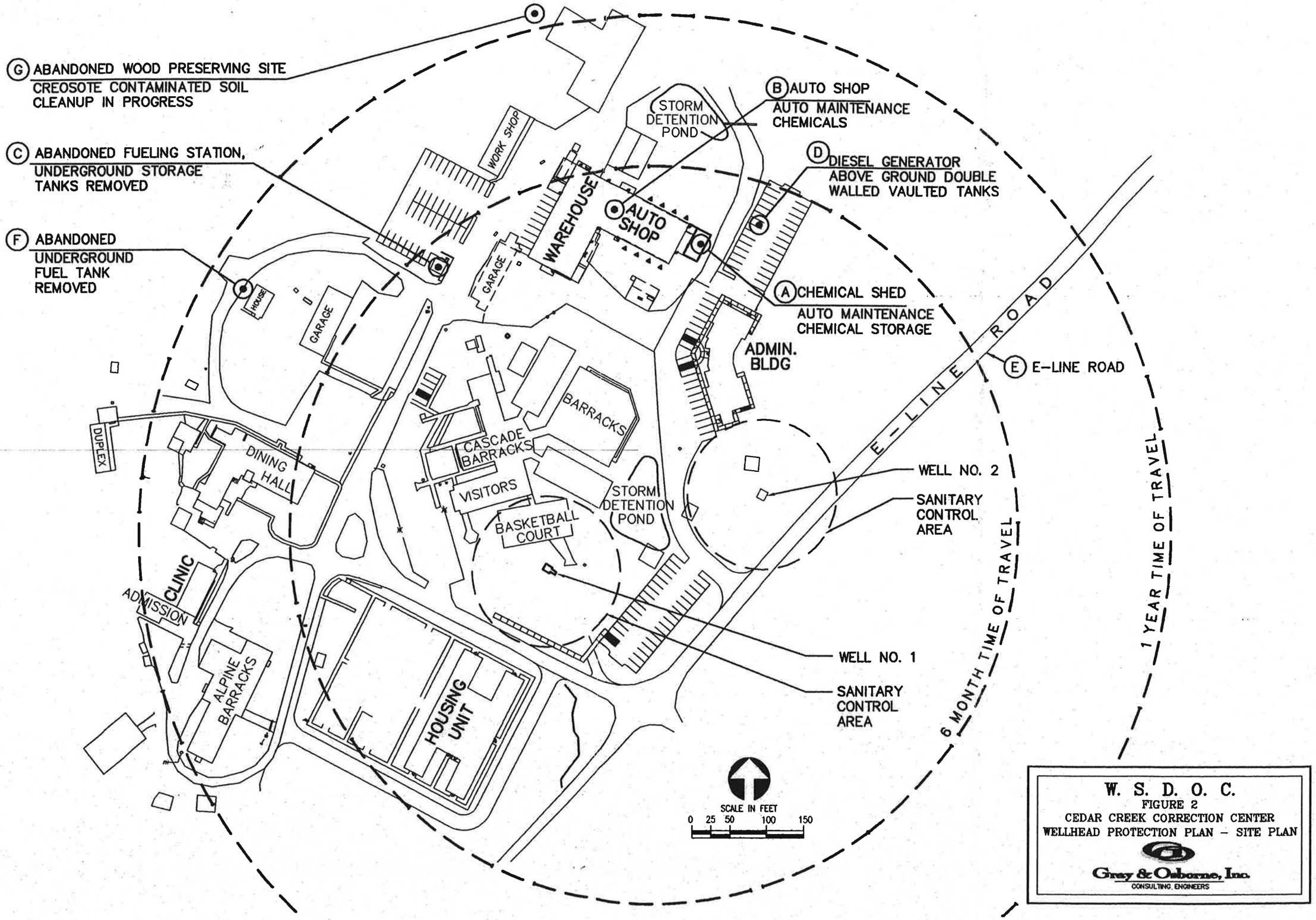
E-Line Road, identified as E in Figure 2, is a very low volume public road. The primary use of the road is for access to and from the CCCC. The road is also for outdoor recreation, pleasure driving and access to various Capitol Forest facilities. The worst case scenario on this road would probably be if a fuel tanker bringing fuel to the CCCC fueling facility were to overturn on this road. Other vehicles as well could also cause groundwater contamination if they were to spill their contents or their fuel tanks on the road. The most likely potential contaminants from the E-Line Road are vehicle fuel and motor oil. Anything else hauled on this road could potentially contaminate the groundwater as well.

The Abandoned Underground Fuel Tank, identified as F in Figure 2, was not inspected during the site visit. DOC staff stated that the fuel tank at the site has been removed and that they are not aware of any contamination problem at the site. The potential contaminants from this site include gasoline, diesel and heating oil.

The Abandoned Wood Preserving Site, identified as G in Figure 2, is one of two sites identified at CCCC in the DOE internet site search. The site was not inspected during the site visit. DOE describes the site as a "voluntary cleanup site." According to DOC staff contaminated soil at this site has been removed and no groundwater contamination was involved. Potential contaminants from the site include solvents, pentachlorophenol (PCP), creosote and coal tar compounds.

The CCCC Wastewater Treatment Plant (WWTP), identified as H in Figure 3, is the other of two sites identified at CCCC in the DOE internet site search. The site was not inspected during the site visit. DOE regulates the waste discharge from the CCCC WWTP under NPDES Permit No. 003773-7. The WWTP receives wastewater from dormitories, laundries, kitchens and plumbing fixtures at buildings throughout the CCCC facility. When considering a WWTP as a potential source of contamination consideration should also be given to the potential for contamination from the wastewater collection system. There are no industries at CCCC that would discharge significant industrial wastes. The WWTP treatment process includes an extended aeration activated sludge treatment process and ultraviolet light disinfection. Potential contaminants from this site include human pathogens, nitrate, and any chemicals which may be dumped into the sewer system.

The Vehicle Fueling Facility, identified ask in Figure 3, consists of above ground concrete vaulted double walled storage tanks with built in leak detection systems. The facility is used to fuel CCCC and DNR vehicles. Potential for contamination from the site comes from possible leakage of the tanks, spillage of fuel during the fueling process, spillage of fuel during the filling of the storage tanks and leakage of fueling pipes and hoses. The likelihood of ground water contamination from above ground fueling facilities is greatly reduced relative to below ground fuel storage and piping systems. Potential contaminants from this site include gasoline and diesel fuel.



W. S. D. O. C.
FIGURE 2
CEDAR CREEK CORRECTION CENTER
WELLHEAD PROTECTION PLAN – SITE PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Chemical Monitoring Worksheet for Waivers and Waiver Renewals: 1996-1998 (continued)

PWSID: 118827	CEDAR CREEK CORRECTIONS CENTER	Source: 03

Part III: Synthetic Organic Chemical Monitoring (SOC):

1. The following table shows a summary of the number and type of SOC (pesticide) samples that were required for this source during the 1993-1995 compliance period, the number of samples that were completed and if there were any detections.

1993-1995 SOC Monitoring Requirements			
Test methods	**Number of samples required**	**Was this requirement met?**	**Any SOC detections**
515.1	NONE	YES	NO
525.2	NONE	YES	NO
531.1	NONE	YES	NO
547	NONE		
549	NONE		
Other			

Comments: This source was tested by DOH as part of the Area Waiver Study.

2. Based on the results of your previous sampling, the following table shows a summary of the SOC monitoring requirements for 1996-1998, both *with* a waiver and *without* a waiver. The table has space for you to record the month and year in which you plan to test for SOCs (if sampling is required).

1996-1998 SOC Monitoring Requirements			
Test Methods	**Number of samples required, *without* a waiver**	**Number of samples required, *with* a waiver**	**Month and year you will begin sampling (if sampling is required).**
515.1	1 qtr	0	
525.2	1 qtr	0	
531.1	1 qtr	0	
Other:			

Comments:

Part IV: Water System Response Form for 1996-1998:

The information in Parts I - III above outlines the sampling requirements and waiver options that are available for this source. You may choose to apply for a waiver (which may include a requirement for limited sampling, as shown in the tables above). **If you do not want a waiver, you will be required to monitor for VOCs and SOCs as outlined in the table in Part III. You must plan to begin any required monitoring before November 1997 at the latest.**
Indicate your waiver choice on the attached Water System Response form (pink sheet) for each of your sources and return the form, along with any corrections or test results, to the DOH address shown on page 2 of the pink response sheet.

Process Date: *2/17/97* *Edit Date:*

Chemical Monitoring Worksheet for Waivers and Waiver Renewals: 1996-1998

PWSID: 118827	CEDAR CREEK CORRECTIONS CENTER	Source: 03

Introduction: This **2-page form** summarizes information used by DOH in deciding what type of waiver options are available for the water system and source listed above. Please review this information carefully. If the information is not correct, draw a line through the incorrect information, and make corrections to the form. If you collected samples during 1993-1995 that are not shown here, make corrections to the green form and attach copies of any missing test results to the form. **Return the corrected form with data (if applicable) to DOH with the pink "Water System Response Form". You should keep a copy of this form for your records.**

PART I: Waiver and other source information:

1. The Susceptibility Rating for this source is: (L = low, M = moderate, H = high) **L**

2. If the susceptibility for this source is "M" or "H", did this source apply (and pay) for an AREA waiver during the 1993-1995 Compliance Period? (NOTE: sources with susceptibility ratings of "Low" did not need an AREA waiver.) **NO**

3. The Pesticide Vulnerability for this source is: (L = low, M = moderate, H = high). **L**

4. Was this source sampled under the terms and conditions of the Chafee Lautenberg Amendment? (NOTE: systems under 3300 population that sampled for VOCs or SOCs between Oct. 1, 1992 and Sept.30, 1993, with no detections, were waived from having to collect 4 quarters of samples during 1993-1995.) **NO**

5. The type of waiver you can obtain for this source in 1996-1998 is: **Organic Waiver Renewal**

Part II: Volatile Organic Chemical Sampling (VOC):

1. The following table shows a summary of the VOC samples required for this source during the 1993-1995 compliance period, and the results of the VOC samples.

1993-1995 VOC Monitoring Requirement			
Test method	**Number of required samples**	**Was this requirement met?**	**Any detections other than trihalomethanes (THMS)?**
524.2	1 qtr	YES	NO

Comments: VOC submitted 9/95.

2. The following table shows the VOC monitoring requirements for this source during the 1996-1998 Compliance Period. It shows only the required number of samples that must be collected. It does not show any samples that you may have already collected after the 1993-1995 Compliance Period. The table has a space for you to record the month and year in which you plan to test for VOCs. (Recording the VOC date is for your information only. You do not have to return this green sheet to us if this is the only change to this form.)

1996-1998 VOC Monitoring Requirement		
Test method	**Number of required samples**	**Month/year you plan to sample (or did sample)?**
524.2	1 qtr	

Comments:

Appendix 1

Susceptibility Assessments and Susceptibility Ratings

MANAGEMENT TOOLS FOR LOCAL GOVERNMENTS

Thurston County has adopted a critical areas ordinance which identifies rules which apply to WHPAs. Thurston County is also in the process of amending their wellhead protection portion of the critical areas ordinance. A copy of the Critical areas ordinance and the Draft Wellhead Protection Area Ordinance are included in the Appendix. Public education is one tool which CCCC can use to their advantage for wellhead protection. Regular training on hazardous materials management and water resource protection would help to keep staff vigilant to potential problems. Training is available through Thurston County Environmental Health. The county contact on this program is Sally Toteff. She can be reached in Olympia at (360) 754-4663.

Posting signs on E-Line Road at the boundaries of the WHPA would inform materials haulers and the motoring public of the sensitivity of the area. A sample sign is included in the Appendix.

treatment for the source. The preferred recommendation will depend on the nature and extent of the contamination. Generally contamination problems tend to be very localized and treatment costs tend to be very expensive, depending on the nature and concentration of the contaminant. Development of a new source away from the contamination problem would likely be the best solution. CCCC is located on a large tract of DNR property and it is anticipated that development of a new source of supply away from contamination would likely be a feasible solution to any groundwater contamination problem.

RECOMMENDED ADDITIONAL WELLHEAD PROTECTION AREA MANAGEMENT STRATEGIES

Optional strategies recommended in the DOH *Wellhead Protection Program Guidance Document* are discussed briefly below. Those which are recommended for CCCC are discussed in more detail in the following sections:

- Establishing a *Local Wellhead Protection Committee* would not be practical for this particular water system because the only owners of potential sources of contamination in the WHPA are DNR and DOC and there is no development activity in the WHPA.
- *Individual Potential Contaminant Source Management* is a practical approach for CCCC because most of the potential sources of contamination are under the direct control of CCCC or DNR and the number of potential sources of contamination is small.
- *Developing a Pollution Prevention Program* may be practical for the CCCC on a small scale and is essentially the same thing as Individual Potential Contaminant Source Management, since CCCC controls most potential sources of contamination in the WHPA.
- *Management Tools for Local Governments* is not directly applicable to CCCC because CCCC is not a local government. The local government for CCCC is Thurston County. CCCC may want to utilize some of the wellhead protection tools which have been developed by Thurston County.

INDIVIDUAL POTENTIAL CONTAMINANT SOURCE MANAGEMENT

The potential sources of contamination identified in Chapter 3 are already fairly well managed. Continued vigilance, continued education of all staff regarding hazardous materials handling and regular review of all hazardous materials handling and storage in the CCCC WHPA is recommended. Best Management Practices (BMPs) have been developed for most potential sources of contamination identified in the WHPA. Selected BMPs from the *Stormwater Management Manual for the Puget Sound Basin* (DOE, 1992) are included in the Appendix.

CONTINGENCY PLANNING

Contingency planning is an important component of a WHPP. In the event that one or both wells need to be taken off line due to contamination, a contingency plan provides immediate mitigation. A properly prepared and updated contingency plan helps ensure the water system, and local officials, are prepared to respond to emergency situations. Contingency planning includes emergency response to loss of a water source due to contamination, provision of temporary alternative sources of drinking water as an interim measure in the event that groundwater should become contaminated and replacement or treatment of contaminated water supplies as a permanent fix to a contamination problem.

Contamination detected in the water supply: In the event that contamination should be detected in the water supply the first action should be to contact the DOH. The regional engineer is Richard Hoey. He can be reached at (360) 664-8058. DOH will determine the public health significance of the contamination and advise CCCC regarding necessary follow-up actions. Generally, one sample test result is not enough to verify a contamination problem and re-sampling is recommended. However, depending on the nature and concentration of the contaminant it may be best to immediately provide notification to all water users and provide an alternative source of water immediately. DOH will advise on this issue.

In the event that contamination is verified or a judgment call is made to require notification of the water users, there are statutory requirements for notification language. DOH will provide the mandatory language and CCCC may add other information to the notification as deemed appropriate. Other information may include details of how much contaminant was found, what is being done to correct the problem and what alternatives are available to the users to minimize their risks.

Provision of temporary alternative sources of drinking water: In the event that contamination renders the water supply undrinkable, a temporary alternative water supply may be provided until either a new source of supply can be found or treatment can be provided. DOH has guidelines for trucking of water. Copies of the guidelines should be obtained and followed. Water must be obtained from a DOH approved water supply. The transportation container must be free of any and all contamination. Containers previously used for transporting petroleum products or solvents should not be used. The transport container must be disinfected pursuant to strict standards in the DOH guidance.

DOC has arrangements with DNR and with Kelly's Water Service to provide an emergency supply of water. CCCC water system is served by a gravity storage system. Therefore trucked-in water could be placed directly into a reservoir to provide water for CCCC in an emergency.

Replacement or treatment of contaminated water supplies: In the event that a source of supply should become contaminated and it appears that the contamination will not go away soon, it will be necessary to either replace the contaminated source or provide

TABLE 5 - Continued

Emergency Response Agency	Contact Name and Phone	Service Provided
Emergency Dispatch System Thurston County Department of Communications 2703 Pacific Ave. Suite A Olympia 98506	Emergency: 911 Business: (360) 704-2740	Serves as point of contact and coordinates information to emergency responders.
Thurston County Fire District #11 10828 Littlerock Ave. SW Olympia, WA 98512	Mike Harris, Chief Emergency: 911 Business: (360) -352-1614	Initial response to a hazardous spill. Spill containment, surface cleanup, public safety
Thurston County Sheriff 2000 Lakeridge Drive, SW Olympia, WA 98502	Emergency: 911 Business: (360) 786-5500	Initial response to a hazardous spill. Spill containment, surface cleanup, public safety
Thurston County Road Department 9605 Tilley Road SW Olympia WA 98512	Emergency: 911 Business: (360) 786-5495	Spill response assistance through traffic control, equipment, and personnel for non-hazardous clean-up activities on County roads.
Fire Protection Bureau Washington State Patrol General Administration Building PO Box 42600 Olympia, WA 98504-2600	Sgt. Roy Glass Emergency: 911 Business: (360) 753-0500	The state patrol is responsible for managing spills on interstate and state highways.
Wellhead Protection Program Washington State Department of Ecology PO Box 47775 Olympia, WA 98504-7775	Dick Szamerik, Coordinator Business: (360) 407-6000	Coordinates information and keeps records on WHPAs.
Spill Response Program Washington State Department of Ecology PO Box 47775 Olympia, WA 98504-7775	Jim Oberlander Emergency: 911 Business: (360) 407-6000	Determines the source, cause and responsible party. If responsible party is unknown, DOE will investigate to determine who is responsible and ensure containment, clean-up and disposal.

Regional Engineer
Washington State Department of Health
Division of Drinking Water
Southwest Regional Office
2411 Pacific Avenue
PO Box 47823
Olympia, WA 98504-7823

Washington State Department of
Community Trade and Economic
Development
Division of Growth Management
906 Columbia Street SW
PO Box 48300
Olympia, WA 98504-8300
Phone: (360) 753-2222

Keith Smith, Director
Division of Environmental Health
Public Health and Social Services
Department
2000 Lakeridge Drive, SW
Olympia, WA 98502
Phone: (360) 786-5455

SPILL/INCIDENT RESPONSE PROGRAM

Spill response planning is an important aspect of both an emergency management plan and a WHPP. Specific response procedures for WHPAs must be determined prior to the occurrence of a contamination incident. The information obtained as a result of the susceptibility assessment and the WHPA inventory can be used to determine what types of spill response measures are necessary for the protection of drinking water sources. In order to be accepted by local emergency responders, spill response procedures for WHPAs will be realistic and easily implemented.

In order for spill response procedures to be effectively executed, coordination, cooperation, and communication among the responding agencies, organizations, and individuals is imperative. Depending on the magnitude and type of the release, any of several agencies may be involved in a spill response for a WHPA in Washington State. Table 5 is a summary of response agencies which may be involved in a spill in the CCCC WHPA. Preliminary discussions regarding spill response have been held with these agencies. A copy of the WHPA maps and list of potential sources of contamination must be provided to each of these agencies. A sample letter transmitting these items is included in the Appendix.

TABLE 5:

Emergency Response Agencies for CCCC WHPA

Emergency Response Agency	Contact Name and Phone	Service Provided
Cedar Creek Corrections Center PO Box 37 Littlerock, WA 98556	Leroy Wallace, Plant Manager Emergency: 911 Business: (360) 753-7278	Water System Operations, overall CCCC facilities management.

- *Developing a Pollution Prevention Program.* DOH encourages communities to develop pollution prevention strategies, long term waste management plans which reduce the creation of waste at the source. EPA recognizes three categories of pollution prevention techniques. (a) Source reduction, creating less waste to begin with; (b) recycling, reusing materials instead of discarding them, and (c) treatment to reduce the contamination threat of the wastes before discharging them.

- *Management Tools for Local Governments.* Tools for local governments include wellhead protection ordinances, zoning, use permits, building codes, operating standards, monitoring and reporting requirements, water conservation measures and public education.

Following is a discussion of WHPA Management Strategies.

REQUIRED WELLHEAD PROTECTION AREA MANAGEMENT ACTIONS

NOTIFICATIONS TO OWNERS OF POTENTIAL SOURCES OF CONTAMINATION

Potential sources of contamination are identified in Table 3. The only owners of potential sources of contamination in the WHPA are DNR and CCCC. The only notification required is to DNR. A sample notification letter is included in the appendix. Notification should be provided to:

Eric Huart
Department of Natural Resources
PO Box 47014
Olympia, WA 98504-7014

NOTIFICATION TO REGULATORY AGENCIES AND LOCAL GOVERNMENT

Regulations require notification of WHPA and potential sources of contamination to regulatory agencies and local government. Following are the regulatory agencies and local government offices which should receive this notification: A copy of the WHPA maps and list of potential sources of contamination must be provided to each of these agencies. A sample letter transmitting these items is included in the Appendix.

Dick Szamerik, Wellhead Protection Program Coordinator
Washington State Department of Ecology
Water Resources Division
PO Box 47775
Olympia, WA 98504-7775
Phone: (360) 407-6000

Rich Hoey, P.E.

CHAPTER 4

WELLHEAD PROTECTION AREA MANAGEMENT

A wellhead protection program will not protect the water supply without implementation of risk reducing measures or pollution prevention efforts. Management strategies can be focused only after WHPAs have been clearly defined and established and potential sources of contamination have been identified. The two wells pump from the same aquifer and have a common WHPA defined in Chapter 2 and shown in Figures 2 and 3. Potential sources of contamination are identified in Chapter 3, summarized in Table 3, and shown on Figures 2 and 3. Minimum WHPA management requirements are specified in WAC 246-290-135. These are:

- Documentation of the purveyor's *notification to all owners and operators of actual or potential sources of groundwater contamination* within the WHPA.
- Documentation of the purveyor's *notification to regulatory agencies* regarding the location and dimensions of the WHPA and the inventory of the potential sources of contamination within the WHPA.
- A *spill response plan* for each WHPA containing documentation for coordination with local first responders.
- *Contingency plans* for providing alternate sources of drinking water in the event that contamination does occur and management recommendations to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.

In addition, the DOH's *Wellhead Protection Program Guidance Document* recommends the following management elements:

- *Establishing a Local Wellhead Protection Committee. This would consist of* representatives of a representative of the water system owner, owners of some of the major potential sources of contamination, a representative of the land use control and planning agencies in the WHPA, and citizen action groups. The purpose of the committee would be to facilitate communication among affected parties about strategies to protect groundwater in the WHPA, develop consensus among owners of potential sources of contamination, and seek input to the water purveyor on contamination concerns and effective management strategies.

- *Individual Potential Contaminant Source Management.* Once the potential sources of contamination have been identified the purveyor can work with the owners of the potential sources of contamination to find practical strategies to minimize the risk of groundwater contamination from the potential sources of contamination, and to improve communication in the event of a contaminant spill.

(L) DIESEL GENERATOR ABOVE GROUND DOUBLE WALLED VAULTED TANK

(J) DIESEL GENERATOR ABOVE GROUND DOUBLE WALLED VAULTED TANK

(K) VEHICLE FUELING FACILITY ABOVE GROUND DOUBLE WALLED VAULTED TANK

(H) CEDAR CREEK CORRECTION CENTER WASTEWATER TREATMENT PLANT

GRAYS HARBOR CO
THURSTON CO

Cedar Creek
State Corrections Center

6 MONTH T.T.
1 YEAR T.T.
5 YEAR TIME OF TRAVEL
10 YEAR TIME OF TRAVEL

Mill Creek
12
897
519

Creek

SCALE IN FEET
0 200 400 800 1200

W. S. D. O. C.
FIGURE 3
CEDAR CREEK CORRECTION CENTER
WELLHEAD PROTECTION PLAN
VICINITY PLAN
G

Received 5/24/94 with request for Well Field designation. (SWI) Drinking Wtr. Operations)

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1

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 : Leroy Wallace / State of WA - DOC

Water system name : Cedar Creek Corrections Center

County: Thurston

Water system number: 118827 Source number: 502 (XX)

Well depth: 200 (ft.) (*From WFI form*)

Source name: Well #2

WA well identification tag number: ___ ___ ___-___ ___ ___

X well not tagged

Number of connections: 35 Population served: 240

Township: 16N Range: 04W

Section: 11 1/4 1/4 Section: NE / SE

Latitude/longitude (if available): 46 55 40 / 123 05 58

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map

X other: FCC License

* 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: 2 / 4 / 93 month/day/year

last reconstruction: ___ / ___ / ___ month/day/year

_____ information unavailable

(Maps & WQ data in separate packet in file.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20-50 ft X 50-100 ft ___ 100-200 ft ___ >200 ft

___ information unavailable (*'< ' means less than; '> ' means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20-50 ft X 50-100 ft ___ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

X well log __ other: Depth finder

__ 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): 715 (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 ~~top~~ Bottom of the ~~open interval~~? lowest confining layer X YES ___ NO

___ information unavailable

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: _____(gallons) New well

How was this determined?

X meter

___ estimated: X pumping rate (60 GPM)

___ pump capacity ( )

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 140 (ft)

1 year ground water travel time : 200 (ft)

5 year ground water travel time: 440 (ft)

10 year ground water travel time: 620 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: ~~80~~ 120' (ft) (open casing below 80')

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? YES / (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) / NO (mark and identify on map).

Comments: well #2 has a stormwater detention pond 100' from the well.

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	NO
Results greater than MCL	___	X
< 2 mg/liter nitrate	X	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___

Test results enclosed < 0.2

___ Nitrate sampling records unavailable

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)

	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	___
VOCs never detected	X	___

Test results enclosed from well #1

___ VOC sampling records unavailable

C. EDB/DBCP:(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

	YES	NO
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	X	___

Test results enclosed from well #1

___ EDB/DBCP tests required but not yet completed

___ EDB/DBCP tests not required

Wells 1 + 2 OK'd as well field 11/94 SWD

D. Other SOCs (Pesticides):

	YES	NO
Other SOCs detected (pesticides and other synthetic organic chemicals).	___	___

___ Other SOC tests performed but none detected (list test methods in comments

X Other SOC tests not performed

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: _____

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.)

_____ 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.

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 202511

Water Right Permit No. _____

(1) OWNER: Name Cedar Creek Correction Center Address Little Rock WA

(2) LOCATION OF WELL: County Thurston NE ¼ SE ¼ Sec 11 T 16 N. R 4 W W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Little Rock WA

(3) PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

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

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

(5) DIMENSIONS: Diameter of well 8 inches. Drilled 200 feet. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 80 ft.

Welded ☐ Liner installed ☐ Threaded ☐ _____ " Diam. from _____ ft. to _____ ft.

_____ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☑

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☑

Manufacturer's Name _____

Type _____ Model No _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 18' ft.

Material used in seal Bentonite

Did any strata contain unusable water? Yes ☐ No ☐

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.

Static level 54 ft. below top of well Date Feb 4 93

Artesian pressure _____ lbs. per square inch Date _____

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

(9) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes ☑ No ☐ If yes, by whom? The Pump

Yield: 60 gal./min. with 81 ft. drawdown after 24 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
0	90'	0:01	75'	0:02	72'
0:03	66'	0:04	63'	0:05	57'
0:10	45'	0:15	43'	0:25	40.65'

Date of test FEB 4, 1993

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

Airtest 60 gal./min. with stem set at 180' ft. for 1 hrs.

Artesian flow _____ g.p.m. Date _____

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

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Silty (Yellow - Brown) [redacted] & Red	0	20
Silty Sand [redacted]	20	55
Silty Sand + Gravel [redacted] (Brown)	55	65
Less silty more sand + gravel (Brown)	65	75
Black Rock fra [redacted] Rock (Trace of Red)	75	90
Black Rock trace of White Rock	90	155
Black Red White + Red Rock Water Barring	155	200
Black Rock Hard	200	

* 5 feet from here to bottom of casing

Work started Feb 2 19 Completed Feb 4 1993

WELL CONSTRUCTOR 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.

NAME Tacoma Pump & Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address 30316 Mountain Hwy Gratt

(Signed) _____ (WELL DRILLER) License No. 1964

Contractor's Registration No. TACOMAPD203PF Date Feb 4 1993

(USE ADDITIONAL SHEETS IF NECESSARY)

Received 5/24/94 with request for Well Field designation. (AW) DOH SW Drinking Water Operations

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1

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 : Leroy Wallace / State of Wa - DOC

Water system name : Cedar Creek Corrections Center

County: Thurston

Water system number: 118827 Source number: 501

Well depth: 200 (ft.) (*From WFI form*)

Source name: Well #1

WA well identification tag number: ___ ___ ___-___ ___ ___

X well not tagged

Number of connections: 35 Population served: 240

Township: 16 N Range: 04 W

Section: 11 1/4 1/4 Section: NE / SE

Latitude/longitude (if available): 46 55 40 / 123 05 58

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map

X other: FCC License

* 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: 12 / 6 / 86 month/day/year

last reconstruction: ___ / ___ / ___ month/day/year

_____ information unavailable

(Maps & WQ data in separate packet, in file) (AW)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft X 50–100 ft ___ 100–200 ft ___ >200 ft

___ information unavailable (*'< ' means less than; '> ' means greater than*)

2) Depth to ground water (static water level):

X < 20 ft ___ 20–50 ft ___ 50–100 ft ___ >100 ft

___ flowing well/spring (artesian)

How was water level determined?

X well log __ other: Depth finder

__ 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): 765 (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.)

✓ 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 ~~top~~ Bottom of the ~~open interval~~? lowest confining layer. X YES ___ NO

___ information unavailable

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 12,750,000 (gallons)

How was this determined?

X meter

___ estimated: X pumping rate (70 GPM)

___ pump capacity ( )

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 140 (ft)

1 year ground water travel time : 200 (ft)

5 year ground water travel time: 440 (ft)

10 year ground water travel time: 620 (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: ~~59'8"~~ 140' (ft) (open casing below 59'8" Lft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? YES / (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) / NO (mark and identify on map).

Comments: well #2 has a stormwater detention pond 100' from the well. (Well #1)

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	NO
Results greater than MCL	___	X

	YES	NO
< 2 mg/liter nitrate	X	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___

Test results Enclosed < 0.2

___ Nitrate sampling records unavailable

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)

	YES	NO
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	___
VOCs never detected	X	___

Test results Enclosed.

___ VOC sampling records unavailable

C. EDB/DBCP:(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

	YES	NO
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	X	___

Test results Enclosed X

___ EDB/DBCP tests required but not yet completed

___ EDB/DBCP tests not required

D. Other SOCs (Pesticides):

	YES	NO
Other SOCs detected (pesticides and other synthetic organic chemicals).	___	___

__ Other SOC tests performed but none detected (list test methods in comments

X Other SOC tests not performed

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: _____

_____

_____

_____

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.)

_____ YES _X_ 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.

nd Copy — Owner's Copy
rd Copy — Driller's Copy

STATE OF WASHINGTON (well #1)

Permit No.

OWNER: Name Cedar Creek Corrections Center Address Little Rock, Wa. VC Box 37 A-582

) LOCATION OF WELL: County Thurston NE ¼ SE ¼ Sec 11 T 16 N., R 4W W.M

ring and distance from section or subdivision corner

) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

, TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

) DIMENSIONS: Diameter of well 8 inches.
Drilled 200 ft. Depth of completed well 200 ft.

) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from +2'9" ft. to 59'8" ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal cement grout
Did any strata contain unusable 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.
tic level 13'4" ft. below top of well Date 12-08-86
lesian 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
a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
d: 70 gal./min. with 64'7" ft. drawdown after 24 hrs
" " "
" " "

overy 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
er test gal./min. with ft. drawdown after hrs.
lesian flow g.p.m. Date
mperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand & gravel fill	0	2
Top soil	2	4
Clay yellow-brown	4	25
Sandy-clay red	25	35
Shale rock redish soft	35	52'4"
Decomposed basalt	52'4"	69
Rock & some clay	69	74
Shale rock red & black medium	74	98
Rock blue medium hard	98	105
Rock blue hard	105	126
Rock blue, green, white medium	126	129
Rock blue & red medium	129	132
Rock blue medium	132	137
Shale rock blue & red medium soft	137	148
Rock blue medium - hard	148	200
Water @ 40 - iron		
Water @ 70 - iron		
Water @ 120 - iron		
Water @ 163' - good		

Work started 12-04 19 86 Completed 12-06 19 86

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

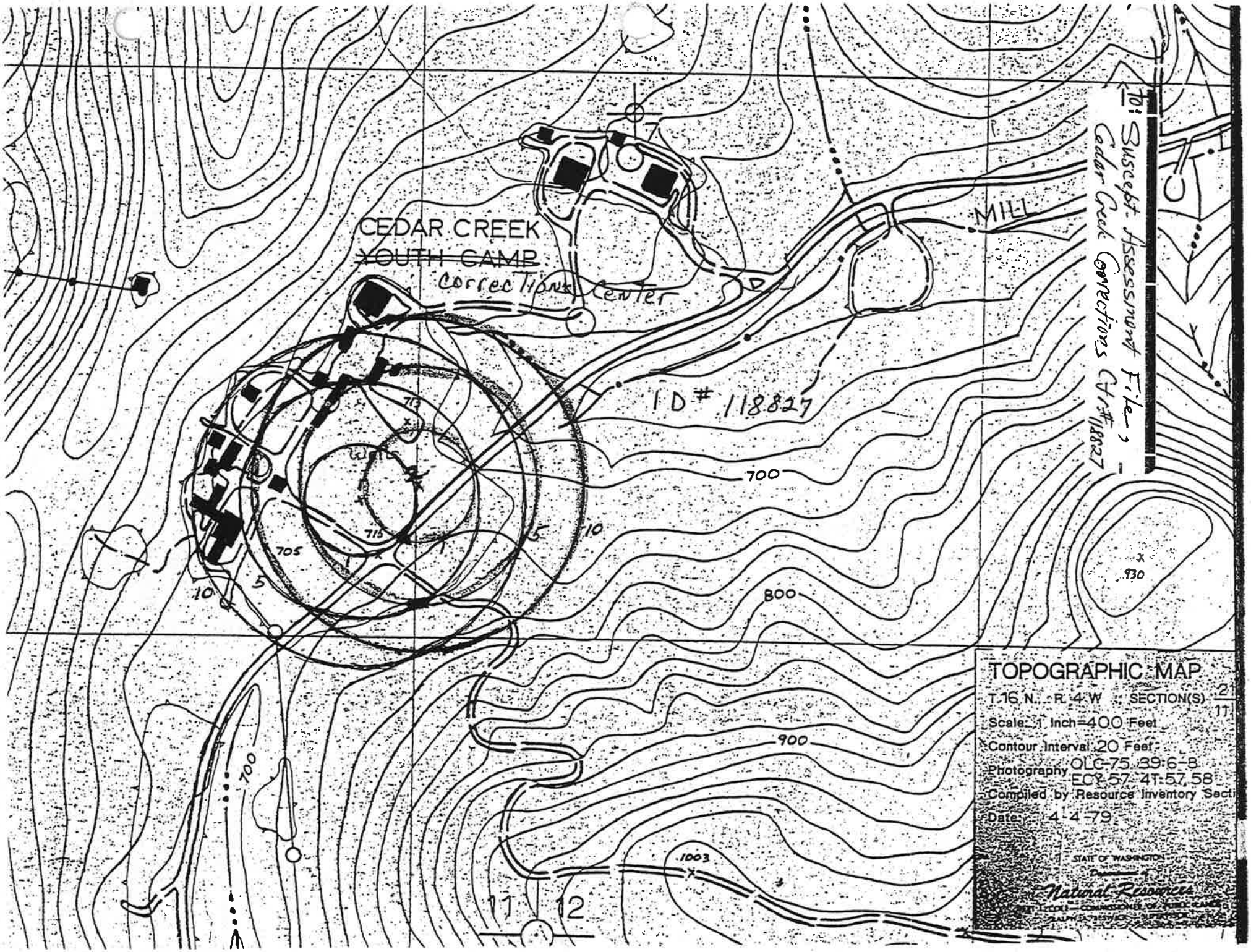
NAME Dale McGhee & Sons Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)

Address 3032 Allen Street Kelso, Wa. 98626

[Signed] J. Dale McGhee
(Well Driller)

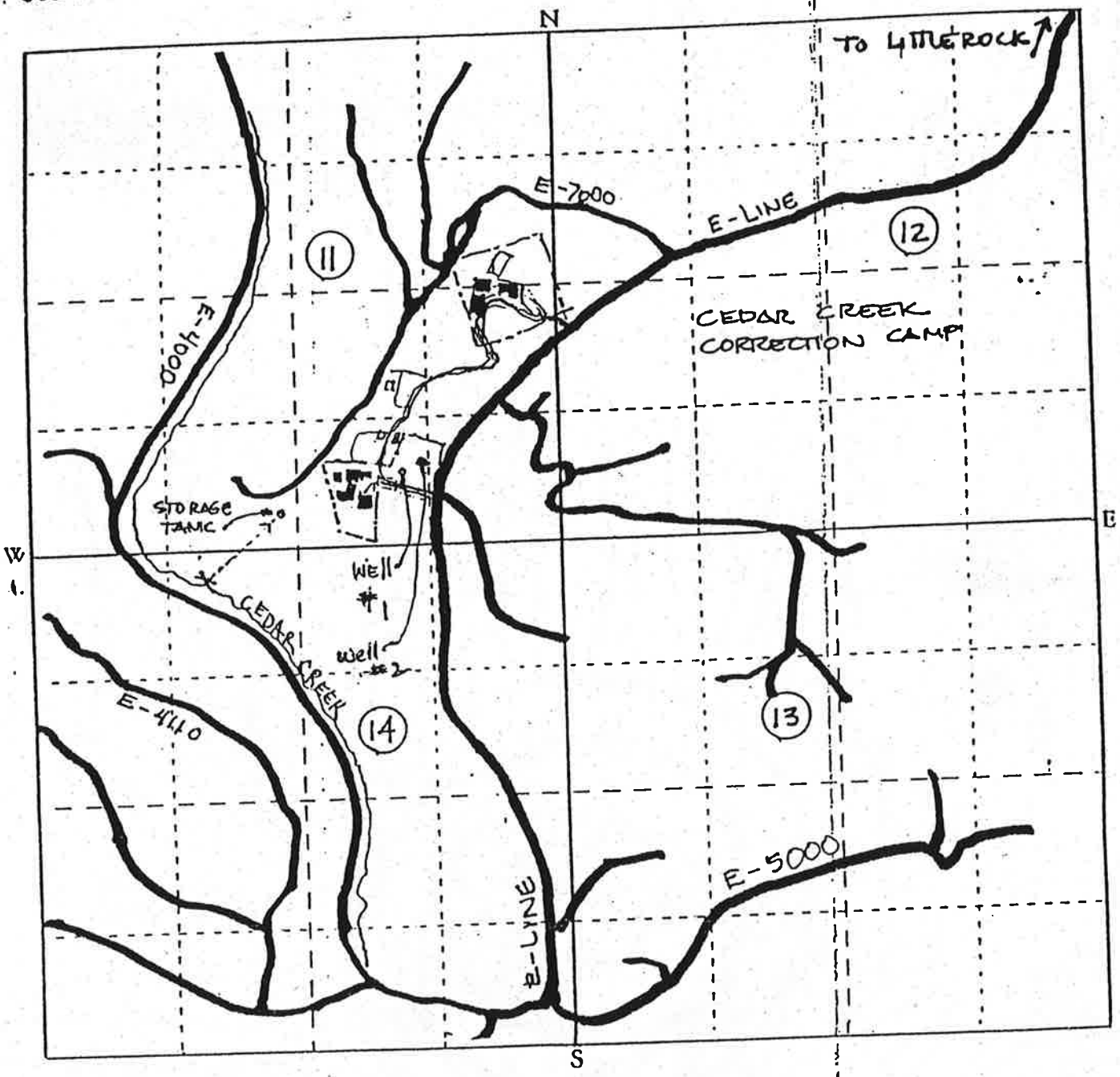
License No. 0298 Date December 24 19 86

(USE ADDITIONAL SHEETS IF NECESSARY)


CEDAR CREEK
~~YOUTH CAMP~~
Correction Center
MILL
ID # 118827
To: Suscept. Assessment File, Cedar Creek Corrections Ctr #118827
700
800
900
1003
930
705
715
10
5
11
12
TOPOGRAPHIC MAP
T. 16 N., R. 4 W. SECTION(S) 2 11
Scale 1 Inch=400 Feet
Contour Interval 20 Feet
Photography OLC-75 39-6-8
EC2-57 4T-57, 58
Compiled by Resource Inventory Secti
Date 4-4-79
STATE OF WASHINGTON
Department of
Natural Resources

SECTION MAP

Sec. 11 & 12 Twp. 16 N. R. 4 West



Scale: 1 inch = 800 feet (each small square = 10 acres)

Show by a cross (X) the location of point of diversion (surface water source) or point of withdrawal (ground water source): For ground water applications, show by a circle (O) the locations of other wells or works within a quarter of a mile.

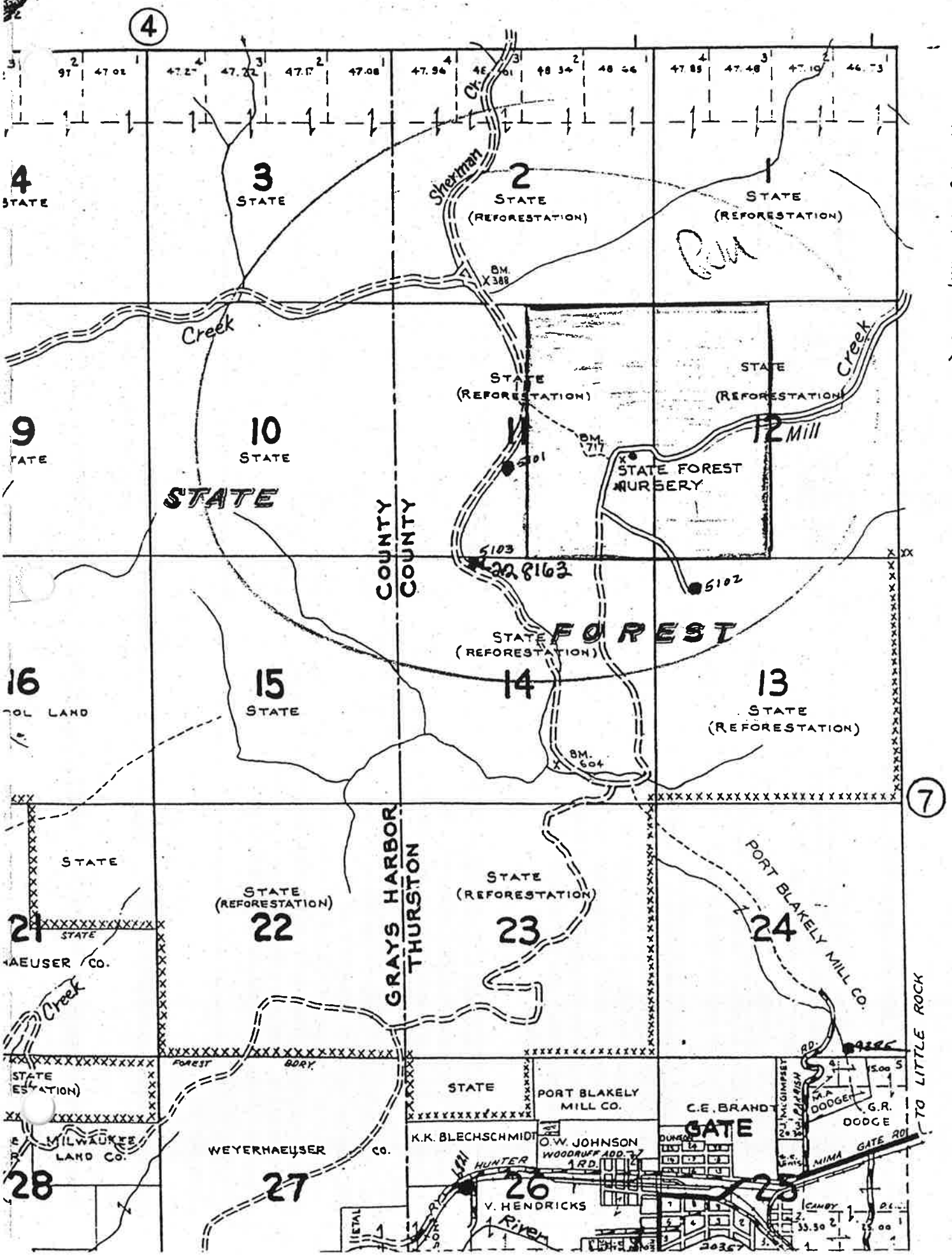
Indicate traveling directions from nearest town in space below.

From Littlerock go South on Mima Road to Bordeaux Road. Turn right and continue to bear left and Bordeaux will become the E-Line shown above. Follow signs to camp, take second entrance.

NOTE: Also see Exhibit B for enlarged plan of camp.

SHIP 16 N. RANGE 4 W.W.M.

RBOR & THURSTON COUNTY. WASHINGTON



ID # 118827

Water System Response Form: complete and return to:

Dept. of Health
Attn: Belle Fuchs
PO Box 47823
Olympia WA 98504-7823

RECEIVED
APR 09 1997
DOH S.W. D
WATER OPERATIONS

System name: Cedar Creek Correction Center PWS ID#: 118827

Complete this form with answers as indicated below. List source numbers across the top row. ***(Return to DOH by April 10, 1997)***

Source Number: *List the source numbers for each active permanent or seasonal source as shown on the "Source Summary Sheet"* (S01, S02 etc.). →	S 03	S 01	S 02	S _____	S _____
Yes, I want a waiver renewal or new waiver for this source. *Check "yes" for each source for which you want a waiver.*	Yes ✓	Yes ✓	Yes ✓	Yes _____	Yes _____
I do NOT want a waiver (or this source is ineligible for a waiver). I must monitor for methods 525.2, 515.1 and 531 instead. (*Check "no" for each source for which you do NOT want a waiver or which is ineligible for one, and write the month/year you will sample for SOCs*) See comment about scheduling on the green Chemical Monitoring Summary sheet.	No _____ Sample Date: _____/_____ *month/year*	No _____ Sample Date: _____/_____ *month/year*	No _____ Sample Date: _____/_____ *month/year*	No _____ Sample Date: _____/_____ *month/year*	No _____ Sample Date: _____/_____ *month/year*
Date (month/year) source will be monitored (or was last sampled) for VOCs in 1996-1998. (See comment about scheduling on the green Chemical Monitoring Summary sheet.)	Sample Date: 5/97 *month/year*	Sample Date: 5/97 *month/year*	Sample Date: 5/97 *month/year*	Sample Date: _____/_____ *month/year*	Sample Date: _____/_____ *month/year*
Have there been any changes to this source which may affect the susceptibility rating? *(Check "yes" or "no:) If "yes", describe.* Examples would include: a new VOC detection, nitrate levels increased to over 5 ppm, changes in well construction, changes in adjacent land use or other contaminant presence. Use the comments section below if more space is needed.	Yes _____ No ✓ Comment:	Yes _____ No ✓ Comment:	Yes _____ No ✓ Comment:	Yes _____ No _____ Comment:	Yes _____ No _____ Comment:

Comments:

Signature of person completing form: Leroy Wallace **Title:** Plant Manager **Date:** 4-3-97
(water system owner, manager, etc.)

Name of person completing form (print): Leroy Wallace **Phone Number:** 360-753-7278 x 217

Washington State Department of Health
Division of Drinking Water

Invoice # Nº 40661

INVOICE
SUSCEPTIBILITY / USE WAIVER REVIEW

Attention: LEROY WALLACE

To:
CEDAR CREEK CORRECTIONS CENTER

PWS ID: 11882 7

4-11-97

Thurston

PO BOX 37
LITTLEROCK WA 98556

DATE	DESCRIPTION	AMOUNT
4/12/97	Organic Waiver Renewal — 1 Sources @ $75.00 each	$75.00
	Total	$75.00
	A detailed description of the billing can be found on the accompanying SOC/VOC Waiver Status Sheet.	

Make check or money order payable to ***Department of Health****. Tear off lower portion and* ***send payment and lower portion within 30 days to:***

DEPARTMENT OF HEALTH
PO BOX 1099
OLYMPIA WA 98507-1099

DOH 710-010(7/96)

Division of Drinking Water
Susceptibility / Use Waiver Review

PWS ID / PWS NAME: 11882 7 CEDAR CREEK CORRECTIONS CENTER	**DEPARTMENT OF HEALTH** **REVENUE SECTION** **PO BOX 1099** **OLYMPIA WA 98507-1099**
SOURCE ID(S): '96 - '98 Organic Chemical Monitoring Waivers	
INVOICE # Nº 40661 — INVOICE DATE 4/12/97	
AMOUNT $75.00	

2F 0420241070 01666

SOC / VOC Chemical Monitoring Waiver Status Sheet

Report Date: *11-Apr-97*

PWSID: 11882 7 **System Name:** CEDAR CREEK CORRECTIONS CENTER

Region: SW **County:** THURSTON **System Type** COMM **Total Connections:** 36

Source		Src Type	Use Code	Waiver Type	Waiver Fee	Invoice#:	Invoice Date:
01	WELL #1	WW	P	No Waiver Needed			
02	WELL #2	WW	P	No Waiver Needed			
03	WELL FIELD (1 & 2)	WF	P	Organic Waiver Renewal	$75.00	40661	4/12/97

Cedar Creek Corrections Center
Cedar Creek Corrections Center
PO Box 37
Littlerock, WA 98556
(360) 753-7278

August 30, 1999

Addressee

SUBJECT: CEDAR CREEK CORRECTIONS CENTER WELLHEAD PROTECTION PROGRAM, WELLHEAD PROTECTION AREA

Dear ____:

As part of the wellhead protection program for the Cedar Creek Corrections Center Water System we are hereby informing you of the findings of our wellhead protection area delineation. This is in accordance with State regulations (WAC 246-290-135).

Our water system serves about 400 inmates and 100 staff. The State Department of Health has given our water sources a rating of low susceptibility. This means our drinking water supply has a low vulnerable to contamination.

The enclosed map shows the 1, 5 and 10 year time of travel boundaries for our wellhead protection area. Any ground water contamination that occurs within this wellhead protection area has a potential to reach our wells. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely

Leroy Wallace, Plant Manager
Bob Bergquist, (TITLE)
Washington State Department of Corrections

Appendix 3

Selected Best Management Practices

IV-2.1.7 INDUSTRIAL MACHINERY AND EQUIPMENT, TRUCKS AND TRAILERS, AIRCRAFT, PARTS AND AEROSPACE, RAILROAD EQUIPMENT

SIC: 3500, 3713/14*, 3720*, 3740*, 3760*, 3800*

DESCRIPTION: Businesses that manufacture a variety of equipment including engines and turbines, farm and garden equipment, construction and mining machinery, metal working machinery, pumps, computers and office equipment, automatic vending machines, refrigeration and heating equipment, and equipment for the manufacturing industries described elsewhere. This group also includes many small machine shops. Also included here is the manufacturing of trucks, trailers, and parts. Manufacturing processes will include various forms of metal working and finishing, and the production of plastic and fiberglass parts. This group also includes manufacturing of airplanes and parts, missiles, spacecraft, and railroad equipment and instruments.

MATERIALS USED AND WASTES GENERATED: Manufacturers of engines or engine-driven equipment can be expected to have fueling facilities. Larger equipment may be stored outside. Outside storage of gasoline, diesel, and cleaning fluids may occur. In contrast, smaller businesses may only have outside containers for temporary storage of waste products.

Businesses making equipment in the Puget Sound area that were surveyed for Dangerous Wastes have been found to produce waste acids, used solvents, paints, metal chips with machine oil, various chemicals, and used oil.

Source Control BMPs: See BMPs S1.10, S1.20, S1.30, S1.40, S1.50, S1.60, S1.80, S2.00 and S2.20 in Chapter IV-4 to determine appropriate actions.

Regulatory Requirements: See R.1, R.2, R.3, R.4, R.6, R.7, R.9, R.10 and R.11 in Chapter IV-5.

Stormwater Treatment BMPs: Stormwater from outside equipment storage areas where dripping of oil or hydraulic fluids is likely to occur shall be treated by an API or CPI-type oil/water separator (BMP RD.35 in Volume III, Runoff Control).

Source control BMPs such as good housekeeping should always be used to control stormwater pollution. Stormwater from parking lots and outside areas where manufacturing processes occur shall be treated using infiltration and/or detention as detailed in Volume III, Runoff Control. Those practices shall be used in combination with other appropriate pre-treatment and treatment BMPs such as biofiltration, pre-settling basins and oil/water separators or equivalent (see Volume III).

Stormwater runoff from rooftops may be discharged to the storm drain below the treatment system as long as the drainage requirements of the local Public Works Department are met. If there is no stormwater drainage system (storm sewer) to discharge to, runoff from rooftops should be disposed of through the use of an infiltration facility wherever possible (see BMPs RI.15 and RI.16 in Chapter III-3 of the Runoff Control Volume).

V-2.3 WHOLESALE AND RETAIL BUSINESSES

V-2.3.1 GAS STATIONS

SIC: 5540

DESCRIPTION: Gasoline service stations primarily sell gasoline and lubricating oils. Most perform minor repair and maintenance including: servicing of engine hydraulic systems, brakes, transmission, and differential; replacement of engine coolant; lubrication of the body chassis and wheel bearings; engine cleaning; servicing of the air-conditioning system; and the servicing of tires and batteries.

Ancillary activities often present are: car washing and/or steam cleaning that may occur within the building or outside on the paved area; sale of food products; and the rental of trucks or trailers.

MATERIALS USED AND WASTES GENERATED: Both solid and liquid wastes are produced, as well as stormwater runoff from the paved surfaces. Waste materials generated by the various operations include: used oils, oil filters, antifreeze, solvents, brake fluid, and batteries, sulfuric acid, battery acid sludges, empty contaminated containers and soiled rags. Spillage of gasoline and diesel fuels occurs, from the pumps and during transfer from tanker trucks to the underground storage tanks. Leaking underground storage tanks can cause surface and/or ground water contamination as well as being a safety hazard.

Stormwater can be contaminated by: fuels and oil spilled on exposed paved surfaces; by solid and liquid wastes (noted above) that are not properly stored while awaiting disposal or recycling; dirt, oils and greases from steam cleaning and vehicle washing that occurs outside; and dripping of these same materials from parked vehicles. Stormwater and/or ground water contaminated by fuels may contain significant concentrations of dissolved organics that cannot be removed by an oil/water separator.

Deliberate disposal of materials to the storm drain can occur, in particular used oils and brake fluid, used antifreeze and radiator flush. It is currently common practice to temporarily store used oils, brake fluid, and solvent in underground fixed tanks although the latter is more frequently stored in steel drums.

Source Control BMPs: See BMPs S1.10, S1.20, S1.30, S1.40, S1.50, S1.80, S2.00 and S2.20 in Chapter IV-4 to determine appropriate actions.

Additionally:

> *Drain oil filters while the oil is warm for as long as possible (24 hours) and at an angle. Collect the oil for recycling in a separate, labeled container. Drained filters should be kept in a suitable container or drum and sent to a scrap metal recycler or hazardous waste management facility. Don't put undrained filters in the dumpster, or put drained filters in the dumpster without first checking with your local health department.*

For more information on automotive repair and disposal requirements for solid and hazardous wastes, see Step By Step: Fact Sheets for Hazardous Waste Generators, Publication 91-12, available from Ecology's Regional Offices.

Regulatory Requirements: See R.1, R.2, R.3, R.6, R.7, and R.10 in Chapter IV-5.

Stormwater Treatment BMPs: Stormwater from parking and maintenance areas where dripping oil or hydraulic fluids is likely to be occurring shall be treated by an API or CPI-type oil/water separator or equivalent (BMP RD.35 in Volume III, Runoff Control).

Stormwater runoff from rooftops may be discharged to the storm sewer below the treatment system as long as the drainage requirements of the local Public Works Department are met. If there is no stormwater drainage system (storm sewer) to discharge to, runoff from rooftops should be disposed of through the use of an infiltration facility wherever possible (see BMPs RI.15 and RI.16 in Chapter III-3 of the Runoff Control Volume).

IV-2.4.2 COMMERCIAL CAR AND TRUCK WASHES
SIC: 7542

DESCRIPTION: Facilities include automatic systems found at individual businesses or at gas stations and 24-hour convenience stores, as well as self-service. There are three main types: tunnels, rollovers and hand-held wands. The tunnel wash, the largest, is housed in a long building through which the vehicle is pulled. At a rollover wash the vehicle remains stationary while the equipment passes over. Wands are used at self-serve car washes. Some car washing businesses also sell gasoline.

MATERIALS USED AND WASTES GENERATED: The main ingredients are water and detergents. Waxes may be present in the commercial operations. Wastewaters are discharged to sanitary sewers. In self-service operations a drain is located inside each car bay.

Although these businesses discharge the wastewater to the sanitary sewer, some washwater can find its way to the storm drain, particularly with the rollover and wand systems. Rollover systems often do not have air drying. Consequently, as it leaves the enclosure the car sheds water to the pavement. With the self-service system, wash water with detergents can spray outside the building and be lost to the storm drain. Users of self-serve operations may also clean engines and change oil, dumping the used oil into the drain.

Source Control BMPs: See BMP S1.10, Fueling Stations, if gas is sold on premises. Also see BMPs S1.20, S1.80, S2.00 and S2.20 in Chapter IV-4 to determine appropriate actions.

The following BMPs also apply:

- *With rollover systems that do not have air drying, a drain shall be located at the exit of the building to which extraneous wash water can drain. This drain shall be connected to the sanitary sewer.*
- *The solution preventing loss of water at self-service businesses is to construct an embayment of sufficient length. Observation of several such operations indicates the individual bay should be at least 30 feet in length.*
- *Vehicles should be washed in an area that is tied directly into the sanitary sewer per the guidelines of the local Sewer Authority. The detergents in wash water from vehicles which runs into the stormwater treatment systems will render oil/water separators useless otherwise.*

Regulatory Requirements: See R.1 and R.10 in Chapter IV-5.

Stormwater Treatment BMPs: Source control BMPs such as good housekeeping should always be used to control stormwater pollution. Stormwater from parking lots and outside areas where manufacturing processes occur shall be treated using infiltration and/or detention as detailed in Volume III, Runoff Control. Those practices shall be used in combination with other appropriate pre-treatment and treatment BMPs such as biofiltration, pre-settling basins and oil/water separators or equivalent (see Volume III).

Downspouts from the wash building may be discharged downstream of any treatment BMP as long as the drainage control requirements of the local Public Works Department are met. If there is no stormwater drainage system (storm sewer) to discharge to, runoff from rooftops should be disposed of through the use of an infiltration facility wherever possible (see BMPs RI.15 and RI.16 in Chapter III-3 of the Runoff Control Volume).

IV-2.4.4 LAUNDRIES AND OTHER CLEANING SERVICES
SIC: 7211 through 7217

DESCRIPTION: This category includes all types of cleaning services such as laundries, linen suppliers, diaper services, coin-operated laundries and dry cleaners, and carpet and upholstery services.

Materials used differ depending on whether wet or dry cleaning is used. Wet washing may involve the use of acids, bleaches and/or multiple organic solvents. Dry cleaners use an organic-based solvent, although small amounts of water and detergent are sometimes used. Solvents may be recovered and filtered for further use.

Carpet and upholstery cleaning may occur on location or at the plant. On-location is done with dry materials or by a hot water extraction process. In-plant processes usually use solvents followed by a detergent wash.

MATERIALS USED AND WASTES GENERATED: Wash liquids are discharged to sanitary sewers. Of concern is the loading and unloading of liquid materials, particularly at large commercial operations, and the disposal of spent solvents and solvent cans.

Source Control BMPs: See BMPs S1.30, S1.40, S1.50, S1.80, S2.00 and S2.20 in Chapter IV-4 to determine appropriate actions.

The following BMPs also apply:

- *Mobile cleaning units shall not discharge the accumulated wash water to storm drains or to surface or ground water. Such water shall be discharged to the sanitary sewer according to local Sewer Authority requirements.*
- *A spill response plan must be developed for each facility. This plan should be implemented immediately upon the spill or release of any liquid.*
- *Spent solvent cans must be disposed of properly in an appropriate, covered container.*

For more information on dry cleaning and disposal requirements for solid and hazardous wastes, see Step By Step: Fact Sheets for Hazardous Waste Generators, publication 91-12, available from Ecology's Regional Offices.

Regulatory Requirements: See R.1, R.2, R.3, and R.10 in Chapter IV-5.

Stormwater Treatment BMPs: Source control BMPs such as good housekeeping should always be used to control stormwater pollution. Stormwater from parking lots and outside areas where manufacturing processes occur shall be treated using infiltration and/or detention as detailed in Volume III, Runoff Control. Those practices shall be used in combination with other appropriate pre-treatment and treatment BMPs such as biofiltration, pre-settling basins and oil/water separators or equivalent (see Volume III).

Stormwater from roof-tops may be discharged to the storm drain below the treatment system as long as the drainage requirements of the local Public Works Department are met. If there is no stormwater drainage system (storm sewer) to discharge to, runoff from rooftops should be disposed of through the use of an infiltration facility wherever possible (see BMPs RI.15 and RI.16 in Chapter III-3 of the Runoff Control Volume).

IV-2.4.9 VEHICLE MAINTENANCE AND REPAIR

SIC: 4000**, 7530

DESCRIPTION: Includes businesses that repair and maintain automobiles, trucks, and buses, excluding those businesses listed elsewhere in this manual. Businesses included here are lube and tune shops, auto and truck repair and painting shops; and battery, radiator, muffler, and tire shops. Excluded here are vehicle dealers and gasoline service stations that also repair vehicles.

MATERIALS USED AND WASTES GENERATED: Wastes generated are similar to those produced by general purpose gas stations, although businesses that provide specialized maintenance activities will not produce all the wastes listed below.

Materials include waste oil, solvents, degreasers, antifreeze, radiator flush, acid solutions with chromium, zinc, copper, lead and cadmium, brake fluid, soiled rags, oil filters, sulfuric acid and battery sludges, and machine chips with residual machining oil.

A large number of vehicles may be parked in and around the service buildings.

Source Control BMPs: See BMPs S1.10, S1.20, S1.30, S1.40, S1.50, S1.70, S1.80, S2.00 and S2.20 in Chapter IV-4 to determine appropriate actions.

Additionally:

- *Drain oil filters while the oil is warm for as long as possible (24 hours) and at an angle. Collect the oil for recycling in a separate, labeled container. Drained filters should be kept in a suitable container or drum and sent to a scrap metal recycler or hazardous waste management facility. Don't put undrained filters in the dumpster, or put drained filters in the dumpster without first checking with your local health department.*

For more information on automotive repair and disposal requirements for solid and hazardous wastes, see Step By Step: Fact Sheets for Hazardous Waste Generators, publication 91-12, available from Ecology's Regional Offices.

Regulatory Requirements: See R.1, R.2, R.3, R.7, R.10 and R.11 in Chapter IV-5.

Stormwater Treatment BMPs: Stormwater from parking and maintenance areas where dripping oil or hydraulic fluids is likely to be occurring shall be treated by an API or CPI-type oil/water separator (BMP RD.35 in Volume III, Runoff Control).

Source control BMPs such as good housekeeping should always be used to control stormwater pollution. Stormwater from parking lots and outside areas shall be treated using infiltration and/or detention as detailed in Volume III, Runoff Control. Those practices shall be used in combination with other appropriate pre-treatment and treatment BMPs such as biofiltration, pre-settling basins and oil/water separators.

Stormwater runoff from rooftops may be discharged to the storm drain below the treatment system as long as the drainage requirements of the local Public Works Department are met. If there is no stormwater drainage system (storm sewer) to discharge to, runoff from rooftops should be disposed of through the use of an infiltration facility wherever possible (see BMPs RI.15 and RI.16 in Chapter III-3 of the Runoff Control Volume).

Appendix 4
County Ordinances

Revised April 6, 1999

DRAFT REVISED LANGUAGE 98-02
THURSTON COUNTY CRITICAL AREAS ORDINANCE
NEW LAND USES AND EXISTING AND EXPANDING FACILITIES

Proposed Revisions: ***(note - additions are indicated by underlined text and deletions are indicated by ~~text strike out~~)***

6.5 "AKART" means All Known, Available, and Reasonable methods of prevention, control, and Treatment. AKART may include, but not be limited to, pollution prevention plan development and implementation, engineering solutions, and practices deemed necessary to prevent release.

6.6 "Animal Unit"is defined as 1,000 pounds of live weight of any given livestock species or any combination of livestock species. Animal equivalents are calculated for each livestock and poultry sector according to estimated rates of manure production for each species. Common examples of livestock species include, but are not limited to, cattle (beef and dairy), chickens, horses, goats, pigs, and llamas. For additional information, refer to the U.S. Department of Agriculture Natural Resource Conservation Service Animal Waste Field Handbook.

63.5 "MPCs" means reasonable Methods of Prevention and Control. Examples of MPCs include, but are not limited to, pollution prevention plan development and implementation, routine maintenance, secondary containment, and measures to eliminate contaminant pathways to the source water .

73.5 "Pollution Prevention Plan" means a site-specific plan that addresses the avoidance of unplanned chemical release in the air, water, or land. It is based on deliberate waste management planning, site design, and operational practices.

116.5 "Wellhead Protection Area, Designated" means the surface and subsurface area surrounding a water well or well field, supplying a public water supply system with over 1,000 connections, through which contaminants are reasonably likely to move toward and reach such well or well field within one, five, and ten years. A designated wellhead protection area is an area for which the water purveyor has adopted a wellhead protection plan and the plan has been approved by the Washington State Department of Health.

17.15.850 Special Management Areas--Wellhead Protection Areas Map. The requirements of Sections 17.15.855, 17.15.856, and 17.51.857 shall apply to lands within the one, five and ten year time of travel zones of those wellhead protection areas depicted on the map entitled "Designated Wellhead Protection Areas." A copy of this map shall be on file with the Thurston County Development Services Department. Refer to Figures 30 and 31 for a general location of

County Wellhead Ordinance .doc

these designated areas. (Ordinance No. 11590, 12/15/97).

17.15.855 Special Management Areas - Wellhead Protection Area Standards for New Uses.

A. The following uses shall be prohibited within the designated one (1) year time of travel zone:

1. Land Spreading disposal facilities (as defined by WAC 173-304 and WAC 173-308 - disposal above agronomic rates);
2. ~~Confined animal feeding operations (defined as over 200 dairy cattle or the equivalent animal unit)~~ Agricultural operations with over 200 animal units. For purposes of this section, one animal unit is the equivalent number of livestock and/or poultry as defined by the U.S. Department of Agriculture Natural Resource Conservation Service Animal Waste Field Handbook;
3. Gas stations, petroleum products refinement, reprocessing, and storage (except underground storage of heating oil or agricultural fueling in quantities less than 1,100 gallons for consumptive use on the parcel where stored), and liquid petroleum products pipelines ~~(SIC Codes 517,554, 598, 461)~~;
4. Automobile wrecking yards;
5. Wood waste landfills; and
6. Dry cleaners, excluding drop-off only facilities ~~(SIC Code 721)~~.

B. The following uses shall be prohibited within the designated one (1), five (5) and ten (10) year time of travel zones:

1. Landfills (municipal sanitary solid waste and hazardous waste);
2. Hazardous waste transfer, storage and disposal facilities;
3. Wood and wood products preserving ~~(SIC Code 2491)~~; and
4. Chemical manufacturing ~~(SIC Code 28)~~.

C. For any use proposed within the designated one (1), five (5), and ten (10) year time of travel zones which uses, stores, handles or disposes of hazardous materials above the minimum quantities listed below, the applicant shall submit for review and approval documentation that ~~all known available and reasonable technologies~~ (AKART) are proposed to be ~~will~~ used to prevent impact to the source water. The health officer ***(note in City ordinances this will be the permitting authority),*** in consultation with the water purveyor, will review this documentation to determine ~~if conditions need to be placed on the use~~ whether the application shall be approved, denied, or approved with conditions ~~need to be placed on the use~~ to ensure adequate protection of the source water supply.

Notwithstanding the minimum quantity thresholds listed below, the health officer ***(or permitting authority)*** may, at his/her discretion and with reasonable expectation of risk to ground water, require pollution prevention plans and MPCs on any use proposed within the one (1), five (5), and ten (10) year time of travel zones.

1. Types of c~~C~~hemical substances regulated in Table 8001.~~13-b~~ 15-a,b,c,d of the Uniform Fire Code, and as subsequently amended, ~~which are associated with daily operations, including routine maintenance~~. *Minimum cumulative quantity:* 160 pounds (or the equivalent 20 gallons)

~~2. Maintenance chemical substances that are actively in use for non-routine maintenance or repair of property. Minimum quantity: 400 pound or the equivalent 50 gallons)~~

~~3.~~2. Cleaning substances ~~that are cleaning agents~~ for janitorial use or retail sale ~~packaged for personal or household use or are~~ present in the same ~~form~~ size, packaging, and concentrations as a product packaged for use by the general public. Chlorinated solvents and non-chlorinated solvents which are derived from petroleum or coal tar will not be considered a cleaning ~~regulated~~ substance under this ~~category~~ sub-section, but rather a chemical substance under subsection 17.15.855 (C)(1) above. *Minimum cumulative quantity:* 800 pounds ~~cumulative~~ (or the equivalent 100 gallons), not to exceed 55 gallons for any single package

~~4. Laboratory related substances (medical and research laboratory substances). No single container/package or any chemical substance shall exceed 50 gallons. *Minimum quantity:* cumulative exceeding 2,000 pounds (or the equivalent 250 gallons)~~

~~5. School related substances (a combination of laboratory, maintenance and cleaning regulated substances). No single container/package shall exceed 50 gallons. *Minimum quantity:* cumulative exceeding 2,000 pounds (or the equivalent 250 gallons) (Ordinance No. 11590, 12/15/97)~~

3. Businesses which use, store, handle or dispose of chemicals listed in WAC 173-303-9903 as "P" chemicals. *Minimum cumulative quantity*: 2.2 pounds.

Additions: ***(note - all the following text is new)***

17.15.856 Special Management Areas - Wellhead Protection Area Standards for Expansion of Existing Uses. The following shall apply to expansion of use of facilities located within the designated wellhead protection areas defined in Section 17.15.850. In this section, "expansion" shall be defined as any addition, remodel, or structural change that requires a building permit. ***(Cities will use their own definitions of expansion here.)***

A. Expansion of the following uses will be prohibited within the designated one (1) year time of travel zone:

1. Land Spreading disposal facilities (as defined by WAC 173-304 and WAC 173-

308 - disposal above agronomic rates);

2. Gas stations (fuel related uses), petroleum products refinement, reprocessing, and storage (except underground storage of heating oil or agricultural fueling in quantities less than 1,100 gallons for consumptive use on the parcel where stored), and liquid petroleum products pipelines;

3. Automobile wrecking yards;

4. Wood waste landfills; and

5. Dry cleaners, excluding drop-off only facilities.

6. Agricultural operations with less than 200 animal units cannot expand to over 200 animal units. For purposes of this section, one animal unit is the equivalent number of livestock and/or poultry as defined by the U.S. Department of Agriculture Natural Resource Conservation Service Animal Waste Field Handbook.

B. Expansion of the following uses shall be prohibited within the designated one (1), five (5) and ten (10) year time of travel zones:

1. Landfills (municipal sanitary solid waste and hazardous waste);

2. Hazardous waste transfer, storage and disposal facilities;

3. Wood and wood products preserving; and

4. Chemical manufacturing; and

C. For any expansion of an existing use proposed within the designated one (1), five (5), and ten (10) year time of travel zones which uses, stores, handles or disposes of hazardous materials above the minimum quantities listed below, the applicant shall submit for review and approval, documentation that AKART is proposed to be used to prevent impact to source water. The health officer ***(or permitting authority)*** will review this documentation to determine whether the expansion shall be approved, denied, or approved with conditions to ensure adequate protection of the source water supply.

Notwithstanding the minimum quantity thresholds listed below, the health officer ***(or permitting authority)***, at his/her discretion and with reasonable expectation of risk to ground water, may require pollution prevention plan development and implementation of MPCs on any use located within the one (1), five (5), and ten (10) year time of travel zones. The health officer ***(or permitting authority)*** will review this documentation to

determine whether the expansion shall be approved, denied or approved with conditions to ensure adequate protection of the source water supply.

1. Types of chemical substances regulated in Table 8001.15-a,b,c,d of the Uniform Fire Code, and as subsequently amended. *Minimum cumulative quantity:* 160 pounds (or the equivalent 20 gallons).

2. Cleaning substances for janitorial use or retail sale present in the same packaging and concentrations as products packaged for use by the general public. Chlorinated solvents and non-chlorinated solvents which are derived from petroleum or coal tar will not be considered a cleaning regulated substance under this category, but rather a chemical substance under subsection 17.15.856 (C)(1) above. *Minimum cumulative quantity:* 800 pounds(or the equivalent 100 gallons), not to exceed 55 gallons for any single package.

3. Businesses which use, store, handle or dispose of chemicals listed in WAC 173-303-9903 as "P" chemicals. *Minimum cumulative quantity*: 2.2 pounds.

17.15.857 Special Management Areas—Wellhead Protection Area Standards for Existing Uses. The following shall apply to existing uses located within the designated wellhead protection areas defined in Section 17.15.850.

A. For any existing use identified by the pollution source inventory in an area with an approved wellhead protection plan, within the one (1), five (5), and ten (10) year time of travel zones which uses, stores, handles or disposes of hazardous materials above the minimum quantity thresholds listed in 17.15.855 (C)(1-3), the owner, upon request of the health officer, shall submit a pollution prevention plan that will ensure adequate protection of the source water supply. The health officer ***(note in City ordinances this will be the permitting authority)***, in consultation with the water purveyor in which the use is located, shall review this plan to determine whether the plan shall be approved, or approved with conditions to ensure adequate protection of the source water supply.

Notwithstanding the minimum quantity thresholds listed in 17.15.855(C)(1-3), the health officer ***(or permitting authority)***, at his/her discretion, for good cause and with reasonable expectation of risk to ground water, may require pollution prevention plans and MPCs on any use proposed within the one (1), five (5), and ten (10) year time of travel zones.

B. For any existing agricultural use located within the designated one (1), five (5), and ten (10) year time of travel zones, the owner, upon request of the health officer ***(or permitting authority)***, at his/her discretion, for good cause and with reasonable expectation of risk to ground water, and with consultation with the Thurston

Conservation District, shall develop and implement a farm conservation plan in conformance with the U.S. Natural Resources Conservation Service Field Office Technical Guide and obtain approval of the Thurston Conservation District Board of Supervisors. For purposes of this section, only those activities in an approved farm plan related to groundwater protection must be implemented. However, nothing in this section relieves an agricultural operation from meeting the requirements of other jurisdictions.

	Prohibited	AKART (includes P2 Plan)	MPCs	P2 Plan	Farm Conservation Plan
New Uses					
Extremely high risk activities	X				
Uses with cumulative quantities > minimum thresholds		X			
Uses determined by the Health Officer to pose a risk		D			
Expanding Uses					
Extremely high risk activities	X				
Uses with cumulative quantities of hazardous materials > minimum thresholds		X			
Other uses with quantities < minimum quantities determined by the Health Officer to pose a risk			D	D	
Existing Uses					
Uses with cumulative quantities of hazardous materials > minimum thresholds			D	X	
Other uses with quantities < minimum thresholds determined by the Health Officer to pose a risk			D	D	
Farms with > 2 animal units/acre					X

AKART means means all known, available, and reasonable methods of prevention, control, and treatment. AKART may include, but not be limited to, pollution prevention plan development and implementation, engineering solutions, and practices deemed necessary to prevent release.

MPCs means reasonable methods of prevention and control. Examples of MPCs include, but are not limited to, Pollution prevention plan development and implementation, routine maintenance, secondary containment, and measures to eliminate contaminant pathways to the source water .

P2 Plan = Pollution Prevention Plan; X = Required; D = Determination by Health Officer
Prohibitions for **new** uses listed in Section 17.15.855, prohibitions for **expanding** uses listed in Section 17.15.856.

Larch Corrections Center

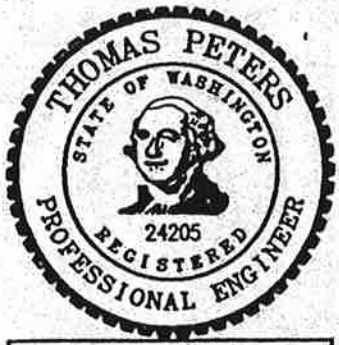
LCC Drinking Water

WASHINGTON STATE DEPARTMENT OF CORRECTIONS

LARCH CORRECTIONS CENTER

DRAFT

LARCH WELLHEAD PROTECTION PLAN



EXPIRES: 7-29-1997

G&O No. 95730.32

FEBRUARY 1997

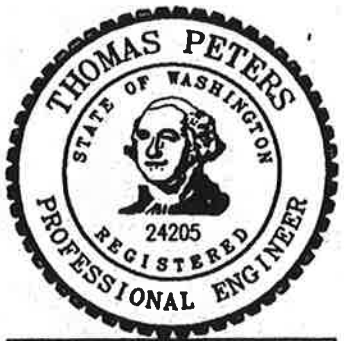
Gray & Osborne, Inc.
CONSULTING ENGINEERS

WASHINGTON STATE DEPARTMENT OF CORRECTIONS

LARCH CORRECTIONS CENTER

DRAFT

LARCH WELLHEAD PROTECTION PLAN



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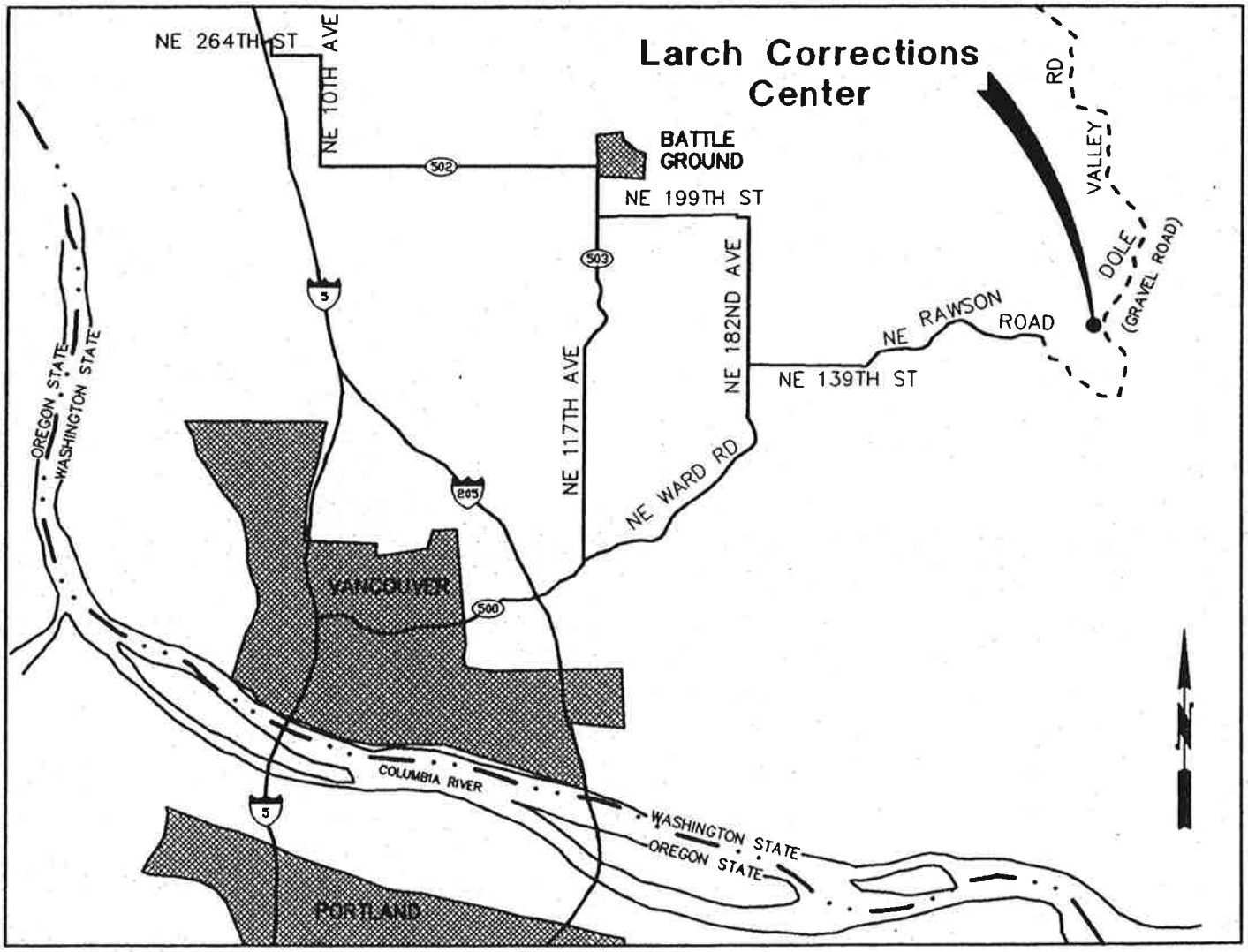
CHAPTER 1
INTRODUCTION

Gray & Osborne, Inc. was retained by the Washington State Department of Corrections (DOC) to prepare a Wellhead Protection Plan for the Larch Corrections Center (LCC). The LCC is a minimum security facility located 10 miles south of the Town of Yacolt in Clark County (Figure 1-1). It has a current inmate population of approximately 165 with a staff population of 44. The facility is currently undergoing expansion to become a 400 bed facility which should be completed in the fall of 1997. Figure 1-2 is a site map which includes the major structures and water system components of the LCC.

Source protection, which includes either a watershed control program or a wellhead protection program, is a required component of a water system plan (WAC 246-290-100 (4)(m)) or a small water system management program (WAC 246-290-100 (4)(d)). The contents of a wellhead protection program are listed in WAC 246-290-135 (4) and are as follows:

- A susceptibility assessment;
- Wellhead protection area (WHPA) delineation for each well, wellfield, or spring with the one, five, and ten year time of travel boundaries marked;
- A list of all actual and potential groundwater contaminant sources within the defined WHPA(s);
- Documentation of purveyor's notification to all owners/operators of actual and potential sources of groundwater contamination within WHPA boundaries;
- Documentation of purveyor's notification to regulatory agencies and local governments of the boundaries of the WHPA(s) and the finding of the WHPA inventory;
- A contingency plan to ensure consumers have an adequate supply of potable water in the event that contamination results in the temporary or permanent loss of the principal source of supply; and
- Documentation of coordination with local emergency spill responders, including notification of WHPA boundaries, results of susceptibility assessment, inventory findings, and contingency plan.

A wellhead protection plan (WPP) is a component of the wellhead protection program and is designed to protect groundwater sources of supply. The first step is a delineation of the Wellhead Protection Area(s) (WPA) to define the boundaries of aquifer recharge. Delineation is discussed in Section 2 of this report. The second step, presented in Section 3, is an inventory of potential pollution sources located at the LCC and their locations within the boundaries of the WPA. Section 4, Wellhead Protection Area Management, provides a discussion of agencies with an interest in wellhead protection and provides a summary of management tools that will aid in the effort to protect groundwater quality.



NOT TO SCALE

WSDOC
Larch Wellhead Protection Plan
FIGURE 1-1
Location Map

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Wastewater Treatment Pond

WWTP (under Construction)

Grease Interceptor

Barracks

Kitchen /Dining

Well #3 Sanitary Control Zone

Well #3

Well #2 Sanitary Control Zone

Well #2

Well #1 Sanitary Control Zone

Well #1

Administration Building

Maintenance

New Housing

New Housing

DNR Warehouse & Garage

DNR Shops

New Warehouse

Well House

Fueling Station

Cedar Creek

130,000 Gallon Concrete Reservoir

30,000 Gallon Concrete Reservoir

120' 0' 120' 240'

Legend

Facilities under Construction for Expansion

WSDOC
Larch Wellhead Protection Plan
FIGURE 1-2
Site Map

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Sections 5 and 6 address Contingency Planning and Spill Response. Section 7 includes a summary of the report findings and gives recommendations for implementing the WPP.

FACILITY DESCRIPTION

LCC is supplied by groundwater sources. Four wells are located within the property boundaries of the institution. Two wells are active, one is inactive, and one has been capped. Well logs for the active wells (Wells 2 and 3) are included in Appendix A. All wells pump directly to the reservoirs. The capped well was completed in 1971 to a depth of 81 feet and is located nearby a well house. The well is to remain capped since it does not meet Washington State Department of Ecology regulations listed in WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

Well No. 1, drilled in 1980 to a depth of 124 feet, is operable but is no longer in active use due to limited production capacity. The LCC anticipates pumping this well once per week to ensure the well is available for emergencies. The water well report indicates the casing was perforated from 104 feet to 124 feet. A surface seal of cement was placed to a depth of 20 feet. Well No. 2 was completed in 1980 to a depth of 160 feet. The water well report indicates that the casing was perforated from 145 feet to 155 feet. A surface seal of bentonite was installed to a depth of 18 feet. The well has a 5 HP pump and was observed to be pumping at 50 gpm during two site visits in August and October 1994. Well No. 3 was drilled in 1993 to a depth of 200 feet. The casing was installed to a depth of 68 feet and the remainder of the well was drilled in fractured rock. Bentonite chips were used to provide a surface seal to a depth of 18 feet. The well is equipped with a 3 HP pump and was observed to be pumping at 36 gpm during an October 1994 site visit. The well will be outfitted with a 65 gpm pump after the 400-bed expansion.

Water from the wells is pumped through a central well house where it is chlorinated with a sodium hypochlorite solution. Water flows directly through the well house to the reservoirs. The reservoirs consist of a 30,000 gallon rectangular concrete tank constructed in 1982 and a 130,000 gallon circular concrete tank constructed in 1994. Water from the reservoirs enters the distribution system without any additional treatment. Table 1-1 summarizes the major system components of the LCC water system.

TABLE 1-1

Major Water System Components at LCC

Source Water Components	Well No. 1	Well No. 2	Well No. 3
Well Status	Not in use	In Use	In Use
Well Capacity (gpm)	20 gpm	50 gpm	65 gpm (1)
Well Logs available	yes	yes	yes
Well Pump Type	submersible	submersible	submersible
Pump Horsepower	unknown	5 HP	5 HP
Average Daily hours of operation	NA	5 - 5.5	5 - 5.5
Drawdown Information Available	no	no	no
Emergency or Backup Power	Generator with automatic transfer switch		

(1) Well 3 is currently equipped with a 35 gpm pump. It will be equipped with a 65 gpm pump after the 400-bed expansion.

Reservoir Components	Reservoir No. 1	Reservoir No. 2
Storage Capacity	30,000 gal	130,000 gal
Year Constructed	1982	1994
Material Type	Concrete	Concrete

SUSCEPTIBILITY ASSESSMENT

LCC submitted Susceptibility Assessment Survey Forms for each of its wells to the DOH. The forms include the following information: system, well construction and source, hydrogeologic, groundwater resource mapping, assessment of water quality, and geographic or hydrologic factors contributing to a non-circular zone of contribution. Based on this information, LCC was given a "low" susceptibility rating by the DOH. This means that the system is not very susceptible to contamination and is eligible to receive susceptibility waivers from the DOH. The LCC Susceptibility Assessment Survey Forms are included in Appendix B.

AREA SOILS

Soil types at LCC are classified as Kinney Silt Loam 3 to 15 percent slopes (symbol KeC) or Kinney Silt Loam 15 to 30 percent slopes (symbol KeE) (USDA, 1972). The Kinney series consists of deep, well-drained, gently sloping to very steep soils. These are medium-textured soils that have a moderately fine textured topsoil. They formed in volcanic ash and residuum that weathered from igneous rock. Surface runoff from KeC is slow to medium and the erosion hazard is slight to moderate if the soil is left bare. The main use of this soil is for timber and a few small areas are cleared for pasture. Surface runoff from KeE is medium to rapid and the erosion hazard is moderate to severe if the soil is left bare. This soil is suitable for timber and recreation. Both soil types are listed as moderately corrosive to untreated steel pipe and concrete conduits. They have permeabilities in the range of 0.6 - 2.0 inches per hour and available water capacities of 0.14 - 0.16 inches of water per inch of soil (USDA, 1972).

CHAPTER 2
DELINEATION OF WELLHEAD PROTECTION AREAS

Delineation of the wellhead protection area(s) (WHPA) for given groundwater sources is the first step in developing a local Wellhead Protection Plan (WPP). A WHPA is defined by WAC 246-260-010 as "the portion of a well's, wellfield's, or spring's zone of contribution. . ." A zone of contribution is "the area surrounding a pumping well or spring that encompasses all areas or features that supply groundwater recharge to the well or spring".

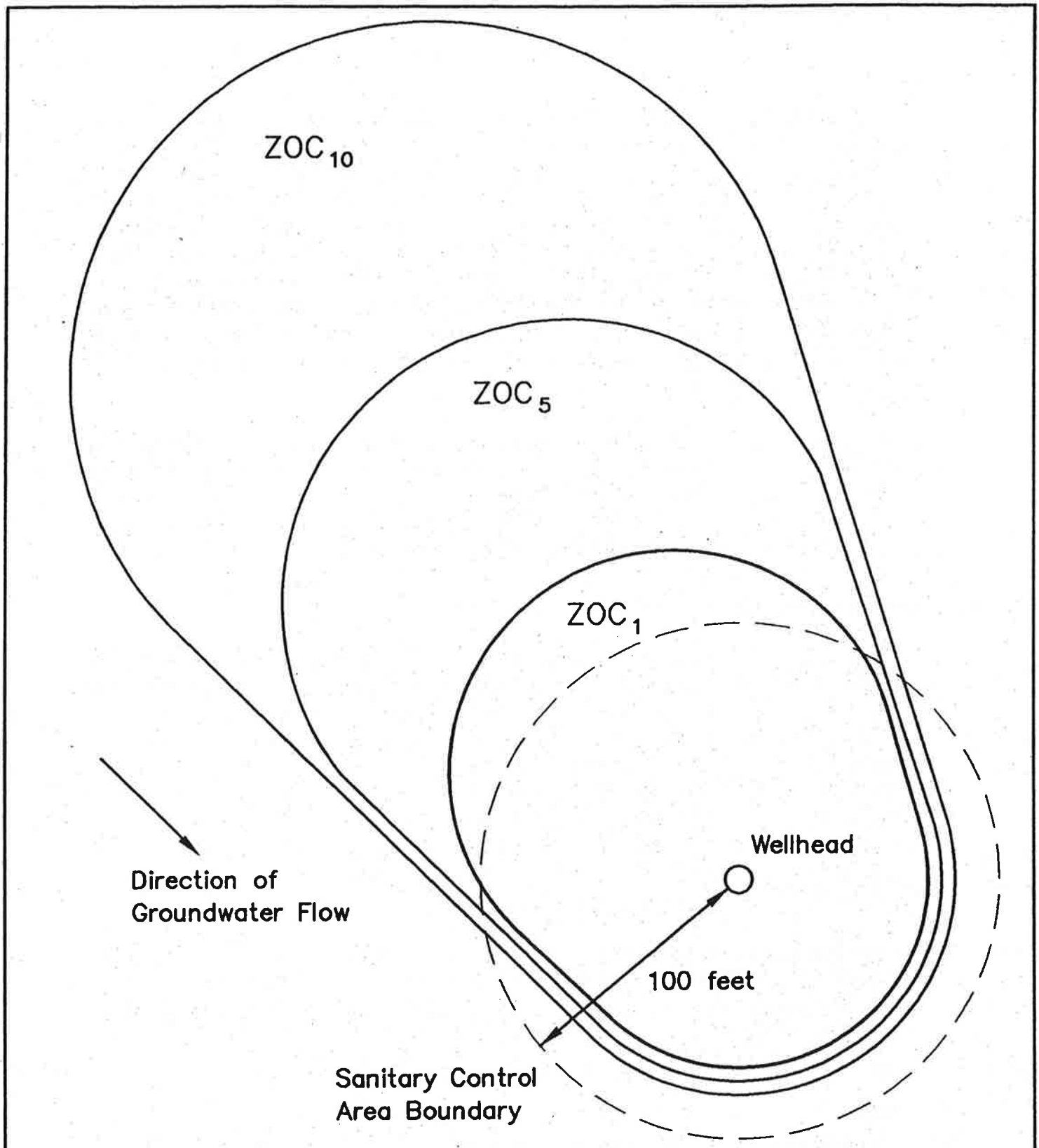
A wellhead protection area consists of up to five primary zones: a sanitary control zone, the one, five, and ten year time of travel boundaries, and a buffer zone (if necessary). As defined by WAC 246-290-135, the minimum sanitary control zone for wells shall have a radius of 100 feet, unless engineering justification supports a smaller area. No source of contamination may be constructed, stored, disposed of, or applied within the sanitary control zone without the permission of the DOH and the water purveyor.

The three time of travel boundaries or zones are determined by estimating the travel paths of a hypothetical particle of water through the aquifer to the pumping well. These zones define aquifer management regions around the pumping well that can be used to determine potential sources of contamination that could conceivably impact the water supply. (DOH, 1993b) For this report, these time of travel zones will be referred to as the one, five and 10 year zones of contribution (ZOC_1, ZOC_5, ZOC_{10}, respectively). In terms of aquifer gradient, ZOC_{10} is upgradient to ZOC_5 which is upgradient to ZOC_1. The sanitary control zone will always contain a portion of ZOC_1 and may contain portions of ZOC_5 and ZOC_{10}. Figure 2-1 shows a hypothetical well with a sanitary control zone and hypothetical zones of contribution. A buffer zone may be extended upgradient of ZOC_{10} to focus on selected areas of control such as aquifer recharge areas.

DELINEATION METHODS

There are four general delineation methods acceptable to the DOH to determine ZOCs and wellhead protection areas. They are:

- Calculated Fixed Radius (CFR);
- Analytical Models;
- Hydrogeologic Mapping; and
- Numerical Flow/Transport Models.



LEGEND

ZOC_1 – One Year Zone of Contribution

ZOC_5 – Five Year Zone of Contribution

ZOC_{10} – Ten Year Zone of Contribution

WSDOC
Larch Wellhead Protection Plan
FIGURE 2-1
Hypothetical Well and ZOCs

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In general, there is an increase in complexity and input data from the top to the bottom of the list. However, the increase in input data and complexity generally results in greater accuracy and reliability. The CFR method is the minimum acceptable interim method of delineation for public water systems with between 100 and 1000 connections. There are two scenarios under which the water system would be expected to upgrade their initialdelineation: 1) if the susceptibility assessment indicates that the system is highly susceptible, or 2) there are irregular or steep groundwater gradients in the vicinity of the well. If either of these two conditions exist, the public water supply should upgrade the initial delineation to an analytical or a groundwater flow model within 5 years (DOH, 1993b). Figure 2-2 gives a sample representation of the zones of contribution calculated from a CFR delineation.

The isolation of the LCC, the small number of connections, the low susceptibility of the water source, and the limited number of potential pollution sources lends itself well to the use of the CFR method. In addition, the lack of readily available information regarding the aquifer and local hydrological conditions (such as groundwater gradient and aquifer transmissivity) eliminates the options of the more complex models.

LCC CFR DELINEATION

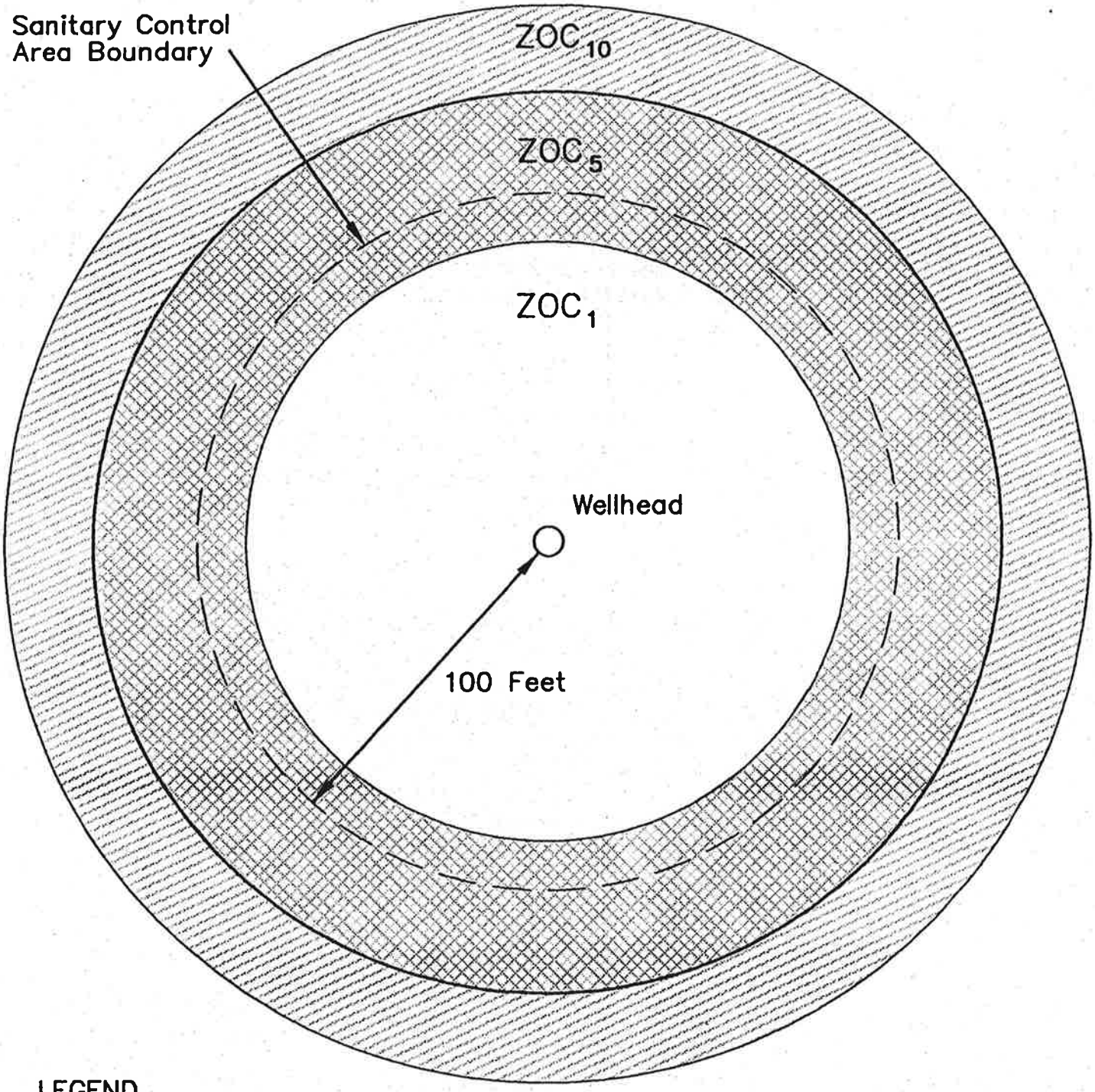
Clark County has summarized existing Group A Water System WHPAs and performed delineations for all Group A Water Systems within the county. Two methods (CFR and analytical model) were used to determine well head protection areas for the Group A wells without previous delineations. The method for each well was selected based on the following criteria: 1) whether the well serves a residential population or a school, or was for business use, 2) whether or not there was water-level information for the aquifer tapped by the well, and 3) the presence or absence of a well construction record (Clark County, 1995). Aquifer water-levels were required to map gradient and flow direction. Due to the lack of flow direction and gradient information, a CFR delineation was conducted for LCC in the same fashion as the county.

The CFR model is based on a simple volumetric flow equation (U.S. EPA, 1994) which calculates the radius of a cylindrical volume of water bearing strata that holds the volume of water pumped during a specified period of time. The equation for calculating the radius for a ZOC is:

$$\textbf{radius} = (Qt/\pi nH)^{1/2}$$

Where:

- **radius** - the radius in feet of a delineation for a selected time of travel
- **Q** - the volume of water pumped by the well in a year in cubic feet
- **t** - the number of years selected for the time of travel (1, 5, 10 years)
- **n** - the aquifer porosity as a decimal fraction
- **H** - the water bearing interval of the well (aquifer thickness)



LEGEND

ZOC_1 – One Year Zone of Contribution

ZOC_5 – Five Year Zone of Contribution

ZOC_{10} – Ten Year Zone of Contribution

ZOC RADIUS = $\sqrt{\frac{Qt}{\pi nH}}$ (ft.)

Q– Pumping Rate of Well (ft^3/yr)
n– Aquifer Porosity
H– Water Bearing Interval of Well (aquifer thickness, ft.)
t– Travel Time to Well (1,5,10 yr.)

WSDOC
Larch Wellhead Protection Plan
FIGURE 2-2
Hypothetical Well and ZOCs

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The method assumes that the aquifer has a flat water-level surface with no regional groundwater flow, is uniformly thick and porous, and does not receive recharge from above and below. The method is sensitive to changes in each parameter. As pumping rate (Q) increases, a delineation radius increases because a larger volume of aquifer is required to hold the water used by the well in a specific period of time. Increasing porosity decreases the radius because the volume of aquifer needed to produce a volume of water is inversely proportional to porosity. Increasing the open interval decreases the radius by making a taller, thinner cylinder (Clark County, 1995).

Current LCC water use flows (Q) used by Gray & Osborne were determined using the recorded flows for the period October 1, 1995 to September 30, 1996. The average daily water production for LCC during this period was 26,900 gallons for a total of 9.82 million gallons (1,310,000 cubic feet). Given a pumping capacity of 50 gpm for Well 2 and 35 gpm for Well 3, the annual volume of water pumped from Well 2 was 771,000 cubic feet and 539,000 cubic feet from Well 3.

To determine the flows after the 400-bed expansion, the LCC Water Conservation Plan was referenced (G&O, 1994). A production per capita value of 137 gallons per capita per day was estimated after implementation of Phase I of the Plan. The per capita value is based on the number of inmates plus one third the number of staff since the staff is on 8-hour shifts and does not live at the facility. This corresponds to a per inmate production of 152 gallons per inmate per day, or 60,800 gpd after expansion, since the number of staff is projected to increase proportionally with the number of inmates. This results in an annual production of 68.1 acre-feet (2,970,000 cubic feet). Given a pumping capacity of 50 gpm for Well 2 and 65 gpm for Well 3, the volume of water from Well 2 is estimated to be 1,290,000 cubic feet and 1,680,000 cubic feet from Well 3.

Tables 2-1 and 2-2 summarize the parameters used in the CFR model and the results obtained by Clark County and Gray & Osborne.

L

TABLE 2-1

CFR Model Parameters and Results for LCC Well 2.

Parameter	Clark County, Delineation	Gray & Osborne, Current LCC Water Use	Gray & Osborne, LCC Water Use after 400-Bed Expansion
Q	545,000 cubic feet	771,000 cubic feet	1,290,000 cubic feet
t	1, 5, 10 year	1, 5, 10 year	1, 5, 10 year
n	0.1	0.1	0.1
H	100 feet	100 feet	100 feet
Radius (ZOC_1)	132 feet	157 feet	203 feet
Radius (ZOC_5)	295 feet	350 feet	453 feet
Radius (ZOC_{10})	417 feet	496 feet	641 feet

TABLE 2-2

CFR Model Parameters and Results for LCC Well 3.

Parameter	Clark County, Delineation	Gray & Osborne, Current LCC Water Use	Gray & Osborne, LCC Water Use after 400-Bed Expansion
Q	431,000 cubic feet	539,000 cubic feet	1,680,000 cubic feet
t	1, 5, 10 year	1, 5, 10 year	1, 5, 10 year
n	0.1	0.1	0.1
H	132 feet	132 feet	132 feet
Radius (ZOC_1)	102 feet	114 feet	201 feet
Radius (ZOC_5)	228 feet	255 feet	450 feet
Radius (ZOC_{10})	322 feet	361 feet	636 feet

The water bearing thickness of the Well 2 aquifer is 100 feet. Well 3 was drilled to 200 feet of which 132 feet was drilled in fractured rock. The porosity estimate of 0.1 was considered to be typical of fractured rock aquifers which are typical of those found in the Cascade Mountains (Clark County, 1995).

CHAPTER 3
INVENTORY OF POTENTIAL CONTAMINATION SOURCES

A site visit was conducted by G&O personnel on October 24, 1996 to review and document potential groundwater contamination sources. Table 3-1 lists the potential groundwater contaminant sources encountered at LCC during the site visit.

TABLE 3-1

Potential Groundwater Contamination Sources at LCC

Site Map	Source	Typical Activities	Potential Contaminant Types
A	DNR Warehouse & Garage	Vehicle storage and maintenance welding repair	Diesel fuel, motor oil, heavy metals
B	DNR Fueling Station	Vehicle fueling	Gasoline, diesel fuel
C	Underground storage tanks at DNR fueling station	Diesel and gasoline storage	Gasoline, diesel fuel
D	DNR O/W Separator	Collects runoff from DNR shops and fueling station	Gasoline, diesel fuel, motor oil, heavy metals
E	Aboveground diesel storage tanks (4000 & 2000 gal)	Boiler room fuel storage	Diesel fuel
F	DOC paint and flammables storage sheds	Painting, flammables storage	Paints, solvents
G	Garbage can wash	Garbage can washing	Fats, oils, grease, metals
H	Entrance road	Vehicle entry, Material transport	Gasoline, diesel fuel, motor oil, heavy metals, herbicides applied to roadsides above LCC
I	Boiler room sump	Sump pump pumps fugitive boiler water into a dry well	Diesel fuel, metals, nutrients
J	DNR Shops welding repair	Vehicle and material storage	Gasoline, diesel fuel, motor oil, heavy metals

In addition, existing data source information was reviewed in *Inventory of Potential Contaminant Sources in Washington's Wellhead Protection Areas* (DOH, 1993a). The Ecology database of Underground Storage Tanks was reviewed. Three operational tanks appeared on the list at the LCC. Two are reported to hold unleaded gasoline while one is reported to hold diesel fuel. These are the tanks at the DNR fueling station. The DNR

plans on removing these thanks in the spring of 1997 and replacing them with two aboveground storage tanks (one unleaded and one diesel).

Two leaking underground storage tanks were listed on the Ecology Leaking Underground Storage Tank database. DNR personnel indicated the first listing was attributed to a detected leak in the parking area adjacent to the fueling station. Upon excavating soil to find the leak, a previously unknown 1000 gallon tank was discovered that had caused the leak. The tank and contaminated soil have been removed. The second listing was in reference to the removal of an old diesel tank for replacement which resulted in the discovery of contaminated soil which has since been removed.

DNR personnel also indicated that the local DNR unit based in Battle Ground occasionally applies herbicides to the roadside above the LCC for control of competing vegetation. The total area affected is relatively small and the DNR uses Best Management Practices for the application of herbicides. The LCC has received a low susceptibility rating from the DOH and has received a waiver from performing synthetic organic chemical (SOC) analyses. It is recommended the DOC should consider conducting a herbicide analysis of one of the wells once every five years. The herbicide analysis is a subset of the entire body of SOCs and would be specific to the potential contamination posed by the forest management practices.

Figures 3-1 and 3-2 show the pre-400-bed expansion and post-400-bed expansion ZOC_1, ZOC_5, and ZOC_{10} for Wells 2 and 3. These figures also summarize the approximate locations of the potential groundwater contamination sources relative to these ZOCs. The following potential contamination sources were located within one or more pre-expansion ZOCs as determined using current water production data. A feature that is contained in a ZOC_1 for a source is, by definition, also included in the ZOC_5 and ZOC_{10} for the source.

- Entrance Road - Located within ZOC_1 for Well No. 2. Located within ZOC_5 for Well No. 3.
- DNR Shops - Located within ZOC_5 for Well No. 2.

The following contamination sources will be located within a ZOC after expansion of LCC to a 400 bed facility. The ZOCs were calculated based on water production estimated by the *Larch Corrections Center Water Conservation Plan* (G&O, 1994).

- Entrance Road - Located within ZOC_1 for Well No. 2. Located within ZOC_5 for Well No. 3.
- DNR Shops - Located within ZOC_5 for Well No. 2. Located within ZOC_{10} for Well No. 3
- DNR Fueling Station - Located within ZOC_{10} for Well No. 2. The underground tanks at the fueling station are on the fringe of the ZOC_{10}.
- DNR Garage and Warehouse - Located within and on the fringe of ZOC_{10} for Well No. 3.

Wastewater Treatment Pond

WWTP (under Construction)

Grease Interceptor

Barracks

Kitchen /Dining

Sanitary Control Zone

Well #3

ZOC 1

ZOC 5

ZOC 10

Administration Building

Sanitary Control Zone

Well #2

Well #1

Maintenance

New Housing

New Housing

130,000 Gallon Concrete Reservoir

30,000 Gallon Concrete Reservoir

DNR Warehouse & Garage

DNR Shops

New Warehouse

Well House

Fueling Station

Cedar Creek

UNDESIGNATED WET LAND

ZOC 5

ZOC 10

120' 0' 120' 240'

Zone of Contribution Radii

	Well #2	Well #3
ZOC 1	157 ft	114 ft
ZOC 5	350 ft	255 ft
ZOC 10	496 ft	361 ft

Legend

Facilities under Construction for Expansion

(A) Potential Source of Contamination – See Chapter 3

WSDOC
Larch Wellhead Protection Plan
FIGURE 3-1
Pre-400 Bed Expansion ZOC Delineations and Potential Sources of Contemination

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\WSDOC\30.32\PRE-EXP.DWG

ZOC 10

ZOC 5

ZOC 1

Sanitary Control Zone

Grease Interceptor

WWTP (under Construction)

Wastewater Treatment Pond

Barracks

Kitchen /Dining

Well #3

Sanitary Control Zone

Administration Building

Well #2

Well #1

Maintenance

New Housing

New Housing

DNR Warehouse & Garage

DNR Shops

New Warehouse

Well House

Fueling Station

Cedar Creek

UNDESIGNATED WET LAND

TYPE III WETLAND

TYPE IV WETLAND

TYPE V WETLAND

120' 0' 120' 240'

Zone of Contribution Radii

	Well #2	Well #3
ZOC 1	203 ft	201 ft
ZOC 5	453 ft	450 ft
ZOC 10	641 ft	636 ft

130,000 Gallon Concrete Reservoir

30,000 Gallon Concrete Reservoir

Legend

Facilities Constructed for Expansion

(A) Potential Source of Contamination — See Chapter 3

WSDOC

Larch Wellhead Protection Plan

FIGURE 3-2

Post-400 Bed Expansion ZOC Delineations and Potential Sources of Contemination

Gray & Osborne, Inc.

CONSULTING ENGINEERS

\WSDOC\95730.32\POST-EXP.DWG

- Aboveground Diesel Storage Tanks - Located within the ZOC_{10} for Well No. 3.
- Boiler Room Sump - Located within the ZOC_{10} for Well No. 3.

Although most of the potential contamination sources are located outside of the one, five, and ten year zones of contribution, it is important to note that several critical groundwater characteristics are unknown such as the general direction and velocity of groundwater flow, and the cone of groundwater depression induced by the well pumps. It is possible that these sources, although outside of the 10 year zone of contribution, may still pose contamination hazards.

CHAPTER 4
WELLHEAD PROTECTION AREA MANAGEMENT

A wellhead protection program will not protect the water supply without implementation of risk reducing measures or pollution prevention efforts. Management strategies can be focused only after Wellhead Protection Areas (WHPA) have been clearly defined and established and potential sources of groundwater contamination have been identified. Two wells with separate WHPAs were defined in Chapter 2 of this report. The individual WHPAs overlap to some degree to form a single merged WHPA. At LCC, several management tools have been identified to assist facility managers in preventing potential contamination of the water supply.

SIGNS

At a minimum, signs should be posted within the sanitary control zone of each well identifying the boundaries of the zone and stating the restrictions placed on activities within the zone. These signs should be placed on the actual well vaults for wells 1, 2, and 3.

GROUNDWATER MONITORING

The 1996 DOH Draft Waterworks Guidelines define aquifer/source reliability as the safe yield of a groundwater source (Section 7.1.1) (DOH, 1996). Safe yield is determined by the physical characteristics of the well and the aquifer in which the well is located. Safe well yield is demonstrated through a properly conducted pump test or a hydrogeological analysis prepared by a licensed engineer or hydrogeologist. At a minimum, LCC should develop and implement a monthly program to measure static and dynamic water levels in Wells 2 and 3. In addition, the specific capacity of each well should be determined three to four times per year by facility personnel. Specific capacity is the rate of discharge of a well per unit of drawdown and is commonly expressed as gpm/ft. Specific capacity can be determined by allowing the well pump to run to a steady state, measuring the gallons pumped in a period of time, and measuring the water level in the well at that time. Specific capacity records should be kept with pumping records.

Routine sampling of bacteriological and chemical parameters is also required under WAC 246-290. Coliform, organic chemical, and inorganic chemical sampling schedules for LCC are summarized in the *Sampling and Monitoring Plan* contained in the *Statewide Water System Plan* (G&O, 1996). Written coliform plans do not exist for LCC. Coliform samples are collected monthly and different sites are chosen each time. However, written coliform monitoring plans are required in WAC 246-290-300 (2)(b) and should be developed for LCC.

FOREST MANAGEMENT PRACTICES

The valley, owned entirely by the DNR, is managed for timber production. WAC 222, Washington Forest Practices Rules and Regulations, governs the way in which the DNR conducts its timber resource activities. WAC 222 offers a number of mechanisms that can be used for groundwater protection. WAC 222-16-050, Classes of Forest Practices, suggests that activity within a Well head Protection Area is likely considered a "Class-IV-Special" practice because the activity has the potential for substantial impact on the environment. All Class IV-Special practices require an environmental checklist in accordance with the State Environmental Policy Act (SEPA). Activities may have to modified or abandoned depending on the outcome of the SEPA checklist.

Protecting groundwater begins by insuring that the DOC is aware of forest practices proposed for the valley and surrounding hills. WAC 222-20-10, Notices of Forest Practices, instructs the DNR to establish a register of incorporated cities and towns that wish to be notified of forest practices applications in their region. The DOC should include LCC on the register.

The DOC may appeal unfavorable forest practices decisions according to WAC 222-12-0080, Administrative and Judicial Appeals. Appeals are first made to the Forest Practices Board and then, if necessary, to the local superior court.

WAC 222 provides definitive guidance for protecting surface water supplies which could potentially be used for groundwater protection as well. WAC 222-38, Forest Chemicals, states that water purveyors may request DNR to designate lands upstream from a surface water intake as an "area of water supply interest". The designation is applied if the DNR believes the application of pesticides may adversely impact the affected water supply. The designation only applies to aerial applications. An "area of water supply interest" automatically elevates the proposed aerial application to a Class IV-Special practice.

WATER CONSERVATION

A two phase conservation program was proposed for LCC in the *Larch Corrections Center Water Conservation Plan*. Phase I consists of the following program elements:

1. A program to publicize the need for efficient use of water,
2. Individual meters for each source of supply,
3. Service meters, and
4. A recommendation that LCC consider performing preliminary leak testing of the old galvanized distribution system.

Phase II consists of several program elements that should be considered if additional water savings above those achieved in Phase I are needed or LCC is not able to secure

additional water rights to satisfy future demands. The objective of Phase II is to reduce average day production. Phase II consists of the following program elements:

1. Install low flow showerheads,
2. Install low flush toilets,
3. Leak detection, and
4. Wastewater reuse at the wastewater treatment plant, vehicle facilities, and greenhouse.

The *Larch Corrections Center Water Conservation Plan* estimated a reduction of per inmate use to 152 gpid (137 gpcd in the Plan) after implementation of Phase I of the Water Conservation Plan (G&O, 1994). This would lead to an annual average production of 60,800 gpd or 68.1 acre-feet per year which would be within the allowed water rights for the facility. Implementation of Phase II of the Water Conservation Plan would lead to an estimated per inmate use of 132 gpid (119 gpcd in the Plan) which would result in an average water production of 52,800 gpd or 59.2 acre-feet per year.

CHAPTER 5
CONTINGENCY PLAN FOR ALTERNATIVE WATER SUPPLY SOURCES

Subsection 1428 (a)(5) of the 1986 amendments to the Safe Drinking Water Act specifies that state programs require public water systems to develop contingency plans ". . . for the locations and provisions of alternate drinking water supplies for each public water system in the event of well or wellfield contamination . . .". Contingency plans are a required component of water system plans (WAC 246-290-100 (4)(m) and 246-290-135 (4)(c)(vi)) and small water system management plans (WAC 246-290-410 (4)(m) and 246-290-135 (4)(c)(vi)).

Contingency plans for LCC include supplying emergency backup power to the well pumps to supply power during power outages. LCC has contacted a private water vendor who will be able to supply water to the facility via tanker trunks in the event the LCC water supply becomes unusable.

WATER RIGHTS

One water rights certificate exists for groundwater withdrawal from the existing wells at LCC.

- Certificate number G2-00438C, priority date August 13, 1971, allows an annual withdrawal of 14 acre-feet at a maximum rate of 60 gpm from the capped well (Well 0) for multiple domestic use and 4.0 acre-feet per year for irrigation.

A water rights application, G2-29044, has been filed for Wells 2 and 3 with the Department of Ecology. A Report of Examination, dated 9/19/96, has been issued by Ecology for this application. The Report allows withdrawal of 70.1 acre-feet per year from Wells 2 and 3 at a maximum rate of 115 gpm. The total water rights consist of 70.1 acre-feet of which 52.1 acre-feet are primary rights for multiple domestic supply. The following water rights are supplemental to existing rights (from G2-00438C): 14.0 acre-feet for multiple domestic supply and 4.0 acre-feet for irrigation. The Report also states that prior to issuance of a certificate, "Larch Corrections Center shall properly abandon Well 0 to prevent contamination of the water source in accordance with WAC 173-160, Minimum Standards for Construction and Maintenance of Wells." An existing surface water right, certificate number S2-22209C, has been relinquished by LCC. Copies of the Report of Examination is included in Appendix A.

STORAGE CAPACITY

LCC maintains two concrete reservoirs. The reservoirs consist of a 30,000 gallon rectangular concrete tank constructed in 1982 and a 130,000 gallon circular concrete tank constructed in 1994. The total required storage for LCC is 123,000 gallons which

consists of standby and fire flow storage. Equalizing storage is not required under the current system configuration. The total required storage for LCC after the 400-bed expansion is estimated to be 178,000 gallons which consists of the sum of standby and fire storage requirements. The storage requirements for LCC were determined using the DOH Draft Group A Public Water Systems Waterworks Standards (DOH, 1996) and are summarized in the 1996 *Statewide Water System Plan* (G&O, 1996).

INTERTIES

There are no public water systems within 5 miles of the LCC. The closest Group A water system is the DNR Cold Creek Campground Well approximately two miles north of LCC. An intertie with another system is not feasible for LCC.

EMERGENCY SOURCE

A private water supply source has been located to provide bulk potable water deliveries to LCC in the event the LCC water supply becomes unusable. The company is Water Truck Services, Inc. in Enumclaw, Washington at (360) 825-5445. Water Truck Services has supplied water to the Valley Water District in Orting and the Covington Water District and has undergone random water quality testing by the DOH during the delivery operations. The company has also supplemented DNR water trucks for fire fighting.

CHAPTER 6
SPILL RESPONSE

To provide adequate spill response planning, a public water system must coordinate with local emergency responders, the Department of Ecology's Spill Operations Section, the Department of Community Development's Emergency Management Program, the local health department, and any local emergency planning committees. (DOH, 1993b) They should evaluate whether changes in spill response measures are needed to better protect groundwater quality within wellhead protection areas.

The DOC has instituted policies regarding hazardous waste management at LCC which is included in Appendix C. These policies identify procedures for identifying, labeling, storing, and shipping of hazardous wastes kept at the LCC. Emergency phone numbers for contacting DOH, the Department of Ecology, and the local fire department are included in Table 6-1. The LCC keeps a supply of oil absorbent pads on-site to handle small petroleum product spills.

ECOLOGY SPILL RESPONSE

The **24-Hour Emergency Spill Response** phone number for the Department of Ecology is **(360) 407-6300**. This is the number for the Southwest Regional Office receptionist and is answered by a an answering service during non-business hours.

Other Emergency Phone Numbers

TABLE 6-1

Emergency Phone Call-Up List

Personnel/Agency	Working Hours Number	Off-Duty Number
James Tooley - Plant Manager	(360) 260-6300	(360) 892-3930
Jim Oja - Treatment Plant Operator	(360) 260-6300	(360) 687-6117
Terry Haines - Main Office/Superintendent	(360) 260-6300	
Paul Szumlanski - DOC Project Mgr.	(360) 753-1656	
Bob Bergquist - DOC Environmental Mgr.	(360) 753-3975	
Jim Messer - DNR Representative	(360) 260-6286	
Jim McCauley - DOH Engineer	(360) 586-5209	
Clark County PUD - Electrical Utility	(360) 253-8886	
Water Truck Services - Bulk Water Delivery	(360) 825-5445	
Ecology 24-Hour Spill Response	(360) 407-6300	
Police/Security	911	
Fire Department	911	
Emergency Medical	911	

CHAPTER 7
CONCLUSIONS AND RECOMMENDATIONS

1. A Report of Examination has been made by Ecology that recommends granting LCC the water rights necessary for operation of the facility. However, the capped well (Well 0) at LCC must be abandoned according to WAC 173-160 prior to Ecology issuing the Certificate of Water Right for Wells 2 and 3.

2. In order to be issued a water rights certificate for Wells 2 and 3, LCC must develop a monthly program to measure water levels in Wells 2 and 3. In addition, the specific capacity of each well should be determined three to four times per year by facility personnel. Specific capacity is the rate of discharge of a well per unit of drawdown and is commonly expressed as gpm/ft. Specific capacity can be determined by allowing the well pump to run to a steady state, measuring the gallons pumped in a period of time, and measuring the water level in the well at that time. Specific capacity records should be kept with pumping records.

3. The training requirements for water system personnel are contained in WAC 246-292-050 and are summarized in the Statewide Operations and Maintenance Manual. Briefly, a WDM is required of all Group A water systems that service 100 or more services or use complex filtration technologies. Because of the size and the high profile nature of the LCC water system it is recommended that the person(s) responsible for overseeing the water system receive training to become a certified WDM.

4. Signs should be posted on the well vaults of wells 1, 2, and 3 identifying the sanitary control zones and the restrictions placed on activities within the zones.

5. Due to the application of herbicides on the roadsides above the LCC, the DOC should consider conducting a herbicide analysis of one of the wells once every five years.

REFERENCES

Clark County Water Quality Division (Clark County). 1995. *Wellhead Protection Area Delineations for Clark County*. September 1995.

Gray & Osborne (G&O). 1994. *Larch Corrections Center Water Conservation Plan*. Prepared for the Washington Department of Corrections. November 1994.

Gray & Osborne (G&O). 1996. *Draft Statewide Water System Plan*. Prepared for the Washington Department of Corrections. December 1996.

U.S. Department of Agriculture (USDA). 1972. *Soil Survey of Clark County Washington*. November 1972.

U.S. Environmental Protection Agency (U.S. EPA). 1994. *Ground Water and Wellhead Protection*. EPA/625/R-94/001. September 1994.

Washington State Department of Health (DOH). 1993a. *Inventory of Potential Contaminant Sources in Washington's Wellhead Protection Areas*. December 1993.

DOH. 1993b. *Washington State Wellhead Protection Program*. December 1993.

DOH. 1996. *Draft Group A Public Water Systems Waterworks Standards*. April 1996.

APPENDIX A

Wells Logs and Water Rights Certificates

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

LCC Wells 2+3

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

ITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
May 10, 1994	G2-29044		

partment of Corrections/Department of Natural Resources

DRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
5314 NE Dole Valley Road	Yacolt	Washington	98675-9531

PUBLIC WATERS TO BE APPROPRIATED

E
Vell #2 & #3

TARY OF (IF SURFACE WATERS)

UM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	115	70.1*

TITY, TYPE OF USE, PERIOD OF USE		
.1 Acre-feet per year (Primary)	Multiple domestic supply	Year-round, as needed
plemental to Existing Rights		
1.0 Acre-feet per year	Multiple domestic supply	Year-round, as needed
0 Acre-feet per year	Irrigation	Irrigation season
	Fire Protection	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

PROXIMATE LOCATION OF DIVERSION–WITHDRAWAL

00 feet East and 600 feet North of the center of Section 20.

ED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
¼ NE¼	20	3	4E	27	Clark

RECORDED PLATTED PROPERTY

	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

he Southwest quarter of the Northeast quarter of Section 20, T. 3 N., R. 4 E.W.M.

TOMZ FILE

SEP 23 1996

JDSB
MJJ
RAH

DESCRIPTION OF PROPOSED WORKS

6" ", 7.5 horsepower submersible pump connected to existing water supply system.

DEVELOPMENT SCHEDULE

MENCE PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
tarted	June 1, 1997	June 1, 1998

REPORT

ACKGROUND:

On May 10, 1994, the Department of Corrections/Department of Natural Resources filed two applications for e Larch Corrections Center, under the provisions of Chapter 90.44 Revised Code of Washington (RCW), to ppropriate public ground water from two wells in the amount of 155 gallons per minute (gpm) and 75 gpm for domestic supply. The applications were accepted for processing and assigned application numbers G2-29044 and G2-29045.

legal notice of the applicants proposed appropriation for both applications were published February 28 and March 6, 1996 in the Battle Ground Reflector. No objections were received in response to the public notice.

pon further review of the project plans, the applicant has elected to proceed with a single application. ccordingly, application G2-29045 will be rejected. The intent of application G2-29044 is to increase the withdrawal rate for the system, and to secure additional primary rights for Well 2 and Well 3 for expansion of e facilities.

based on the provisions of Chapters 90.03 and 90.44 RCW, and the following information, I recommend the approval of application G2-29044, and issuance of a permit.

NVESTIGATION:

consideration of this application, I conducted a field examination on April 5, 1996. I met with Jim Tooley water system operator. I also reviewed the information submitted with the application, relevant reports, and Department of Ecologys' records. These findings were reviewed by a staff hydrogeologist.

e Location and Description

arch Corrections Center (LCC) is located in unincorporated Clark County approximately 17 miles northeast Vancouver, Washington. LCC is a minimum security prison with an inmate population of 162. Presently, lities at the institution can support a maximum inmate population of 164. A staff of 52 is assigned to the CC.

institution includes a barracks facility, dining hall and kitchen, administration building, chapel, greenhouse, ehouse and garage, repair shed, boiler facility, gymnasium, and a wastewater treatment plant. According the local USGS topographic map, elevations of the main portion of the institution vary from 1,280 feet to 0 feet MSL. Cedar Creek, a tributary to the East Fork of the Lewis River, flows immediately west of the itution.

ydrogeologic Environment

applicant submitted no information on the geology, climate, ground water, or surface waters of the area, the following is based on Ecologys brief research for the area. The wells are completed in volcanic rock, dicated on the most recent geology map as "basaltic-andesite and basalt flows" of Oligicene age (Phillips, W. 987, Geologic Map of the Vancouver Quadrangle, Washington and Oregon, Wa. Div. Geology and Earth ources Open File Report 87-10). No analysis of the hydraulic properties of this formation is available. The ell indicated clay at ground surface, probably volcanic saprolite, grading down into partly weathered ock and finally to mostly unweathered, though highly fractured, volcanic rock in the water-bearing . The hydraulic conductivity and storativity cannot be predicted at any distance from the wells but based the pumping tests appears to be adequate to provide the predicted pumping rate and annual quantity of ter.

Existing Water Right Certificates

e Larch Corrections Center has one Ground Water Right Certificate, No. G2-00438C, for a well that uthorizes 60 gpm and 14 acre feet per year (a-f/y) for domestic supply, 4 acre feet per year for irrigation during he irrigation season, and fire protection as needed. This has been designated as Well 0.

rface Water Right Certificate S2-22209C, was issued as a supplemental supply. Because of the intermittent ature of the stream, the supply pipes and intertie with the facility water system have been recently removed nd surface water is not in use. This surface water right should be relinquished and could be considered as igation if withdrawal of ground water impacts surface water flows in the zone of contribution for the Larch rrections Center wells.

ther than the existing LCC water rights, there are no recorded water rights within a 2-mile radius of the rrections Center. Within that same 2-mile radius, there are six recorded wells, four of which are for the rrections Center.

mand Projection

alculations for water demand are based on permanent inmate populations and 8 hour shifts for the staff opulation. Staff population is calculated to use approximately 1/3 of the water that a full time inmate uses.

sent water demand requires 75 gpm and approximately 27 acre feet per year. The facility plans to increase he number of inmates to approximately 400 and the number of staff to 132. With additional service staff, a ervice population of 444 is calculated. Based on a reported 141 gallons per capita per day water demand, 604 gallons of water per day will be required. Yearly demand will require 70.1 acre feet of water.

s certificate G2-00438 already authorizes an annual withdrawal of 14 acre-feet per year for domestic supply, issuance of an additional 52.1 acre-feet per year is needed to meet future demand.

nalysis of Existing Data

ere are four wells on the property. Three of these wells are used to supply water to two storage tanks. The rage tanks hold up to 160,000 gallons of water that is gravity fed back to the facility for domestic uses, rigation, and fire protection.

ll 0, the original well, failed and is not connected to the water supply system, but the well still exists. Well as drilled to replace Well 0 in February of 1980. Well 1 produces approximately 25 gpm for about five hours nd then starts drawing air. Well 1 is not a reliable source of water but is maintained, by periodic pumping, an emergency supply. Well 2 was drilled in April of 1988 and produces 50 gpm. Well 3 was drilled in July 1993 and produces 35 gpm.

ll three wells are screened in different zones between 100 and 200 feet. It appears from well records, static er levels, and limited pumping data, that all of the wells are taking water from the same source. Well 2 and ll 3 are the main supply wells for the LCC water system.

ccording to the Larch Corrections Center Water Conservation Plan, written by Grey and Osborne, Inc. in vember, 1994;

Well 3 production can be increased from 35 gpm to 65 gpm by installing a larger pump,

Supply to the storage tanks can be increased by installing larger diameter supply pipes,

The source aquifer should be able to sustain additional withdrawal without affecting the existing wells on the property.

arch Corrections Center is approximately 4 miles from the nearest public water supply line operated by Clark ublic Utilities. Because of elevation changes between the pipeline and LCC, the new pipeline and pumplift ions required to supply water to LCC would not be cost effective.

NCLUSION:

ound water right certificate G2-00438 is issued for 60 gpm and 18 acre feet from one well (14 for domestic, for irrigation and fire protection). Well 1, which replaced well 0, is the point of withdrawal for this water t. Well 0 will be abandoned.

rface Water Right Certificate No. S2-22209C was issued to the facility as a supplemental supply. LCC is no

Well 1 is not a reliable source of water, and will be used as an emergency supply. Wells 2 and 3 are to be the main supply wells for the LCC water system; with a combined pumping capacity of 115 gpm.

The ground water source is considered to be the same for all three wells. This water right will be issued for 11 gallons per minute with the understanding that a total of 115 gpm could be supplied to the LCC water s. from a combination of withdrawal from all wells.

Based on projected demand, a total of 70.1 a-f/y is needed for facility operation. An additional 52.1 a-f/y will meet this demand. This water right will be issued for 52.1 a-f/y primary, not to exceed a total of 70.1 a-f/y combined total withdrawal from all wells.

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and should not impair existing rights or be detrimental to public welfare.

RECOMMENDATION:

Based on the above information and conclusions, I recommend that application G2-29044 be permitted for 115 gpm and 52.1 a-f/y to be used year round as needed for domestic supply from wells 2 and 3. I also recommend that application G2-29045 be rejected. Total combined water use from all wells connected to the LCC water system is not to exceed 115 gpm and 70.1 a-f/y (52.1 primary and 18.0 supplemental) under all water rights issued to Larch Corrections Center.

Provisions

"Total combined water use from all wells connected to the LCC water system is not to exceed 115 gpm and 70.1 a-f/y under all water rights issued to Larch Corrections Center."

The water source and/or water transmission facilities are not wholly located upon land owned by the applicant. Issuance of a permit by this department for appropriation of the waters in question does not convey a right of access to, or other right to use, land which the applicant does not legally possess. Obtaining such a right is a matter between applicant and owner of that land.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

Prior to issuance of a certificate, Larch Corrections Center shall properly abandon Well 0 to prevent contamination of the water source in accordance with Chapter 173-160 Washington Administration Code (WAC), Minimum Standards for Construction and Maintenance of Wells."

Installation and maintenance of an access port as described in WAC 173-160-355 is required."

"An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 8-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly."

"In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record."

Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format and shall include the following elements:

For Water Use Reporting:

. Measurement method (ie; totaling meter, acoustic meter, etc.) for each well;

. Total volume pumped from each well by month in thousands or millions of gallons;

. Unique Well ID number.

For Water Level Reporting:

2. Unique Well ID Number;

Measurement data and time;

3. Measurement method (ie; air line, electric tape, pressure transducer, etc.);

Well status (ie; pumping, recently pumped, etc.);

5. Water level accuracy (ie; to nearest foot, tenth of foot, etc.);

Description of the measuring point (ie; top of casing, sounding tube, etc.);

7. Measuring point elevation above or below land surface to the nearest 0.2 foot;

Land surface elevation at the well head to the nearest foot."

Issuance of this water right is subject to the implementation of the minimum requirements established in the onservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding ater Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

nder RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be empha- ed in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a ater conservation plan approved by Department of Health. The standards for such a plan may be tained from either the Department of Health or the Department of Ecology.

EPORTED BY: Chris Andreo Date: September 19, 1996

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been roughly investigated. Furthermore, I find water is available for appropriation and the appropriation as ecommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29044, subject to sting rights and indicated provisions, to allow appropriation of public ground water for the amount and ses specified in the foregoing report.

Signed at Olympia, Washington, this 19th day of September, 1996.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

LCC #1

WATER WELL REPORT
STATE OF WASHINGTON

Application No.
Permit No.

(1) OWNER: Name Dept. Natural Resources Address Mail Dept ~~Natural~~ Olympia, Washington 9850

(2) LOCATION OF WELL: County Clark SW ¼ NE ¼ Sec 20 T 3 N. R 4

Bearing and distance from section or subdivision corner Larch mt- Honor Camp

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 124 ft. Depth of completed well 124 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 62 ft.
Threaded ☐ 5 " Diam. from 54 ft. to 124 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used Torch
SIZE of perforations 1/8 in. by 12" in.
18 perforations from 104 ft. to 124 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 25 ft. below top of well Date 2-14-80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) 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.

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 20 gal./min. with 75 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure; show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of form.

MATERIAL	FROM	TO
Top soil	0	2
Brown clay	2	9
Brown claystone & decomposed rock	9	60
Brown & grey rock w/ broken layers	60	124

Work started Feb. 14 19 80 Completed Feb. 14

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this re[port] is true to the best of my knowledge and belief.

NAME Hansen Drilling Co. Inc. (Person, firm, or corporation) (Type or prin[t])

Address 6711 NE. 58th Ave. Vancouver, Washingto[n]

0006 Ron Aspaas

[Signed] Ron Aspaas (Well Driller) K.M. Ha[nsen]

License No. C-51 Date Feb. 15

223-02HA-NS-ED-*377NT

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

#1

WATER WELL REPORT

LCC#2

STATE OF WASHINGTON

Water Right Permit No. ____

(1) OWNER: Name [illegible] Address 15214 NE Del [illegible]

(2) LOCATION OF WELL: County Clark ____ SW ¼ NE ¼ Sec [illegible] T. [illegible] N., R. 4E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) [illegible] NE Del Caller Rd [illegible]

(3) PROPOSED USE: ☑ Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) 2
Abandoned ☐ New well ☑ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Bored ☐ Cable ☐ Driven ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 160 feet. Depth of completed well 160 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 58 ft.
Welded ☑ / Liner installed ☑ PVC 4½" Diam. from 50 ft. to 160 ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☑ No ☐
Type of perforator used Drill
SIZE of perforations ¼ in. by ____ in.
[illegible] perforations from 145 ft. to 155 ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☑
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel ____
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

(7) PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

(8) WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 49 ft. below top of well Date 4/18/88
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) 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.

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 75 gal./min. with stem set at 158 ft. for 1 hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☑ No ☐
Iron-Less than Pepper [illegible]

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Topsoil	0	1
Subsoil with broken lava rock	1	3
Clay, brown	3	27
Lava rock broken, weathered water bearing	27	31
Conglomerate of multi-colored rock with quartz	31	54
Same formation, but water bearing	54	154
Basalt, gray hard	154	160

Work started 4/15/88 19. Completed 4/15 19. [illegible]

WELL CONSTRUCTOR 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.

NAME RITOLA WELL DRILLING (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 14214 N.E. 202nd Ave. Ph. 892-4764 Brush Prairie, Wash. 98606

(Signed) [illegible] II (WELL DRILLER) License No. 127[illegible]

Contractor's Registration No. RITOLWD251MM Date 4/19, 19[illegible]

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- PX17

Water Right Permit No. _____

(1) OWNER: Name Dept NATURAL RESOURCES Address Olympia, WA. 98504

(2) LOCATION OF WELL: County CLARK SW ¼ NE ¼ Sec 20 T. 3 N, R 4 E W.M.

STREET ADDDRESS OF WELL (or nearest address) LARCH MT HONOR CAMP

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ ☐ Irrigation ☐ Test Well ☐ Other ☐ ☐ DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) 3

Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8" inches. Drilled 200 feet. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8" Diam. from +2 ft. to 68 ft.

Welded ☒ Liner installed ☐ Threaded ☐ _____" Diam. from _____ ft. to _____ ft.

_____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☐

Type of perforator used _____

SIZE of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☐

Manufacturer's Name _____

Type _____ Model No _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☐ Size of gravel _____

Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 18' ft.

Material used in seal Bent Chips

Did any strata contain unusable water? Yes ☐ No ☒

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____

Type: _____ H.P _____

(8) WATER LEVELS: Land surface elevation above mean sea level _____ ft.

Static level 27' ft. below top of well Date 7-28-93

Artesian pressure _____ lbs. per square inch Date _____

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

(9) 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

" " " "

" " " "

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 155 gal./min. with stem set at 170 ft. for 1 hrs.

Artesian flow _____ g.p.m. Date _____

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

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated with at least one entry for each change of information.

MATERIAL	FROM	TO
REDISH BROWN SILTY CLAY	0	49
BRIGHT SILT	49	52
YELLOWISH SILT	52	54
REDISH BROWN SILT	54	57
(ALL OF ABOVE HAD DECOMPOSED BASALT ROCKS)		
BROKEN PINKISH BASALT WATER BEARING	57	71
CONGLOMERATE OF COLORED ROCK W QUARTZ HARD	71	94
ALTERNATING LAYERS OF GREEN AND PINKISH BASALT W QUARTS HARD	94	200

Work started 7-25- 19 Completed 7-30 19 9

WELL CONSTRUCTOR 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.

NAME Holt Testing, Inc. (PRINTED FULL NAME OF CORPORATION) (TYPE OF PRINT)

Address 10611 Todd E. Puyallup, WA

(Signed) _____ (WELL DRILLER) License No 1672

Contractor's Registration No HOLTTI*870J Date 8/2 19 93

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10/87) -1329- ©

LCC #3

APPENDIX B

Susceptibility Assessments

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

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 : LARCH CORRECTIONS CENTER/ DEPT. OF CORRECTIONS, STATE OF WA.

Water system name : LARCH CORRECTIONS CENTER - WELL #1

County: CLARK

Water system number: NR4403 Source number: UNKNOWN

Well depth: 124(Abandoned) (ft.) (*From WFI form*)

Source name: LARCH MOUNTAIN

WA well identification tag number:___ ___ ___-___ ___ ___

_X_ well not tagged

Number of connections: 2 Population served: 190

Township: 3 Range: 4E

Section: 20 1/4 1/4 Section: S.W. OF N.E.

Latitude/longitude (if available): N/A /

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: 2 / 15/80 month/day/year

last reconstruction: N/A / ___ /___ month/day/year

_____ information unavailable

2) Well driller: Hansen Drilling Co., Vancouver, Wa.

___ well driller unknown

3) Type of well:

___ 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: 20 GAL PER MIN. (gallons/min)

Source of information: WELL REPORT

If not documented, how was pumping rate determined? _____

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

X disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):
Chlorination, to eliminate coloform bacteria from reservoir tanks.

7) If source is chlorinated, is a chlorine residual maintained: (YES) / NO

Residual level: .2 (*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 _X_ 50-100 ft ___ 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?

_X_ well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_N/A_ 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): 1350 (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 ~~top~~ of the ~~open interval~~ lowest confining layer? _X_ YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100-120 ft ___ 120-200 ft X > 200 ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

__ wellhead enclosed in a wellhouse

X controlled access (describe): CONCRETE DRYWELL SCHEDULED TO BE SEALED

___ 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: N/A (gallons) NOTE: CURRENTLY NOT IN USE

How was this determined?

X meter

___ estimated: X pumping rate (23 GPM)

___ pump capacity ( )

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 100' (ft)

1 year ground water travel time : 140' (ft)

5 year ground water travel time: 310' (ft)

10 year ground water travel time: 440' (ft)

Information available on length of screened/open interval?

X YES __ NO

Length of screened/open interval: 58' (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? (YES) / NO (mark and identify on map).

SEE ATTACHMENT

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? YES / (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:

NONE	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	____	____	____	____
residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
sites used for land application of waste	____	____	____	____

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:

NONE

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.)

	YES	NO
A. Nitrate: (Nitrate MCL = 10 mg/l)		
Results greater than MCL	___	___
	YES	NO
< 2 mg/liter nitrate	___	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___
X Nitrate sampling records unavailable		
	YES	NO
B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)		
Results greater than MCL or SAL	___	___
VOCs detected at least once	___	___
VOCs never detected	___	___
X VOC sampling records unavailable		
	YES	NO
C. EDB/DBCP:(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		
X EDB/DBCP tests not required		
	YES	NO
D. Other SOCs (Pesticides):		
Other SOCs detected (pesticides and other synthetic organic chemicals).	___	___

___ Other SOC tests performed but none detected (list test methods in comments

X Other SOC tests not performed

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	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ 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:

Ver small year round stream.

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?

_____ YES X NO

Suggestions and Comments

Did you attend one of the susceptibility workshops? (YES) / NO

Did you find it useful? (YES) / NO

Did you seek outside asistance to complete the assessment? YES / (NO)

5-3-94

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

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 : LARCH CORRECTIONS CENTER/ DEPT. OF CORRECTIONS, STATE OF WA.

Water system name : LARCH CORRECTIONS CENTER - WELL #2

County: CLARK

Water system number: NR4403 Source number: UNKNOWN

Well depth: 158 (ft.) (*From WFI form*)

Source name: LARCH MOUNTAIN

WA well identification tag number: ___ ___ ___-___ ___ ___

X well not tagged

Number of connections: 2 Population served: 190

Township: 3 Range: 4E

Section: 20 1/4 1/4 Section: S.W. OF N.E.

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: 4 / 16 / 88 month/day/year

last reconstruction: N/A / ___ / ___ month/day/year

_____ information unavailable

2) Well driller: Ritola Well Drilling, Brush Prairie, Wa.

___ well driller unknown

3) Type of well:

___ 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: 75 GAL. PER MIN. (gallons/min)

Source of information: WELL REPORT

If not documented, how was pumping rate determined? _____

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

_X_ disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):
Chlorination, to eliminate coliform bacteria from reservoir tanks.

7) If source is chlorinated, is a chlorine residual maintained: (YES) / NO

Residual level: .2 (*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 _X_ 50-100 ft ___ 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?

_X_ well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_N/A_ 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): 1350 (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 ~~top of the open interval?~~ BOTTOM OF THE LOWEST CONFINING LAYER. YES _X_ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100-120 ft ___ 120-200 ft X > 200 ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

8) Wellhead construction:

__ wellhead enclosed in a wellhouse

X controlled access (describe): CONCRETE DRYWELL WITH 200 LBS. LID

_____

___ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) (*'<' means less than*)

___ < 18 ft (Approved by Ecology, include documentation) (*'<' means less than*)

X > 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: 1,040,000 (gallons)

How was this determined?

X meter

___ estimated: X pumping rate (40 GPM)

___ pump capacity ( )

____ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 100' (ft)

1 year ground water travel time : 140' (ft)

5 year ground water travel time: 310' (ft)

10 year ground water travel time: 440' (ft)

Information available on length of (screened)/open interval?

X YES __ NO

Length of screened/open interval: 58' (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? (YES) / NO (mark and identify on map).
SEE ATTACHMENT

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? YES / (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:

	NONE	6 month	1 year	5 year	unknown
likely pesticide application					
stormwater injection wells					
other injection wells					
abandoned ground water well					
landfills, dumps, disposal areas					
known hazardous materials clean-up site					
water system(s) with known quality problems					
population density > 1 house/acre					
residences commonly have septic tanks					
Wastewater treatment lagoons					
sites used for land application of waste					

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:

NONE

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.)

	YES	NO
A. Nitrate: (Nitrate MCL = 10 mg/l)		
Results greater than MCL	___	X
	YES	NO
< 2 mg/liter nitrate	X	___
2-5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	X
___ Nitrate sampling records unavailable		
	YES	NO
B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)		
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___
___ VOC sampling records unavailable		
	YES	NO
C. EDB/DBCP:(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		
X EDB/DBCP tests not required		
	YES	NO
D. Other SOCs (Pesticides):		
Other SOCs detected (pesticides and other synthetic organic chemicals).	___	___
__ Other SOC tests performed but none detected (list test methods in comments		
X Other SOC tests not performed		

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: _____

_____

_____

_____

	YES	NO
E. Bacterial contamination:		
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ 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:

Very small year round stream.

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?

_____ YES X 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.)

_____ 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.

NONE

Suggestions and Comments

Did you attend one of the susceptibility workshops? (YES) NO

Did you find it useful? (YES) NO

Did you seek outside asistance to complete the assessment? YES / (NO)

5-3-94

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

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 : LARCH CORRECTIONS CENTER/ DEPT. OF CORRECTIONS, STATE OF WA.

Water system name : LARCH CORRECTIONS CENTER - WELL #3

County: CLARK

Water system number: NR4403 Source number: UNKNOWN

Well depth: 200 (ft.) (*From WFI form*)

Source name: _____

WA well identification tag number: ___ ___ ___-___ ___ ___

X well not tagged

Number of connections: 2 Population served: 190

Township: 3 Range: 4E

Section: 20 1/4 1/4 Section: S.W. OF N.E.

Latitude/longitude (if available): N/A / _____

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: 8 / 2 /93 month/day/year

last reconstruction: N/A / ___ / ___ month/day/year

_____ information unavailable

2) Well driller: Holt Testing Inc., Puyallup, Wa.

___ well driller unknown

3) Type of well:

___ 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: 155 GAL. PER MIN. (gallons/min)

Source of information: WELL REPORT

If not documented, how was pumping rate determined? _____

___ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

_X_ disinfection ___ filtration ___ carbon filter ___ air stripper ___ other

Purpose of treatment (describe materials to be removed or controlled by treatment):
Chlorination, to eliminate coliform bacteria from reservoir tanks.

7) If source is chlorinated, is a chlorine residual maintained? (YES) / NO

Residual level: .2 (*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 _X_ 50-100 ft ___ 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?

_X_ well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

__N/A__ 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): 1300 (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 ~~xxxxxxxxxxxxxxx~~ bottom of the lowest confining layer ~~of the open interval~~? _X_ YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100-120 ft ___ 120-200 ft X > 200 ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

8) Wellhead construction:

__ wellhead enclosed in a wellhouse

X controlled access (describe): CONCRET DRYWELL 200 LBS. LID

_____

___ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) (*'<' means less than*)

___ < 18 ft (Approved by Ecology, include documentation) (*'<' means less than*)

X > 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: ? (gallons) NEW WELL / NOT YET CONNECTED

How was this determined?

X meter

___ estimated: X pumping rate (155 GPM)

___ pump capacity ( )

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 100' (ft)

1 year ground water travel time : 140' (ft)

5 year ground water travel time: 310' (ft)

10 year ground water travel time: 440' (ft)

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/open interval: 58' (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? (YES) / NO (mark and identify on map).
SEE ATTACHMENT

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? YES / (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:

NONE	6 month	1 year	5 year	unknown
likely pesticide application	____	____	____	____
stormwater injection wells	____	____	____	____
other injection wells	____	____	____	____
abandoned ground water well	____	____	____	____
landfills, dumps, disposal areas	____	____	____	____
known hazardous materials clean-up site	____	____	____	____
water system(s) with known quality problems	____	____	____	____
population density > 1 house/acre	____	____	____	____
residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
sites used for land application of waste	____	____	____	____

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:

NONE

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.)

	YES	NO
A. Nitrate: (Nitrate MCL = 10 mg/l)		
Results greater than MCL	___	X
	YES	**NO**
< 2 mg/liter nitrate	X	___
2-5 mg/liter nitrate	___	X
> 5 mg/liter nitrate	___	X
___ Nitrate sampling records unavailable		
	YES	**NO**
B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)		
Results greater than MCL or SAL	___	X
VOCs detected at least once	___	X
VOCs never detected	X	___
___ VOC sampling records unavailable		
	YES	**NO**
C. EDB/DBCP:(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		
X EDB/DBCP tests not required		
	YES	**NO**
D. Other SOCs (Pesticides):		
Other SOCs detected (pesticides and other synthetic organic chemicals).	___	___
___ Other SOC tests performed but none detected (list test methods in comments		
X Other SOC tests not performed		

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: _____

_____

_____

_____

	YES	NO
E. Bacterial contamination:		
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	X
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	X

___ 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:

Springs area.

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?

X YES _____ 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?

_____ YES X 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.)

_____ 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.

NONE

Suggestions and Comments

Did you attend one of the susceptibility workshops? (YES) / NO

Did you find it useful? (YES) / NO

Did you seek outside asistance to complete the assessment? YES / (NO)

5-3-94

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

12/29/94

Ground Water

SUSCEPTIBILITY SURVEY UPDATE

JAN 3 1995

LARCH CORRECTIONS CENTER

Water system name: Larch Corrections Ctr. ID/Source# NR 440 02 (Well #2)

Your Susceptibility Assessment Survey form has been received by the Department of Health (DOH). The items checked below were found incomplete; these could affect your Waiver determination. Please make the necessary adjustments or additions and return the information to:

Vinnie Wright
Department of Health
Division of Drinking Water
~~**Technical Services Section**~~
P.O. Box ~~47822~~ 47823
Olympia WA 98504-~~7822~~ -7823

If you have questions or need assistance completing your survey form, please contact Vinnie Wright at DOH Southwest Drinking Water Operations, (206) 664-2203.

☐ We did not receive a map of the area around your source, as requested in PART IV. This map should include your calculated fixed radii and other pertinent information for determining your level of susceptibility. Please write the water system name and ID number on the map.

☑ The following items were ~~unanswered or~~ incomplete:

Page:	Part:	Item:	
8+9	____	____	(pages 8+9 missing from the copy we received. Would you please send copies of those 2 pages. Thank you!)
____	____	____	
____	____	____	
____	____	____	

MAILED 3/4/95 DPW

☐ We did not receive a copy of the well log or engineering report for your source, although you did say one was available (p. 2), or you cited evidence of confining layers (p. 3). Please submit a copy of the well log or report, marked with your water system's name and ID number.

☐ Other: _____

_____

_____

APPENDIX C

Hazardous Waste Management Policy

DEPARTMENT OF CORRECTIONS

INSTITUTIONAL POLICY AND PROCEDURES

POLICY NUMBER	PAGE
I 250.065	1 of 5

REFERENCES
WAC 173-303-141, WAC 173-303-2[illegible]
WAC 173-303-071, WAC 173-303-[illegible]
WAC 173-303-060, WAC 173-303-145
WAC 173-303-180

CHAPTER	SUBJECT
ADMINISTRATIVE SUPPORT SERVICES	HAZARDOUS WASTE MANAGEMENT

This policy is required to provide a safe and healthful working environment and ensure institution compliance with state law. At Larch Corrections Center, the Plant Manager shall have the responsibility for Hazardous Waste Management.

A. PURPOSE:

The intent of this program is to define the requirements regarding the identification and control of Hazardous Waste Management at this institution. The regulations contained herein are mandatory. Non-compliance presents not only a hazard to life safety but possibly for monetary penalty assessed by the Department of Labor and Industries.

B. DEFINITION:

Waste is considered hazardous if it appears on the attachment which lists wastes commonly generated by small quantity generators. Hazardous waste fall into four general categories:

1. It is easily combustible or flammable. This is called ignitable waste.

2. It dissolves metal, other materials, or burns the skin. This is called a corrosive waste.

3. It is unstable or undergoes rapid or violent chemical reaction with water or other materials. This is called a reactive waste.

4. Acutely hazardous waste. These are wastes that EPA has determined to be so dangerous in small amounts that they are regulated in the same way as are large amounts of hazardous wastes. Waste that appear on the attached list with an asterick have been designated acutely hazardous waste.

C. IDENTIFICATION AND LABELLING OF KNOWN HAZARDOUS WASTE MATERIALS:

1. An approved container shall be provided for waste material.

2. Container must be labelled prior to placing any contents in it. Special Note: Avoid mixing substances.

3. Once container is labelled, waste may be placed into it.

4. Labelled containers once full shall be placed in a designated storage area.

D. IDENTIFICATION AND LABELLING OF UNKNOWN CONTENTS/HAZARDOUS WASTE MATERIALS:

1. Test unknown substances in each container.

   a. Use approved hazardous communication identification system for containers and identify each container.

b. Obtain sample of unknown substance in each container.

c. Place container I.D. number on sample taken.

d. Send sample to approved lab, asking for following tests:

1. characteristics of flammability
2. corrosivity
3. reactivity
4. toxicity
5. toxic dangerous waste
6. persistent dangerous waste
7. characteristics of dangerous waste.

e. When test results are received, label the containers accordingly. Date when contents were actually placed in container, designation type as defined in WAC 173-303-9903 and accumulalting waste WAC 173--303-200(d). Hazardous material identification system HMIS labels should be used to accomplish this task.

E. Larch Corrections Center will manage its waste generation to generate no more than 100 kilograms about 220 pounds or 25 gallons of hazardous waste and no more than one kilogram about 2 pounds of acutely hazardous waste in any calendar month. This will classify this institution as a conditionally exempt small quantity generator and WAC requires the following:

1. Identify all hazardous waste generated.

a. A Monthly Report shall be submitted through the Business Manager to the Superintendent to identify all hazardous waste generated within a given month giving the quantity in gallons or pounds as required.

b. The generated waste shall be sent to a ~~local sanitation department for disposal~~ transported off site for disposal per all State & Federal regulations.

F. STORING HAZARDOUS WASTE ON-SITE:

1. Hazardous waste shall not be accumulated or stored for more than one calendar month. Disposal shall be monthly.

2. The storage of hazardous waste in containers shall be as follows:

a. Clearly mark each container with the words "HAZARDOUS WASTE" and the name of the material and with the date you begin to collect waste in that container.

b. Keep containers in good condition, handle them carefully and replace any leaking ones.

c. Do not store hazardous waste in a container if it may cause rupture, leaks, corrosion or other failure.

d. Keep containers closed except when you fill or empty them.

e. Inspect the containers for leak or corrosive every week.

f. In storing ignitable or reactive waste, be sure containers are placed as far as possible from facility buildings to creat a buffer zone.

g. Never store waste in the same container that could react together to cause fires, leaks or other releases.

h. Hazardous waste that is stored shall be taken off site prior to the end of a calendar month.

G. SHIPPING OF HAZARDOUS WASTE:

This section shall be followed only if hazardous waste in quantities exceed quanti exclusion limits as defined in WAC 173-303-071.

1. Obtain EPA state identification number as described in WAC 173-303-060.

2. Manifest shipment of hazardous waste as outlined in WAC 173-303-180. Manifest will contain:

   a. Location where shipment is going.

   b. Date shipment is to be picked up by transporter.

   c. Name of transporter that picks up shipment.

   d. Signature of both generating facility manager and transporter.

   e. One signed copy is retained at generating facility and two signed copies are sent with the transporter.

3. The storage facility will return signed copy to Larch Corrections Center stating:

   a. Date received.

   b. Disposition of waste.

c. Documentation and receipt of completed manifest must be completed within thirty-five (35) days of shipment from Larch Corrections Center. If the manifest is not received within forty-five (45) days of shipment, an Exception Report must be submitted to the Department of Ecology. This letter of explanation will include a copy of the original manifest and dates where disposal or storage was to take place.

H. RECORDING/RECORDKEEPING:

All records pertaining to hazardous waste will be retained by the facility Hazardous Waste Manager:

1. Retain copies of all manifests, chronological by date.

2. Retain copies of all laboratory test results.

3. Retain records of any on-site visits by the Department of Ecology or other agencies reviewing hazardous waste materials activities.

I. TRAINING:

All individuals handling hazardous waste are to be trained. Specific hazardous waste training will be provided by the Department of Corrections staff Training Officer and will include as a minimum:

1. Identifying hazardous waste and labelling.

2. Handling.

3. Overview on manifesting.

4. Disposal.

5. Contingency plan in case of spill.

6. Emergency procedure.

J. CONTINGENCY EMERGENCY PLANNING:

1. As part of the Emergency Response Plan for hazardous waste, emergency notification of the following will be done:

   a. Local authorities.

   b. Division of Prisons Office of Capital Programs - SCAN 321-6181.

c. Department of Corrections Safety Office - SCAN 234-4845.

d. Department of Ecology - SCAN 585-6000.

2. The following information will be provided:

a. Name of reporting party.

b. Name of facility.

c. Contact phone number.

d. Description of substance.

e. Quantity of substance spilled.

f. Potential environmental impact spilled in stream, etc.

g. Clean-up status.

K. REVIEW:

This policy will be revieved by the Superintendent annually and the Assistant Director will review and approve all changes.

Approved, Acting Superintendent, Larch Corrections Center James E. Thatcher 8-12-81
Date

APPENDIX B

EPA HAZARDOUS WASTE NUMBERS FOR WASTE STREAMS COMMONLY GENERATED BY SMALL QUANTITY GENERATORS

The Environmental Protection Agency recognizes that generators of small quantities of hazardous waste, many of which are small businesses, may not be familiar with the manner in which hazardous waste materials are identified. This Appendix has been assembled to aid 100-1000 kg/mo small quantity generators in determining the EPA Hazardous Waste Numbers for their wastes. These numbers are needed to complete the "Notification of Hazardous Waste Activity," Form 8700-12.

This Appendix contains lists of EPA Hazardous Waste Numbers for each waste stream identified in Table 2 in Chapter 1 of the handbook. Note that acutely hazardous wastes are identified with an asterisk (*).

To Use This Appendix

1. Locate your business type in Table 2 in Chapter 1. This will help you to identify the waste streams common to your activities.
2. Find each of the waste streams that you identified in Table 2 in the more detailed descriptions in this Appendix. Review the more detailed descriptions of typical wastes to determine which waste streams actually result from your activities.
3. If you determine that you actually do generate a particular waste stream, report the four-digit EPA Hazardous Waste Number in Item X of Form 8700-12, "Notification of Hazardous Waste Activity."

The specific instructions for completing Item X (Description of Hazardous Wastes) of the notification form are included in the notification package. You should note, however, that specific EPA Hazardous Waste Numbers beginning with:

- "F" should be entered in Item X, Section A.
- "K" should be entered in Item X, Section B.
- "P" or "U" should be entered in Item X, Section C.
- "D" should be entered in Item X, Section E.

The industries and waste streams described here do not provide a comprehensive list, but rather serve as a guide to potential small quantity generators in determining which of their wastes, if any, are hazardous. Except for the pesticide and wood preserving categories, this Appendix does not include EPA Hazardous Waste Numbers for commercial chemical products that are hazardous when discarded unused. These chemicals and their EPA Hazardous Waste Numbers are listed in Title 40 of the Code of Federal Regulations (40 CFR) in Section 261.33.

If the specific EPA Hazardous Waste Number that should be applied to your waste stream is unclear, please refer to 40 CFR Part 261, reprinted in the Notification Form 8700-12 package. In those cases where more than one EPA Hazardous Waste Number is applicable, all should be used. If you have any questions, or if you are unable to determine the proper EPA Hazardous Waste Numbers for your wastes, contact your state hazardous waste management agency, or the RCRA/Superfund Hotline (see Appendix A).

Solvents:

Solvents, spent solvents, solvent mixtures, or solvent still bottoms are often hazardous. This includes solvents used in degreasing (identified as F001) and paint brush cleaning and distillation residues from reclamation. The following are some commonly used hazardous solvents (also see ignitable wastes for other hazardous solvents, and 40 CFR 261.31 for most listed hazardous waste solvents):

Benzene	F005
Carbon Disulfide	F005
Carbon Tetrachloride	F001
Chlorobenzene	F002
Cresols	F004
Cresylic Acid	F004
O-Dichlorobenzene	F002
Ethanol	D001
2-Ethoxyethanol	F005
Ethylene Dichloride	D001
Isobutanol	F005

Isopropanol	D001
Kerosene	D001
Methyl Ethyl Ketone	F005
Methylene Chloride	F001
	F002
Naphtha	D001
Nitrobenzene	F004
2-Nitropropane	F005
Petroleum Solvents (Flashpoint less than 140°F)	D001
Pyridine	F005
1,1,1-Trichloroethane	F001
	F002
1,1,2-Trichloroethane	F002
Tetrachloroethylene (Perchloroethylene)	F001
	F002
Toluene	F005
Trichloroethylene	F001
	F002
Trichlorofluoromethane	F002
Trichlorotrifluoroethane (Valclene)	F002
White Spirits	D001

Acids/Bases:

Acids, bases, or mixtures having a pH less than or equal to 2 or greater than or equal to 12.5, are considered corrosive (for a complete description of corrosive wastes, see 40 CFR 261.22, Characteristic of corrosivity). All corrosive materials and solutions have the EPA Hazardous Waste Number D002. The following are some of the more commonly used corrosives:

Acetic Acid	Nitric Acid
Ammonium Hydroxide	Oleum
Chromic Acid	Perchloric Acid
Hydrobromic Acid	Phosphoric Acid
Hydrochloric Acid	Potassium Hydroxide
Hydrofluoric Acid	Sodium Hydroxide
	Sulfuric Acid

Dry Cleaning Filtration Residues:

Cooked powder residue (perchloroethylene plants only), still residues, and spent cartridge filters containing perchloroethylene or valclene are hazardous and have the EPA Hazardous Waste Number F002.

Still residues containing petroleum solvents with a flashpoint less than 140°F are considered hazardous and have the EPA Hazardous Waste Number D001.

Heavy Metals/Inorganics:

Heavy metals and other inorganic waste materials exhibit the characteristic of EP Toxicity and are considered hazardous if the extract from a representative sample of the waste has any of the specific constituent concentrations as shown in 40 CFR 261.24, Table 1. This may include dusts, solutions, wastewater treatment sludges, paint wastes, waste inks, and other such materials which contain heavy metals/inorganics (note that wastewater treatment sludges from electroplating operations are identified as F006). The following are EP Toxic:

Arsenic	D004
Barium	D005
Cadmium	D006
Chromium	D007
Lead	D008
Mercury	D009
Selenium	D010
Silver	D011

Ignitable Wastes:

Ignitable wastes include any liquids that have a flashpoint less than 140°F, any non-liquids that are capable of causing a fire through friction, absorption of moisture, or spontaneous chemical change, or any ignitable compressed gas as described in 49 CFR 173.300 (for a complete

description of ignitable wastes, see 40 CFR 261.21, Characteristic of ignitability). Examples are spent solvents (see also solvents), solvent still bottoms, ignitable paint wastes (paint removers, brush cleaners and stripping agents), epoxy resins and adhesives (epoxies, rubber cements and marine glues), and waste inks containing flammable solvents. Unless otherwise specified, all ignitable wastes have the EPA Hazardous Waste Number of D001.

Some commonly used ignitable compounds are:

Acetone	F003
Benzene	F005
n-Butyl Alcohol	F003
Chlorobenzene	F002[1]
Cyclohexanone	F003
Ethyl Acetate	F003
Ethylbenzene	F003
Ethyl Ether	F003
Ethylene Dichloride	D001
Methanol	F003
Methyl Isobutyl Ketone	F003
Petroleum Distillates	D001
Xylene	F003

Ink Sludges Containing Chromium and Lead:

This includes solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead. All ink sludges have the EPA Hazardous Waste Number K086.

[1]Chlorobenzene is listed by EPA as a hazardous waste due to its toxicity and has been assigned EPA Hazardous Waste Number F002. It has a flashpoint, however, of less than 140°F and is therefore included here as an ignitable waste.

Lead-Acid Batteries:

Used lead-acid batteries should be reported on the notification form *only* if they are not recycled. Used lead-acid batteries that *are* recycled do not need to be counted in determining the quantity of waste that you generate per month, nor do they require a hazardous waste manifest when shipped off your premises. (Note: Special requirements do apply if you recycle your batteries on your own premises—see 40 CFR Part 266.)

Lead Dross	D008
Spent Acids	D002
Lead-Acid Batteries	D008

Pesticides:

The pesticides listed below are hazardous. Wastes marked with an asterisk (*) have been designated acutely hazardous. For a more complete listing, see 40 CFR 261.32 and 261.33 for specific listed pesticides, and other wastes, wastewaters, sludges, and by-products from pesticide formulators. (Note that while many of these pesticides are no longer in common use, they are included here for those cases where they may be found in storage.)

*Aldicarb	P070
*Aldrin	P004
Amitrole	U011
*Arsenic Pentoxide	P011
*Arsenic Trioxide	P012
Cacodylic Acid	U136
Carbamic Acid, Methylnitroso-, Ethyl Ester	U178
Chlordane	U036
*Copper Cyanides	P029
1,2-Dibromo-3-chloropropane	U066
1,2-Dichloropropane	U083
1,3-Dichloropropene	U084
2,4-Dichlorophenoxy Acetic Acid	U240
DDT	U061
*Dieldrin	P037
Dimethylcarbamoyl Chloride	U097

Pesticides *(Continued):*

• Dinitrocresol	P047
• Dinoseb	P020
Disodium Monomethanearsenate	D004
• Disulfoton	P039
• Endosulfan	P050
• Endrin	P051
Ethylmercuric Chloride	D009
• Famphur	P097
• Heptachlor	P059
Hexachlorobenzene	U127
Kepone	U142
Lindane	U129
2-Methoxy Mercuric Chloride	D009
Methoxychlor	D014
• Methyl Parathion	P071
Monosodium Methanearsenate	D004
• Nicotine	P075
• Parathion	P089
Pentachloronitrobenzene	U185
Pentachlorophenol	U242
Phenylmercuric Acetate	D009
• Phorate	P094
• Strychnine	P108
2,4,5-Trichlorophenoxy Acetic Acid	U232
2-(2,4,5-Trichlorophenoxy)-Propionic Acid	U233
• Thallium Sulfate	P115
Thiram	U244
• Toxaphene	P123
Warfarin	U248

Reactives:

Reactive wastes include reactive materials or mixtures which are unstable, react violently with or form explosive mixtures with water, generate toxic gases or vapors when mixed with water (or when exposed to pH conditions between 2 and 12.5 in the case of cyanide or sulfide bearing wastes), or are capable of detonation or explosive reaction when heated or subjected to shock (for a complete description of reactive wastes, see 40 CFR 261.23, Characteristic of reactivity). Unless otherwise specified, all reactive wastes have the EPA Hazardous Waste Number D003. The following materials are commonly considered to be reactive:

Acetyl Chloride	Organic Peroxides
Chromic Acid	Perchlorates
Cyanides	Permanganates
Hypochlorites	Sulfides

Spent Plating and Cyanide Wastes:

Spent plating wastes contain cleaning solutions and plating solutions with caustics, solvents, heavy metals, and cyanides. Cyanide wastes may also be generated from heat treatment operations, pigment production, and manufacturing of anti-caking agents. Plating wastes are generally Hazardous Waste Numbers F006-F009, with F007-F009 containing cyanide. Cyanide heat treating wastes are generally Hazardous Waste Numbers F010-F012. See 40 CFR 261.32 for a more complete description of plating wastes.

Wood Preserving Agents:

The wastewater treatment sludges from wastewater treatment operations are considered hazardous (EPA Hazardous Waste Number K001—bottom sediment sludges from the treatment of wastewater processes that use creosote and pentachlorophenol). In addition, unless otherwise indicated, specific wood preserving compounds are:

Chromated Copper Arsenate	D004
Creosote	U051
Pentachlorophenol	F027

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.3

IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **JIM OJA**

Water System Name: **LARCH CORRECTIONS CENTER WS**

County: **CLARK**

Water System Number: **06461 Y** Source Number: **04**

Well Depth: **170** (ft) (From WFI form)

Source Name: **WELL #4**

WA well identification tag number: **AGP - 432** ____ Well not tagged

Number of connections: **160** Population served: **430**

Township: **3N** Range: **4E**

Section: **20** 1/4 1/4 Section: **SW / NE**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **08/17/2002** (month/day/year)

last reconstruction: ____/____/_____ (month/day/year)

X Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

____	Drilled:	____	Rotary	____	Bored	____	Dug
		____	Cable (percussion)			____	Unspecified
____	Other:	____	Spring(s)	____	Driven	____	Jetted
		____	Lateral collector (Ranney)			____	Unspecified

Additional comments:

_____

4) Well report available? ____ YES X 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: _____ (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

X Pumping rate unknown

6) Is source treated? If so what type of treatment:

X	Disinfection	____	Filtration	____	Carbon Filter
____	Air Stripper	____	Other	____	Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: X YES ____ NO

Residual level: 0.2000 (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

__X__ (greater than) 200ft ____ Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft __X__ 20 - 50ft ____ 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ Unknown

3) If source is a flowing well or spring, what is the confining pressure:

__0.00__ 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 the source?

____ YES __X__ NO

5) Wellhead elevation (height above mean sea level): _____ (ft)

How was elevation determined?

____ 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.)

____ Evidence of a confining layer in well log

__X__ 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:

____ (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

X 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr ____ (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: _____ (gallons)

How was this determined?

X Meter

___ Estimated: ___ Pumping Rate (_____)

___ Pump Capacity (_____)

___ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time:	271	(ft)	
1 Year ground water travel time:	383	(ft)	
5 Year ground water travel time:	252	(ft)	265
10 Year ground water travel time:	1,213	(ft)	

Information available on length of screened/open interval?

X YES ___ NO

Length of screened/ open interval: 50 (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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application	____	____	____	____
Stormwater injection wells	____	____	____	____
Other injection wells	____	____	____	____
Abandoned ground water well	____	____	____	____
Landfills, dumps, disposal areas	____	____	____	____
Known hazardous materials clean-up site	____	____	____	____
Water system(s) with known quality problems	____	____	____	____
Population density (greater than) 1 house / acre	____	____	____	____
Residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
Sites used for land application of waste	____	____	____	____

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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

	YES
A. Nitrate: (Nitrate MCL = 10 mg/l)	
Results greater than MCL	
(less than) 2 mg/liter nitrate	X
2 - 5 mg/liter nitrate	
(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP test required but not yet completed	
EDB/DBCP tests not required	
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)	X
Other SOC tests not performed	

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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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?)

____ YES ____ NO ____ Unknown

Describe with references to map produced in Part IV:

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 ____ NO ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES ____ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 vear travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

Maple Lane Correction Center

Excerpt from Maple Lane School Water System Evaluation (February 18, 1998)

SECTION IV

WELLHEAD PROTECTION PROGRAM

SECTION IV

WELLHEAD PROTECTION PROGRAM

BACKGROUND

The objective of Wellhead Protection (WHP) is to reduce the potential risk for contamination of groundwater within the identified WHP area. The WHP program outlines basic activities for notification to potential contaminant sources, education of actions which are non-threatening to groundwater supply, and identify locally defined spill response procedures for spill incidents within the wellhead protection area.

WELLHEAD PROTECTION AREA DELINEATION

Table IV-1 shows the WHP areas as determined by using the Calculated Fixed Radius (CFR) method. The CFR method is conservative in most cases and is recommended for use by DOH for small water systems with low to moderately susceptible sources of supply. Since both wells were rated highly susceptible, time of travel distances should be delineated through a more sophisticated, site specific method within 5 years from July 1995 according to DOH WHP guidance.

TABLE IV-1
WELLHEAD PROTECTION AREAS BY CALCULATED FIXED RADIUS (CFR)

Time of Travel	Zone of Contribution
6 month	430 feet
1 year	610 feet
5 year	1,370 feet
10 year	1,940 feet

The draft WSP for the proposed Thurston County water system in the Grand Mound area referenced various hydrologic information for the area. Included in the information are average transmisivity (350,000gpd/ft), average hydraulic gradient (0.0025), flow direction

(west to southwest) and aquifer depth (40' to 60'). Using a more site specific method, the uniform flow equation, the stagnation point down gradient of the well is approximately 85 feet and the distance to the hydraulic divide on either side of the flow axis is approximately 270'. Groundwater movement associated with pumping is approximately 190 feet per year. An estimate of aquifer movement in the area may be as high as 730 feet per year using a very simple assumption that velocity of discrete component of water in the aquifer is equal to the product of the average permeability and the average hydraulic gradient. Withdrawal from the well appears to have very little influence on the five and ten year WHP areas due to the relatively high groundwater flow in the aquifer. The cumulative impact of withdrawal and groundwater movement upstream of the wellfield is shown in Table IV-2 below.

TABLE IV-2
WELLHEAD PROTECTION AREAS BY UNIFORM FLOW

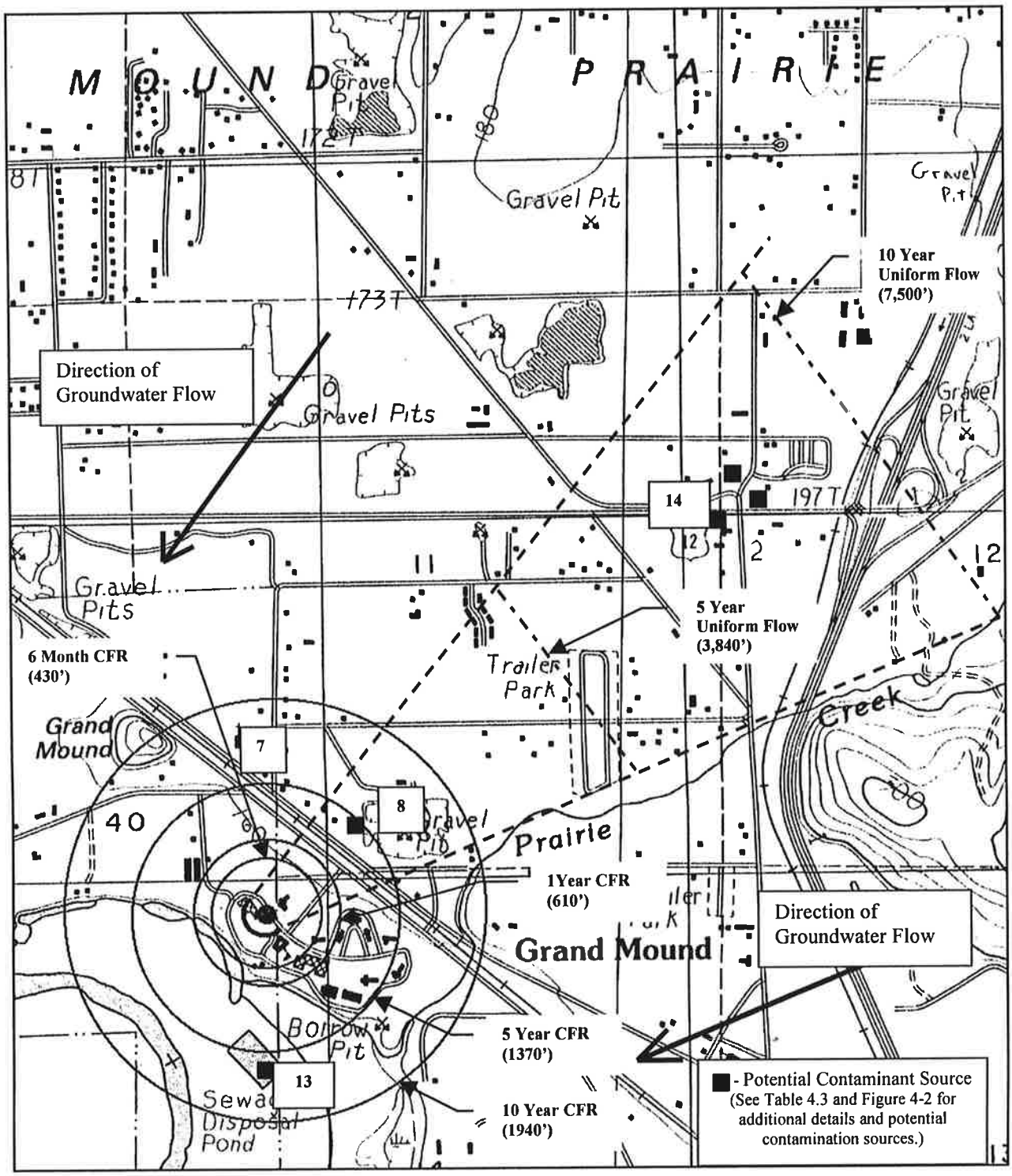
Time of Travel	Zone of Contribution
6 month	460 feet
1 year	1,020 feet
5 year	3,840 feet
10 year	7,500 feet

The WHP areas for both the CFR and the uniform flow methods are shown in Figure IV-1. Figure IV-2 identifies the six-month and one-year time of travel areas in more detail.

CONTAMINANT SOURCE INVENTORY

A contaminant source inventory was completed as part of the original susceptibility assessments submitted to DOH by the school. A much broader inventory was also completed in conjunction with the WHP program for the Grand Mound water system. A copy of the Grand Mound contaminant inventory is included in Appendix C. Table IV-3 contains a summary of the potential sources of contamination within the school's WHP areas. Known point sources of contamination are identified on the maps in Figures IV-1 and IV-2. Less specific sources of contamination such as residential on-site sewage and agriculture areas are not shown on the maps.

Figure IV-1 Wellhead Protection Areas



SCALE: 1"=200'

1 YEAR UNIFORM FLOW TOT(1,020')

CALCULATED UNIFORMED FLOW LINE FOR SØ3

PROBABLE UNIFORM FLOW LINES

6 MONTH UNFORM FLOW TOT(460')

6 MONTH CFR TOT (430')

1 YEAR CFR TOT (610')

1 ■

2 ■

3 ■

4 ■

5 ■

6 ■

LAUREL

GUARD SHACK

BIRCH

WELLS (SØ3)

GARAGE/ MAINT

GARAGE

GARAGE

CHICKEN COOP

PUMPHOUSE

MAINTENANCE

ADMINISTRATION

PRAIRIE CREEK

FAMILY FOCUS

PINE

CEDAR

CYPRESS

RAINIER

OLYMPIC

SPRUCE

PACIFIC

EVERGREEN

OMNI

SEQUOIA

MULTI-SERVICES

SCHOOL

GYMNASIUM

TENNIS

LEGEND

X ■ POTENTIAL CONTAMINATION SOURCE (SEE SCHEDULE IN WHP PROGRAM)

TOT – TIME OF TRAVEL

FIGURE:IV–2

6 MONTH AND 1 YEAR TIME OF TRAVEL

GIBBS & OLSON INC.
Engineers • Planners • Surveyors
LONGVIEW • TUMWATER
WASHINGTON

TABLE IV-3 WHP CONTAMINANT INVENTORY		
Map ID #	**Potential Contaminant Source**	**Potential Contamination**
6 Month Time of Travel		
1	On-site sewage collection lines.	Biological, Nitrate, VOC.
2	Prairie Creek	Biological, VOC, SOC.
3	On-site Visitor parking	VOC.
4	On-site above ground fuel storage tanks ↘	VOC.
5	Maintenance shop and storage buildings ↘	VOC, SOC
6 Month to 1 Year Time of Travel		
6	On-site paint shop↘	VOC.
1 to 5 Year Time of Travel		
7	Burlington Northern Railroad	Biological, VOC, SOC.
8	Future Wastewater Treatment Plant	Biological, VOC, SOC.
9	On-site sewage (approx. 10 single family)	Nitrate, VOC.
10	Agricultural	Nitrate, SOC.
5 to 10 Year Time of Travel		
11	On-site sewage (approx. 15 single family)	Biological, Nitrate, VOC.
12	Agricultural	Nitrate, SOC.
13	Sewage disposal pond↘	Biological, Nitrate, VOC.
Upgadient and potentially within a 10 Year Time of Travel		
14	3 gas stations approximately 5,500 feet to the Northeast.	VOC.
15	Numerous on-site sewage.	Nitrate VOC
16	Agricultural	Nitrate, SOC.

↘ - Potential contamination source within the CFR is down gradient and is not likely to affect the well field.

MANAGEMENT PROGRAM FOR THE WELLHEAD PROTECTION AREA

Public water systems are required to implement a management plan to accomplish wellhead protection. The required elements of the management plan are public notification, contingency planning, and emergency spill response. The following is a discussion of those elements.

NOTIFICATION

No notification is needed for the residents with on-site sewage disposal systems within the 6-month and 1-year time of travel boundaries. All of the potential on-site sewage sources of contamination will be replaced by the county sewage collection system in the near future. The gas station and pesticide applicators within the 5 and 10 year time of travel boundaries will be notified in conjunction with efforts by the County for the Grand Mound water system.

Several on-site facilities are listed in Table IV-3 as potential contamination sources. The maintenance shop, fuel storage tanks, paint shop, and sewage disposal pond are within the 10 year CFR, but are located down gradient of the well field. Based on the uniform flow estimates and information from the Grand Mound wellhead protection study, a release from these potential sources of contamination is not anticipated to affect the well field. Any future on-site hazards will be addressed through maintenance staff education and future construction activities. In particular, on-site sewage collection pipes will either be routed around the 100 foot protective radius around the wellfield or the pipes will be encased through the radius in accordance with methods acceptable to the DOH Regional Engineer.

CONTINGENCY PLANNING

Currently, there are no feasible intertie options. After establishment of the Grand Mound water system, a relatively feasible option will exist. In the event of a loss of the water from the main production wells due to failure or contamination, the system would have to pursue an intertie with the Grand Mound water system or evaluate whether new wells on another part of the school property are prudent. In general, aquifer contamination upgradient of the well field may preclude the use of new wells at the school. For any other events, the choice would be subject to the cost difference between the two alternatives. Water rights may have to be transferred in either case. During the interim, supply could come from a local tanker truck such as those utilized in the past. The tanker would have to be properly disinfected and equipped with a supply fitting. Additional emergency response procedures are also discussed in the Section 6 – Operations & Maintenance.

EMERGENCY SPILL RESPONSE

The local fire district and county emergency services department will be informed of the wellhead protection area through submittal of the map of the WHP zones. Procedures for response to a spill incident within the wellhead protection area will be developed by the local emergency service entities.

Mission Creek Corrections Center for Women

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

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 : DSHS , Mission Creek Youth Camp

Water system name : Mission Creek Youth Camp

County: Mason

Water system number: 55325Y Source number: S01

Well depth: 186 ft. (ft.) (XXXX XXXX)

Source name: N/A WATER RIGHTS PERMIT #G2-21634P

WA well identification tag number: N/A ___ ___-___ ___ ___

XX well not tagged

Number of connections: One Population served: 120

Township: T23N Range: R2WM

Section: Sec 13 1/4 1/4 Section: SE 1/4 -NE1/4

Latitude/longitude (if available): N/A /

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: ___ / ___ / 59 month/day/year

last reconstruction: ___ / ___ / ___ month/day/year

XX information unavailable

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20-50 ft ___ 50-100 ft XX 100-200 ft ___ >200 ft

___ information unavailable ('< ' *means less than;* '> ' *means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20-50 ft ___ 50-100 ft XX > 100 ft

___ flowing well/spring (artesian)

How was water level determined?

___ well log XX other: Position of pump bowls and intake strainer

XX 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): 350 (ft)

How was elevation determined? XX 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.)

___ 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 top of the open interval? ___ YES ___ NO

XX information unavailable

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 3,650,000 gallons)

How was this determined?

__ meter

XX estimated: __ pumping rate (_____)

XX pump capacity (100 GPM)

XX other: Estimated 10,000 Gal./day usage

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 1550 (ft)

1 year ground water travel time : 2200 (ft)

5 year ground water travel time: 4920 (ft)

10 year ground water travel time: 6950 (ft)

Information available on length of screened/open interval?

__ YES XX NO

Length of screened/open interval: Appendix E (10) (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? XX YES __ 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 XX NO (mark and identify on map).

Comments: There is a drainfield within the six (6) month Time of Travel Boundary.

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.)

	YES	NO
A. Nitrate: (Nitrate MCL = 10 mg/l)		
Results greater than MCL	___	XX
< 2 mg/liter nitrate	XX	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___
___ Nitrate sampling records unavailable		

	YES	NO
B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)		
Results greater than MCL or SAL	___	___
VOCs detected at least once	___	___
VOCs never detected	XX	___
___ VOC sampling records unavailable		

	YES	NO
C. EDB/DBCP:		
(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		
XX EDB/DBCP tests not required		

	YES	NO
D. Other SOCs (Pesticides):		
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected		
(list test methods in comments		
XX Other SOC tests not performed		

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: _____

_____

_____

_____

_____

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.)

__ YES XX 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	__	XX	__
6 month–1 year travel time	__	XX	__
1–5 year travel time	__	XX	__
5–10 year travel time	__	XX	__

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	__	XX	__
1–5 year travel time	__	XX	__
5–10 year travel time	__	XX	__

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.

Our well is located between Sandhill Rd. & Delmore Rd., higher in elevation than drainage basins that are on both our east &west sides . Most of the area around our 10 Yr. CFR is State Forest lands. Basically undeveloped with only a small number of individual private residences and no large density population developments.

2) Well driller: _____

_____

_____

XX well driller unknown

3) Type of well:

XX Drilled: ___ rotary ___ bored ___ cable (percussion) ___ Dug

___ Other: ___ spring(s) ___ lateral collector (Ranney)

___ driven ___ jetted ___ other: _____

Additional comments: 8 in. Steel casing

_____

4) Well report available? ___ YES (attach copy to form) XX 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: One hundred (gallons/min)

Source of information: Pump sizing information

If not documented, how was pumping rate determined? _____

_____

___ Pumping rate unknown

6) Is this source treated? No Treatment.

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 XX NO Chlorine

Residual level: _____ *(At the point closest to the source.)*

7) Sanitary setback:

__ < 100 ft* __ 100–120 ft __ 120–200 ft __ > 200 ft
* if less than 100 ft describe the site conditions:

8) Wellhead construction:

XX wellhead enclosed in a wellhouse

XX controlled access (describe): Locked door.

XX other uses for wellhouse (describe): None.

__ no wellhead control

9) Surface seal:

__ 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)

XX depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr __ 10–25 in/yr XX > 25 in/yr

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:

** We are not aware of any regional sources of risk in our area**	6 month	1 year	5 year	unknown
likely pesticide application	___	___	___	XX
stormwater injection wells	___	___	___	XX
other injection wells	___	___	___	XX
abandoned ground water well	___	___	___	XX
landfills, dumps, disposal areas	___	___	___	XX
known hazardous materials clean-up site	___	___	___	XX
water system(s) with known quality problems	___	___	___	XX
population density > 1 house/acre	___	___	___	XX
residences commonly have septic tanks	___	___	___	XX
Wastewater treatment lagoons	___	___	___	XX
sites used for land application of waste	___	___	___	XX

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:

Junction of Sand Hill Rd. And 10 Yr. Radius in Sec.19 is a Mason County garbage transfer Station, that in the past was a landfill dump site.

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	XX
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	XX

___ 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?)

XX YES ___ NO

Describe with references to map produced in Part IV:

Sec. 13, 24, sec.7 Mission Creek flows SW Parallel to Sand Hill Rd. which is uphill from Creek Bed.

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 XX 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?

XX YES ___ NO

Gravel Pit in the Area indicates that area is made up of Glacial till with little [illegible] evidence as to the presense of basalt

Olympic Corrections Center

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **ROD CHRISTY**

Water System Name: **OLYMPIC CORRECTIONS CENTER**

County: **JEFFERSON**

Water System Number: **13560 D** Source Number: **01**

Well Depth: **65** (ft) (From WFI form)

Source Name: **WELL C (1)**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **188** Population served: **350**

Township: **26** Range: **11W**

Section: **29** 1/4 1/4 Section: **SESE**

Latitude / longitude (if available) _____ / _____

How was lat. / long. determined?

____ Global Positioning device ____ Survey **X** Topographic Map

____ Other: _____

* Please refer to Assistance Packet for details and explanations of all the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **08/14/1980** (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

____ Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

X Drilled: ____ Rotary ____ Bored ____ Dug

____ Cable (percussion) X Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? X YES ____ 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: **100.0** (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

X Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: X YES ____ NO

Residual level: **0.1500** (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft **X** 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft ____ Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft **X** 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ 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 the source?

____ YES ____ NO

5) Wellhead elevation (height above mean sea level): **660.00** (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?

X YES ____ NO

____ Information Unavailable

7) Sanitary setback:

____ (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft X (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

X 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **30,000,000** (gallons)

How was this determined?

____ Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

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: **10** (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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application				
Stormwater injection wells				
Other injection wells				
Abandoned ground water well			X	
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks				
Wastewater treatment lagoons				
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 occurance of any test results since 1986 that might 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	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	X
	EDB/DBCP test required but not yet completed	
	EDB/DBCP tests not required	
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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES __X__ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES **X** NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES **X** NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 year travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.3

IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **ROD CHRISTY**

Water System Name: **OLYMPIC CORRECTIONS CENTER**

County: **JEFFERSON**

Water System Number: **13560 D** Source Number: **02**

Well Depth: **67** (ft) (From WFI form)

Source Name: **WELL D (2)**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **188** Population served: **350**

Township: **26** Range: **11W**

Section: **28** 1/4 1/4 Section: **SWSW**

Latitude / longitude (if available) _____ / _____

How was lat. / long. determined?

____ Global Positioning device ____ Survey **X** Topographic Map

____ Other: _____

* Please refer to Assistance Packet for details and explanations of all the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **07/30/1980** (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

____ Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

X Drilled: X Rotary ____ Bored ____ Dug

____ Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? X YES ____ 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: **100.0** (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

X Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: X YES ____ NO

Residual level: **0.1500** (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

X (less than) 20ft ___ 20 - 50ft ___ 50 - 100ft ___ 100 - 200ft

___ (greater than) 200ft ___ Information unavailable

2) Depth to ground water (static water level)

___ (less than) 20ft ___ 20 - 50ft X 50 - 100ft ___ (greater than) 100ft

___ Flowing well spring (artesian) ___ Depth to Ground water unknown

How was water level determined?

___ Well log ___ Other: _____ ___ 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 the source?

___ YES ___ NO

5) Wellhead elevation (height above mean sea level): **660.00** (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?

X YES ___ NO

___ Information Unavailable

7) Sanitary setback:

____ (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft X (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

X 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **30,000,000** (gallons)

How was this determined?

____ Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

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: **10** (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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application				
Stormwater injection wells				
Other injection wells				
Abandoned ground water well			X	
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks				
Wastewater treatment lagoons				
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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

		YES
A.	Nitrate: (Nitrate MCL = 10 mg/l)	
	Results greater than MCL	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	
	EDB/DBCP test 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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES __X__ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES **X** NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES **X** NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 year travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **ROD CHRISTY**

Water System Name: **OLYMPIC CORRECTIONS CENTER**

County: **JEFFERSON**

Water System Number: **13560 D** Source Number: **03**

Well Depth: **60** (ft) (From WFI form)

Source Name: **WELL F (3)**

WA well identification tag number: _____ **X** Well not tagged

Number of connections: **188** Population served: **350**

Township: **26** Range: **11W**

Section: **29** 1/4 1/4 Section: **NESE**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **11/16/1994** (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

____ Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

X Drilled: ___ Rotary ___ Bored ___ Dug

X Cable (percussion) ___ Unspecified

___ Other: ___ Spring(s) ___ Driven ___ Jetted

___ Lateral collector (Ranney) ___ Unspecified

Additional comments:

_____

4) Well report available? ___ YES X 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: **100.0** (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

___ Pumping rate unknown

6) Is source treated? If so what type of treatment:

___ Disinfection ___ Filtration ___ Carbon Filter

___ Air Stripper ___ Other ___ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: X YES ___ NO

Residual level: **0.2000** (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft **X** 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft ____ Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft **X** 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ 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 the source?

____ YES ____ NO

5) Wellhead elevation (height above mean sea level): **640.00** (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?

X YES ____ NO

____ Information Unavailable

7) Sanitary setback:

____ (Less than) 100ft* **X** 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

X Wellhead enclosed in a wellhouse

X Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

X 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr **X** (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **36,500,000** (gallons)

How was this determined?

X Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: **586** (ft)

1 Year ground water travel time: **820** (ft)

5 Year ground water travel time: **1,810** (ft)

10 Year ground water travel time: **2,603** (ft)

Information available on length of screened/open interval?

X YES ____ NO

Length of screened/ open interval: **5** (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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application	____	____	____	____
Stormwater injection wells	____	____	____	____
Other injection wells	____	____	____	____
Abandoned ground water well	____	____	____	____
Landfills, dumps, disposal areas	____	____	____	____
Known hazardous materials clean-up site	____	____	____	____
Water system(s) with known quality problems	____	____	____	____
Population density (greater than) 1 house / acre	____	____	____	____
Residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
Sites used for land application of waste	____	____	____	____

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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

		YES
A.	Nitrate: (Nitrate MCL = 10 mg/l)	
	Results greater than MCL	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	
	EDB/DBCP test required but not yet completed	
	EDB/DBCP tests not required	
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	

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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES X NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES **X** NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES **X** NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 year travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **GEORGE CAMPBELL**

Water System Name: **WASHINGTON CORRECTIONS CENTER WS**

County: **MASON**

Water System Number: **93063 K** Source Number: **01**

Well Depth: **178** (ft) (From WFI form)

Source Name: **WELL # 1**

WA well identification tag number: _____-_____ **X** Well not tagged

Number of connections: **1,000** Population served: **1,900**

Township: **20** Range: **04W**

Section: **09** 1/4 1/4 Section: **SWNW**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: ___/___/_____ (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

X Information unavailable

2) Well Driller:

_____

_____

_____

__X__ Well Driller unknown

3) Type of Well:

____ Drilled: ____ Rotary ____ Bored ____ Dug

____ Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? ____ YES __X__ 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: _____ (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

__X__ Pumping rate unknown

6) Is source treated? If so what type of treatment:

____ Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: ____ YES ____ NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft X Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft X (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ 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 the source?

____ YES ____ NO

5) Wellhead elevation (height above mean sea level): _____ (ft)

How was elevation determined?

____ 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.)

____ 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 ____ NO

X Information Unavailable

7) Sanitary setback:

____ (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr ____ (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: _____ (gallons)

How was this determined?

____ Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: _____ (ft)

1 Year ground water travel time: _____ (ft)

5 Year ground water travel time: _____ (ft)

10 Year ground water travel time: _____ (ft)

Information available on length of screened/open interval?

____ YES ___X___ NO

Length of screened/ open interval: _____ (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary?

____ YES ____ 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 ____ 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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application	____	____	____	____
Stormwater injection wells	____	____	____	____
Other injection wells	____	____	____	____
Abandoned ground water well	____	____	____	____
Landfills, dumps, disposal areas	____	____	____	____
Known hazardous materials clean-up site	____	____	____	____
Water system(s) with known quality problems	____	____	____	____
Population density (greater than) 1 house / acre	____	____	____	____
Residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
Sites used for land application of waste	____	____	____	____

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 occurance of any test results since 1986 that might 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	____
(less than) 2 mg/liter nitrate	____
2 - 5 mg/liter nitrate	____
(greater than) 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	____
VOC sampling records unavailable	____

C. EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
EDB/DBCP detected below MCL at least once	____
EDB/DBCP detected above MCL at least once	____
EDB/DBCP never detected	____
EDB/DBCP test required but not yet completed	____
EDB/DBCP tests not required	____

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	____

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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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?)

____ YES ____ NO ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ NO ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES ____ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 year travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **GEORGE CAMPBELL**

Water System Name: **WASHINGTON CORRECTIONS CENTER WS**

County: **MASON**

Water System Number: **93063 K** Source Number: **02**

Well Depth: **46** (ft) (From WFI form)

Source Name: **WELL # 2**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **1,000** Population served: **1,900**

Township: **20** Range: **04W**

Section: **09** 1/4 1/4 Section: **SWNW**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **09/01/1963** (month/day/year)

last reconstruction: ____ / ____ / _____ (month/day/year)

X Information unavailable

2) Well Driller:

L R GAUDIO

____ Well Driller unknown

3) Type of Well:

X	Drilled:	____	Rotary	____	Bored	____	Dug
		____	Cable (percussion)			**X**	Unspecified
____	Other:	____	Spring(s)	____	Driven	____	Jetted
		____	Lateral collector (Ranney)			____	Unspecified

Additional comments:

4) Well report available? ____ YES **X** 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: **596.0** (gallons / min)

Source of information:

If not documented, how was pumping rate determined?

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

____	Disinfection	____	Filtration	____	Carbon Filter
____	Air Stripper	**X**	Other	____	Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is clorinated, is a chlorine residual maintained: ____ YES **X** NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft X Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft X 20 - 50ft ____ 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log X Other: _____ ____ Unknown

3) If source is a flowing well or spring, what is the confining pressure:

0.00 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 the source?

____ YES X NO

5) Wellhead elevation (height above mean sea level): 277.00 (ft)

How was elevation determined?

____ Topographic map X 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 ____ NO

X Information Unavailable

7) Sanitary setback:

X (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

X Wellhead enclosed in a wellhouse

X Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

WELLHOUSE IS LOCKED

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

X no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **100,000,000** (gallons)

How was this determined?

X Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: **980** (ft)

1 Year ground water travel time: **1,390** (ft)

5 Year ground water travel time: **3,110** (ft)

10 Year ground water travel time: **4,400** (ft)

Information available on length of screened/open interval?

X YES ____ NO

Length of screened/ open interval: **10** (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary?

X YES ____ 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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application				X
Stormwater injection wells				
Other injection wells				
Abandoned ground water well		X		
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks				
Wastewater treatment lagoons			X	
Sites used for land application of waste		X	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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

		YES
A.	Nitrate: (Nitrate MCL = 10 mg/l)	
	Results greater than MCL	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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	
	VOC sampling records unavailable	X
C.	EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	
	EDB/DBCP test 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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

X YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO __X__ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES __X__ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 year travel time	____	____	____
1 - 5 year travel time	____	____	____
5 - 10 year travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **GEORGE CAMPBELL**

Water System Name: **WASHINGTON CORRECTIONS CENTER WS**

County: **MASON**

Water System Number: **93063 K** Source Number: **03**

Well Depth: **184** (ft) (From WFI form)

Source Name: **WELL # 3**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **1,000** Population served: **1,900**

Township: **20** Range: **04W**

Section: **09** 1/4 1/4 Section: **SWNW**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **04/01/1962** (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

X Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

X Drilled: X Rotary ____ Bored ____ Dug

____ Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? ____ YES X 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: 144.0 (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

____ Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper X Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: ____ YES X NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft X Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft X (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log X Other: _____ ____ Unknown

3) If source is a flowing well or spring, what is the confining pressure:

0.00 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 the source?

____ YES X NO

5) Wellhead elevation (height above mean sea level): **267.00** (ft)

How was elevation determined?

____ Topographic map X 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?

X YES ____ NO

____ Information Unavailable

7) Sanitary setback:

X (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

X Wellhead enclosed in a wellhouse

X Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

WELLHOUSE IS LOCKED

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

X (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **1,871,000** (gallons)

How was this determined?

X Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: **220** (ft)

1 Year ground water travel time: **310** (ft)

5 Year ground water travel time: **700** (ft)

10 Year ground water travel time: **980** (ft)

Information available on length of screened/open interval?

X YES ____ NO

Length of screened/ open interval: **14** (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary?

X YES ____ 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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application				X
Stormwater injection wells				
Other injection wells				
Abandoned ground water well				
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks				
Wastewater treatment lagoons				
Sites used for land application of waste				

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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

		YES
A.	Nitrate: (Nitrate MCL = 10 mg/l)	
	Results greater than MCL	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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	
	VOC sampling records unavailable	X
C.	EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	
	EDB/DBCP test 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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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?)

____ YES **X** NO ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES **X** NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO __X__ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

__X__ YES ____ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	X	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 vear travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

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IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **GEORGE CAMPBELL**

Water System Name: **WASHINGTON CORRECTIONS CENTER WS**

County: **MASON**

Water System Number: **93063 K** Source Number: **04**

Well Depth: **56** (ft) (From WFI form)

Source Name: **WELL #4**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **1,000** Population served: **1,900**

Township: **20** Range: **04W**

Section: **09** 1/4 1/4 Section: **SWNW**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **03/01/1984** (month/day/year)

last reconstruction: ____ / ____ / _____ (month/day/year)

X Information unavailable

2) Well Driller:

_____

_____

_____

__X__ Well Driller unknown

3) Type of Well:

__X__ Drilled: ____ Rotary ____ Bored ____ Dug

__X__ Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? __X__ YES ____ 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: **660.0** (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

____ Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: ____ YES ____ NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

X (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft ____ Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft X 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ Unknown

3) If source is a flowing well or spring, what is the confining pressure:

0.00 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 the source?

____ YES X NO

5) Wellhead elevation (height above mean sea level): **270.00** (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.)

____ Evidence of a confining layer in well log

X 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 ____ NO

X Information Unavailable

7) Sanitary setback:

X (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

X (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **100,000,000** (gallons)

How was this determined?

X Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: **980** (ft)

1 Year ground water travel time: **1,390** (ft)

5 Year ground water travel time: **3,110** (ft)

10 Year ground water travel time: **4,400** (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?

X YES ____ 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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application				X
Stormwater injection wells				
Other injection wells				
Abandoned ground water well		X		
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks				
Wastewater treatment lagoons			X	
Sites used for land application of waste		X	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 occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

		YES
A.	Nitrate: (Nitrate MCL = 10 mg/l)	
	Results greater than MCL	
	(less than) 2 mg/liter nitrate	X
	2 - 5 mg/liter nitrate	
	(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
	EDB/DBCP detected below MCL at least once	
	EDB/DBCP detected above MCL at least once	
	EDB/DBCP never detected	
	EDB/DBCP test 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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

X YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES __X__ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 vear travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

Washington Corrections Center for Women

ADDENDUM TO

WASHINGTON STATE
DEPARTMENT OF CORRECTIONS
STATEWIDE
WATER SYSTEM OPERATIONS
AND MAINTENANCE PLAN

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available on request. Reporting requirements are specified in WAC 246-290-480 and summarized in the DOC Statewide O&M Plan.

DOH Addresses

WCCW reports to the DOH Northwest Regional Office. The current DOH regional engineer for Pierce County is Derek Pell. The address and phone number of the DOH Northwest Regional Office is:

Washington State Department of Health
NW Drinking Water Operations
20435 72nd Avenue South, Suite 200, K17-12
Kent, WA 98032-2358
(253) 395-6750

CHAPTER 7 - CROSS-CONNECTION CONTROL PROGRAM

Summary information about DOC's Cross-Connection Control program is presented in the DOC Statewide O&M Plan. A copy of the current DOC Cross-Connection Control and Backflow Prevention Program is included in Appendix D of the DOC Statewide O&M Plan.

CHAPTER 8 - WELLHEAD PROTECTION PROGRAM

Background

The goal of the WHPP is to protect WCCW's water supply by identifying and managing potential sources of ground water contamination that could impact the facility's wells. WCCW currently uses two production wells completed in confined glacial outwash aquifers. The depths to the top of the screened interval for Well No. 1 and Well No. 2R are 338 feet and 506 feet, respectively.

The objectives of the WHPP are to delineate a wellhead protection area (WHPA) around Well No. 1 and Well No. 2R, establish and maintain an inventory of potential sources of ground water contamination, and outline the emergency spill response and contingency plans. The WHPP is also a formalized process to notify business owner/operators and educate the public about wellhead protection.

Delineation of the Wellhead Protection Area

The following five zones of the WHPA were delineated:

1. Sanitary control area

2. Six-month time of travel zone
3. One-year time of travel zone
4. Five-year time of travel zone
5. Ten-year time of travel zone

The six-month through ten-year time of travel zone boundaries are displayed in the Susceptibility Assessment Survey Forms completed for each well. Copies of the Susceptibility Assessment Survey Forms for Well No. 1 and Well No. 2 were previously submitted to DOH.

Well No. 1 and Well No. 2R do not have sanitary control areas with a radius of at least 100 feet as required by WAC 246-290-135 (2). Existing drawings show sanitary sewer lines approximately 10 feet from Well No. 1 and 100 feet from Well No. 2R. A paint shed is located approximately 52 feet southwest of Well No. 2R. A double-walled above ground storage tank is located approximately 100 feet northwest of Well No. 2R. A variance to reduce the sanitary control area radius around Well No. 2R to 50 feet was granted by DOH. Well No. 1 and Well No. 2R are located on relatively flat land and are covered by a locked wellhouse.

The Calculated Fixed Radius method was used to determine the six-month, one-year, five-year, and ten-year time of travel zone boundaries as described in the DOH WHPP Guidance Document. Conservative annual pumping rates based on the limitations of the annual water rights were used in the calculations. The screened intervals of Well No. 1 and Well No. 2R are 13 feet and 10 feet, respectively. A generalized porosity value of 0.22 was used in the calculations. Table 8-1 displays the radius of each zone of the WHPA.

TABLE 8-1
Wellhead Protection Area Radii

Time of Travel	Radius to Edge of Boundary from Well #1	Radius to Edge of Boundary from Well #2R
Sanitary Control Area	10 feet	50 feet
6 month	700 feet	560 feet
1 year	980 feet	800 feet
5 year	2,200 feet	1,800 feet
10 year	3,110 feet	2,500 feet

Contaminant Inventory in the Wellhead Protection Area

A walking/driving survey was conducted to inventory potential sources of ground water contamination around Well No. 1 and Well No. 2R. Areas within a one-mile radius of Well No. 1 or Well No. 2R were investigated

during the survey. Facility staff and others with local knowledge about past, current, and future land use were interviewed. Water Well Reports from the Washington Department of Ecology (Ecology) were used to infer information about abandoned water wells. The following United States Environmental Protection Agency (USEPA) and Ecology databases were searched for sites with a Gig Harbor or Purdy address and for sites with a Gig Harbor or Purdy zip code:

- Comprehensive Environmental Response, Compensation & Liability Information System
- Resource Conservation and Recovery Information System
- Toxic Release Information System
- Permit Compliance System
- Solid Waste Facility List
- Underground Storage Tank List
- Leaking Underground Storage Tank List
- Confirmed and Suspected Contaminated Sites List

Commercial/industrial facilities within the WHPA with potential contaminant sources include WCCW, a trucking company, two construction firms, and a gasoline station. The WHPA contains two sites regulated by the Resource Conservation and Recovery Act (RCRA), two leaking underground storage tank (LUST) sites, and several sites with operational storage tanks. Locations of these facilities relative to the WHPA are shown in the Susceptibility Assessment Survey Form submitted for Well No. 2R.

Notification letters will be sent to owner/operators of the commercial/industrial facilities mentioned above informing them of their location within the WHPA. Notification letters will also be sent to the government agency responsible for regulating operational practices, waste management, or spill response activities at each facility. A list of owner/operators and agencies contacted is included in Appendix A. Sample copies of the owner/operator and agency notification letters are included in Appendix A.

Other potential sources of contamination in the vicinity of Well No. 1 and Well No. 2R include residential properties and State Highway 16. Potential residential sources of contamination include septic systems, pesticide application, household hazardous waste storage and disposal, and heating tanks. Septic tanks and/or drainfields are assumed to be associated with each residence in the vicinity of WCCW. The WCCW facility is connected to the Gig Harbor sanitary sewer. State Highway 16 is located within the six-month time of travel boundary around both Well No. 1 and Well No. 2R. Pesticide application and accidental spills are the primary potential sources

of contamination associated with State Highway 16. Agricultural land use within the WHPA is either non-existent or extremely limited.

Abandoned wells within the WHPA can potentially provide an unobstructed pathway for surface contamination to enter the deep aquifers used by Well No. 1 and Well No. 2R. The Elks Lodge Well (Well No. 3 or DOH Source No. SO3) has been decommissioned. Well No. 2 has been abandoned and will be decommissioned in accordance with WAC 173-160-381 once access to the well is available (after the SNU construction project is complete).

DOC is notified of proposed land use changes adjacent to the facility by the Pierce County Planning and Land Services.

Management Program for the Wellhead Protection Area

The susceptibility of Well No. 1 and Well No. 2R to contamination is low based on the depth of the wells and the presence of significant confining layers. Nonetheless, WCCW has adopted management strategies including contingency planning, spill response planning, and public notification in order to protect their wells.

In the event that one of WCCW's two wells are unfit for consumption, WCCW could make the other well the exclusive source of supply for a limited time. The potential for both Well No. 1 and Well No. 2R becoming contaminated at the same time is unlikely since the wells are completely in separate aquifers. In the unlikely event that both wells are unfit for consumption, several contingency options are available. DOC would most likely purchase water from the City of Gig Harbor in accordance with their current service agreement and impose conservation measures. In the event that both wells are taken off-line due to bacteriological contamination, WCCW could also provide potable water by boiling water or purchasing bottled water. In the event of long-term disability of Well No. 1 and Well No. 2R due to ground water contamination other than bacteriological, the Town could transport water from another municipality or private water company by tanker truck. If water were transported from another water purveyor, the tanker truck would need to be disinfected and equipped with a supply fitting prior to use.

WCCW has a written emergency spill response plan. In the event of an accidental spill, WCCW facility staff notify the Plant Manager/Water Operator. The Plant Manager or switchboard operator would in turn notify Pierce County Fire District No. 5 as a first responder. The Fire District would likely contact either the Tacoma Fire Department HAZMAT Team or Central Pierce County Fire and Rescue HAZMAT Team if additional spill response measures are needed. Notification letters were sent to these

emergency responders informing them of the location of WCCW and State Highway 16 in the WHPA. A list of emergency responders contacted is included in Appendix A. A sample copy of an emergency responder notification letter is included in Appendix A.

Public education is not a major component of the WCCW WHPP since the water system serves a correctional facility. Water quality information is periodically posted on the facility bulletin board. WHPP notification letters have been sent to owner/operators located within the WHPA, government agencies, and emergency responders.

Summary of WHPP Needs

Although potential sources of contamination are located within the delineated WHPA, the susceptibility of WCCW's wells to contamination is low based on hydrogeologic conditions. The management strategies adopted by DOC appear to be adequate to provide protection of the WCCW's water supply. However, additional measures should be taken to improve the WHPP. WHPP improvements for DOC to implement at WCCW are summarized in Table 8-2.

TABLE 8-2
Future Considerations for WHPP

Description	Purpose	Year	Cost
Clean-up waste material stored outside the WCCW paint shed	Remove potential sources of contamination from the Well #2R sanitary control area	2001	No cost
Wellhead improvements for Well #1 (raise casing collar and add screened vent)	Increased protection of Well #1 from bacteriological	2002	$5,000
Relocate the WCCW paint shed	Remove potential sources of contamination from the Well #2R sanitary control area	2003	Unknown
Update contaminant inventory	Should reflect land use changes	2003	No cost if conducted internally

APPENDIX A

WHPP Notification Letters

Table A-1
Notification List for WCCW WHPP

Contact	Affiliation	Address	Comments
Steve Judy (253) 858-4234	Washington Corrections Center for Women	P.O. Box 17 Gig Harbor, WA 98335	RCRA Facility and Operational USTs within WHPA
Mary Webster (253) 853-3322	Cokamar Trucking	9511 54th Street NW Gig Harbor, WA 98332	RCRA Facility within WHPA
N/A (253) 851-6040	Pape & Sons Construction	9512 State Highway 16 Gig Harbor, WA 98335	LUST Site within WHPA
N/A (253) 857-3352	Conan Fuel	10320 Burnham Drive NW Gig Harbor, WA 98335	LUST Site within WHPA
Beth Perrow (253) 851-9309	Wade Perrow Construction	10421 Burnham Drive NW Gig Harbor, WA 98335	RCRA Facility within WHPA
N/A (253) 851-3432	Hemley's Septic Service	9303 54th Avenue NW Gig Harbor, WA 98335	Decommissioned USTs within WHPA
Carol Johnston, Southwest Regional Office (360) 407-6263	Washington Department of Ecology, Toxics Cleanup Program	P.O. Box 47775 Olympia, WA 98504-7775	Regulates UST and LUST Sites
Alex Stone, Southwest Regional Office (360) 407-6344	Washington Department of Ecology, Hazardous Waste and Toxics Reduction Program	P.O. Box 47775 Olympia, WA 98504-7775	Regulates RCRA Facilities
Ray Hanowell (253) 798-2845	Tacoma-Pierce County Health Department	3629 South D Street Tacoma, WA 98418	Maintains wellhead protection data for Pierce County
Mark LaVergne (253) 798-6566	Tacoma-Pierce County Health Department	3629 South D Street Tacoma, WA 98418	UST and LUST compliance in Pierce County
Chief Penny Hulse (253) 851-5111	Pierce County Fire District #5	6711 Kimball Drive Gig Harbor, WA 98335	First Responder
Asst. Chief Ron Stephens (253) 591-5737	Tacoma Fire Department HAZMAT Team	901 Fawcett Avenue Tacoma, WA 98402	Local Emergency Spill Response
Captain Mark Lycan (253) 538-6400	Central Pierce County Fire & Rescue HAZMAT Team	17520 222nd Avenue East Tacoma, WA 98445	Local Emergency Spill Response

July 2, 2001

2-00-251

Ms. Beth Perrow
Wade Perrow Construction
10421 Burnham Drive NW
Gig Harbor, WA 98335

Subject: Washington Corrections Center for Women
Wellhead Protection Notification Letter

Dear Ms. Perrow:

In order to protect the drinking water supply for the Washington Corrections Center for Women (WCCW), we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

After mapping the wellhead protection area, we conducted an inventory of **potential** sources of ground water contamination within the area. The nature of your business and its relative proximity to both wells used at WCCW means your activities have the potential to affect the towns drinking water supply.

We realize you are already careful to protect the environment as you conduct your business. We hope that informing you of your location in our wellhead protection area will result in an increase in precautions to ensure that your activities will not impact our drinking water quality.

Thank you for your support in protecting our drinking water.

Sincerely,

Linda Glasier
Environmental Manager, Department of Corrections

TB:mjk:doc

July 2, 2001

2-00-251

Mr. Alex Stone
Hazardous Waste and Toxics Reduction Program
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Subject: Washington Corrections Center for Women
Wellhead Protection Notification Letter

Dear Mr. Stone:

As part of the wellhead protection program for the Washington Corrections Center for Women (WCCW), we are hereby informing the Department of Ecology Hazardous Waste and Toxics Reduction Program of the findings of our wellhead protection area delineation. This is in accordance with Washington Department of Health regulations (WAC 246-290-135).

The following RCRA-regulated facilities are located within WCCW's wellhead protection area:

- ❑ Washington Corrections Center for Women (Facility ID# WA980978738)
- ❑ Cokamar Trucking (Facility ID# WA0001830553)
- ❑ Wade Perrow Construction (Facility ID#WA0000817635)

The enclosed map shows the 6-month, 1-year, 5-year, and 10-year time of travel boundaries for our wellhead protection area around WCCW Well No. 2R. Any ground water contamination that occurs within this wellhead protection area may impact one of our wells. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Linda Glasier
Environmental Manager, Department of Corrections

TB:mjk:doc

Enclosure

July 2, 2001

2-00-251

Ms. Carol Johnston
Toxics Cleanup Program
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Subject: Washington Corrections Center for Women
Wellhead Protection Notification Letter

Dear Ms. Johnston:

As part of the wellhead protection program for the Washington Corrections Center for Women (WCCW), we are hereby informing the Department of Ecology Toxics Cleanup Program of the findings of our wellhead protection area delineation. This is in accordance with Washington Department of Health regulations (WAC 246-290-135).

The following leaking underground storage tank (LUST) sites are located within WCCW's wellhead protection area according to the Ecology LUST Database:

- ❑ Pape & Sons Construction (Site ID# 2583)
- ❑ Conan Fuel (Site ID# 192)

The following operational or decommissioned underground storage tank (UST) facilities are located within WCCW's wellhead protection area according to the Ecology UST Database:

- ❑ Washington Corrections Center for Women (Site ID# 4875)
- ❑ Eyrish Hemley Land Company (Site ID#3574)

The enclosed map shows the 6-month, 1-year, 5-year, and 10-year time of travel boundaries for our wellhead protection area around WCCW Well No. 2R. Any ground water contamination that occurs within this wellhead protection area may impact one of our wells. It is therefore of utmost importance to us that all reasonable steps be taken to ensure that land use activities within this area do not contaminate our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Linda Glasier
Environmental Manager, Department of Corrections

TB:mjk:doc

Enclosure

July 2, 2001

2-00-251

Chief Penny Hulse
Pierce County Fire District No. 5
6711 Kimball Drive
Gig Harbor, WA 98335

Subject: Washington Corrections Center for Women
Wellhead Protection Notification Letter

Dear Chief Hulse:

In order to protect the drinking water supply for Washington Corrections Center for Women (WCCW), we are developing a wellhead protection program in accordance with Washington Department of Health regulations. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

A portion of State Highway 16 is located within the wellhead protection area. We are notifying Pierce County Fire District No. 5 since you would be the first responder in the event of an accidental spill of contaminants along State Highway 16.

The enclosed map shows the 6-month, 1-year, 5-year, and 10-year time of travel boundaries for our wellhead protection area around Well No. 2R. A contaminant spill within this wellhead protection area has the potential to impact one of our wells. It is therefore of utmost importance to us that reasonable spill response measures are taken in the event of an accidental spill in order to protect our town's drinking water supplies.

Thank you for your support in protecting our drinking water.

Sincerely,

Linda Glasier
Environmental Manager, Department of Corrections

TB:mjk:doc

Enclosure

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.3

IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **STEVE JUDY**

Water System Name: **WASHINGTON STATE CORRECTIONS-WOMEN**

County: **PIERCE**

Water System Number: **69945 J** Source Number: **01**

Well Depth: **351** (ft) (From WFI form)

Source Name: **WELL #1**

WA well identification tag number: **ACM - 654** ____ Well not tagged

Number of connections: **162** Population served: **800**

Township: **22** Range: **01E**

Section: **36** 1/4 1/4 Section: **SESE**

Latitude / longitude (if available) _____ / _____

How was lat. / long. determined?

____ Global Positioning device ____ Survey **X** Topographic Map

____ Other: _____

* Please refer to Assistance Packet for details and explanations of all the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: **04/05/1971** (month/day/year)

last reconstruction: ____ / ____ / _____ (month/day/year)

____ Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

X Drilled: ____ Rotary ____ Bored ____ Dug

X Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? X YES ____ 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: **107.0** (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

____ Pumping rate unknown

6) Is source treated? If so what type of treatment:

____ Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: ____ YES ____ NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

__X__ (greater than) 200ft ____ Information unavailable

2) Depth to ground water (static water level)

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft __X__ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ 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 the source?

____ YES ____ NO

5) Wellhead elevation (height above mean sea level): **320.00** (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?

__X__ YES ____ NO

____ Information Unavailable

7) Sanitary setback:

X (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

8) Wellhead construction:

X Wellhead enclosed in a wellhouse

X Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

X (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr X (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: **43,989,885** (gallons)

How was this determined?

____ Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

X Other:

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: **13** (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?

X YES ____ NO (Mark and identify on map).

Comments:

Stormwater collected from the WCCW parking lot is piped to 2 stormwater retention ponds located approximately 350 ft southeast of well #1. Water in the ponds is removed via evaporation, infiltration and discharge to a stormwatr drain.

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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application	X	X	X	
Stormwater injection wells				
Other injection wells				
Abandoned ground water well	X	X	X	
Landfills, dumps, disposal areas				
Known hazardous materials clean-up site				
Water system(s) with known quality problems				
Population density (greater than) 1 house / acre				
Residences commonly have septic tanks			X	
Wastewater treatment lagoons				
Sites used for land application of waste				

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:

Potential sources of contamination within a one-mile radius of well #1 were identified by conducting a walking/driving survey, interviewing people with local knowledge, and reviewing EPA and WADOH db. A small automotive maintenance shop run by WCCW personnel is located approximately 70 ft east of well #1. WCCW has a RCRA waste handler ID # of WAD980978738. State route 16 is located approx. 450 ft east of Well #1. A company that pumps septic tanks and hauls domestic sewage to off-site disposal facilities is located approx. 2000 ft southeast of well 1.

2) Source specific water quality records:

Please indicate the occurance of any test results since 1986 that might meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

	YES
A. Nitrate: (Nitrate MCL = 10 mg/l)	
Results greater than MCL	
(less than) 2 mg/liter nitrate	X
2 - 5 mg/liter nitrate	
(greater than) 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: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP test required but not yet completed	X
EDB/DBCP tests not required	
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)	X
Other SOC tests not performed	

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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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 ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

X YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES **X** NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES **X** NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 vear travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

Please identify or describe additional hydrological 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

potential hydrologic boundaries and sources/sinks were identified by interpreting the US geolocial survey gig harbor 7.5-minute quadrangle, interviewing people with local knowledge and reviewing the WADOH SADIE db. Impacts to well 1 from other production wells and salt water intrusion are not anticipated. The city of Gig Harbor has the only High Capacity production well (> or equal to 500 gpm) in the vicinity of well 1. The nearest city of Gig Harbor production well is located approximately 2 miles south of well 1. Puget

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.3

IMPORTANT! Please complete one form for each ground water source (well, well in wellfield, spring, spring in springfield) used in your water system. Photocopy as necessary

PART I: System Information

Well owner / manager: **STEVE JUDY**

Water System Name: **WASHINGTON STATE CORRECTIONS-WOMEN**

County: **PIERCE**

Water System Number: **69945 J** Source Number: **05**

Well Depth: **522** (ft) (From WFI form)

Source Name: **UNAPPROVED WELL "#2R"**

WA well identification tag number: ___ ___ ___ - ___ ___ ___ **X** Well not tagged

Number of connections: **162** Population served: **800**

Township: **22** Range: **01E**

Section: **36** 1/4 1/4 Section: **SESE**

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 the questions in Parts II through V

PART II: Well Construction and Source Information

1) Date well originally constructed: ___/___/_____ (month/day/year)

last reconstruction: ___/___/_____ (month/day/year)

X Information unavailable

2) Well Driller:

_____

_____

_____

X Well Driller unknown

3) Type of Well:

____ Drilled: ____ Rotary ____ Bored ____ Dug

____ Cable (percussion) ____ Unspecified

____ Other: ____ Spring(s) ____ Driven ____ Jetted

____ Lateral collector (Ranney) ____ Unspecified

Additional comments:

_____

4) Well report available? ____ YES X 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: _____ (gallons / min)

Source of information: _____

If not documented, how was pumping rate determined?

_____

X Pumping rate unknown

6) Is source treated? If so what type of treatment:

____ Disinfection ____ Filtration ____ Carbon Filter

____ Air Stripper ____ Other ____ Unknown

Purpose of treatment (describe materials to be removed or controlled by treatment):

_____

7) If source is clorinated, is a chlorine residual maintained: ____ YES ____ NO

Residual level: _____ (At point closest to the source)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

____ (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ 100 - 200ft

____ (greater than) 200ft X Information unavailable

2) Depth to ground water (static water level)

X (less than) 20ft ____ 20 - 50ft ____ 50 - 100ft ____ (greater than) 100ft

____ Flowing well spring (artesian) ____ Depth to Ground water unknown

How was water level determined?

____ Well log ____ Other: _____ ____ 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 the source?

____ YES ____ NO

5) Wellhead elevation (height above mean sea level): _____ (ft)

How was elevation determined?

____ 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.)

____ 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 ____ NO

X Information Unavailable

7) Sanitary setback:

____ (Less than) 100ft* ____ 100 - 200ft ____ 120 - 200ft ____ (greater than) 200ft

* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

____ Wellhead enclosed in a wellhouse

____ Controlled access (describe below in comments):

____ Other uses for wellhouse (describe below in comments):

____ No wellhead control

Wellhead construction comments

_____

_____

_____

_____

9) Surface seal:

____ 18 ft

____ (less than) 18ft (No Department of Ecology approval)

____ (less than) 18ft (Approved by Ecology, include documentation)

____ (greater than) 18 ft

____ depth of seal unknown

____ no surface seal

10) Annual rainfall (inches per year)

____ (less than) 10 in/yr ____ 10 - 25 in/yr ____ (greater than) 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: _____ (gallons)

How was this determined?

____ Meter

____ Estimated: ____ Pumping Rate (_____)

____ Pump Capacity (_____)

____ Other:

2) "Calculated Fixed Radius" estimate of ground water movement (see Instruction Packet)

6 Month ground water travel time: _____ (ft)

1 Year ground water travel time: _____ (ft)

5 Year ground water travel time: _____ (ft)

10 Year ground water travel time: _____ (ft)

Information available on length of screened/open interval?

____ YES ____X____ NO

Length of screened/ open interval: _____ (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary?

____ YES ____ 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 ____ 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 Mo	1 Yr	5 yrs	Unknown
Likely pesticide application	____	____	____	____
Stormwater injection wells	____	____	____	____
Other injection wells	____	____	____	____
Abandoned ground water well	____	____	____	____
Landfills, dumps, disposal areas	____	____	____	____
Known hazardous materials clean-up site	____	____	____	____
Water system(s) with known quality problems	____	____	____	____
Population density (greater than) 1 house / acre	____	____	____	____
Residences commonly have septic tanks	____	____	____	____
Wastewater treatment lagoons	____	____	____	____
Sites used for land application of waste	____	____	____	____

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 occurance of any test results since 1986 that might 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	____
(less than) 2 mg/liter nitrate	____
2 - 5 mg/liter nitrate	____
(greater than) 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	____
VOC sampling records unavailable	____

C. EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l) (DBCP MCL = 0.2 ug/l or 0.0002 mg.l)	YES
EDB/DBCP detected below MCL at least once	____
EDB/DBCP detected above MCL at least once	____
EDB/DBCP never detected	____
EDB/DBCP test required but not yet completed	____
EDB/DBCP tests not required	____

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	____

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 last 3 years in samples taken from the source (not distribution sampling records) ..... ____

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 Hydrological 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 calculation 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 the sources. As a system developes its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrological 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?)

____ YES ____ NO ____ Unknown

Describe with references to map produced in Part IV:

_____

_____

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 ____ NO ____ Unknown

b) 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 primarily identified as coarse sand and gravel?

____ YES ____ NO ____ Unknown

3) Is the source located in an aquafer 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)

____ YES ____ NO ____ Unknown

4) Are there other high capacity wells (agricultural, municipal, and/or industrial) located within the CFRs?

____ YES ____ NO ____ Unknown

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	Unknown
6 Month travel time	____	____	____
6 Month - 1 yr travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within....

	YES	NO	Unknown
1 vear travel time	____	____	____
1 - 5 vear travel time	____	____	____
5 - 10 vear travel time	____	____	____

Please identify or describe additional hydrological 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

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be

C-8
Cross-Connection Control Program Forms

DEPARTMENT OF CORRECTIONS
Cross Connection Control Program
Field Inspection

Date: _____

Location: _____ Facility Type: _____

Address: _____ Mailing Address: _____

_____ _____

Contact Person: _____ Phone/Fax: _____

Inspection Type: Unannounced Scheduled Areas Inspected: _____

New Business Complaint _____

Backflow Incident _____

Water Service:	Size	Pressure	Meter No.	Backflow Assembly (Type or "N/A")
Domestic				
Fire				
Irrigation				

Existing Cross Connection Protection (Approved Assemblies)

Hazard/Location	Assembly Type	Make	Model	Serial #	Tested Annually? (Attach Reports)

Item No.	Location & Description of Potential Cross Section	Inspector's Recommendation

Hazardous Chemicals/Products Used or Stored on Site:

1._____	4._____	7._____	10._____
2._____	5._____	8._____	11._____
3._____	6._____	9._____	12._____

Sketch of Water Lines & Hazard Locations

_____ _____ _____ _____

Inspector Signature Date Owner Signature Date

DEPARTMENT OF CORRECTIONS
Cross-Connection Plan Check

Project Name:_____ Date_____

Project Address:_____ _____

_____ Phone_____

Plumbing Contractor:_____ Phone_____

Plans approved as submitted, with the following backflow protection devices installed as indicated:

Device	Location & Hazard	Size

Plans approved provided the following conditions are met:

Items	Recommended Correction

_____

Inspected by:

Based upon a review of the above information and the *Cross Connection Control Program Survey* completed by the owner, premise isolating backflow prevention assemblies shall be installed on the following service connections:

Device Type	Type of Service	Size

_____

Building Official or Authorized Designate

158009

PNWS-AWWA

BACKFLOW ASSEMBLY TEST REPORT

☐ NEW
☐ EXISTING
☐ REMOVED
☐ REPLACEMENT

PROPERTY OWNER: _____ PHONE: _____

MAILING ADDRESS: _____

CITY _____ STATE _____ ZIP _____

ASSEMBLY ADDRESS: _____
STREET

☐ R.P.B.A. ☐ D.C.V.A. ☐ R.P.D.A. ☐ D.C.D.A. ☐ P.V.B.A. ☐ S.V.B.A. ☐ A.V.B. ☐ AIR GAP

SIZE: ___.___ MAKE: _____ MODEL: _____

WATER PURVEYOR: _____ SERIAL NUMBER: _____

ASSEMBLY LOCATION: _____

	REDUCED PRESSURE ASSEMBLY		P.V.B.A. / S.V.B.A.		INITIAL TEST
INITIAL TEST RESULTS	#1 CHECK PRESS DROP _____ (A)	DOUBLE CHECK	AIR INLET	CHECK	PASSED ☐ FAILED ☐
	RELIEF VALVE OPENED AT _____ (B) MIN 2 PSID	CHECK #1 TIGHT ☐ _____ PSID LEAKED ☐	OPENED AT: _____ PSID	PRESS DROP _____ PSID	DATE: / /
	BUFFER A - B = _____ MIN 3 PSI	CHECK #2 TIGHT ☐ _____ PSID LEAKED ☐	DID NOT OPEN ☐	FAILED ☐	SYSTEM PSI _____
	RELIEF VALVE PASS ☐ FAIL ☐				

COMMENTS REPAIRS AND/OR PARTS

	REDUCED PRESSURE ASSEMBLY		P.V.B.A./S.V.B.A.		AFTER REPAIRS
TEST AFTER REPAIRS	#1 CHECK PRESS DROP _____ (A)	D.C.V.A.	OPENED AT	PRESS DROP	DATE: / /
	RELIEF OPENED _____ (B) MIN 2 PSID	CHECK #1 TIGHT ☐ _____ PSID	_____ PSID	_____ PSID	PASSED ☐
	BUFFER A - B = _____ MIN 3 PSI	CHECK #2 TIGHT ☐ _____ PSID			

IN COMPLETING AND SUBMITTING THIS TEST REPORT, THE TESTER CERTIFIES THAT THE ASSEMBLY HAS BEEN TESTED AND MAINTAINED IN ACCORDANCE WITH ALL APPLICABLE RULES AND REGULATIONS OF THE WATER SYSTEM, AND STATE REGULATIONS.

GAUGE CALIBRATION DATE ___/___/___ DETECTOR METER READING _____

TESTER SIGNATURE _____ CERT # _____

TESTERS NAME PRINTED _____ GAUGE # _____

TESTERS ADDRESS _____ PHONE # _____

COMPANY NAME _____

☐ SERVICE RESTORED

REPORT RECEIVED BY: _____ (REPRESENTATIVE OF OWNER)

WHITE - Water System Copy PINK - Customer Copy YELLOW - Tester Copy

BACKFLOW PREVENTION ASSEMBLY TEST RECORD CARD

LOCATION	FILE NO.	ASSEMBLY NO
ADDRESS	ZIP	PHONE NO.
PARTY CONTACTED	TITLE	

TYPE OF ASSEMBLY

☐ Reduced Pressure Backflow Assembly ☐ Double Check Valve Assembly ☐ Pressure Vacuum Breaker Assembly

MAKE OF ASSEMBLY	MODEL	SERIAL NO.	SIZE
DATE INSTALLED		METER NO.	

CROSS-CONNECTION CONTROLLED

LOCATION OF ASSEMBLY

(Reverse Side of Card)

DATE TESTED	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	POPPET (PVBA)	DATE REPAIRS MADE	REMARKS

TEST EQUIPMENT CALIBRATION FORM

Name: _____

Address: _____
Street

_____
City Zip

Duplex Diff. Press.

Gauge I.D. #: ☐☐☐☐☐☐ Type: ☐ ☐

Make: _____ Model #: ☐☐☐☐☐

Calibration Adjustment Required

Duplex:	Green (Low Needle):	Low ☐	High ☐	None ☐
	Red (High Needle):	Low ☐	High ☐	None ☐
Differential Pressure:		Low ☐	High ☐	None ☐

Repairs And/
Or Parts _____

_____

Comments: _____

_____

_____

_____

_____

	Yes	No
All necessary adjustments have been made:	☐	☐

This gauge has been calibrated in compliance with _____ Administrative Rules.

Date Of Calibration: ☐☐☐

Next Calibration Date: ☐☐☐

Calibrator's Name: _____

Calibrator's #: ☐☐☐☐☐

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: _____

Reduced Pressure Backflow Assemblies

Make & Model Of Assembly: _____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES						
		(a) No. 1 Check	(b) No. 2 Check	(c) Both Checks	(d) Relief Valve	(e) Relief & Either Check	(f) Relief & Both Checks	(g) No. 1 CV - Relief < 3 PSI
0.375								
0.50								
0.75								
1.00								
1.25								
1.50								
2.00								
2.50								
3.00								
4.00								
6.00								
8.00								
10.00								

Name Of Water Utility: _____

Report By: _____ Telephone No.: _____

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: _____

Double Check Valve Assemblies

Make & Model Of Assembly: _____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES		
		(a) No. 1 Check	*(b) No. 2 Check*	*(c) Both Checks*
0.375				
0.50				
0.75				
1.00				
1.25				
1.50				
2.00				
2.50				
3.00				
4.00				
6.00				
8.00				
10.00				

Name Of Water Utility: _____

Report By: _____ Telephone No.: _____

American Water Works Association
Pacific Northwest Section
Cross Connection Control Committee

Summary Of Annual Test Reports - Year: _____

Pressure Vacuum Breaker Assemblies

Make & Model Of Assembly: _____

SIZE OF ASSEMBLY (Inches)	TOTAL NUMBER OF TESTS	NUMBER OF FAILURES		
		(a) Air Inlet	*(b) Check Valve*	*(c) Both CV & Inlet*
0.50				
0.75				
1.00				
1.25				
1.50				
2.00				

Name Of Water Utility: _____

Report By: _____ Telephone No.: _____

C-9
Distribution System Analysis Data

Cedar Creek Corrections Center

hr Q_F

Date:	11/30/2012	Location:	Cedar Creek Corrections			Tested By:		Kondrack/Bennett			
Hydrant #	Hydrant Manufacturer	Manufacturer Date	GPS Location	Test Duration	Static Pres.	Residual Pres.	Pitot Pres.	Discharge Coefficient	Outlet Diameter	GPM Flow	Notes
1	American Darling	1995		2 Mins.	65	50	55		2 1/2"	1275	
2	MH	1963		2 Mins.	65	15	25		2 1/2"	800	
3	MH	1962		2 Mins.	65	20	25		2 1/2"	800	Valve stem lay be broken
4	American Darling	1990		2 Mins.	65	60	60		2 1/2"	1350	
5	American Darling	1980		2 Mins.	65	65	60		2 1/2"	1350	
6	American Darling	1995		2 Mins.	65	50	55		2 1/2"	1275	Right Side Discharge loose
7	American Darling	1990		2 Mins.	65	60	60		2 1/2"	1350	
8 (515)	American Darling	1999		2 Mins.	65	55	55		2 1/2"	1275	
9	American Darling	1996		2 Mins.	65	50	55		2 1/2"	1275	
10	American Darling	1989		2 Mins.	65	55	55		2 1/2"	1275	
11 (517)	CLOW	2000		2 Mins.	65	55	55		2 1/2"	1275	
12 (512)	American Darling	1999		2 Mins.	65	55	55		2 1/2"	1275	Right/Left Discharge loose
13 (503)	Iowa Valve CO.			2 Mins.	60	25	25		2 1/2"	840	
14 (516)	Waterous	1993		2 Mins.	65	50	50		2 1/2"	1190	
15	American Darling	1988		2 Mins.	65	50	50		2 1/2"	1190	
16 (509)	Iowa Valve CO.			2 Mins.	65	5	5		2 1/2"	380	
17 (510)	Iowa Valve CO.										Unable to test, valve nuts too small for wrench

Hydrant Flow (gpm)	Static Pressure (PSI)	Residual Pressure (PSI)
1060	52	42

First step is to get the actual flow by timing by 90%:
1060 * .9 = 954 gpm round up to 950 gpm

The next step is using this math equation:

$$Q_R = Q_F * \frac{h_{r\ 0.54}}{h_{f\ 0.54}}$$

Q_R = flow available at the desired residual pressure

Q_F=flow obtained during the flow test

h_r = pressure drop to the desired residual pressure (usually 20 PSI)

h_f = Pressure drop during test

QF = 930 gpm

h_r = 41 – 20 = 21 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 6.5

h_f = 41 – 30 = 11 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 3.47

$$Q_R = (950)\frac{5.18}{3.65} = Q_R = (950)(1.87) = Q_R = 1776 \text{ gpm}$$

But you should round to the nearest 100 gpm when flow is over 1000 gpm

Q_R = 1800 gpm

$Q_R = Q_{20}$

$Q_f = Q_t$

645×9.37

$645\ \frac{9.37}{3.11}$

Larch Corrections Center

Heinitz, Eric F. (DOC)

From: Markham, Aaron I. (DOC)
Sent: Thursday, September 20, 2012 2:08 PM
To: Heinitz, Eric F. (DOC)
Subject: RE: Larch's flow testing

Here the other flow test data we performed today and the manual we used.

fire flow testing manual.pdf

Hydrant Flow (gpm)	Static Pressure (PSI)	Residual Pressure (PSI)
1060	52	42

First step is to get the actual flow by timing by 90%:
1060 * .9 = 954 gpm round up to 950 gpm

The next step is using this math equation:

$$Q_R = Q_F * \frac{h_{r\ 0.54}}{h_{f\ 0.54}}$$

Q_R = flow available at the desired residual pressure
Q_F=flow obtained during the flow test
h_r = pressure drop to the desired residual pressure (usually 20 PSI)
h_f = Pressure drop during test

QF = 930 gpm
h_r = 41 – 20 = 21 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 6.5
h_f = 41 – 30 = 11 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 3.47

$$Q_R = (950)\frac{5.18}{3.65} = Q_R = (950)(1.87) = Q_R = 1776 \text{ gpm}$$

But you should round to the nearest 100 gpm when flow is over 1000 gpm

Q_R = 1800 gpm

From: Heinitz, Eric F. (DOC)
Sent: Thursday, September 20, 2012 9:18 AM

To: Markham, Aaron I. (DOC)
Subject: RE: Larch's flow testing

Thanks Aaron. I will check this against my other flow figures from LCC, but it looks good. Since I am not and engineer and have very little if any experience with fluid dynamics, I will rely on you to me what is good or not.

I believe LCC must meet a fire flow of greater than 1,000 gpm (calculated) with a residential pressure of 20 psi. So, it looks like you've met that.

I'm sending you a table which I'm hoping you can fill out with your new flow data. (I think I may have already sent it to you). If you can include your calculations also, that will help.

Thanks again. This is a great help.

Regards,

Eric Heinitz
Environmental Specialist 5
Capital Programs
Department of Corrections
360-725-8397

From: Markham, Aaron I. (DOC)
Sent: Thursday, September 20, 2012 9:01 AM
To: Heinitz, Eric F. (DOC)
Subject: Larch's flow testing

Good morning Eric,
I did one flow test yesterday on the upper part of our water system and got some numbers a little bit different then Oja's test results back in 2005. But I'm thinking he tested the low section of the water system, which I we going to do today. Here are my results for yesterday and you can tell me if they look good or not. I also included the math equation to show you how I got the answer. I didn't send table 2 out of my instruction manual, but if you like a copy I can send the 9 page manual to you with my next results.

Hydrant Flow (gpm)	Static Pressure (PSI)	Residual Pressure (PSI)
1030	41	30

First step is to get the actual flow by timing by 90%:
1035 * .9 = 927 gpm round up to 930 gpm

The next step is using this math equation:

$$Q_R = Q_F * \frac{h_{r\ 0.54}}{h_{f\ 0.54}}$$

Q_R = flow available at the desired residual pressure
Q_F=flow obtained during the flow test

h_r = pressure drop to the desired residual pressure (usually 20 PSI)

h_f = Pressure drop during test

QF = 930 gpm

h_r = 41 – 20 = 21 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 5.18

h_f = 41 – 30 = 11 PSI Now using table 2 (values of "h" to the 0.54 power) becomes 3.65

$$Q_R = (930)\frac{5.18}{3.65} = Q_R = (900)(1.42) = Q_R = 1320 \text{ gpm}$$

But you should round to the nearest 100 gpm when flow is over 1000 gpm

Q_R = 1300 gpm

Aaron Markham
Larch Corrections Center
WWTPO
15314 NE Dole valley Road
Yacolt WA 98675
(360)260-6300 ex.284

Maple Lane Correction Center

Excerpt from Maple Lane School Water System Evaluation (February 18, 1998)

The current system is a single pressure zone where two wells are pumped into a ground level reservoir and then with booster pumps water is pumped to the existing elevated storage reservoir. The elevated reservoir has an overflow elevation of 255. Ground elevations of the school range from approximately 155 to 161 feet above sea level. This results in static pressures of approximately 41 to 43 psi. Pipe sizing is such that under average day demands system pressures are very near the static pressures of 41 to 43 psi.

HYDRAULIC ANALYSIS AND FIRE FLOW CAPABILITY

The hydraulic analysis in Appendix H evaluates distribution system performance under peak hour demand (PHD) and fire flow conditions. A hydraulic analysis was performed using the Cybernet water distribution modeling program. All pipes 4-inch and larger were included in the model. The model was run for current and future ultimate build out capacity at PHD and PHD plus fire flows. The distribution system was modeled with the existing system as well as with recommended improvements for projected future build out capacity. All modeling scenarios assumed the well pumps were off. Generally, the cast iron pipes were set with a Hazen-Williams friction loss coefficient "C" of 110 and all other piping at 120. The results of one hydrant flow test is available to calibrate the model and confirm existing pipe conditions are adequately represented.

The existing distribution system can supply the anticipated current and future peak hour demands with a 30 psi residual pressure as required. However, the current peak hour demands plus the recommended fire flows cannot be met with portions of the existing distribution system. As stated earlier, the recommended fire flow is 1,500 gpm throughout the system. Flows up to 2,000 gpm were modeled at the school and multi-services building for informational purposes. The fire flows recommended are at 30 psi residual pressure to ensure that the automatic sprinkler systems have adequate pressure to operate.

It has been recommended that the existing elevated storage reservoir be removed. All modeling scenarios for future flows assumed the elevated reservoir is removed and that pressure tanks will be used with the two 3 horsepower pumps and the three 30 horsepower

pumps to supply the necessary flow and pressure to the system. The following recommended improvements will meet the current and projected future build out peak hour demands plus fire flow, see Figure V-2.

10-inch Improvements

It is recommended that the 10-inch waterline be extended from the west side of the multi-services building approximately 700 feet to the Sequoia building where the 6- and 8-inch waterlines go east and north respectively. This will replace an existing 6-inch cast iron waterline and supply 2,000 gpm to the school and multi-services building. This line will also supply the majority of the flows to the existing 6- and 8-inch loop at the east end of the system.

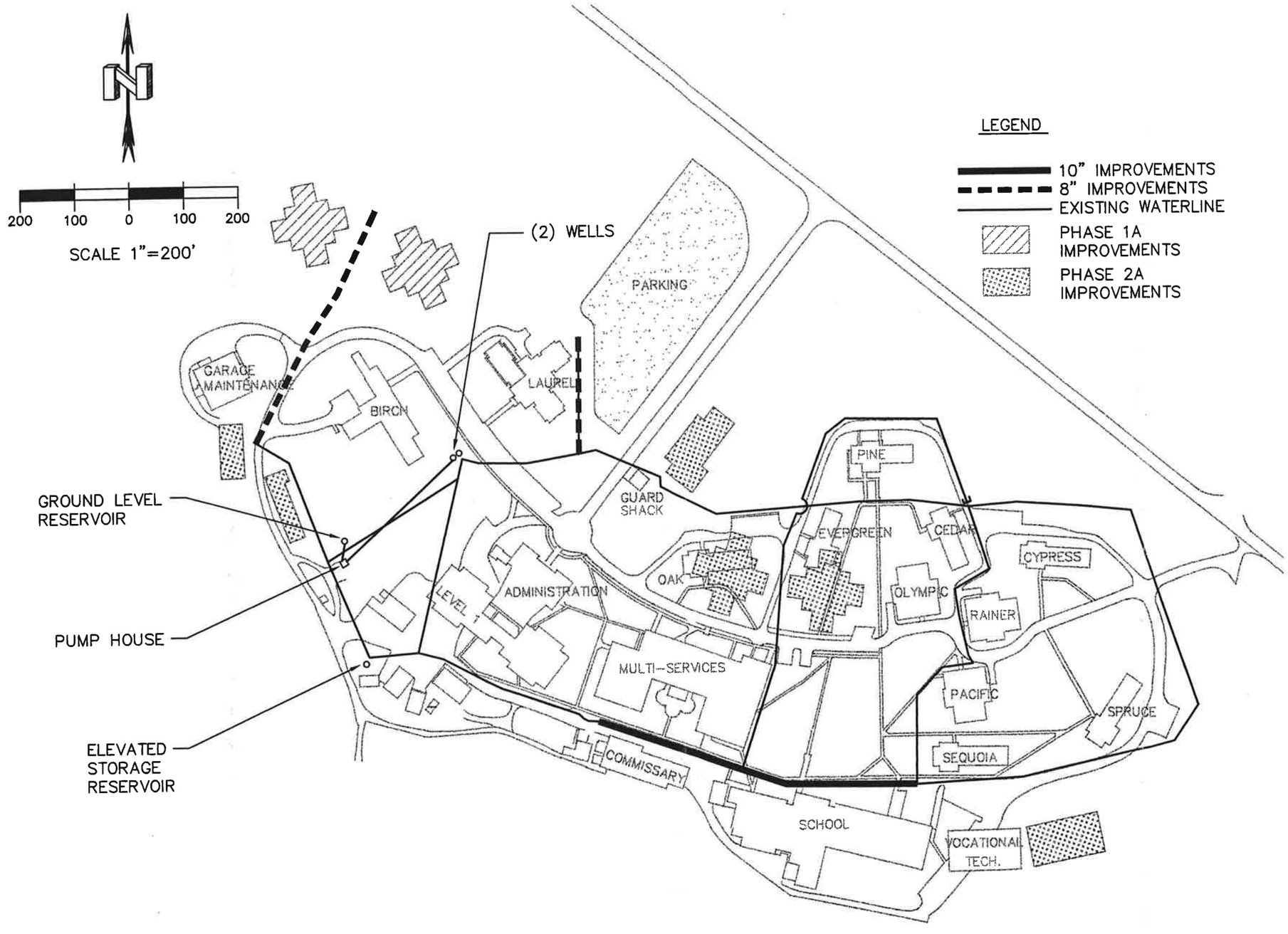
8-inch Improvements

When the new dorms are constructed to the northwest of the existing garage/maintenance building it is recommended that an 8-inch waterline be extended. The new 8-inch waterline will run from the existing garage/maintenance building approximately 350 feet. This will be capable of supplying 1,500 gpm with 30 psi residual to the new dorms.

An existing 6-inch waterline extends approximately 225 feet north from the existing 6-inch loop to the Laurel building. This line is not capable of providing 1,500 gpm with a 30 psi residual pressure. If it is necessary to provide fire protection off this line then an 8-inch waterline will need to be constructed from the existing 6-inch loop to the point at which fire protection is required (up to 225 feet).

Other Distribution System Improvements

There is very limited valving within the system which makes isolation for repair or new construction difficult. At a minimum, it is recommended that valves are strategically installed to allow school and administration building operation during maintenance or new construction activities. Additional valving may require up to two 10-inch valves,



MAPLE LANE SCHOOL

FIGURE V-2
RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

GIBBS & OLSON INC.
Engineers • Planners • Surveyors
LONGVIEW WASHINGTON

one 8-inch valve, four 6-inch valves and one 4-inch valve. Actual valve locations should be verified by school staff prior to installation.

CAPITAL IMPROVEMENT PROGRAM

The recommended capital improvements are listed in Table V-3. Implementation of the capital improvement program is anticipated to be done by DSHS as identified in Table V-3 but may be delayed depending upon the ability to receive funding from the Legislature. The cost presented are based upon estimated construction costs, plus 25 percent contingency, 8 percent tax, and 35 percent engineering and administration. Other recommendations, which are not summarized below, are water quality monitoring, conservation program, cross connection control program, and operation and maintenance program.

TABLE V-3
CAPITAL IMPROVEMENT PROGRAM SUMMARY

Description	Purpose	Year	Cost
1. Booster Pump Station	Future Demand	1999	$43,750
2. Install new 10-inch pipe	Fire flow	1999	$84,500
3. Install new 8-inch pipe	Fire Flow	1999	$70,500
4. Misc. Gate Valves (4" – 10")	Reliability	1999	
5. Corrosion Control Study *	Lead/Copper Rule	1998	$7,500
6. Corrosion Control Treatment **	Lead/Copper Rule	2000	$8,000
7. Irrigation System Analysis	Water Conservation	1998	N/A

*If required, may be partially completed by DOH (see Water Quality Analysis in this Section).

** May not be required (see Water Quality Analysis in this Section).

The Booster Pump Station improvements include $5,000 for two new pumps, $4,500 for pressure transducer and PLC, $12,000 for two pressure tanks, and $2,500 for miscellaneous piping and electrical. Cost for 10-inch pipe and 8-inch pipe assumes $65 and $60 per foot, respectively, which includes contingency, engineering, tax, and administration. The Corrosion Control Desktop Study is an estimate based upon G&O knowledge of the requirements of the study. Corrosion Control Treatment cost estimate assumes a chemical injection type treatment such as soda ash or caustic soda, which would be installed in the existing pump house.

Mission Creek Corrections Center for Women

Attachment A

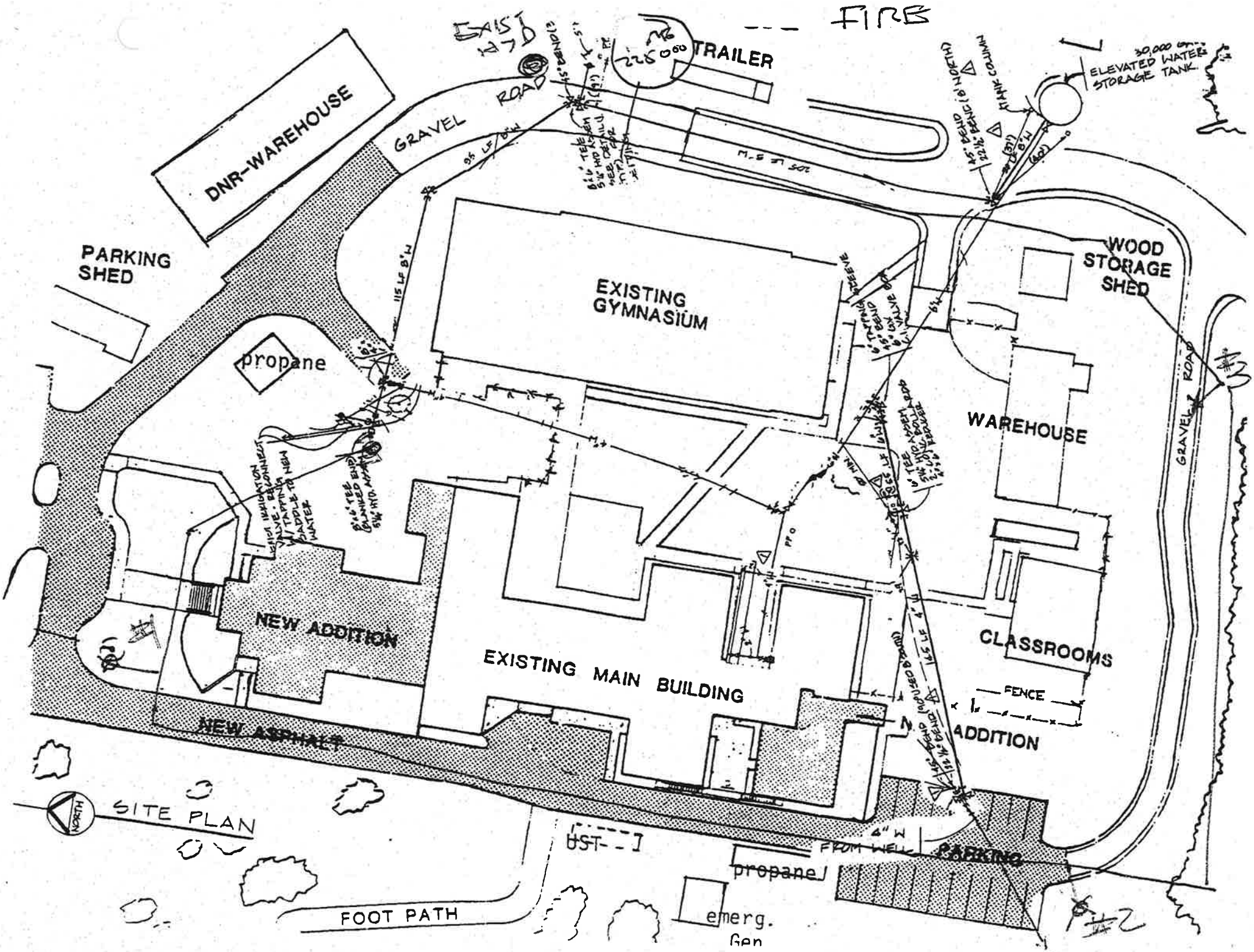
Pressure Testing Data Form									
Facility: MISSION CREEK CC									
Date: 3/1/05									
Initial Reservoir Levels: N/A									
Static Pressure at Highest Service Elevation (psi): 80 PSI STATIC AT JOCKEY PUMP									
	Flow Hydrant Data				Residual Hydrant Data				
Site No.	Hydrant Id.	Diameter (in)	Pitot Pressure (psi)	Flow (1) (gpm)	Hydrant Id.	Static Pressure (psi)	Residual Pressure (psi)	Reservoir Levels	Notes
1	1	2 1/2	60	1020	2	160	98		110 PSI STATIC W/PUMP
2	2	2 1/2	65	1070	3	103	95		*
3									
4									
5									
6									

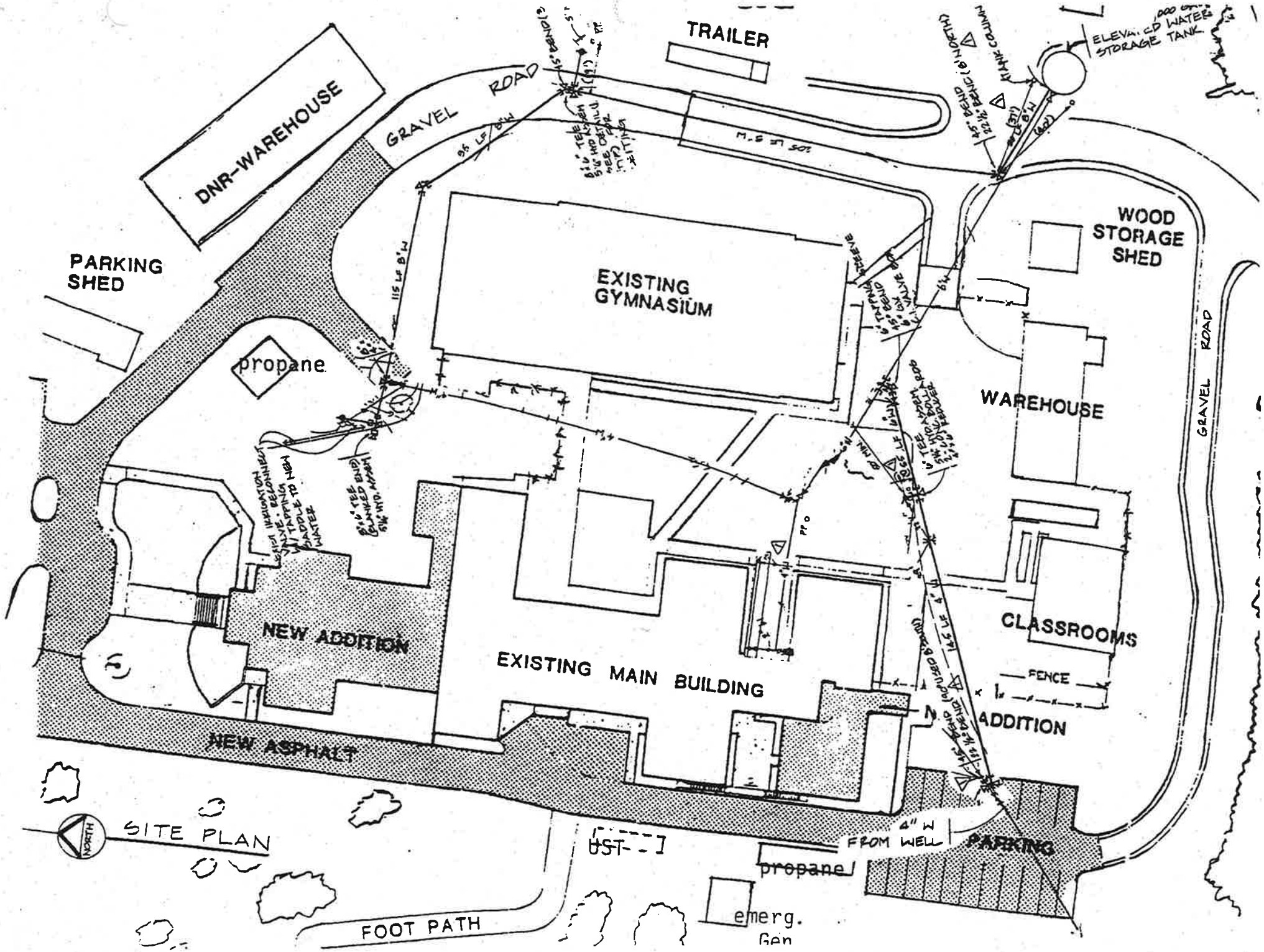
Notes:

(1) Calculated as Flow = 29.83 $Cd^2p^{1/2}$. Can also be obtained from discharge tables (Attachment B – to be provided prior to testing).

a. C = coefficient, with approximate value of 0.90
b. d = diameter, in inches
c. p = velocity (pitot) pressure, in psi

* RESIDUAL AT FIRE PUMP WITH FLOWING TEST 95 PSI


FIRE
EAST
ROAD
TRAILER
DNR-WAREHOUSE
GRAVEL ROAD
PARKING SHED
propane
EXISTING GYMNASIUM
WOOD STORAGE SHED
WAREHOUSE
GRAVEL ROAD
NEW ADDITION
EXISTING MAIN BUILDING
CLASSROOMS
FENCE
ADDITION
NEW ASPHALT
SITE PLAN
NORTH
UST
FROM WELL
PARKING
propane
FOOT PATH
emerg. Gen


TRAILER
DNR-WAREHOUSE
GRAVEL ROAD
PARKING SHED
EXISTING GYMNASIUM
WOOD STORAGE SHED
propane
WAREHOUSE
GRAVEL ROAD
NEW ADDITION
EXISTING MAIN BUILDING
CLASSROOMS
FENCE
ADDITION
NEW ASPHALT
NORTH
SITE PLAN
UST
FROM WELL
PARKING
propane
FOOT PATH
emerg.
Gen

McNeil Island Corrections Center

Department of Corrections
McNeil Island Corrections Center
Node Inventory

Node Label	Pressure Zone	Elevation (ft)	Demand (gpm)	Demand Pattern
J-1	293 Zone	65	0.65	AWWA
J-2	293 Zone	80	0.65	AWWA
J-3	293 Zone	70	0.65	AWWA
J-4	293 Zone	20	0.65	AWWA
J-5	293 Zone	40	0.65	AWWA
J-6	293 Zone	60	0.65	AWWA
J-7	293 Zone	185	0.65	AWWA
J-8	293 Zone	90	0.65	AWWA
J-9	293 Zone	35	0.65	AWWA
J-10	293 Zone	110	0.65	AWWA
J-11	293 Zone	75	0.65	AWWA
J-12	293 Zone	105	0.65	AWWA
J-13	Annex	185	0.76	AWWA
J-14	Tank	185	0.00	AWWA
J-15	Annex	118	0.76	AWWA
J-16	Annex	145	0.76	AWWA
J-17	293 Zone	160	0.65	AWWA
J-18	Annex	180	0.76	AWWA
J-19	Annex	170	0.76	AWWA
J-20	Annex	110	0.76	AWWA
J-21	Annex	118	0.76	AWWA
J-22	Annex	115	0.76	AWWA
J-23	Annex	125	0.76	AWWA
J-24	Annex	160	0.76	AWWA
J-25	Annex	122	0.76	AWWA
J-26	Annex	125	0.76	AWWA
J-27	293 Zone	175	0.65	AWWA
J-28	293 Zone	25	0.65	AWWA
J-29	293 Zone	0	0.65	AWWA
J-30	293 Zone	25	0.65	AWWA
J-31	293 Zone	95	0.65	AWWA
J-32	293 Zone	125	0.65	AWWA
J-33	293 Zone	123	0.65	AWWA
J-34	293 Zone	175	0.65	AWWA
J-35	293 Zone	155	0.65	AWWA
J-36	293 Zone	52	0.65	AWWA
J-37	99	210	0.00	AWWA
J-38	99	225	0.00	AWWA
J-39	293 Zone	55	0.65	AWWA
J-40	Main Inst	57	28.36	AWWA
J-41	Main Inst	62	28.36	AWWA
J-43	293 Zone	115	0.65	AWWA
J-44	Main Inst	105	28.36	AWWA
J-45	293 Zone	140	0.65	AWWA
J-46	Main Inst	68	28.36	AWWA
J-47	293 Zone	35	0.65	AWWA
J-48	293 Zone	55	0.65	AWWA
J-49	293 Zone	70	0.65	AWWA
J-50	293 Zone	20	0.65	AWWA

Department of Corrections
McNeil Island Corrections Center
Node Inventory

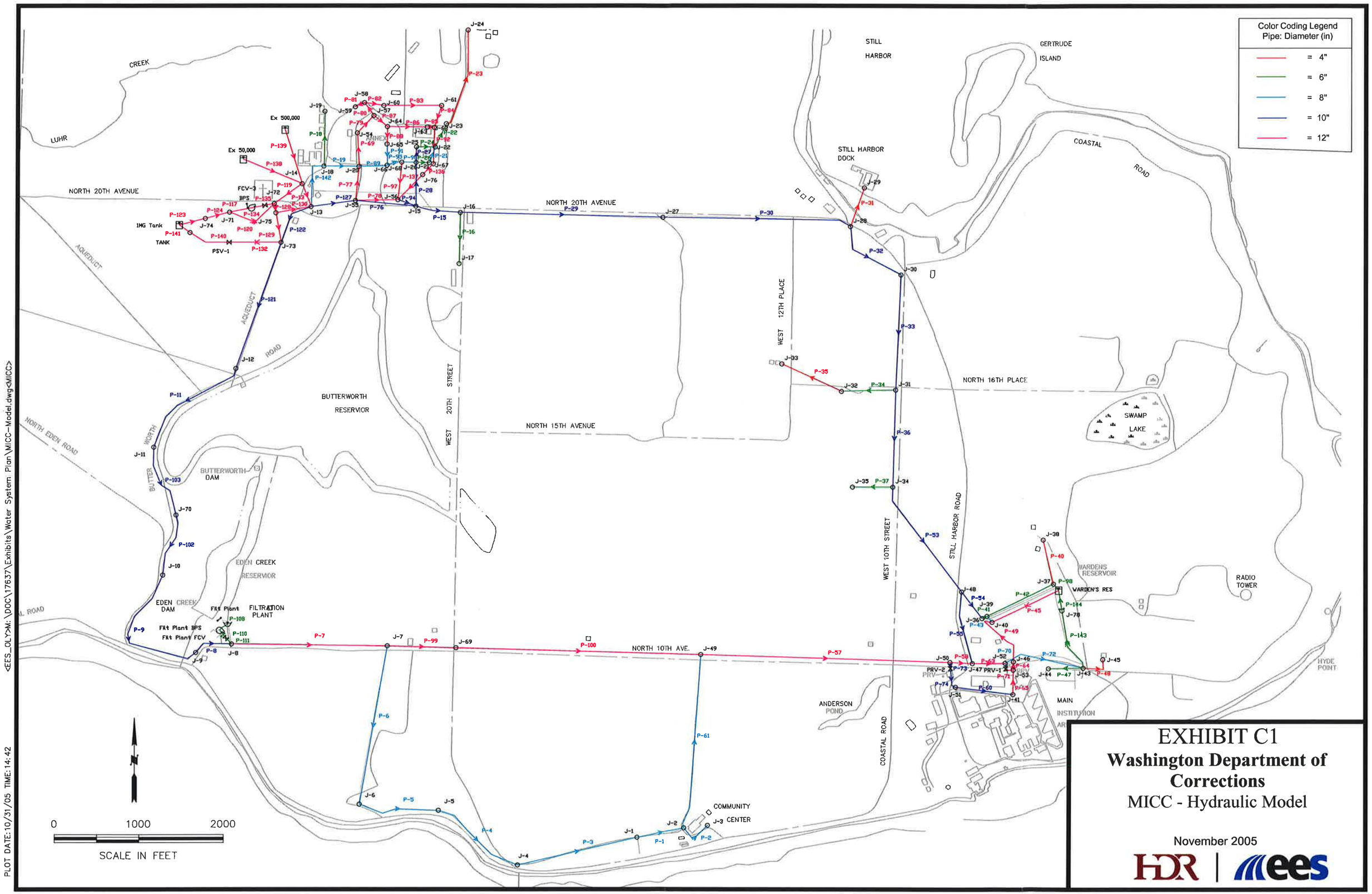
Node Label	Pressure Zone	Elevation (ft)	Demand (gpm)	Demand Pattern
J-51	Main Inst	30	28.36	AWWA
J-52	293 Zone	65	0.65	AWWA
J-53	Main Inst	65	28.36	AWWA
J-54	Annex	165	0.76	AWWA
J-55	Annex	95	0.76	AWWA
J-56	Annex	130	0.76	AWWA
J-57	Annex	135	0.76	AWWA
J-58	Annex	155	0.76	AWWA
J-59	Annex	150	0.76	AWWA
J-60	Annex	135	0.76	AWWA
J-61	Annex	145	0.76	AWWA
J-62	Annex	147	0.76	AWWA
J-63	Annex	148	0.76	AWWA
J-64	Annex	130	0.76	AWWA
J-65	Annex	130	0.76	AWWA
J-66	Annex	125	0.76	AWWA
J-67	Annex	110	0.76	AWWA
J-68	Annex	130	0.76	AWWA
J-69	293 Zone	170	0.65	AWWA
J-70	293 Zone	90	0.65	AWWA
J-71	Tank	185	0.00	AWWA
J-72	Tank	185	0.00	AWWA
J-73	Tank	185	0.00	AWWA
J-74	Tank	185	0.00	AWWA
J-75	Tank	185	0.00	AWWA
J-76	Annex	120	0.76	AWWA
TANK	Tank	288	0.00	AWWA
J-78	Tank	184	0.00	AWWA

Department of Corrections
McNeil Island Corrections Center
Pipe Inventory

Pipe Label	Length (ft)	Diameter (in)	Material	Roughness
P-1	574	8	PVC	150
P-2	416	8	PVC	150
P-3	1,456	8	PVC	150
P-4	1,174	8	PVC	150
P-5	966	8	PVC	150
P-6	1,906	8	PVC	150
P-7	1,849	12	Ductile Iron	130
P-8	475	10	Ductile Iron	130
P-9	1,770	10	Ductile Iron	130
P-11	1,425	10	Asbestos Cement	100
P-13	292	12	Ductile Iron	130
P-15	535	10	Asbestos Cement	100
P-16	608	6	Cast iron	130
P-18	652	6	Cast iron	130
P-19	417	8	Cast iron	130
P-21	199	8	Cast iron	130
P-22	307	6	Cast iron	130
P-23	1,195	4	Galvanized iron	120
P-24	222	6	Ductile Iron	130
P-26	157	6	Cast iron	130
P-27	185	10	Ductile Iron	130
P-28	519	10	Ductile Iron	130
P-29	2,406	10	Asbestos Cement	100
P-30	2,246	10	Ductile Iron	130
P-31	487	4	Cast iron	130
P-32	922	10	Ductile Iron	130
P-33	1,367	10	Cast iron	80
P-34	643	6	Cast iron	130
P-35	780	4	Cast iron	130
P-36	1,153	10	Cast iron	80
P-37	478	6	Cast iron	130
P-40	538	4	Cast iron	130
P-41	65	6	Ductile Iron	130
P-42	877	6	Asbestos Cement	140
P-43	92	8	Ductile Iron	130
P-45	875	12	Ductile Iron	130
P-47	405	6	Cast iron	130
P-48	359	4	Cast iron	130
P-49	737	12	Ductile Iron	130
P-53	1,520	10	Cast iron	80
P-54	399	10	Cast iron	80
P-55	871	10	Ductile Iron	130
P-57	2,965	12	Ductile Iron	130
P-58	267	12	Ductile Iron	130
P-60	684	10	Ductile Iron	130
P-61	2,080	8	PVC	150
P-63	387	12	Ductile Iron	130
P-64	99	12	Ductile Iron	130
P-65	290	12	Ductile Iron	130
P-69	400	12	Ductile Iron	130
P-70	63	8	Ductile Iron	130
P-71	106	12	Ductile Iron	130
P-72	968	8	Ductile Iron	130
P-73	71	10	Ductile Iron	130

Department of Corrections
McNeil Island Corrections Center
Pipe Inventory

Pipe Label	Length (ft)	Diameter (in)	Material	Roughness
P-74	250	10	Ductile Iron	130
P-76	718	10	Ductile Iron	130
P-77	407	12	Ductile Iron	130
P-78	502	12	Ductile Iron	130
P-79	284	12	Ductile Iron	130
P-80	190	12	Ductile Iron	130
P-81	120	12	Ductile Iron	130
P-82	231	12	Ductile Iron	130
P-83	682	12	Ductile Iron	130
P-84	274	12	Ductile Iron	130
P-85	83	12	Ductile Iron	130
P-86	470	12	Ductile Iron	130
P-87	207	12	Ductile Iron	130
P-88	207	12	Ductile Iron	130
P-89	333	8	Ductile Iron	130
P-91	252	8	Ductile Iron	130
P-92	432	12	Ductile Iron	130
P-94	226	10	Ductile Iron	130
P-95	181	8	Cast iron	130
P-96	169	8	Ductile Iron	130
P-97	449	12	Ductile Iron	130
P-98	98	6	Ductile Iron	130
P-99	814	12	Ductile Iron	130
P-100	2,912	12	Ductile Iron	130
P-102	755	10	Ductile Iron	130
P-103	890	10	Asbestos Cement	100
P-108	121	6	Ductile Iron	130
P-110	119	6	Ductile Iron	130
P-111	97	6	Ductile Iron	130
P-117	9	12	Ductile Iron	130
P-119	18	12	Ductile Iron	130
P-120	644	12	Ductile Iron	130
P-121	1,589	10	Asbestos Cement	100
P-122	609	10	Asbestos Cement	100
P-123	7	12	Ductile Iron	130
P-124	6	12	Ductile Iron	130
P-127	532	10	Cast iron	130
P-128	111	12	Ductile Iron	130
P-129	357	12	Ductile Iron	130
P-130	424	12	Ductile Iron	130
P-132	1	12	Ductile Iron	130
P-134	6	12	Ductile Iron	130
P-135	4	12	Ductile Iron	130
P-136	181	12	Ductile Iron	130
P-137	417	12	Ductile Iron	130
P-138	758	12	Ductile Iron	130
P-139	673	12	Ductile Iron	130
P-140	1	12	Ductile Iron	130
P-141	1	12	Ductile Iron	130
P-142	620	8	Cast iron	130
P-143	753	6	Cast iron	130
P-144	244	6	Cast iron	130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= 6"
= 8"
= 10"
= 12"
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LUHR
NORTH 20TH AVENUE
Ex 500,000
Ex 50,000
FCV-3
BPS
HMG Tank
TANK
PSV-1
AQUEDUCT
ROAD
NORTH EDEN ROAD
BUTTERWORTH RESERVIOR
BUTTERWORTH DAM
EDEN CREEK RESERVIOR
EDEN CREEK DAM
Fkt Plant
Fkt Plant BPS
Fkt Plant FCV
FILTRATION PLANT
ANNEX
NORTH 15TH AVENUE
NORTH 10TH AVE.
WEST 20TH STREET
WEST 12TH PLACE
WEST 10TH STREET
NORTH 16TH PLACE
STILL HARBOR
GERTRUDE ISLAND
STILL HARBOR DOCK
COASTAL ROAD
STILL HARBOR ROAD
SWAMP
LAKE
WARDENS RESERVOIR
WARDEN'S RES
RADIO TOWER
HYDE POINT
ANDERSON POND
COMMUNITY CENTER
MAIN INSTITUTION
PRV-1
PRV-2
0
1000
2000
SCALE IN FEET
N
EXHIBIT C1
Washington Department of Corrections
MICC - Hydraulic Model
November 2005
HDR | ees
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Olympic Corrections Center

Attachment A

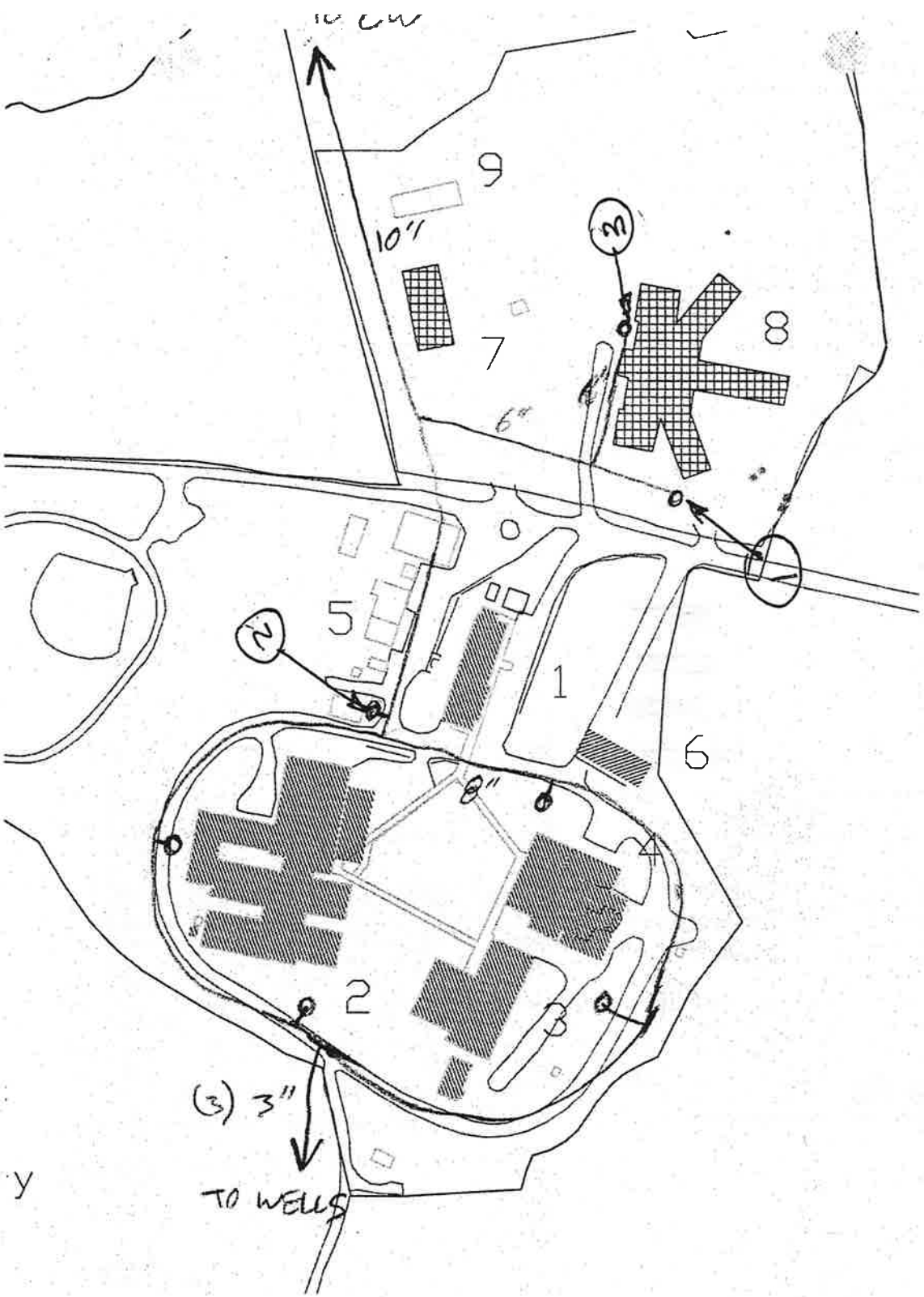
Pressure Testing Data Form									
Facility: OLYMPIC CORRECTIONS CENTER									
Date: 3/4/05									
Initial Reservoir Levels:									
Static Pressure at Highest Service Elevation (psi):									
	Flow Hydrant Data				Residual Hydrant Data				
Site No.	Hydrant Id.	Diameter (in)	Pitot Pressure (psi)	Flow (1) (gpm)	Hydrant Id.	Static Pressure (psi)	Residual Pressure (psi)	Reservoir Levels	Notes
1	1	2 1/2	65	1353 [redacted]	2	110	92		STATIC @ 1 112 PSI
2	3	2 1/2	725	1429 [redacted]	2	108	90		*
3	5	2 1/2	45	1126 [redacted]	4	88	72		
4	7	2 1/2	35	993 [redacted]	6	92	80		
5									
6									

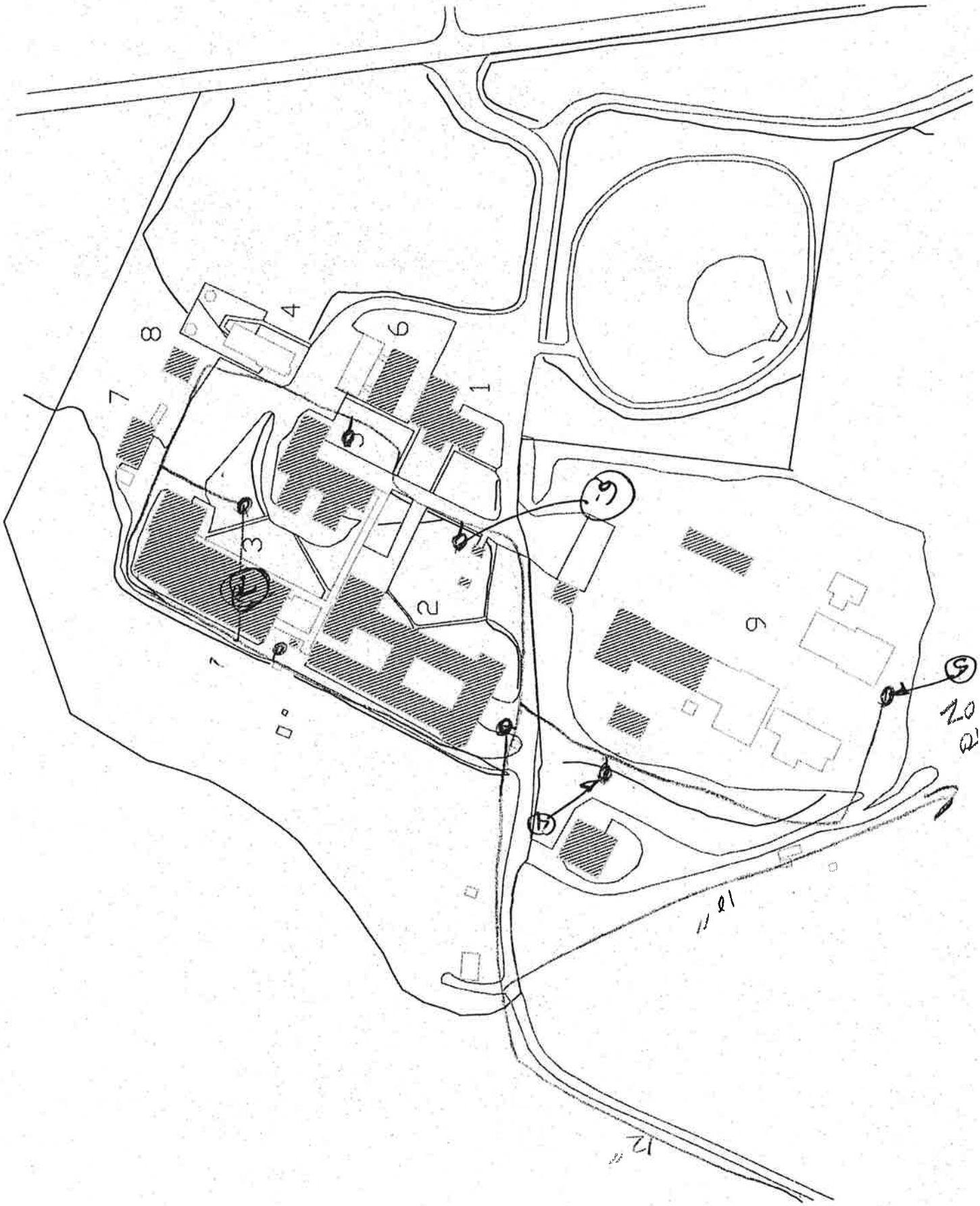
Notes:

(1) Calculated as Flow = 29.83 $Cd^2p^{1/2}$. Can also be obtained from discharge tables (Attachment B – to be provided prior to testing).

a. C = coefficient, with approximate value of 0.90
b. d = diameter, in inches
c. p = velocity (pitot) pressure, in psi

* ALL BUILDINGS REQUIRE PRESSURE REDUCING VALVE


9
10"
7
8
6"
5
1
6
2
(3) 3"
TO WELLS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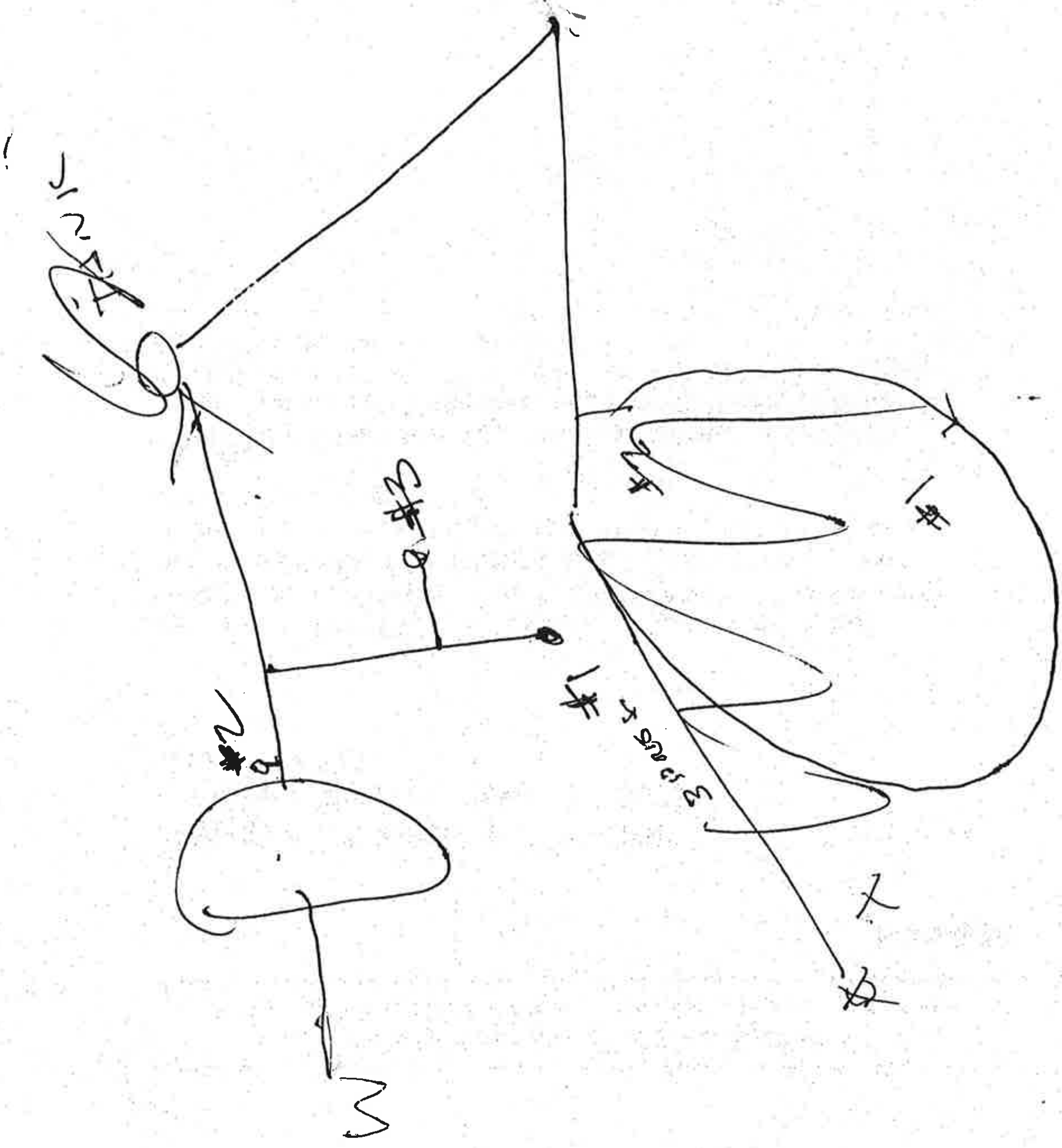

#1
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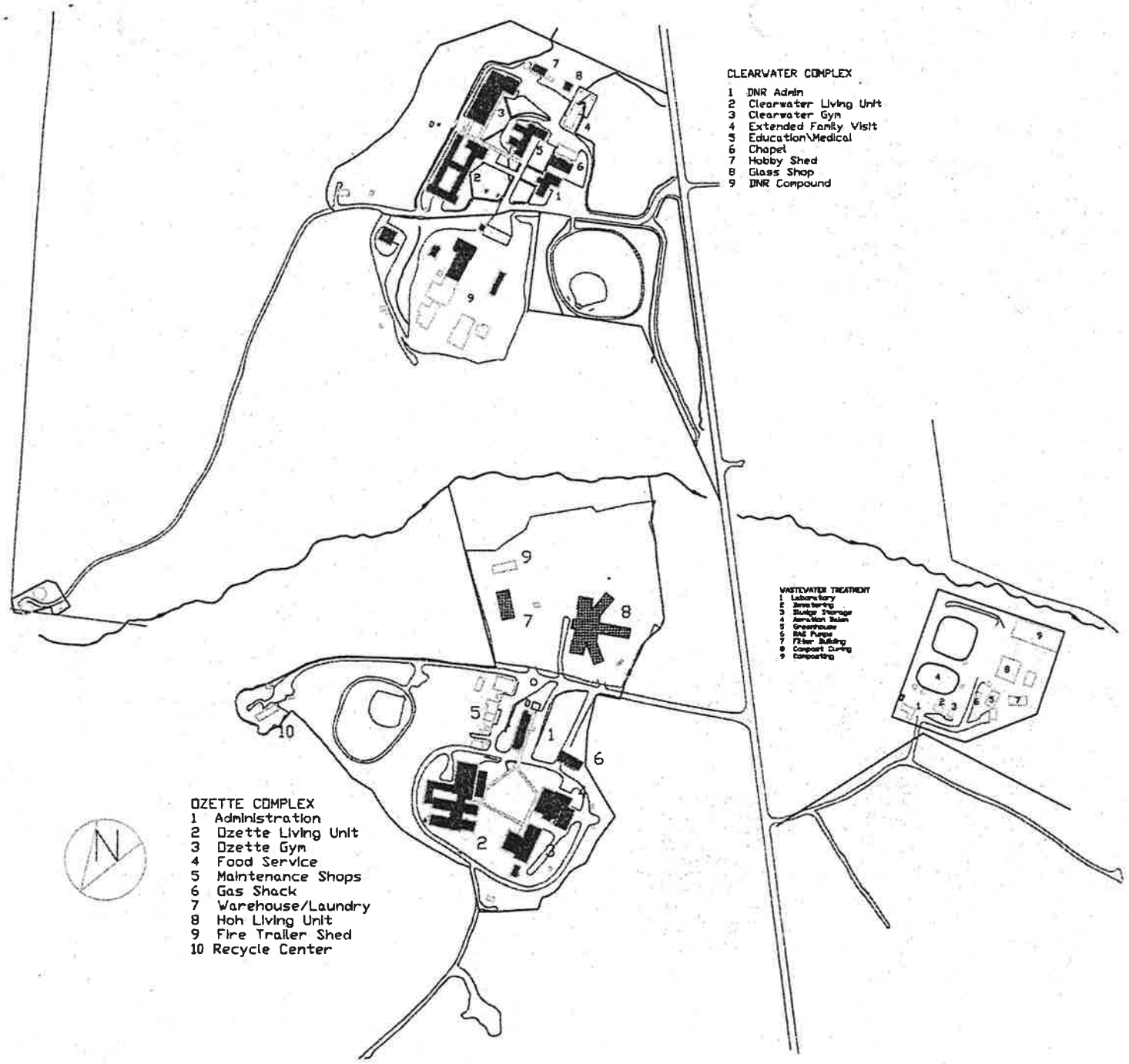
#2



OLYMPIC CORRECTIONS CENTER

Washington Corrections Center

Department of Corrections
Washington Corrections Center
Node Inventory

Node Label	Pressure Zone	Elevation (ft)	Demand (gpm)	Demand Pattern
J-2	Wells	280	0.00	AWWA Diurnal
J-3	Wells	283	0.00	AWWA Diurnal
J-4	Zone-1	295	2.84	AWWA Diurnal
J-5	Zone-1	296	2.84	AWWA Diurnal
J-6	Zone-1	298	2.84	AWWA Diurnal
J-7	Zone-1	297.5	2.84	AWWA Diurnal
J-8	Zone-1	296.5	2.84	AWWA Diurnal
J-9	Zone-1	295.5	2.84	AWWA Diurnal
J-10	Zone-1	280	2.84	AWWA Diurnal
J-11	Zone-1	282	2.84	AWWA Diurnal
J-12	Zone-1	285	2.84	AWWA Diurnal
J-13	Zone-1	287	2.84	AWWA Diurnal
J-14	Zone-1	279	2.84	AWWA Diurnal
J-15	Zone-1	295	2.84	AWWA Diurnal
J-16	Zone-1	296	2.84	AWWA Diurnal
J-17	Zone-1	297	2.84	AWWA Diurnal
J-18	Zone-1	298	2.84	AWWA Diurnal
J-19	Zone-1	299.5	2.84	AWWA Diurnal
J-20	Zone-1	299.5	2.84	AWWA Diurnal
J-21	Zone-1	300	2.84	AWWA Diurnal
J-22	Zone-1	300	2.84	AWWA Diurnal
J-23	Zone-1	301	2.84	AWWA Diurnal
J-24	Zone-1	301.5	2.84	AWWA Diurnal
J-25	Zone-1	302	2.84	AWWA Diurnal
J-26	Zone-1	302	2.84	AWWA Diurnal
J-27	Zone-1	300	2.84	AWWA Diurnal
J-28	Zone-1	299	2.84	AWWA Diurnal
J-29	Wells	280	0.00	AWWA Diurnal
J-30	Dead-End	303	2.84	AWWA Diurnal
J-31	Dead-End	303	2.84	AWWA Diurnal
J-32	Dead-End	303	2.84	AWWA Diurnal
J-33	Zone-1	300	2.84	AWWA Diurnal
J-34	Dead-End	301	2.84	AWWA Diurnal
J-35	Dead-End	297.5	2.84	AWWA Diurnal
J-36	Dead-End	296	2.84	AWWA Diurnal
J-38	Dead-End	295.5	2.84	AWWA Diurnal
J-39	Dead-End	296.5	2.84	AWWA Diurnal
J-40	Dead-End	300	2.84	AWWA Diurnal
J-41	Dead-End	300	2.84	AWWA Diurnal
J-42	Dead-End	300	2.84	AWWA Diurnal
J-43	Dead-End	298.5	2.84	AWWA Diurnal
J-44	Dead-End	298.5	2.84	AWWA Diurnal
J-45	Zone-1	299.5	2.84	AWWA Diurnal
J-46	Dead-End	300	2.84	AWWA Diurnal
J-47	Zone-1	296	2.84	AWWA Diurnal
J-48	Zone-1	295.5	2.84	AWWA Diurnal
J-49	Zone-1	295.5	2.84	AWWA Diurnal
J-50	Zone-1	295.5	2.84	AWWA Diurnal
J-51	Dead-End	285	2.84	AWWA Diurnal
J-52	Zone-1	285	2.84	AWWA Diurnal
J-53	Dead-End	295	2.84	AWWA Diurnal
J-54	Dead-End	299	2.84	AWWA Diurnal
J-55	Dead-End	298.5	2.84	AWWA Diurnal
J-56	Zone-1	295	2.84	Fixed

Department of Corrections
Washington Corrections Center
Pipe Inventory

Pipe Label	Length (ft)	Diameter (in)	Material	Roughness
P-2	334	6	Ductile Iron	100
P-5	608	14	Ductile Iron	100
P-6	148	10	Ductile Iron	100
P-7	731	10	Ductile Iron	100
P-9	403	10	Ductile Iron	100
P-10	122	10	Ductile Iron	100
P-11	344	10	Ductile Iron	100
P-13	668	10	Ductile Iron	100
P-14	551	10	Ductile Iron	100
P-15	174	10	Ductile Iron	100
P-16	245	10	Ductile Iron	100
P-17	176	10	Ductile Iron	100
P-18	545	12	Ductile Iron	100
P-19	43	12	Ductile Iron	100
P-21	26	12	Ductile Iron	100
P-22	150	12	Ductile Iron	100
P-23	87	12	Ductile Iron	100
P-24	88	12	Ductile Iron	100
P-25	146	12	Ductile Iron	100
P-26	214	12	Ductile Iron	100
P-28	247	12	Ductile Iron	100
P-29	70	8	Ductile Iron	100
P-33	164	14	Ductile Iron	100
P-34	40	6	Ductile Iron	100
P-35	491	6	Ductile Iron	100
P-36	1257	6	Ductile Iron	100
P-37	127	4	Ductile Iron	100
P-38	128	4	Ductile Iron	100
P-39	24	12	Ductile Iron	100
P-40	294	12	Ductile Iron	100
P-41	128	4	Ductile Iron	100
P-42	295	3	Ductile Iron	100
P-43	295	3	Ductile Iron	100
P-45	117	5	Ductile Iron	100
P-46	140	4	Ductile Iron	100
P-47	247	4	Ductile Iron	100
P-48	167	3	Ductile Iron	100
P-49	164	4	Ductile Iron	100
P-50	461	6	Ductile Iron	100
P-51	149	4	Ductile Iron	100
P-52	78	12	Ductile Iron	100
P-53	121	12	Ductile Iron	100
P-54	99	6	Ductile Iron	100
P-55	149	14	Ductile Iron	100
P-56	115	14	Ductile Iron	100
P-57	108	8	Ductile Iron	100
P-58	120	8	Ductile Iron	100
P-59	355	10	Ductile Iron	100
P-60	91	10	Ductile Iron	100
P-61	608	6	Ductile Iron	100
P-62	182	10	Ductile Iron	100
P-63	163	10	Ductile Iron	100
P-64	157	3	Ductile Iron	100
P-65	138	3	Ductile Iron	100
P-66	238	3	Ductile Iron	100
P-67	20	8	Ductile Iron	100
P-68	30	8	Ductile Iron	100
P-69	40	8	Ductile Iron	100
P-70	40	8	Ductile Iron	100
P-71	114	8	Ductile Iron	100
P-73	287	12	Ductile Iron	130
P-74	506	8	Ductile Iron	130
P-75	203	8	Ductile Iron	130
P-76	247	12	Ductile Iron	130

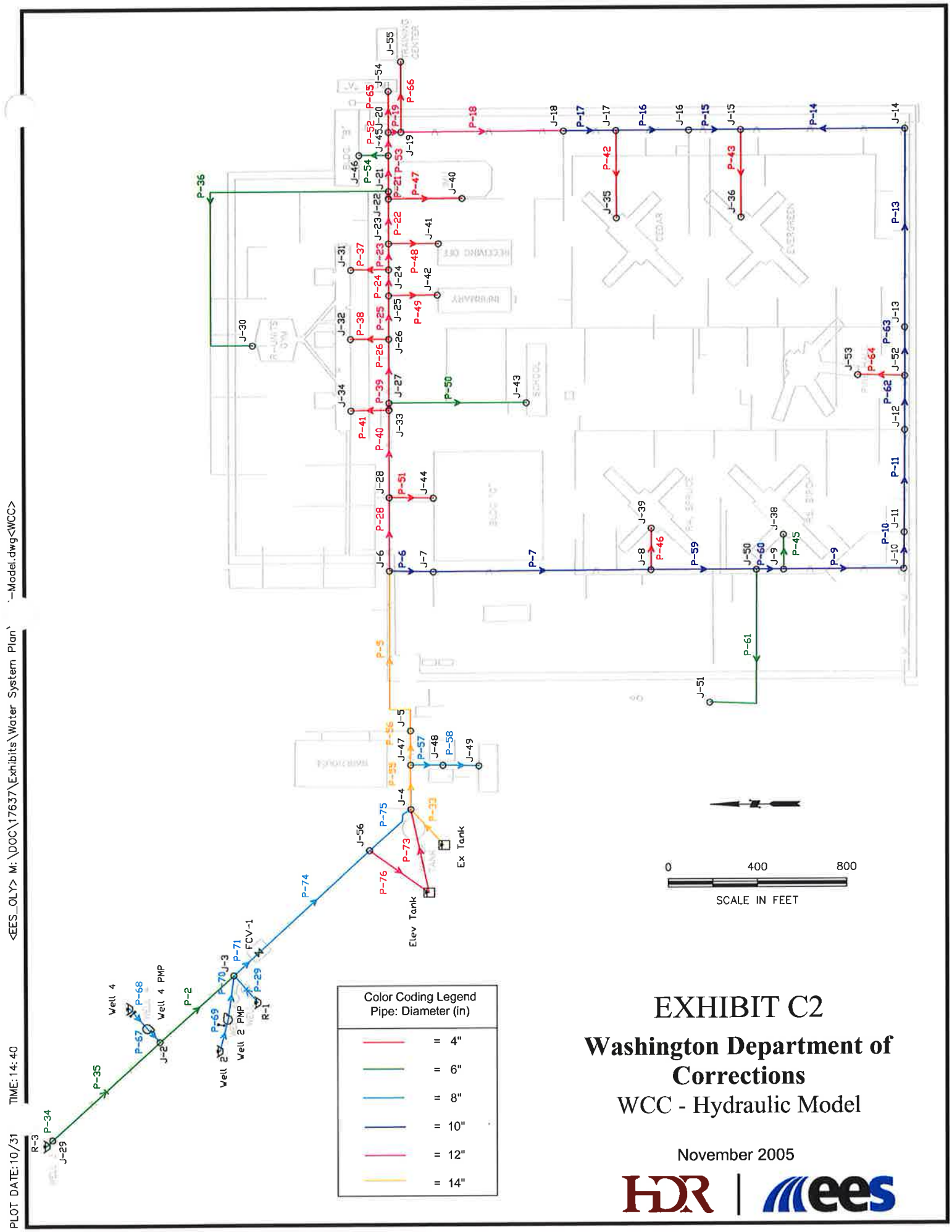


EXHIBIT C2

Washington Department of Corrections

WCC - Hydraulic Model

November 2005

HDR | ees

Washington Corrections Center for Women

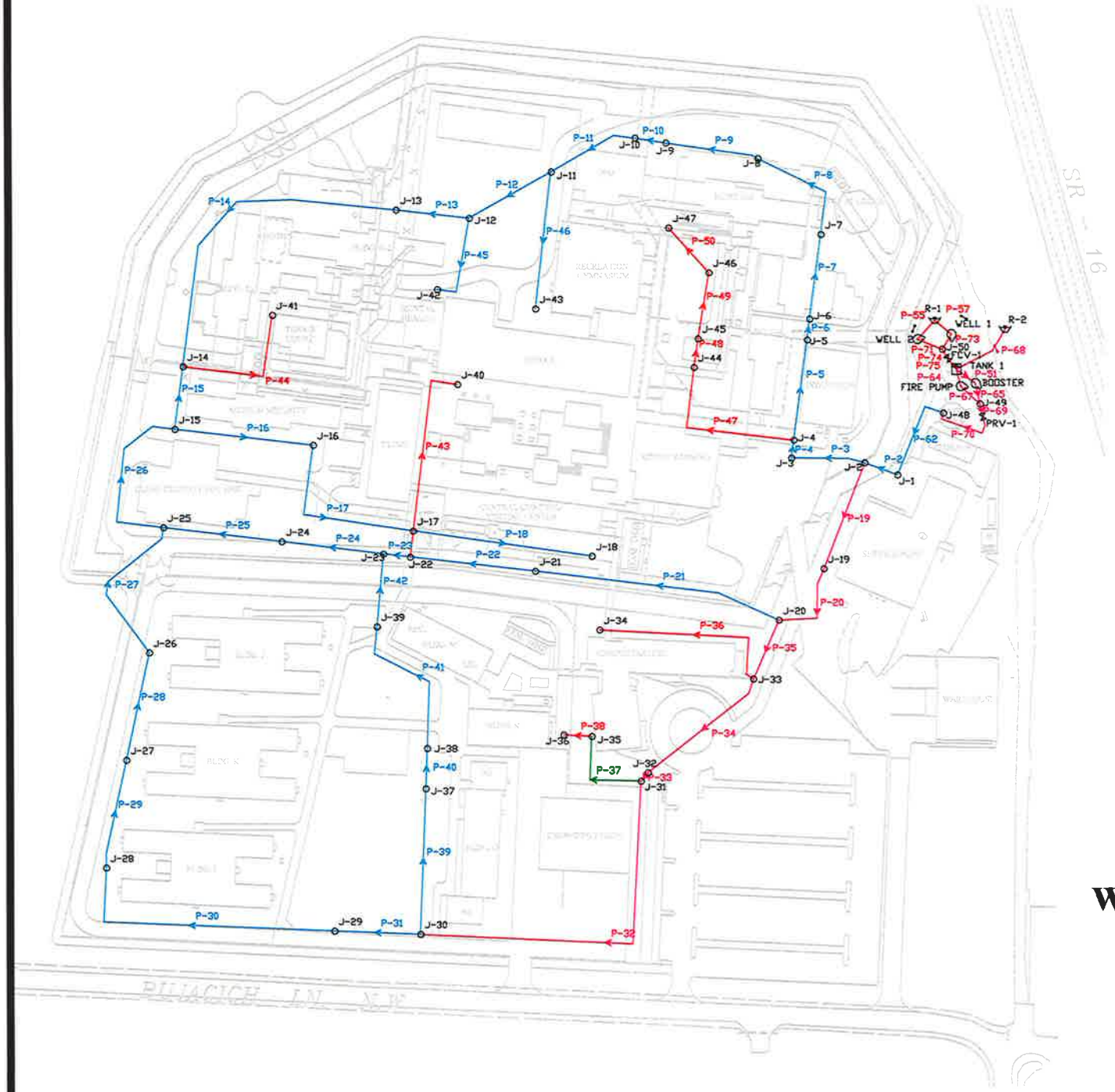
Department of Corrections
Washington Corrections Center for Women
Node Inventory

Node Label	Pressure Zone	Elevation (ft)	Demand (gpm)	Demand Pattern
J-1	Zone-1	320	1.40	AWWA
J-2	Zone-1	320	1.40	AWWA
J-3	Zone-1	320	1.40	AWWA
J-4	Zone-1	320	1.40	AWWA
J-5	Zone-1	320	1.40	AWWA
J-6	Zone-1	320	1.40	AWWA
J-7	Zone-1	320	1.40	AWWA
J-8	Zone-1	320	1.40	AWWA
J-9	Zone-1	320	1.40	AWWA
J-10	Zone-1	320	1.40	AWWA
J-11	Zone-1	320	1.40	AWWA
J-12	Zone-1	320	1.40	AWWA
J-13	Zone-1	320	1.40	AWWA
J-14	Zone-1	320	1.40	AWWA
J-15	Zone-1	320	1.40	AWWA
J-16	Zone-1	320	1.40	AWWA
J-17	Zone-1	320	1.40	AWWA
J-18	Zone-1	320	1.40	AWWA
J-19	Zone-1	320	1.40	AWWA
J-20	Zone-1	320	1.40	AWWA
J-21	Zone-1	320	1.40	AWWA
J-22	Zone-1	320	1.40	AWWA
J-23	Zone-1	320	1.40	AWWA
J-24	Zone-1	320	1.40	AWWA
J-25	Zone-1	320	1.40	AWWA
J-26	Zone-1	320	1.40	AWWA
J-27	Zone-1	320	1.40	AWWA
J-28	Zone-1	320	1.40	AWWA
J-29	Zone-1	320	1.40	AWWA
J-30	Zone-1	320	1.40	AWWA
J-31	Zone-1	320	1.40	AWWA
J-32	Zone-1	320	1.40	AWWA
J-33	Zone-1	320	1.40	AWWA
J-34	Dead Ends	320	1.40	AWWA
J-35	Zone-1	320	1.40	AWWA
J-36	Dead Ends	320	1.40	AWWA
J-37	Zone-1	320	1.40	AWWA
J-38	Zone-1	320	1.40	AWWA
J-39	Zone-1	320	1.40	AWWA
J-40	Dead Ends	320	1.40	AWWA
J-41	Dead Ends	320	1.40	AWWA
J-42	Zone-1	320	1.40	AWWA
J-43	Zone-1	320	1.40	AWWA
J-44	Dead Ends	320	1.40	AWWA
J-45	Dead Ends	320	1.40	AWWA
J-46	Dead Ends	320	1.40	AWWA
J-47	Dead Ends	320	1.40	AWWA
J-48	Tanks	320	0.00	AWWA
J-49	Tanks	320	0.00	AWWA
J-50	Tanks	0	0.00	Fixed

Department of Corrections
Washington Corrections Center for Women
Pipe Inventory

Pipe Label	Length (ft)	Diameter (In)	Material	Roughness
P-2	46	8	Ductile Iron	130
P-3	98	8	Ductile Iron	130
P-4	24	8	Ductile Iron	130
P-5	134	8	Ductile Iron	130
P-6	28	8	Ductile Iron	130
P-7	113	8	Ductile Iron	130
P-8	158	8	Ductile Iron	130
P-9	124	8	Ductile Iron	130
P-10	42	8	Ductile Iron	130
P-11	125	8	Ductile Iron	130
P-12	125	8	Ductile Iron	130
P-13	98	8	Ductile Iron	130
P-14	453	8	Ductile Iron	130
P-15	84	8	Ductile Iron	130
P-16	186	8	Ductile Iron	130
P-17	241	8	Ductile Iron	130
P-18	240	8	Ductile Iron	130
P-19	151	10	Ductile Iron	130
P-20	119	10	Ductile Iron	130
P-21	333	8	Ductile Iron	130
P-22	167	8	Ductile Iron	130
P-23	36	8	Ductile Iron	130
P-24	136	8	Ductile Iron	130
P-25	159	8	Ductile Iron	130
P-26	239	8	Ductile Iron	130
P-27	221	8	Ductile Iron	130
P-28	146	8	Ductile Iron	130
P-29	146	8	Ductile Iron	130
P-30	380	8	Ductile Iron	130
P-31	114	8	Ductile Iron	130
P-32	498	10	Ductile Iron	130
P-33	15	10	Ductile Iron	130
P-34	191	10	Ductile Iron	130
P-35	85	10	Ductile Iron	130
P-36	258	3	Galvanized iron	120
P-37	126	6	Ductile Iron	130
P-38	37	4	Galvanized iron	120
P-39	194	8	Ductile Iron	130
P-40	53	8	Ductile Iron	130
P-41	206	8	Ductile Iron	130
P-42	97	8	Ductile Iron	130
P-43	272	4	Galvanized iron	120
P-44	189	2	Galvanized iron	120
P-45	125	8	Ductile Iron	130
P-46	183	8	Ductile Iron	130
P-47	224	4	Galvanized iron	120
P-48	38	2	Galvanized iron	120
P-49	89	2	Galvanized iron	120
P-50	80	1	Galvanized iron	120
P-51	32	10	Ductile Iron	130
P-55	34	4	Ductile Iron	130
P-57	28	4	Ductile Iron	130
P-62	124	8	Ductile Iron	130
P-64	23	10	Ductile Iron	130
P-65	28	10	Ductile Iron	130
P-67	35	10	Ductile Iron	130
P-68	87	12	Ductile Iron	130
P-69	17	10	Ductile Iron	130
P-70	87	10	Ductile Iron	130
P-71	36	4	Ductile Iron	130
P-73	23	4	Ductile Iron	130
P-74	14	4	Ductile Iron	130
P-75	18	4	Ductile Iron	130

PLOT DATE: 10/31 TIME: 14: 39 <EES_OLY> M: \DOC\17637\Exhibits\Water System Plan\ W-Model.dwg<WCCW>



Color Coding Legend
Pipe: Diameter (in)

= 4"
= 6"
= 8"
= 10"
= 12"
= 18"

N

0 200 400

SCALE IN FEET

EXHIBIT C3

Washington Department of Corrections

WCCW - Hydraulic Model

November 2005

HDR | ees

C-10
Fire Authority
Correspondence

February 10, 2005

Mr. David Lynam
Clark County Fire Marshall
505 NW 179th Street
Ridgefield, WA 98642

Subject: Request for Confirmation of Fire Flow Requirements and Approval of Nesting
Washington State Department of Corrections Water System Plan Update
HDR 17637/EES 2-03-355 /3

Dear Mr. Lynam:

The Washington State Department of Corrections (DOC) is in the process of updating its statewide Water System Plan (WSP). One of the facilities included in this update is the Larch Corrections Center (LCC), located in Clark County. As a part of the WSP update, we are analyzing the ability of LCC's water system to meet fire flow requirements. Regarding this effort, we are requesting confirmation that the fire flow requirements that DOC has been using in the recent past for LCC are still valid. Furthermore, we are requesting approval of nesting (i.e., consolidating) standby storage with fire suppression storage. These items are described in more detail below.

LCC has a storage volume of 160,000 gallons. This is used to meet equalizing, standby, and fire suppression storage requirements. Equalizing storage is the amount required to meet daily fluctuations in water demand. Standby storage is essentially the amount of storage needed to meet demands when the largest water supply source is inoperable. Fire suppression storage is the quantity needed to meet fire flow requirements. The fire flow requirements that have been used for LCC in the recent past are a flow of 1,000 gallons per minute for a duration of 2 hours. This equates to a defined fire suppression storage requirement of 120,000 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for LCC are:

Equalizing	12,289 gallons
Standby	34,783 gallons
Fire Suppression	120,000 gallons
Total	167,072 gallons

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As you can see, the total requirement is slightly greater than the available storage. Therefore, we are requesting an allowance to enable "nesting" of standby and fire suppression storage. This essentially means that the larger volume (i.e., fire suppression) would be taken as the requirement, and it would be acknowledged that standby storage (the smaller of the two volumes) would be drawn from the fire suppression storage (but only during those times when the largest source is out of service). Washington Administrative Code (WAC) 246-290-235(4) allows for this, by stating: "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive."

If nesting is allowed in the case of LCC, the available storage is sufficient to meet storage requirements and to allow for some facility expansion. We are therefore requesting approval of nesting in this situation. Please respond by letter, which will then be included in the WSP update. Please feel free to contact me at (360) 352-5090 if you require any additional information or have other questions. Thank you for your time and attention to this matter.

Sincerely,

Jeffrey M. Hansen

Jeffrey M. Hansen, P.E.
Project Engineer

JMH:sc:DOC

February 10, 2005

Mr. Joseph Butler
Thurston County Fire Marshall
Thurston County Development Services
2000 Lakeridge Dr.
Olympia, WA 98502

Subject: Request for Confirmation of Fire Flow Requirements and Approval of Nesting
Washington State Department of Corrections Water System Plan Update
HDR 17637/EES 2-03-355 /3

Dear Mr. Butler:

The Washington State Department of Corrections (DOC) is in the process of updating its statewide Water System Plan (WSP). One of the facilities included in this update is the Cedar Creek Corrections Center (CCCC), located in Thurston County. As a part of the WSP update, we are analyzing the ability of CCCC's water system to meet fire flow requirements. Regarding this effort, we are requesting confirmation that the fire flow requirements that DOC has been using in the recent past for CCCC are still valid. Furthermore, we are requesting approval of nesting (i.e., consolidating) standby storage with fire suppression storage. These items are described in more detail below.

CCCC has a storage volume of 173,000 gallons. This is used to meet equalizing, standby, and fire suppression storage requirements. Equalizing storage is the amount required to meet daily fluctuations in water demand. Standby storage is essentially the amount of storage needed to meet demands when the largest water supply source is inoperable. Fire suppression storage is the quantity needed to meet fire flow requirements. The fire flow requirements that have been used for CCCC in the recent past are a flow of 1,810 gallons per minute for a duration of 1 hour. This equates to a defined fire suppression storage requirement of 108,600 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for CCCC are:

Equalizing	14,280 gallons
Standby	34,783 gallons
Fire Suppression	108,600 gallons
Total	157,663 gallons

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As you can see, the existing storage is sufficient to meet these requirements. However, future expansion of the facility may be limited by storage, as equalizing and standby storage are a function of population. Therefore, we are requesting an allowance to enable "nesting" of standby and fire suppression storage. This essentially means that the larger volume (i.e., fire suppression) would be taken as the requirement, and it would be acknowledged that standby storage (the smaller of the two volumes) would be drawn from the fire suppression storage (but only during those times when the largest source is out of service). Washington Administrative Code (WAC) 246-290-235(4) allows for this, by stating: "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive."

If nesting is allowed in the case of CCCC, the available storage is sufficient to meet storage requirements under facility expansion. We are therefore requesting approval of nesting in this situation. Please respond by letter, which will then be included in the WSP update. Please feel free to contact me at (360) 352-5090 if you require any additional information or have other questions. Thank you for your time and attention to this matter.

Sincerely,

Jeffrey M. Hansen

Jeffrey M. Hansen, P.E.
Project Engineer

JMH:sc:DOC

February 10, 2005

Mr. Dave Salzer
Assistant City of Shelton Fire Chief and Interim Mason County Fire Marshall
City of Shelton City Hall
525 West Cota Street
Shelton, WA 98584

Subject: Request for Confirmation of Fire Flow Requirements and Approval of Nesting
Washington State Department of Corrections Water System Plan Update
HDR 17637/EES 2-03-355 /3

Dear Mr. Salzer:

The Washington State Department of Corrections (DOC) is in the process of updating its statewide Water System Plan (WSP). One of the facilities included in this update is the Washington Corrections Center (WCC), located in Mason County. As a part of the WSP update, we are analyzing the ability of WCC's water system to meet fire flow requirements. Regarding this effort, we are requesting confirmation that the fire flow requirements that DOC has been using in the recent past for WCC are still valid. Furthermore, we are requesting approval of nesting (i.e., consolidating) standby storage with fire suppression storage. I was referred to you by Steve Swarthout (State Fire Marshall's office) as the person who can most likely address these questions. These items are described in more detail below.

WCC has a storage volume of 730,000 gallons. This is used to meet equalizing, standby, and fire suppression storage requirements. Equalizing storage is the amount required to meet daily fluctuations in water demand. Standby storage is essentially the amount of storage needed to meet demands when the largest water supply source is inoperable. Fire suppression storage is the quantity needed to meet fire flow requirements. The fire flow requirements that have been used for WCC in the recent past are a flow of 3,750 gallons per minute for a duration of 3 hours. This equates to a defined fire suppression storage requirement of 675,000 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for WCC are:

Equalizing	38,524 gallons
Standby	164,696 gallons
Fire Suppression	675,000 gallons
Total	878,220 gallons

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Fax: (360) 357-6573
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As you can see, the total requirement is greater than the available storage. Therefore, we are requesting an allowance to enable "nesting" of standby and fire suppression storage. This essentially means that the larger volume (i.e., fire suppression) would be taken as the requirement, and it would be acknowledged that standby storage (the smaller of the two volumes) would be drawn from the fire suppression storage (but only during those times when the largest source is out of service). Washington Administrative Code (WAC) 246-290-235(4) allows for this, by stating: "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." Nesting was previously approved during the design of the newest storage facility at WCC in 2002; we are looking for written approval in this case.

If nesting is allowed in the case of WCC, the available storage is sufficient to meet storage requirements and to allow for some facility expansion. We are therefore requesting approval of nesting in this situation. Please respond by letter, which will then be included in the WSP update. Please feel free to contact me at (360) 352-5090 if you require any additional information or have other questions. Thank you for your time and attention to this matter.

Sincerely,

Jeffrey M. Hansen

Jeffrey M. Hansen, P.E.
Project Engineer

JMH:sc:DOC

February 10, 2005

Mr. Wayne Wienholz
Pierce County Fire Marshall
Pierce County Fire Prevention Bureau
2401 S. 35th Street, Room 2
Tacoma, WA 98409-7494

Subject: Request for Confirmation of Fire Flow Requirements and Approval of Nesting
Washington State Department of Corrections Water System Plan Update
HDR 17637/EES 2-03-355 /3

Dear Mr. Wienholz:

The Washington State Department of Corrections (DOC) is in the process of updating its statewide Water System Plan (WSP). Two of the facilities included in this update are the McNeil Island Corrections Center (MICC) and the Washington Corrections Center for Women (WCCW), located in Pierce County. As a part of the WSP update, we are analyzing the ability of these water systems to meet fire flow requirements. Regarding this effort, we are requesting confirmation that the fire flow requirements that DOC has been using in the recent past for MICC and WCCW are still valid. Furthermore, we are requesting approval of nesting (i.e., consolidating) standby storage with fire suppression storage. These items are described in more detail below.

MICC has a storage volume of 1,680,000 gallons. This is used to meet equalizing, standby, and fire suppression storage requirements. Equalizing storage is the amount required to meet daily fluctuations in water demand. Standby storage is essentially the amount of storage needed to meet demands when the largest water supply source is inoperable. Fire suppression storage is the quantity needed to meet fire flow requirements. The fire flow requirements that have been used for MICC in the recent past are a flow of 2,750 gallons per minute (gpm) for a duration of 3 hours. This equates to a defined fire suppression storage requirement of 495,000 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for MICC are:

Equalizing	79,831 gallons
Standby	401,664 gallons
Fire Suppression	495,000 gallons
Total	976,495 gallons

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WCCW has a storage volume of 300,000 gallons. The fire flow requirements that have been used for WCCW in the recent past are a flow of 1,500 gpm for a duration of 1.5 hours. This equates to a defined fire suppression storage requirement of 156,000 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for WCCW are:

Equalizing	25,163 gallons
Standby	78,435 gallons
Fire Suppression	156,000 gallons
Total	259,598 gallons

As you can see, the existing storage is sufficient to meet the requirements in both instances. However, future expansion of the facilities may be limited by storage, as equalizing and standby storage are a function of population. Therefore, we are requesting an allowance to enable "nesting" of standby and fire suppression storage. This essentially means that the larger volume (i.e., fire suppression) would be taken as the requirement, and it would be acknowledged that standby storage (the smaller of the two volumes) would be drawn from the fire suppression storage (but only during those times when the largest source is out of service). Washington Administrative Code (WAC) 246-290-235(4) allows for this, by stating: "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive."

If nesting is allowed in the cases of MICC and WCCW, the available storage is sufficient to meet storage requirements under facility expansion. We are therefore requesting approval of nesting in these situations. Please respond by letter, which will then be included in the WSP update. Please feel free to contact me at (360) 352-5090 if you require any additional information or have other questions. Thank you for your time and attention to this matter.

Sincerely,

Jeffrey M. Hansen

Jeffrey M. Hansen, P.E.
Project Engineer

JMH:sc:DOC

February 10, 2005

Mr. Al Scalf
Jefferson County Fire Marshall
Jefferson County Department of Community Development
621 Sheridan Street
Port Townsend, WA 98368

Subject: Request for Confirmation of Fire Flow Requirements and Approval of Nesting
Washington State Department of Corrections Water System Plan Update
HDR 17637/EES 2-03-355 /3

Dear Mr. Scalf:

The Washington State Department of Corrections (DOC) is in the process of updating its statewide Water System Plan (WSP). One of the facilities included in this update is the Olympic Corrections Center (OCC), located in Jefferson County. As a part of the WSP update, we are analyzing the ability of OCC's water system to meet fire flow requirements. Regarding this effort, we are requesting confirmation that the fire flow requirements that DOC has been using in the recent past for OCC are still valid. Furthermore, we are requesting approval of nesting (i.e., consolidating) standby storage with fire suppression storage. These items are described in more detail below.

OCC has a storage volume of 675,000 gallons. This is used to meet equalizing, standby, and fire suppression storage requirements. Equalizing storage is the amount required to meet daily fluctuations in water demand. Standby storage is essentially the amount of storage needed to meet demands when the largest water supply source is inoperable. Fire suppression storage is the quantity needed to meet fire flow requirements. The fire flow requirements that have been used for OCC in the recent past are a flow of 3,500 gallons per minute for a duration of 3 hours. This equates to a defined fire suppression storage requirement of 630,000 gallons. This has been the basis of design for the facility's water system. Please confirm that these requirements are still valid.

In summary, the storage requirements for OCC are:

Equalizing	17,739 gallons
Standby	31,304 gallons
Fire Suppression	630,000 gallons
Total	679,043 gallons

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As you can see, the total requirement is slightly greater than the available storage. Therefore, we are requesting an allowance to enable "nesting" of standby and fire suppression storage. This essentially means that the larger volume (i.e., fire suppression) would be taken as the requirement, and it would be acknowledged that standby storage (the smaller of the two volumes) would be drawn from the fire suppression storage (but only during those times when the largest source is out of service). Washington Administrative Code (WAC) 246-290-235(4) allows for this, by stating: "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive."

If nesting is allowed in the case of OCC, the available storage is sufficient to meet storage requirements and to allow for some facility expansion. We are therefore requesting approval of nesting in this situation. Please respond by letter, which will then be included in the WSP update. Please feel free to contact me at (360) 352-5090 if you require any additional information or have other questions. Thank you for your time and attention to this matter.

Sincerely,

Jeffrey M. Hansen

Jeffrey M. Hansen, P.E.
Project Engineer

JMH:sc:DOC

C-11
DOH Public Health Advisory Materials

Aug. 2013
DOH 331-179
Revised

Questions & Answers

Public Health Advisory
Coliform

Why must I boil my water?

Recent tests show that your water system is contaminated with organisms that can cause illness.

Who can be affected? Can I become ill?

Anyone who drinks contaminated water may become ill. Infants, young children, the elderly, and people with severely compromised immune systems are more at risk of illness.

Who are people with compromised immune systems?

People who are on chemotherapy, organ or bone marrow recipients, those with HIV or AIDS, malnourished children, infants, and some of the elderly have compromised or weakened immune systems. An infection from a disease-causing organism may lead to very serious health problems for these people.

Can these diseases be spread in ways other than drinking the water?

Yes. Many of these disease-causing organisms are shed in the feces of infected people. In fact, some infected people do not have any symptoms but still shed these organisms. Childcare workers, young children who attend childcare, and caregivers for people who are sick and shedding these organisms are at the greatest risk of becoming ill. Washing hands with soap and water after using the toilet and before preparing food prevents the spread of diseases to others.

What are the symptoms to watch for?
What should I do if I think I have a waterborne illness?

Disease-causing organisms in water can cause diarrhea, stomach cramps, bloating, gas, fatigue, weight loss, nausea, vomiting, and/or fever. Symptoms may appear as early as a few hours to several days after infection and may last more than two weeks. If you are ill with these symptoms, contact your health care provider.

How can I make the water safe?

Boiling is the best way to ensure water is free of illness-causing organisms. Bring the water to a rolling boil for one minute. When it cools, refrigerate the water in clean covered containers.

If you don't want to boil your water, you can disinfect the water using household bleach. Do not use bleach that contains perfume, dyes, or other additives. Use 1/4-teaspoon bleach per gallon of water, mix thoroughly, and then let stand for 60 minutes before using.

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

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Can I use bottled water?

You can use purchased bottled water. If you choose to use bottled water, Department of Health recommends water that is:

- Reverse-osmosis treated.
- Distilled.
- Filtered through an "absolute" one-micron or smaller filter.

Carbonated water in cans or bottles is usually filtered or heated to remove illness-causing organisms.

During a health advisory, can I use tap water for...?

Drinking	No	Coffee or tea	No
Ice cubes	No	Showers/Baths	Yes
Brushing teeth	No	Washing clothes	Yes
Baby's formula	No	Baby's bath	See below
Washing vegetables/fruits	No	Washing dishes	See below
Preparing food	No	Pet's water bowl	Contact Veterinarian

Can I bathe my baby or child using tap water?

Yes, as long as they do not drink any of the water. Don't let babies suck on a washcloth, as they will be ingesting some of the water.

Can I wash dishes?

You can use your dishwasher if you use the sanitizing/heat cycle and commercial dishwashing detergent. You can hand wash dishes, rinse them in a diluted bleach solution—one teaspoon household bleach to one gallon of water—and then let dishes air dry.

What must be done to fix the problem?

Fixing the problem could be different in each situation depending on whether the problem is at the water source or in the water lines. Usually, in every case the water lines will need to be flushed and the whole system will need to be disinfected using chlorine. The water will then be tested to make sure it is free of coliform bacteria.

How long will this health advisory be in effect?

This health advisory will remain in effect until the water is tested and results show that it meets public health drinking water standards. Your water system will notify you when that occurs.

For more information:

Personal medical questions: Contact your health care provider (physician, nurse consultant, etc.)

Call your local health jurisdiction with general questions about infectious disease, communicable disease transmission, symptoms, causes and prevention of waterborne disease.

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Fact Sheet

Emergency water supply guidelines for food service

Restaurants – Food Stores – Schools
Institutions – Convenience Stores

April 2014
DOH 331-182
(Revised)

These guidelines are for establishments that provide food service to the public. State regulation requires food service establishment (FSE) owners to ensure that their water supply is from an approved public drinking water system (WAC 246-215-05100). The state Department of Health regulates public water systems (WAC 246-290).

Procedures required during a boil water advisory

When a water system issues a boil water advisory, food service establishments must close unless the local health agency authorizes them stay open. If the local health agency does authorize an FSE to operate during a boil water advisory, it must follow the minimum requirements below until the health advisory is lifted. *The local health agency may impose additional requirements to protect against health hazards during the boil water advisory, such as modifying food preparation steps or prohibiting some menu items.*

Minimum Requirements

Shut off:

- Ice machines
- Drinking fountains
- Produce misters
- Bottled water refill machines
- Pop dispensers connected to water supply
- Running water dipper wells
- Coffee pots

Discard:

- Ice made with contaminated water
- Beverages made with contaminated water

Ice: Use packaged ice from an approved source

Use boiled or bottled water for:

- Drinking
- Cooking
- Food preparation
- Washing produce

Hand washing:

- Wash with antibacterial soap and water.
- Recommended: Use hand sanitizer after rinsing and drying.

Dishwashing options: Follow normal procedures.

- Mechanical dishwasher with high temperature or chemical sanitizer (verify correct operation).
- Three-compartment sink
  1. Wash in hot water with detergent.
  2. Rinse in warm water.
  3. Sanitize in cool-water chemical sanitizer solution (1 teaspoon bleach per 1 gallon water) or hot water (150 degrees) for one minute.
  4. Air dry.

Employee Information:

- Post signs or copies of the water system's health advisory.
- Develop a plan to notify and educate employees about emergency procedures.

When the health advisory is lifted, consult the owner's manual to find out how to sanitize appliances.

Follow these procedures until notified by the local health agency or the state Department of Health.

How the After-Hours Emergency Hotline Works

Office of Drinking Water staff are available around the clock to troubleshoot drinking water emergencies and help protect the health of your customers. Call it Murphy's Law or whatever – emergencies don't just happen during business hours.

Imagine. . .

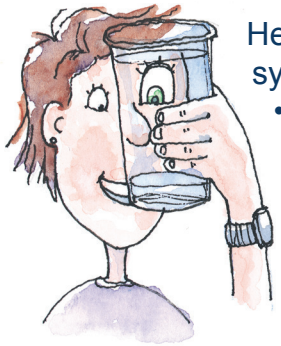
- *A midnight landslide damages your distribution system.*
- *You are notified on Friday evening before a three-day weekend that your repeat samples were E. Coli positive.*
- *A nearby stream floods, leaving your wellhead underwater on the day after Thanksgiving.*

This service is intended for water system operators, local health officials, laboratory operators, and others who need immediate technical, engineering or public health advice from state drinking water experts during emergencies.

While citizen concerns will be addressed if they call, this is not a public emergency hotline.

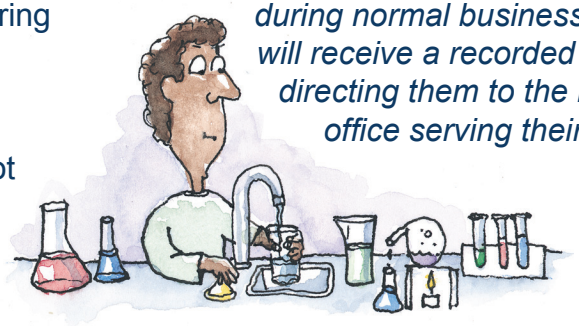
Individuals with concerns about their drinking water should call their water utility, their local health department or 911.

This hotline is intended for after-hours emergencies only, not for problems that arise during business hours, and not for routine business.



Here's how the system works:

- *After-hour calls will be evaluated to determine the nature of the emergency.*
- *Callers clearly seeking routine business assistance will be asked to contact their regional office during business hours.*
- *The Office of Drinking Water staff person on call will return the call within 30 minutes.*
- *Callers using the emergency number during normal business hours will receive a recorded message directing them to the regional office serving their area.*



Drinking Water After-Hours Emergency Hotline

Toll Free 1-877-481-4901 After-Hours Troubleshooting for Drinking Water Emergencies

Call this number after-hours if a drinking water emergency:

- ***Threatens the health of your customers.***
- ***Threatens the integrity of your system.***
- ***Can't wait until the next business day.***

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

ODW Headquarters	**360-236-3100**
Toll-free within Washington	**1-800-521-0323**
Northwest Regional Office	**253-395-6750**
Southwest Regional Office	**360-236-3030**
Eastern Regional Office	**509-329-2100**
After-Hours Emergency	**1-877-481-4901**

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

February 2013
(Updated)
DOH 331-133

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

WARNING:
Do not drink tap water without boiling it first!

☐ **Fecal coliform**
☐ **E. coli bacteria**
☐ **Other: _____**

were detected in the water supply on:
(date) _____.

Boiling kills bacteria and other organisms in the water:

- **Bring water to a rolling boil for one minute**
- **Let water cool before using**

To avoid possible illness: use boiled or purchased bottled water for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Contact your doctor, if you experience one or more of these symptoms: nausea, cramps, diarrhea, jaundice, headache and/or fatigue. People with chronic illnesses, infants and the elderly may be at higher risk and should seek medical advice.

Water System: _____
I.D.: _____
County: _____
Contact: _____
Telephone: _____
Date notice distributed: _____

What is fecal coliform and E. coli?

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these waters can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

How long will this warning be in effect?

We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

Vea al reverso para la versión en Español.

October 2008

WARNING:
Do not drink tap water without boiling it first!

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☐ **E. coli bacteria**
☐ **Other: _____**

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We will consult with the Washington State Department of Health about this incident. We will notify you when you no longer need to boil the water.

Vea al reverso para la versión en Español.

October 2008

ADVERTENCIA:
¡No tome el agua de la llave sin antes hervirla!

☐ **Bacteria coliforme fecal**
☐ **Bacteria E. coli**
☐ **Otra: _____**

fueron encontradas en su sistema de agua:
(el día)_____.

Hervir el agua mata a las bacterias y otros organismos en el agua:

- **Ponga el agua en la estufa hasta que hierva y deje hervir el agua por un minuto**
- **Deje enfriar el agua antes de usarla**

Para evitar posibles enfermedades y hasta nuevo aviso: use agua hervida o agua potable embotellada para tomar, hacer hielo, limpiarse los dientes, lavar los platos y para preparar comidas.

Hable con su doctor si usted tiene uno o más de los siguientes síntomas: náusea, dolor estomacal, diarrea, ictericia, dolores de cabeza y/o cansancio. La gente con enfermedades crónicas, bebés y personas mayores de edad, pueden estar en situación de alto riesgo y deben consultar con su médico o proveedores de servicios médicos.

Sistema de agua: _____
I.D.: _____
Condado: _____
Contacto: _____
Teléfono: _____
Fecha de notificación: _____

¿Qué son las bacterias coliforme fecal y E. coli?

Coliformes fecales o E. coli son bacterias cuya presencia indica que el agua esta contaminada con desechos humanos o de animales. Microbios de esos desechos pueden causar diarrea, dolor estomacal, náusea, dolores de cabeza u otros síntomas. Pueden representar un peligro para la salud de bebés, niños y niñas de corta edad y personas con sistemas inmunológicos en alto riesgo.

¿Por cuánto tiempo va a estar en efecto esta advertencia?

Vamos a consultar con el Departamento de Salud del estado de Washington acerca de este incidente. Le vamos a notificar cuando ya no sea necesario hervir el agua.

See reverse side for English version.

ADVERTENCIA:
¡No tome el agua de la llave sin antes hervirla!

☐ **Bacteria coliforme fecal**
☐ **Bacteria E. coli**
☐ **Otra: _____**

fueron encontradas en su sistema de agua:
(el día)_____.

Hervir el agua mata a las bacterias y otros organismos en el agua:

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Sistema de agua: _____
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Condado: _____
Contacto: _____
Teléfono: _____
Fecha de notificación: _____

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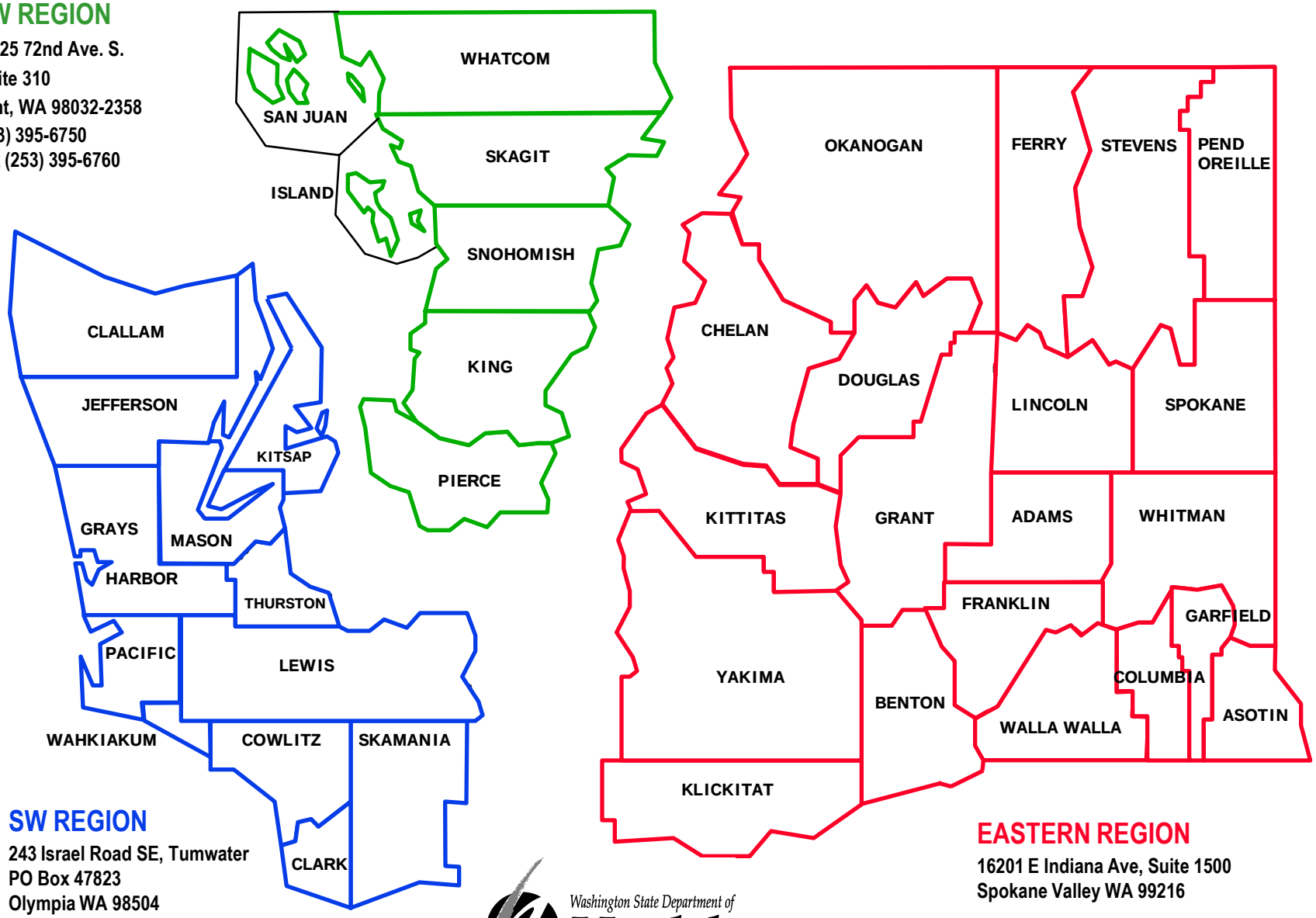
¿Por cuánto tiempo va a estar en efecto esta advertencia?

Vamos a consultar con el Departamento de Salud del estado de Washington acerca de este incidente. Le vamos a notificar cuando ya no sea necesario hervir el agua.

See reverse side for English version.

NW REGION

20425 72nd Ave. S.
Suite 310
Kent, WA 98032-2358
(253) 395-6750
Fax (253) 395-6760



SW REGION

243 Israel Road SE, Tumwater
PO Box 47823
Olympia WA 98504

(360) 236-3030
Fax (360) 664-8058

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

EASTERN REGION

16201 E Indiana Ave, Suite 1500
Spokane Valley WA 99216

(509) 329-2100
Fax (509) 329-2104

6/7/10

NOTICE TO WATER SYSTEM USERS

COLIFORM MAJOR MONITORING VIOLATION

We, _____ Water System, I.D. _____, located in _____ County are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During the month of _____ we did not monitor or test for coliform bacteria, and therefore cannot be sure of the quality of your drinking water during that time.

At this time:

☐ No action is required by the users.

☐ Our routine coliform sample required for the month of _____ has been collected and was found to show no presence of coliform bacteria.

☐ Samples will be collected in the future as required.

☐ Other information for customers:

For more information, contact _____ at ( )_____ or at _____.
(owner or operator) (phone number) (address)

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses.) You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is sent to you by _____ Water System on ____/____/____

Coliform Major Monitoring Public Notice Certification Form
The purpose of this form (below) is to provide documentation to the department that public notice was distributed. Please check the appropriate box and fill in the date that the notice was distributed:

☐ Notice was mailed to all water customers on ____ / ____/____.

☐ Notice was hand delivered to all water customers on ___ / ___ /___.

☐ Notice was posted (*with department approval*) at:
_____ on ___ / ___ /____.

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

_____ _____ _____
Signature of owner or operator Position Date

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

Send copy of completed notification and certification to:

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

☐ Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

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

DRINKING WATER WARNING

The _____ Water System, ID_____, located in _____County is contaminated with E. coli bacteria.

E. coli bacteria were detected in the water supply on _____. These bacteria can make you sick and are a particular concern for people with weakened immune systems.

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil for one minute. Let it cool before using. Boiled or purchased bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care provider.

What happened? What is the suspected or known source of contamination?

The following is being done to correct the problem:

We will notify you when you no longer need to boil the water. We anticipate resolving the problem by

_____.

For more information, please contact _____ at ( ) ___-_____ or at _____(email).

Please share this notice with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments and businesses). You can do this by posting this notice in a public place or distribution copies by hand or mail.

This notice is sent to you by _____ Water System on ___/___/____

Your logo or
company name here.

News Release

For Immediate Release: <DATE>
Contact: Water purveyor/system contact name and telephone number

<Water System> announces boil water advisory for all customers in <area>

CITY NAME — The <SYSTEM NAME> is advising all water customers to boil their drinking water after recent samples showed the presence of <fecal coliform, E. coli, total coliform>. The Washington State Department of Health (DOH) has been notified and <SYSTEM NAME> is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

<System spokesperson quote> (e.g. "We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority," said system spokesperson.)

<NUMBER or NO> illnesses related to the community's drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps that customers should take. These include using purchased treated bottled water or boiled water for any water that might be consumed: drinking, brushing teeth, dishwashing, preparing food and making ice. Water should come to a rolling boil for one minute, then allowed to cool before using.

The advisory will remain in effect until <SYSTEM NAME> and DOH are confident there is no longer a threat of illness to their customers. Once satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have any questions, please call us at <TELEPHONE NUMBER>.

###

06-22-11

Washington State Department of Health
Division of Drinking Water
PO Box 47828
Olympia, WA 98504-7828

Treatment of

Drinking Water

for

Emergency

Use

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

DOH Pub. #331-115 (Revised October 2001)

When Do You Need To Treat Drinking Water?

Normally your water is safe to drink, but it may need to be treated if your usual water supply is interrupted or becomes unsafe for drinking. Conditions that may require treatment of drinking water include:

- Disasters such as floods, earthquakes and power outages that interrupt your water supply;
- Water supply system disruption or loss of pressure because of line breaks or repairs;
- Special conditions under which your water system, local health department, or the State Department of Health informs you that the water should be boiled or treated before drinking.

Preparing For Emergencies

The best way to ensure a safe supply of drinking water is to routinely **store enough water to last through an emergency.** Although most emergencies are unexpected, you may be able to anticipate situations by watching or listening to weather reports. You should also pay attention to notices from your water system about planned water disruptions or other conditions that could signal a problem with your water supply.

Whether or not you store supplies of water, keep on hand the following items used to treat water during an emergency:

- Fresh supply of liquid household bleach and kitchen measuring spoons or a medicine dropper (medicine droppers with both teaspoon and milliliter markings are available at drug stores),
- Equipment (propane or gas stoves, outdoor barbeque grills, etc.) needed to boil water (remember that your usual source of energy may not be available during an emergency).

Storing Drinking Water For Emergencies

To be prepared for a drinking water emergency, the American Red Cross recommends storing **one gallon of water per person per day** (two quarts for drinking, two quarts for each person in your household for food preparation/ sanitation). Keep at least a three-day supply of water per person. Extremely warm temperatures and intense physical activity can double that amount; children, nursing mothers, and ill people will need more.

- **Collect the water from a safe supply.** If you are connected to a state-approved public water system, your water should be considered safe unless you have been notified otherwise. If you have your own supply, contact your local health department about how to have it tested.
- **Use proper storage containers.** Store the water in containers that are made for water storage, or glass and plastic jugs previously used for juice, milk, pop or bottled water. Clean containers thoroughly before using and make sure that the container has a tight fitting cap. ***Never use containers that were previously used for pesticides, chemicals, solvents, anti-freeze, oils, etc.***

- **Add liquid bleach** to the water according to the tables provided at the end of this publication in order to keep it safe for drinking.
- **Store in a cool place, safe from flooding, freezing and earthquakes.** It is recommended that you use or discard the stored water and replace it with a fresh supply every two months.

Treating Water In Emergencies: Boil Or Add Bleach

If a safe supply of water is not available, it should be treated before being used for drinking, cooking or brushing teeth.

There are two primary ways of treating water: **boiling or adding bleach**. If the supply has been made unsafe because of untreated surface water (from floods, streams or lakes), boiling is the better treatment.

If the water is cloudy, it should be filtered before boiling or adding bleach. Filters designed for use when camping, coffee filters, towels (paper or cotton), cheesecloth, or a cotton plug in a funnel are effective ways to filter cloudy water.

Boiling

Boiling is the best way to purify water that is unsafe because of the presence of protozoan parasites or bacteria. Boiling should not be used when toxic metals, chemicals (pesticides, solvents, etc.), or nitrates have contaminated the water.

- Place the water in a clean metal or glass container and bring to a rolling boil for one minute.

(revised Oct. 2008)

- Boiled water should be kept covered while cooling and should then be stored in the manner previously described under "Storing Drinking Water For Emergencies."

Purifying By Adding Liquid Chlorine Bleach

If boiling is not possible, water can be made safe for drinking by treating with liquid household chlorine bleach, such as Clorox, Purex, etc. Household bleach is typically between 5% and 6% chlorine. Avoid using bleaches that contain perfumes, dyes or other additives. Be sure to read the label.

- Place the water (filtered if necessary) in a clean container. Add the amount of bleach according to the tables at the end of this advisory. Mix thoroughly and allow to stand for at least 30 minutes before using (60 minutes if the water is cloudy, or very cold).
- Purifying tablets or chemicals designed for use when camping or backpacking can also be an effective way to treat water. Always follow the directions on the package.

Note:

Chlorine and other chemicals will <u>not</u> kill oocysts of the parasite *Cryptosporidium* ("Crypto"), which may be present in water supplies affected by untreated surface water. *Cryptosporidium* is an organism that can cause severe illness and even death in persons who have been weakened because of health problems. Boiling is the best water treatment if there is the possibility of contamination by Crypto.

Caution

The treatments described above work only in situations where the water is unsafe because of the presence of bacteria. If you suspect the water is unsafe because of chemicals, oils, poisonous substances, sewage, etc., do not use the water for drinking.

For additional copies or more information call 1-800-521-0323.
The Department of Health is an equal opportunity agency.
If you need this publication in an alternative format, please call 1-800-525-0127 (voice) or 1-800-833-6388 (TDD relay service).

www.doh.wa.gov/ehp/dw/

Treating Water With a 5-6% Liquid Chlorine Bleach Solution

(Allow treated CLEAR water to stand 30 minutes before using; treated CLOUDY water should stand for 60 minutes)

Volume of Water To Be Treated	Treating Clear Water Bleach Solution To Add	Treating Cloudy, Very Cold or Surface Water Bleach Solution To Add
1 quart/1 liter	3 drops	5 drops
1/2 gallon/2 quarts/2 liters	5 drops	10 drops OR 1/8 tsp
1 gallon	10 drops OR 1/8 tsp	20 drops OR 1/4 tsp
5 gallons	50 drops OR 2.5 mL OR 1/2 tsp	5 mL OR 1 tsp
10 gallons	5 mL OR 1 tsp	10 mL OR 2 tsp

tsp = teaspoon; Tbsp = tablespoon; mL = milliliter

Treating Small Quantities of Water

For treating small amounts of water, you may find it easier to use a 1% bleach solution.

- Mix one part of 5-6% household bleach and four parts clean water by volume to yield a 1% bleach solution. For example, add **one cup of bleach to four cups water** to yield five cups of 1% bleach solution.
- Keep the bleach solution in a tightly capped container labeled as 1% bleach solution. Store in a cool place. Discard and make a fresh solution every two months.

Treating Water With a 1% Liquid Chlorine Bleach Solution

(Allow treated CLEAR water to stand 30 minutes before using; treated CLOUDY water should stand for 60 minutes)

Volume of Water To Be Treated	Treating Clear Water Bleach Solution To Add	Treating Cloudy, Very Cold or Surface Water Bleach Solution To Add
1 quart/1 liter	10 drops OR 1/8 tsp	20 drops OR 1/4 tsp
1/2 gallon/2 quarts/2 liters	20 drops OR 1/4 tsp	40 drops OR 2.5 mL OR 1/2 tsp
1 gallon	40 drops OR 2.5 mL OR 1/2 tsp	5 mL OR 1 tsp
5 gallons	12.5 mL OR 2.5 tsp	25 mL OR 5 tsp
10 gallons	25 mL OR 5 tsp	50 mL OR 10 tsp OR 3 Tbsp

tsp = teaspoon; Tbsp = tablespoon; mL = milliliter

C-12
DOH Trucked Water Guidelines

Disinfection of trucked water

All trucked water must maintain a free chlorine residual of at least 0.5 ppm. To accomplish this, the hauler must add 5 to 6 tablespoons (2.5 to 3 ounces) of common household bleach to each 1,000 gallons of water that does not have a free chlorine residual. The bleach must be 5.25 to 6 percent strength, unscented and without additives. Add the bleach in proportion to the quantity of water at the beginning of each haul during filling to ensure uniform distribution.

For more information

If you have questions, call our nearest regional office:

Eastern Region: Spokane Valley
(509) 329-2100

Northwest Region: Kent
(253) 395-6750

Southwest Region: Tumwater
(360) 236-3030

Office of Drinking Water publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

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

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Truck Transportation

Emergency water supply for public use

October 2012
DOH 331-063
Revised

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

Public water systems that truck or receive potable water for the public during

emergencies must follow drinking water standards (WAC 246-290-451(2)).

The Washington State Department of Health doesn't allow trucked water as a long-term source of drinking water. We do recognize that it may be the only option as a temporary source in some emergencies.

Before a water system can truck or receive potable water for the public during an emergency, it must get the current requirements and approval from one of the following:

- Our nearest regional office
- The local health department
- The state emergency management agency
- The local emergency management agency

To protect public health, water systems thinking about receiving trucked water must consider the following:

- The source and quality of the water
- Personnel
- Documentation
- Recordkeeping
- The truck container, including disinfection and condition
- The receiving container

Source and quality of water

Trucked emergency water must come from an approved public water system. If there is no other option, *and* there is a formal written agreement between the receiving water system and the state or local health department, hauled water may be from an unapproved source.

The water system must prove to the health agency that the intended unapproved source is safe to use when treated to the minimal levels described in "Disinfection of trucked water," on page 7.

The water system must confirm that the:

- Truck hauler is familiar with proper handling procedures at the supply source and during transport.
- Delivered trucked water contains a free chlorine residual of at least 0.5 ppm.

The water system must reject the water if it believes the hauler failed to take the steps necessary to ensure the water remains potable.

Personnel

The water system must have the certified operator coordinate the receiving process, collect documentation, and keep records. These procedures must be in the water system's emergency response program (WAC 246-290-415(2)(d)).

Documentation

The water system must document and keep proper records of the trucked water operation. This includes:

- The hauler's name and contact information.
- The amount of water delivered per trip.
- The name of the approved water source or water system.
- Date and time of delivery.

Recordkeeping

The water system must keep the following records for at least one year after the emergency water hauling operation ends.

- Documents to show proper disinfection of the water for each trip.
- Confirmation of initial tanker disinfection method and follow-up coliform monitoring results.
- The free chlorine residual in the container at the start of the haul.
- The free chlorine residual of the water at point of delivery.
- Any conditions observed about the receiving tank.

Records must be available on request for review by health agencies, haulers, or the supplying water system.

Containers designed and used only for potable water service

Properly designed and maintained truck containers dedicated to hauling only potable water may be used without initial tanker cleaning, disinfection, and testing for bacteria.

The truck container must be contaminant-free and maintained to prevent potential water contamination.

The hauler must fill and empty all truck containers through an air gap or other approved method. All containers must be completely enclosed and tightly sealed with lockable lids or hatches. Containers open to the atmosphere during hauling cannot be used.

Bulk water hauling may be acceptable as a *temporary* solution to a water shortage.

It is not an acceptable *long-term* solution for system infrastructure deficiencies such as inadequate water supply sources.

Truck container

Truck containers used for hauling petroleum products, surfactants, or other non-food grade products may not be used for hauling potable water.

Trucks used for hauling food-grade products other than potable water must be evaluated on an individual basis. At minimum, a truck container used to haul a food-grade product other than potable water must be disinfected as directed in "Initial tanker disinfection," below.

Initial testing must show absence of coliform bacteria before using the truck to haul water. We may require additional water quality analysis depending on a truck's prior use.

After emergency hauling begins and safety measures are in place to prevent contamination, any health authority can require repeat testing at any time. An extended water-hauling emergency warrants additional water quality monitoring, including chlorine residuals.

Initial tanker disinfection

Truck containers used to transport food-grade products other than potable water must be cleaned and disinfected before potable water hauling operations begin.

1 Rinse and flush all water-hauling containers, hoses, truck-mounted pumps, and other equipment until they are free of rust, sediment, and other matter.

2 Use water with chlorine levels of at least 50 to 60 parts per million (ppm) to completely fill the tank, pumps, hoses, and other hauling equipment that will contact potable water. About one gallon of liquid bleach is required in every 1,000 gallons of water to produce 50 to 60 ppm. Bleach must be 5.25 to 6 percent hypochlorite with no scent, cleaning enhancer, or other additives. Add the bleach to the water while filling the tank to ensure uniform distribution.

All surfaces that will contact potable water must be disinfected with the chlorine solution for at least 4 hours.

All equipment used to collect, transport, and deliver drinking water must be designed to handle potable water and endure disinfection.

3 After 4 hours, flush the chlorine solution from the tank and all pieces of equipment. *Do not discharge directly into a stream because the chlorine in the water can kill fish and plants*. To dechlorinate the water, treat it with citric acid or thiosulfate before discharging it.

4 When the tank, hoses, pipes, and pumps are empty, refill them with potable water and test for coliform bacteria. If coliform are present, repeat the disinfection steps. If coliform is still present after a second attempt to disinfect, the tanker cannot be used to haul potable water.

Handling

All hoses and other handling equipment used in the operation must always be stored off the ground. Hoses must be capped at each end when not in use.

All surfaces that contact potable water, including fill-point equipment, containers, caps, valves, filters, fittings, and other plumbing attachments, must be inspected regularly and disinfected or replaced as needed.

Receiving container

Inspect the water system's receiving tanks to confirm water quality during filling and later distribution to consumers. Clean and disinfect receiving tanks using the disinfection steps in "Initial tanker disinfection," at left.

Secure and protect the receiving tanks from contamination throughout the emergency response process. Keep written records of any comments about the receiving tanks.

The water system must inspect each water delivery for appearance or odor problems, check the chlorine residual, and fill water through an air gap or other approved method.

C-13
Water Production – Monthly
2012 – 2013

Cedar Creek Corrections Center

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Edward Burns

Title
Operator

City: Littlerock, WA | Report Month: Dec | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	14 pH	15 Hardness	REMARKS
30th	4,711,050															
1	4,771,671	60,621	505,579	42	3	0.29	0.57									
2	4,833,638	61,967	516,805	40	2	0.19	0.37									
3	4,871,316	37,678	314,235	38	2	0.19	0.61									
4	4,920,176	48,860	407,492	36	2	0.19	0.47									
5	4,969,036	48,860	407,492	34	2	0.19	0.47									
6	5,017,896	48,860	407,492	32	2	0.19	0.47									
7	5,108,961	91,065	759,482	28	4	0.38	0.51									
8	5,146,335	37,374	311,699	26	2	0.19	0.62									
9	5,212,312	65,977	550,248	23	3	0.29	0.52									
10	5,253,093	40,781	340,114	22	1	0.10	0.28									
11	5,297,342	44,249	369,037	20	2	0.19	0.52									
12	5,376,044	78,702	656,375	17	3	0.29	0.44									
13	5,419,748	43,704	364,491	15	2	0.19	0.53									
14	5,473,426	53,678	447,675	13	2	0.19	0.43									
15	5,541,459	68,033	567,395	10	3	0.29	0.51									
16	5,584,990	43,531	363,049	7	3	0.29	0.79									
17	5,612,840	27,850	232,269	5	2	0.19	0.83									
18	5,698,211	85,371	711,994	2\52	3	0.29	0.40									
19	5,726,753	28,542	238,040	49	3	0.29	1.21									
20	5,811,981	85,228	710,802	45	4	0.38	0.54									
21	5,858,587	46,606	388,694	43	2	0.19	0.49									
22	5,916,028	57,441	479,058	41	2	0.19	0.40									
23	5,968,016	51,988	433,580	38	3	0.29	0.66									
24	6,028,554	60,538	504,887	36	2	0.19	0.38									
25	6,086,246	57,692	481,151	33	3	0.29	0.60									
26	6,113,182	26,936	224,646	31	2	0.19	0.85									
27	6,198,702	85,520	713,237	28	3	0.29	0.40									
28	6,235,631	36,929	307,988	26	2	0.19	0.62									
29	6,312,910	77,279	644,507	22	4	0.38	0.60									
30	6,368,469	55,559	463,362	19	3	0.29	0.62									
31	6,395,339	26,870	224,096	17	2	0.19	0.86									

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Steve Blahut

Title: Operator

City: Littlerock, WA | Report Month: NOV. ~~MONTH~~ | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
31st	3,155,977			19												
1	3,185,123	29,146	243,078	18	1	0.10	0.39				0.55	-0.16				
2	3,221,312	36,189	301,816	14	4	0.38	1.27				0.50	0.77		8.01	120	
3	3,299,969	78,657	655,999	12	2	0.19	0.29									
4	3,348,794	48,825	407,201	10	2	0.19	0.47									
5	3,370,999	22,205	185,190	9	1	0.10	0.52				0.41	0.11				
6	3,452,139	81,140	676,708	5	4	0.38	0.57				0.41	0.16				
7	3,498,991	46,852	390,746	2	3	0.29	0.74				0.49	0.25				Recharge [2 + (4 + 46)] = 52
8	3,553,804	54,813	457,140	50	2	0.19	0.42									Estimated
9	3,608,617	54,813	457,140	48	2	0.19	0.42							8.06		Estimated
10	3,664,768	56,151	468,299	47	1	0.10	0.20									
11	3,707,960	43,192	360,221	43	4	0.38	1.07									
12	3,762,773	54,813	457,140	41	2	0.19	0.42									Estimated
13	3,812,273	49,500	412,830	38	3	0.29	0.70				0.62	0.08				
14	3,837,331	25,058	208,984	36	2	0.19	0.92				0.46	0.46				
15	3,915,605	78,274	652,805	33	3	0.29	0.44				0.52	-0.08				
16	3,957,458	41,853	349,054	31	2	0.19	0.55				0.52	0.03		7.99	120	
17	4,007,764	50,306	419,552	28	3	0.29	0.69									
18	4,076,932	69,168	576,861	25	3	0.29	0.50									
19	4,114,940	38,008	316,987	23	2	0.19	0.61									
20	4,170,710	55,770	465,122	21	2	0.19	0.41				0.43	-0.02				
21	4,222,449	51,739	431,503	18	3	0.29	0.67				0.41	0.26			120	
22	4,276,454	54,005	450,402	16	2	0.19	0.43									
23	4,341,006	64,552	538,364	13	3	0.29	0.53									
24	4,383,657	42,651	355,709	10	3	0.29	0.81									
25	4,416,971	33,314	277,839	9	1	0.10	0.35									
26	4,488,377	71,406	595,526	5	4	0.38	0.64									
27	4,544,890	56,513	471,318	3	2	0.19	0.41									Recharge [3+(46+4)] =53 gal.
28	4,587,858	42,968	358,353	3	3	0.29	0.80									Estimated
29	4,630,827	42,969	358,361	48	2	0.19	0.54									
30	4,711,050	80,223	669,060	45	3	0.29	0.43									
31																

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): EDWARD BURNS

Title: Operator

City: Littlerock, WA | Report Month: OCTOBER | Year: 2012

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
30th	1,456,760			48												
1	1,493,534	36,774	306,695	46	2	0.19	0.63				0.46	0.17				
2	1,571,410	77,876	649,486	43	3	0.29	0.44				0.49	-0.05				
3	1,613,552	42,142	351,464	41	2	0.19	0.55	0.51	0.39	2	0.45	0.10				
4	1,681,387	67,835	565,744	38	3	0.29	0.51				0.51	0.00				
5	1,745,607	64,220	535,595	35	3	0.29	0.54				0.46	0.08		8.14	120	
6	1,796,300	50,693	422,780	32	3	0.29	0.68									
7	1,862,043	65,743	548,297	30	2	0.19	0.35									
8	1,919,941	57,898	482,869	28	2	0.19	0.40									Estimated
9	1,963,770	43,829	365,534	25	3	0.29	0.79	0.82	0.65	2	0.74	0.05				
10	2,031,933	68,163	568,479	22	3	0.29	0.51				0.59	-0.08				
11	2,053,534	21,601	180,152	20	2	0.19	1.07				0.56	0.51				
12	2,139,236	85,702	714,755	17	3	0.29	0.40				0.47	-0.07		8.04	120	
13	2,194,659	55,423	462,228	14	3	0.29	0.62									
14	2,233,990	39,331	328,021	15	-1	-0.10	-0.29									
15	2,309,355	75,365	628,544	9	6	0.58	0.92				0.49	0.43				
16	2,358,550	49,195	410,286	6	3	0.29	0.70				0.53	0.17				
17	2,411,576	53,026	442,237	4	2	0.19	0.43				0.47	-0.04				
18	2,453,021	41,445	345,651	2	2	0.19	0.56				0.45	0.11				Recharge 2 + (46 + 4) = 52
19	2,526,438	73,417	612,298	48	4	0.38	0.49				0.45	0.04		8.09	120	
20	2,579,127	52,689	439,426	46	2	0.19	0.44									
21	2,619,452	40,325	336,311	44	2	0.19	0.57									
22	2,657,620	38,168	318,321	42	2	0.19	0.60				0.56	0.04				
23	2,731,964	74,344	620,029	39	3	0.29	0.46				0.59	-0.13				
24		50,173	418,443		4	0.38	0.92									Estimated
25		50,173	418,443		4	0.38	0.92									
26	2,882,484	50,173	418,443	27	4	0.38	0.92				0.46	0.46			120	
27	2,927,063	44,579	371,789	26	1	0.10	0.26									
28	2,991,577	64,514	538,047		2	0.19	0.36									Estimated
29	3,046,377	54,800	457,032		2	0.19	0.42									
30	3,101,177	54,800	457,032		2	0.19	0.42									
31	3,155,977	54,800	457,032		1	0.10	0.21									

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): EDWARD BURNS

Title: Operator

City: Littlerock, WA | Report Month: SEPTEMBER | Year: 2012

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
31st	9,795,460			27												
1	9,866,418	70,958	591,790	24	3	0.29	0.49									
2	9,914,760	48,342	403,172	21	3	0.29	0.71									
3	9,951,608	36,848	307,312	20	1	0.10	0.31									
4	25,892	74,283	619,520	16	4	0.38	0.62				0.34	0.28				
5	80,083	54,191	451,953	13	3	0.29	0.64									
6	153,620	73,537	613,299	9	4	0.38	0.63									
7	211,266	57,646	480,768	6	3	0.29	0.60				0.38	0.22		8.06	120	
8	261,049	49,783	415,190	5	1	0.10	0.23									
9	328,266	67,217	560,590	5	0	0.00	0.00									Recharge 5 + (46 + 4) = 55
10	368,593	40,327	336,327	52	3	0.29	0.86				0.31	0.55				
11	420,419	51,826	432,229	49	3	0.29	0.67				0.45	0.22				
12	493,369	72,950	608,403	46	3	0.29	0.47				0.27	0.20				
13	541,871	48,502	404,507	44	2	0.19	0.47				0.48	-0.01				
14	573,811	31,940	266,380	42	2	0.19	0.72				0.50	0.22			120	
15	655,678	81,867	682,771	38	4	0.38	0.56									
16	698,747	43,069	359,195	36	2	0.19	0.53									
17	725,454	26,707	222,736	34	2	0.19	0.86				0.58	0.28		7.94		
18	808,922	83,468	696,123	31	3	0.29	0.41									
19	856,205	47,283	394,340	28	3	0.29	0.73									
20	887,649	31,444	262,243	27	1	0.10	0.37									
21	965,886	78,237	652,497	24	3	0.29	0.44							7.95		
22	1,017,762	51,876	432,646	21	3	0.29	0.67									
23	1,050,324	32,562	271,567	20	1	0.10	0.35									
24	1,111,600	61,276	511,042	17	3	0.29	0.56				0.47	0.09			120	
25	1,147,787	36,187	301,800	14	3	0.29	0.95				0.43	0.52				
26	1,222,270	74,483	621,188	11	3	0.29	0.46				0.49	-0.03				
27	1,274,952	52,682	439,368	9	2	0.19	0.44				0.51	-0.07				
28	1,345,659	70,707	589,696	4	5	0.48	0.81							8.08	120	Recharge [4 + (4 + 46) = 54
29	1,378,151	32,492	270,983	53	1	0.10	0.35									
30	1,456,760	78,609	655,599	48	5	0.48	0.73									

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): EDWARD BURNS

Title: Operator

City: Littlerock, WA | Report Month: August | Year: 2012

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other Chemicals added	Water Quality		Max. Consecutive 2 Day Avg. ____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand		14 pH	15 Hardness	REMARKS
31st	8,093,065			16												
1	8,154,371	61,306	511,292	13	3	0.29	0.56				0.51	0.05				
2	8,187,745	33,374	278,339	12	1	0.10	0.34				0.44	-0.10				
3	8,270,989	83,244	694,255	8	4	0.38	0.55				0.41	0.14		7.49	120	
4	8,326,034	55,045	459,075	4	4	0.38	0.84									
5	8,349,560	23,526	196,207	53	1	0.10	0.49									Recharge [4 + (46 + 4] = 54
6	8,431,132	81,572	680,310	48	5	0.48	0.71				0.52	0.19				
7	8,484,696	53,564	446,724	45	3	0.29	0.64				0.52	0.12				
8	8,517,504	32,808	273,619	44	1	0.10	0.35				0.55	-0.20				
9	8,587,718	70,214	585,585	41	3	0.29	0.49				0.58	-0.09				
10	8,645,620	57,902	482,903	38	3	0.29	0.60				0.48	0.12				
11	8,690,460	44,840	373,966	35	3	0.29	0.77									
12	8,764,434	73,974	616,943	32	3	0.29	0.47									
13	8,808,370	43,936	366,426	29	3	0.29	0.79				0.32	0.47				
14	8,870,252	61,882	516,096	26	3	0.29	0.56				0.47	0.09				
15	8,932,060	61,808	515,479	23	3	0.29	0.56				0.40	0.16				
16	8,962,146	30,086	250,917	21	2	0.19	0.77				0.43	0.34				
17	9,039,288	77,142	643,364	18	3	0.29	0.45				0.46	-0.01		7.98	120	
18	9,092,132	52,844	440,719	15	3	0.29	0.65									
19	9,116,696	24,564	204,864	13	2	0.19	0.94									
20	9,188,944	72,248	602,548	10	3	0.29	0.48				0.42	0.06				
21	9,244,000	55,056	459,167	7	3	0.29	0.63				0.45	0.18				
22	9,280,050	36,050	300,657	5	2	0.19	0.64				0.46	0.18				
23	9,345,688	65,638	547,421	0	5	0.48	0.88				0.43	0.45				Recharge (44 + 6) = 50
24	9,394,525	48,837	407,301	47	3	0.29	0.71				0.33	0.38		8.10	120	
25	9,429,840	35,315	294,527	46	1	0.10	0.33									
26	9,510,196	80,356	670,169	42	4	0.38	0.57									
27	9,535,620	25,424	212,036	40	2	0.19	0.91				0.48	0.43				
28	9,627,270	91,650	764,361	37	3	0.29	0.38				0.54	-0.16				
29	9,681,368	54,098	451,177	34	3	0.29	0.64				0.32	0.32				
30	9,737,636	56,268	469,275	30	4	0.38	0.82				0.60	0.22				
31	9,795,460	57,824	482,252	27	3	0.29	0.60				0.41	0.19		8.06	120	

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
EDWARD BURNS

Title
Operator

City: Littlerock, WA | Report Month: JULY | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	14 pH	15 Hardness	REMARKS
30th	6,484,550			53												
1	6,526,020	41,470	345,860	50	3	0.29	0.83									
2	6,554,791	28,771	239,950	47	3	0.29	1.20				0.28	0.92				
3	6,637,314	82,523	688,242	43	4	0.38	0.56				0.81	-0.25				
4	6,678,365	41,051	342,365	40	3	0.29	0.84									
5	6,705,281	26,916	224,479	38	2	0.19	0.86				0.86	0.00				
6	6,789,180	83,899	699,718	35	3	0.29	0.41				0.74	-0.33		8.13	120	
7	6,843,516	54,336	453,162	32	3	0.29	0.64									
8	6,864,295	20,779	173,297	30	2	0.19	1.11									
9	6,940,059	75,764	631,872	26	4	0.38	0.61									
10	6,991,875	51,816	432,145	24	2	0.19	0.44									
11	7,040,662	48,787	406,884	21	3	0.29	0.71				0.41	0.30				
12	7,090,977	50,315	419,627	18	3	0.29	0.69				0.45	0.24				
13	7,161,902	70,925	591,515	14	4	0.38	0.65				0.46	0.19		8.10	120	
14	7,212,656	50,754	423,288	11	3	0.29	0.68									
15	7,229,666	17,010	141,863	10	1	0.10	0.68									
16	7,304,845	75,179	626,993	7	3	0.29	0.46				0.48	-0.02				
17	7,355,568	50,723	423,030	3	4	0.38	0.91				0.63	0.28				Recharge 3 + (46 + 4) = 53
18	7,405,511	49,943	416,525	50	3	0.29	0.69				0.39	0.30				
19	7,442,403	36,892	307,679	48	2	0.19	0.62				0.50	0.12				
20	7,517,046	74,643	622,523	45	3	0.29	0.46				0.53	-0.07		8.12	120	
21	7,569,306	52,260	435,848	42	3	0.29	0.66									
22	7,584,330	15,024	125,300	41	1	0.10	0.77									
23	7,659,948	75,618	630,654	37	4	0.38	0.61				0.66	-0.05				
24	7,711,727	51,779	431,837	35	2	0.19	0.44				0.67	-0.23				
25	7,740,913	29,186	243,411	33	2	0.19	0.79				0.56	0.23				
26	7,818,047	77,134	643,298	30	3	0.29	0.45				0.62	-0.17				
27	7,869,335	51,288	427,742	27	3	0.29	0.67									Estimate
28	7,909,748	40,413	337,044	25	2	0.19	0.57									
29	7,983,804	74,056	617,627	22	3	0.29	0.47									
30	8,029,757	45,953	383,248	19	3	0.29	0.75				0.54	0.21			120	
31	8,093,065	63,308	527,989	16	3	0.29	0.55				0.39	0.16				

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
EDWARD BURNS

Title
Operator

City: Littlerock, WA | Report Month: JUNE | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other Chemicals added	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand		14 pH	15 Hardness	REMARKS
31st	4,980,604			17												
1	5,012,851	32,247	268,940	16	1	0.10	0.36				0.23	0.13				
2	5,094,063	81,212	677,308	13	3	0.29	0.43									
3	5,137,145	43,082	359,304	11	2	0.19	0.53									
4	5,163,766	26,621	222,019	10	1	0.10	0.43				0.30	0.13				
5	5,241,940	78,174	651,971	7	3	0.29	0.44				0.31	0.13				
6	5,293,683	51,743	431,537	5	2	0.19	0.44				0.30	0.14				
7	5,320,707	27,024	225,380	3	2	0.19	0.85				0.33	0.52				Recharge 2 + (4 + 46) = 52
8	5,395,179	74,472	621,096	50	2	0.19	0.31				0.20	0.11		8.09	>120	
9	5,449,087	53,908	449,593	47	3	0.29	0.64									
10	5,481,313	32,226	268,765	46	1	0.10	0.36									
11	5,537,835	56,522	471,393	44	2	0.19	0.41				0.83	-0.42				
12	5,587,973	50,138	418,151	42	2	0.19	0.46				1.04	-0.58				
13	5,635,332	47,359	394,974	41	1	0.10	0.24									
14	5,685,696	50,364	420,036	39	2	0.19	0.46									Estimated
15	5,743,270	57,574	480,167	37	2	0.19	0.40				0.67	-0.27		8.10	>120	
16	5,796,863	53,593	446,966	35	2	0.19	0.43									
17	5,825,169	28,306	236,072	34	1	0.10	0.41									
18	5,875,845	50,676	422,638	32	2	0.19	0.45				0.48	-0.03				
19	5,934,494	58,649	489,133	29	3	0.29	0.59				0.44	0.15				
20	5,952,720	18,226	152,005	28	1	0.10	0.63				0.34	0.29				
21	6,033,910	81,190	677,125	25	3	0.29	0.43				0.38	0.05				
22	6,085,151	51,241	427,350	22	3	0.29	0.67				0.40	0.27		8.14	>120	
23	6,108,871	23,720	197,825	20	2	0.19	0.97									
24	6,181,870	72,999	608,812	17	3	0.29	0.47									
25	6,223,140	41,270	344,192	14	3	0.29	0.84				0.37	0.47				
26	6,260,862	37,722	314,601	10	4	0.38	1.22				0.33	0.89				
27	6,329,791	68,929	574,868	9	1	0.10	0.17				0.38	-0.21				
28	6,375,600	45,809	382,047	7	2	0.19	0.50				0.36	0.14				
29	6,409,642	34,042	283,910	5	2	0.19	0.68				0.31	0.37			120.00	Recharge 5 + (4 + 46) = 55
30	6,484,550	74,908	624,733	53	2	0.19	0.31									

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Edward Burns

Title: Operator

City: Littlerock, WA | Report Month: MAY | Year: 2012

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
30th	3,301,191	#VALUE!		42	2											
1	3,369,039	67,848	565,852	38	4	0.38	0.68									
2	3,405,798	36,759	306,570	37	1	0.10	0.31									
3	3,472,021	66,223	552,300	34	3	0.29	0.52									
4	3,520,652	48,631	405,583	31	3	0.29	0.71									
5	3,569,284	48,632	405,591	29	2	0.19	0.47									
6	3,622,033	52,749	439,927	26	3	0.29	0.65									
7	3,679,317	57,284	477,749	24	2	0.19	0.40									
8	3,710,725	31,408	261,943	23	1	0.10	0.37									
9	3,790,069	79,344	661,729	18	5	0.48	0.73									
10	3,822,150	32,081	267,556	17	1	0.10	0.36									
11	3,897,090	74,940	625,000	14	3	0.29	0.46									
12	3,953,697	56,607	472,102	11	3	0.29	0.61									
13	3,977,624	23,927	199,551	10	1	0.10	0.48									
14	4,053,208	75,584	630,371	7	3	0.29	0.46									
15	4,111,658	58,450	487,473	3\53	4	0.38	0.79									
16	4,164,700	53,042	442,370	51	2	0.19	0.43									
17	4,229,714	65,014	542,217	48	3	0.29	0.53									
18	4,294,728	65,014	542,217	44	4	0.38	0.71									
19	4,342,565	47,837	398,961	43	1	0.10	0.24									
20	4,405,653	63,088	526,154	41	2	0.19	0.36									
21	4,447,055	41,402	345,293	38	3	0.29	0.83									
22	4,482,593	35,538	296,387	37	1	0.10	0.32									
23	4,537,300	54,707	456,256	35	2	0.19	0.42									
24	4,592,007	54,707	456,256	33	2	0.19	0.42									
25	4,682,662	90,655	756,063	29	4	0.38	0.51									
26	4,705,002	22,340	186,316	28	1	0.10	0.52									
27	4,783,135	78,133	651,629	25	3	0.29	0.44									
28	4,830,285	47,150	393,231	23	2	0.19	0.49									
29	4,852,679	22,394	186,766	22	1	0.10	0.51									
30	4,934,810	82,131	684,973	19	3	0.29	0.42									
31	4,980,604	45,794	381,922	17	2	0.19	0.50									

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
EDWARD BURNS

Title
Operator

City: Littlerock, WA | Report Month: APRIL | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	14 pH	15 Hardness	REMARKS
31st	1,761,256			20												
1	1,830,909	69,653	580,906	16	4	0.38	0.66									
2	1,871,253	40,344	336,469	14	2	0.19	0.57				0.33	0.24				
3	1,924,250	52,997	441,995	12	2	0.19	0.43									Estimated Volume
4	1,978,127	53,877	449,334	10	2	0.19	0.43									
5	2,024,912	46,785	390,187	7	3	0.29	0.74				0.26	0.48				
6	2,061,385	36,473	304,185	4 \ 54	3	0.29	0.95				0.32	0.63		8.40	>120	Recharged 4 + (4+46) = 54
7	2,134,424	73,039	609,145	50	4	0.38	0.63									
8	2,176,595	42,171	351,706	48	2	0.19	0.55									
9	2,204,766	28,171	234,946	46	2	0.19	0.82				0.35	0.47				
10	2,282,965	78,199	652,180	43	3	0.29	0.44				0.38	0.06				
11	2,334,516	51,551	429,935	40	3	0.29	0.67				0.42	0.25				
12	2,362,609	28,093	234,296	38	2	0.19	0.82				0.36	0.46				
13	2,438,668	76,059	634,332	35	3	0.29	0.45				0.40	0.05		8.10	>120	
14	2,491,783	53,115	442,979	33	2	0.19	0.43									
15	2,529,073	37,290	310,999	31	2	0.19	0.62									
16	2,580,273	51,200	427,008	28	3	0.29	0.67									Estimated
17	2,644,409	64,136	534,894	25	3	0.29	0.54				0.39	0.15				
18	2,669,527	25,118	209,484	23	2	0.19	0.92				0.40	0.52				
19	2,745,280	75,753	631,780	20	3	0.29	0.46				0.39	0.07				
20	2,798,123	52,843	440,711	18	2	0.19	0.44				0.35	0.09		8.10	>120	
21	2,828,492	30,369	253,277	16	2	0.19	0.76									
22	2,900,899	72,407	603,874	13	3	0.29	0.48									
23	2,943,650	42,751	356,543	10	3	0.29	0.81				0.35	0.46				
24	2,990,417	46,767	390,037	7	3	0.29	0.74				0.38	0.36				
25	3,062,989	72,572	605,250	4	3	0.29	0.48				0.34	0.14				
26	3,088,747	25,758	214,822	52	2	0.19	0.89				0.35	0.54				Recharged [2 + (46 + 4)] = 52
27	3,166,690	77,943	650,045	49	3	0.29	0.44				0.40	0.04		8.10	>120	
28	3,218,789	52,099	434,506	45	4	0.38	0.88									
29	3,260,474	41,685	347,653	44	1	0.10	0.28									
30	3,301,191	40,717	339,580	42	2	0.19	0.57				0.54	0.03				

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
EDWARD BURNS

Title
Operator

City: Littlerock, WA | Report Month: MARCH | Year: 2012

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other Chemicals added	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand		14 pH	15 Hardness	REMARKS
29th	182,263			41												
1	252,806	70,543	588,329	38	3	0.29	0.49				0.68	-0.19				
2	304,156	51,350	428,259	36	2	0.19	0.45				0.49	-0.04				
3	334,331	30,175	251,660	35	1	0.10	0.38									
4	403,929	69,598	580,447	32	3	0.29	0.50									
5	443,701	39,772	331,698	30	2	0.19	0.58				0.37	0.21				
6	480,550	36,849	307,321	28	2	0.19	0.62				0.32	0.30				
7	559,172	78,622	655,707	25	3	0.29	0.44				0.31	0.13				
8	591,731	32,559	271,542	23	2	0.19	0.71				0.26	0.45				
9	655,493	63,762	531,775	21	2	0.19	0.36				0.30	0.06				
10	716,970	61,477	512,718	18	3	0.29	0.56									
11	753,455	36,485	304,285	16	2	0.19	0.63									
12	794,893	41,438	345,593	14	2	0.19	0.56				0.23	0.33				
13	866,227	71,334	594,926	11	3	0.29	0.48				0.25	0.23				
14	901,748	35,521	296,245	9	2	0.19	0.65				0.24	0.41				
15	958,392	56,644	472,411	7	2	0.19	0.41				0.21	0.20		7.55		
16	1,010,810	52,418	437,166	4	3	0.29	0.66				0.23	0.43				
17	1,047,759	36,949	308,155	2	2	0.19	0.62									Recharge 2 + (4+46) = 52
18	1,122,032	74,273	619,437	50	2	0.19	0.31									
19	1,165,568	43,536	363,090	47	3	0.29	0.79				0.26	0.53				
20	1,199,799	34,231	285,487	45	2	0.19	0.67				0.30	0.37				
21	1,267,153	67,354	561,732	43	2	0.19	0.34				0.35	-0.01				
22	1,314,323	47,170	393,398	40	3	0.29	0.73				0.38	0.35		7.60	>120 ppm	
23	1,382,662	68,339	569,947	37	3	0.29	0.51				0.40	0.11				
24	1,423,053	40,391	336,861	35	2	0.19	0.57									
25	1,454,766	31,713	264,486	33	2	0.19	0.73									
26	1,522,204	67,438	562,433	30	3	0.29	0.51				0.35	0.16				
27	1,570,009	47,805	398,694	28	2	0.19	0.48				0.37	0.11				
28	1,600,859	30,850	257,289	27	1	0.10	0.37				0.36	0.01				
29	1,664,306	63,447	529,148	24	3	0.29	0.54									No well readings; values are estimated
30	1,727,753	63,447	529,148	21	3	0.29	0.54				0.38	0.16		8.10	> 120 ppm	
31	1,761,256	33,503	279,415	20	1	0.10	0.34									

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): **Edward Burns**

Title: **Operator**

	Report Month	Year
Littlerock, WA	**FEBUARY**	**2012**

System Name: **Cedar Creek Corrections Center**

Source Name: **SO4 118827**

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite **[yes] 12.5%**
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: **4** gallons (lbs., ozs., qts.) of compound added for every **46** gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Turbidity		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number # of Tests	11 Avg Avg Test	12 De-Demand	PPM Other Chemicals added	14 High Test	15 Low Test	REMARKS
31st	8,763,108			10												
1	8,843,508	80,400	670,536	6	4	0.38	0.57				0.32	0.25				
2	8,864,684	21,176	176,608	4	2	0.19	1.09				0.30	0.79				
3	8,918,328	53,644	447,391	48	2	0.19	0.43				0.26	0.17				
4	8,974,254	55,926	466,423	45	3	0.29	0.62				0.31	0.31				
5	9,038,166	63,912	533,026	42	3	0.29	0.54				0.28	0.26				
6	9,071,190	33,024	275,420	41	1	0.10	0.35				0.31	0.04				
7	9,136,256	65,066	542,650	38	3	0.29	0.53				0.35	0.18				
8	9,177,072	40,816	340,405	36	2	0.19	0.56				0.27	0.29				
9	9,230,000	52,928	441,420	34	2	0.19	0.43				0.40	0.03				
10	9,307,498	77,498	646,333	30	4	0.38	0.59				0.37	0.22				
11	9,314,472	6,974	58,163	30	0	0.00	0.00				0.41	-0.41				
12	9,364,248	49,776	415,132	28	2	0.19	0.46				0.36	0.10				
13	9,418,514	54,266	452,578	26	2	0.19	0.42				0.36	0.06				
14	9,456,998	38,484	320,957	24	2	0.19	0.60				0.27	0.33				
15	9,528,988	71,990	600,397	21	3	0.29	0.48				0.25	0.23				
16	9,551,464	22,476	187,450	19	2	0.19	1.02				0.35	0.67				
17	9,629,206	77,742	648,368	16	3	0.29	0.44				0.22	0.22				
18	9,679,136	49,930	416,416	14	2	0.19	0.46				0.33	0.13				
19	9,696,888	17,752	148,052	13	1	0.10	0.65				0.36	0.29				
20	9,738,220	41,332	344,709	11	2	0.19	0.56				0.22	0.34				
21	9,784,220	46,000	383,640	9	2	0.19	0.50				0.36	0.14				
22	9,852,666	68,446	570,840	7	2	0.19	0.34				0.21	0.13				
23	9,889,350	36,684	305,945	5	2	0.19	0.63				0.22	0.41				
24	9,938,278	48,928	408,060	2	3	0.29	0.71				0.29	0.42				
25	10,011,569	73,291	611,247	48	4	0.38	0.63				0.20	0.43				
26	35,666	24,097	200,969	47	1	0.10	0.48				0.22	0.26				
27	106,399	70,733	589,913	44	3	0.29	0.49				0.33	0.16				
28	155,419	49,020	408,827	42	2	0.19	0.47				0.47	0.00				
29	182,263	26,844	223,879	41	1	0.10	0.43				0.66	-0.23				
30																
31																

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): **Edward Burns**

Title: **Operator**

Littlerock, WA | Report Month: JANUARY | Year: 2012

System Name: **Cedar Creek Corrections Center**

Source Name: **SO4 118827**

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Turbidity		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number # of Tests	11 Avg Avg Test	12 De-Demand	PPM Other Chemicals added	14 High Test	15 Low Test	REMARKS
31st	7,328,895			20												
1	7,349,767	20,872	174,072	19	1	0.10	0.55				0.36	0.19				
2	7,417,980	68,213	568,896	16	3	0.29	0.51				0.34	0.17				
3	7,459,425	41,445	345,651	14	2	0.19	0.56				0.28	0.28				
4	7,508,730	49,305	411,204	12	2	0.19	0.47				0.25	0.22				
5	7,544,020	35,290	294,319	10	2	0.19	0.65				0.29	0.36				
6	7,617,733	73,713	614,766	7	3	0.29	0.47				0.29	0.18				
7	7,667,219	49,486	412,713	5	2	0.19	0.47				0.28	0.19				
8	7,702,460	35,241	293,910	4	1	0.10	0.33				0.30	0.03				
9	7,738,058	35,598	296,887	2	2	0.19	0.65				0.29	0.36				
10	7,808,364	70,306	586,352	50	2	0.19	0.33				0.28	0.05				
11	7,833,193	24,829	207,074	49	1	0.10	0.46				0.30	0.16				
12	7,882,852	49,659	414,156	47	2	0.19	0.46				0.21	0.25				
13	7,961,277	78,425	654,065	44	3	0.29	0.44				0.31	0.13				
14	8,011,171	49,894	416,116	42	2	0.19	0.46				0.30	0.16				
15	8,043,182	32,011	266,972	40	2	0.19	0.72				0.28	0.44				
16	8,087,845	44,663	372,489	38	2	0.19	0.52				0.32	0.20				
17	8,111,090	23,245	193,863	37	1	0.10	0.50				0.32	0.18				
18				34	3	0.29					0.37					Well was shut down for 3 days due to storm.
19				34	0	0.00					0.36					
20				34	0	0.00					0.21					
21	8,187,304	76,214	635,625	34	3	0.29	0.45				0.35	0.10				
22	8,284,108	173,018	1,442,970	30	4	0.38	0.27				0.38	-0.11				
23	8,381,840	97,732	815,085	26	4	0.38	0.47				0.37	0.10				
24	8,448,722	66,882	557,796	24	2	0.19	0.34				0.33	0.01				
25	8,508,502	59,780	498,565	21	3	0.29	0.58				0.25	0.33				
26	8,521,118	12,616	105,217	20	1	0.10	0.91				0.28	0.63				
27	8,598,002	76,884	641,213	17	3	0.29	0.45				0.33	0.12				
28	8,651,016	53,014	442,137	15	2	0.19	0.43				0.27	0.16				
29	8,688,016	37,000	308,580	13	2	0.19	0.62				0.30	0.32				
30	8,722,922	34,906	291,116	11	2	0.19	0.66				0.28	0.38				
31	8,763,108	40,186	335,151	10	1	0.10	0.29				0.21	0.08				

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: December | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	Max. Consecutive 2 Day Avg. _____ REMARKS
30th	6,742,140			30										
1	6,787,866	45,726	381,355	27	3	0.29	0.76					0.39		
2	6,859,141	71,275	594,434	24	3	0.29	0.48					0.33		
3	6,915,852	56,711	472,970	20	4	0.38	0.81					0.38		
4	6,984,685	68,833	574,067	16	4	0.38	0.67					0.27		
5	7,039,007	54,322	453,045	14	2	0.19	0.42					0.38		
6	7,110,379	71,372	595,242	10	4	0.38	0.65					0.43		
7	7,164,354	53,975	450,152	6	4	0.38	0.85					0.30		
8	7,237,633	73,279	611,147	2\50	4	0.38	0.63					0.37		46+4+2=52
9	7,291,201	53,568	446,757	50	2	0.19	0.43					0.30		
10	7,351,615	60,414	503,853	46	4	0.38	0.76					0.28		
11	7,413,261	61,646	514,128	44	2	0.19	0.37					0.38		
12	7,481,051	67,790	565,369	40	4	0.38	0.68					0.30		
13	7,545,869	64,818	540,582	36	4	0.38	0.71					0.29		
14	7,610,926	65,057	542,575	33	3	0.29	0.53					0.43		
15	7,636,450	25,524	212,870	31	2	0.19	0.90					0.34		
16	7,717,625	81,175	677,000	27	4	0.38	0.57					0.41		
17	7,756,934	39,309	327,837	25	2	0.19	0.59					0.34		
18	7,836,247	79,313	661,470	20	5	0.48	0.73					0.38		
19	7,872,763	36,516	304,543	18	2	0.19	0.63					0.33		
20	7,959,868	87,105	726,456	14	4	0.38	0.53					0.33		
21	7,999,394	39,526	329,647	12	2	0.19	0.58					0.38		
22	8,077,820	78,426	654,073	8	4	0.38	0.59					0.37		
23	8,123,523	45,703	381,163	5	3	0.29	0.76					0.35		
24	8,183,383	59,860	499,232	2\50	3	0.29	0.58					0.37		recharge 46+4+2=52
25	8,251,565	68,182	568,638	49	3	0.29	0.51					0.35		
26	8,294,736	43,171	360,046	45	4	0.38	1.07					0.35		
27	8,368,499	73,763	615,183	41	4	0.38	0.62					0.30		
28	8,433,360	64,861	540,941	38	3	0.29	0.53					0.26		
29	8,476,328	42,968	358,353	35	3	0.29	0.80					0.32		
30	8,549,686	73,358	611,806	32	3	0.29	0.47					0.47		
31	8,616,346	66,660	555,944	29	3	0.29	0.52					0.39		

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: November | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	Max. Consecutive 2 Day Avg. _____ REMARKS
31	4,771,451			34										
1	4,837,172	65,721	548,113	31	3	0.29	0.53					0.44		
2	4,915,637	78,465	654,398	28	3	0.29	0.44					0.39		
3	4,979,869	64,232	535,695	25	3	0.29	0.54					0.41		
4	5,040,941	61,072	509,340	21	4	0.38	0.75					0.31		
5	5,109,238	68,297	569,597	17	4	0.38	0.67					0.36		
6	5,179,312	70,074	584,417	13	4	0.38	0.66					0.33		
7	5,251,986	72,674	606,101	9	4	0.38	0.63					0.40		
8	5,318,283	66,297	552,917	5	4	0.38	0.69					0.27		
9	5,393,465	75,182	627,018	2\52	3	0.29	0.46					0.35		RECHARGE 46+4+2=52
10	5,453,914	60,449	504,145	49	3	0.29	0.57					0.31		
11	5,507,849	53,935	449,818	46	3	0.29	0.64					0.36		
12	5,572,069	64,220	535,595	43	3	0.29	0.54					0.38		
13	5,640,953	68,884	574,493	39	4	0.38	0.67					0.39		
14	5,710,524	69,571	580,222	35	4	0.38	0.66					0.42		
15	5,774,756	64,232	535,695	32	3	0.29	0.54					0.32		
16	5,838,738	63,982	533,610	28	4	0.38	0.72					0.32		
17	5,912,970	74,232	619,095	25	3	0.29	0.47					0.40		
18	5,968,174	55,204	460,401	21	4	0.38	0.83					0.40		
19	6,036,832	68,658	572,608	17	4	0.38	0.67					0.42		
20	6,104,957	68,125	568,163	14	3	0.29	0.51					0.37		
21	6,162,133	57,176	476,848	11	3	0.29	0.60					0.36		
22	6,230,613	68,480	571,123	7	4	0.38	0.67					0.36		
23	6,284,423	53,810	448,775	4	3	0.29	0.64					0.37		
24	6,362,185	77,762	648,535	0\50	4	0.38	0.59					0.33		RECHARGE 46+4=50
25	6,420,182	57,997	483,695	47	3	0.29	0.60					0.44		
26	6,487,119	66,937	558,255	43	4	0.38	0.69					0.38		
27	6,558,703	71,584	597,011	40	3	0.29	0.48					0.34		
28	6,623,331	64,628	538,998	36	4	0.38	0.71					0.43		
29	6,667,429	44,098	367,777	34	2	0.19	0.52					0.24		
30	6,742,140	74,711	623,090	30	4	0.38	0.62					0.40		
31														

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: October | Year: 2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	Max. Consecutive 2 Day Avg. _____ REMARKS
30th	2,797,765			46										
1	2,865,284	67,519	563,108	43	3	0.29	0.51					0.56		
2	2,903,421	38,137	318,063	41	2	0.19	0.60					0.57		
3	2,992,609	89,188	743,828	36	5	0.48	0.65					0.57		
4	3,040,651	48,042	400,670	34	2	0.19	0.48					0.32		
5	3,122,352	81,701	681,386	29	5	0.48	0.70					0.36		
6	3,177,748	55,396	462,003	26	3	0.29	0.62					0.32		
7	3,237,746	59,998	500,383	23	3	0.29	0.58					0.34		
8	3,307,393	69,647	580,856	19	4	0.38	0.66					0.36		
9	3,368,868	61,475	512,702	15	4	0.38	0.75					0.35		
10	3,436,705	67,837	565,761	12	3	0.29	0.51					0.27		
11	3,500,154	63,449	529,165	8	4	0.38	0.73					0.26		
12	3,566,661	66,507	554,668	5	3	0.29	0.52					0.29		
13	3,628,869	62,208	518,815	2\52	3	0.29	0.56					0.27		recharged 2+4+46=52
14	3,682,635	53,766	448,408	49	3	0.29	0.64					0.29		
15	3,748,488	65,853	549,214	46	3	0.29	0.52					0.25		
16	3,820,832	72,344	603,349	41	5	0.48	0.80					0.33		
17	3,862,627	41,795	348,570	39	2	0.19	0.55					0.45		
18	3,942,381	79,754	665,148	34	5	0.48	0.72					0.52		
19	4,010,107	67,726	564,835	31	3	0.29	0.51					0.49		
20	4,072,920	62,813	523,860	28	3	0.29	0.55					0.32		
21	4,127,353	54,433	453,971	25	3	0.29	0.63					0.40		
22	4,194,428	67,075	559,406	21	4	0.38	0.69					0.42		
23	4,253,527	59,099	492,886	17	4	0.38	0.78					0.48		
24	4,316,247	62,720	523,085	15	2	0.19	0.37					0.32		
25	4,382,481	66,234	552,392	11	4	0.38	0.70					0.29		
26	4,454,701	72,220	602,315	7	4	0.38	0.64					0.32		
27	4,512,034	57,333	478,157	4\52	3	0.29	0.60					0.33		recharge-44+4+4=52
28	4,563,295	51,261	427,517	46	6	0.58	1.35					0.30		
29	4,634,209	70,914	591,423	43	3	0.29	0.49					0.37		
30	4,702,781	68,572	571,890	39	4	0.38	0.67					0.42		
31	4,771,451	68,670	572,708	34	5	0.48	0.84					0.44		

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: September | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	REMARKS
30th	882,823			49										
1	946,090	63,267	527,647	45	4	0.38	0.73				0.45	0.28		
2	1,009,716	63,626	530,641	42	3	0.29	0.54				0.86	-0.32		
3	1,075,308	65,592	547,037	39	3	0.29	0.53				0.76	-0.23		
4	1,154,753	79,445	662,571	35	4	0.38	0.58				0.58	0.00		
5	1,211,989	57,236	477,348	32	3	0.29	0.60				0.61	-0.01		
6	1,286,349	74,360	620,162	28	4	0.38	0.62				0.45	0.17		
7	1,352,699	66,350	553,359	25	3	0.29	0.52				0.31	0.21		
8	1,404,029	51,330	428,092	22	3	0.29	0.67				0.52	0.15		
9	1,469,821	65,792	548,705	19	3	0.29	0.52				0.22	0.30		
10	1,527,160	57,339	478,207	15	4	0.38	0.80				0.23	0.57		
11	1,596,873	69,713	581,406	12	3	0.29	0.50				0.23	0.27		
12	1,667,329	70,456	587,603	8	4	0.38	0.65				0.20	0.45		
13	1,732,904	65,575	546,896	4	4	0.38	0.70				0.22	0.48		
14	1,805,600	72,696	606,285	0\50	4	0.38	0.63				0.22	0.41		Recharge 46+4=50
15	1,866,218	60,618	505,554	47	3	0.29	0.57				0.28	0.29		
16	1;916,536	50,318	419,652	44	3	0.29	0.69				0.36	0.33		
17	2,002,434	85,898	716,389	40	4	0.38	0.54				0.27	0.27		
18	2,057,981	55,547	463,262	36	4	0.38	0.83				0.36	0.47		
19	2,119,118	61,137	509,883	33	3	0.29	0.56				0.31	0.25		
20	2,183,969	64,851	540,857	30	3	0.29	0.53				0.32	0.21		
21	2,245,775	61,806	515,462	26	4	0.38	0.74				0.39	0.35		
22	2,311,598	65,823	548,964	23	3	0.29	0.52				0.33	0.19		
23	2,350,948	39,350	328,179	21	2	0.19	0.59				0.36	0.23		
24	2,430,512	79,564	663,564	16	5	0.48	0.72				0.34	0.38		
25	2,487,281	56,769	473,453	14	2	0.19	0.41				0.40	0.01		
26	2,553,576	66,295	552,900	9	5	0.48	0.87				0.46	0.41		
27	2,618,694	65,118	543,084	6	3	0.29	0.53				0.37	0.16		
28	2,674,138	55,444	462,403	3\53	3	0.29	0.62				0.35	0.27		Recharge 46+4+3=53
29	2,747,294	73,156	610,121	50	3	0.29	0.47				0.38	0.09		
30	2,797,765	50,471	420,928	46	4	0.38	0.91				0.38	0.53		
31														

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Larry Vene

Title
Operator

City: Littlerock, WA | Report Month: August | Year: 2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13	
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	PPM Other Chemicals added	Max. Consecutive 2 Day Avg. _____ REMARKS
30th	8,896,294			51										
1	8,956,172	59,878	499,383	48	3	0.29	0.58				0.37	0.21		
2	9,020,660	64,488	537,830	45	3	0.29	0.54				0.38	0.16		
3	9,062,720	42,060	350,780	42	3	0.29	0.82				0.37	0.45		
4	9,146,394	83,674	697,841	38	4	0.38	0.55				0.46	0.09		
5	9,191,432	45,038	375,617	35	3	0.29	0.77				0.51	0.26		
6	9,271,124	79,692	664,631	34	1	0.10	0.14				0.50	-0.36		
7	9,333,716	62,592	522,017	30	4	0.38	0.74				0.31	0.43		
8	9,398,632	64,916	541,399	27	3	0.29	0.53				0.36	0.17		
9	9,468,730	70,098	584,617	24	3	0.29	0.49				0.36	0.13		
10	9,536,464	67,734	564,902	20	4	0.38	0.68				0.44	0.24		
11	9,597,910	61,446	512,460	16	4	0.38	0.75				0.40	0.35		
12	9,622,266	24,356	203,129	15	1	0.10	0.47				0.39	0.08		
13	9,708,588	86,322	719,925	10	5	0.48	0.67				0.42	0.25		
14	9,767,126	58,538	488,207	7	3	0.29	0.59				0.34	0.25		
15	9,838,438	71,312	594,742	2\52	5	0.48	0.81				0.43	0.38		recharge 2 plus 50=52
16	9,899,970	61,532	513,177	50	2	0.19	0.37				0.53	-0.16		
17	9,968,854	68,884	574,493	47	3	0.29	0.50				0.50	0.00		
18	36,081	67,227	560,673	44	3	0.29	0.51				0.45	0.06		
19	85,638	49,557	413,305	40	4	0.38	0.93				0.35	0.58		
20	159,843	74,205	618,870	36	4	0.38	0.62				0.38	0.24		
21	229,553	69,710	581,381	33	3	0.29	0.50				0.47	0.03		
22	294,277	64,724	539,798	29	4	0.38	0.71				0.41	0.30		
23	367,772	73,495	612,948	25	4	0.38	0.63				0.44	0.19		
24	433,834	66,062	550,957	21	4	0.38	0.70				0.37	0.33		
25	482,915	49,081	409,336	19	2	0.19	0.47				0.46	0.01		
26	552,127	69,212	577,228	15	4	0.38	0.67				0.37	0.30		
27	615,128	63,001	525,428	11	4	0.38	0.73				0.45	0.28		
28	681,998	66,870	557,696	8	3	0.29	0.52				0.38	0.14		
29	729,653	47,655	397,443	5	3	0.29	0.72				0.37	0.35		
30	805,366	75,713	631,446	2\52	3	0.29	0.46				0.27	0.19		Recharged tank 46+4+2=52
31	882,823	77,457	645,991	49	3	0.29	0.45				0.41	0.04		

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Larry Vene

Title
Operator

City: Littlerock, WA | Report Month: July | Year: 2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	REMARKS
30th	6,885,705			45										
1	6,959,372	73,667	614,383	44	1	0.10	0.16				0.91	-0.75		
2	7,021,289	61,917	516,388	41	3	0.29	0.56				0.81	-0.25		
3	7,098,988	77,699	648,010	38	3	0.29	0.44				0.79	-0.35		
4	7,158,642	59,654	497,514	36	2	0.19	0.39				0.61	-0.22		
5	7,218,606	59,964	500,100	34	2	0.19	0.38				0.49	-0.11		
6	7,303,612	85,006	708,950	32	2	0.19	0.27				0.35	-0.08		
7	7,351,656	48,044	400,687	30	2	0.19	0.48				0.45	0.03		
8	7,415,607	63,951	533,351	26	4	0.38	0.72				0.42	0.30		
9	7,486,126	70,519	588,128	24	2	0.19	0.33				0.28	0.05		
10	7,536,996	50,870	424,256	21	3	0.29	0.68				0.22	0.46		
11	7,622,195	85,199	710,560	17	4	0.38	0.54				0.24	0.30		
12	7,671,527	49,332	411,429	15	2	0.19	0.47				0.24	0.23		
13	7,761,683	90,156	751,901	11	4	0.38	0.51				0.24	0.27		
14	7,810,095	48,412	403,756	7	4	0.38	0.95				0.23	0.72		
15	7,879,790	69,695	581,256	53	4	0.38	0.66				0.32	0.34		recharged tank 50 + 3
16	7,935,597	55,807	465,430	51	2	0.19	0.41				0.32	0.09		
17	8,019,995	84,398	703,879	46	5	0.48	0.68				0.42	0.26		
18	8,076,103	56,108	467,941	43	3	0.29	0.62				0.41	0.21		
19	8,144,754	68,651	572,549	40	3	0.29	0.50				0.47	0.03		
20	8,210,264	65,510	546,353	36	4	0.38	0.70				0.36	0.34		
21	8,274,863	64,599	538,756	33	3	0.29	0.53				0.35	0.18		
22	8,329,879	55,016	458,833	30	3	0.29	0.63				0.48	0.15		
23	8,400,032	70,153	585,076	26	4	0.38	0.66				0.44	0.22		
24	8,456,802	56,770	473,462	23	3	0.29	0.61				0.41	0.20		
25	8,520,982	64,180	535,261	20	3	0.29	0.54				0.40	0.14		
26	8,580,852	59,870	499,316	17	3	0.29	0.58				0.41	0.17		
27	8,652,606	71,754	598,428	13	4	0.38	0.64				0.45	0.19		
28	8,710,800	58,194	485,338	10	3	0.29	0.59				0.39	0.20		
29	8,759,240	48,440	403,990	7	3	0.29	0.71				0.31	0.40		
30	8,824,414	65,174	543,551	5	2	0.19	0.35				0.23	0.12		
31	8,896,294	71,880	599,479	1	4	0.38	0.64				0.31	0.33		Recharged CL2 tank 50+1=51

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Larry Vene

Title
Operator

City: Littlerock, WA | Report Month: June | Year: 2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
31st	5,011,679			38												
1	5,075,269	63,590	530,341	38	0	0.00	0.00				0.45	-0.45				
2	5,116,538	41,269	344,183	36	2	0.19	0.56				0.41	0.15				
3	5,184,680	68,142	568,304	34	2	0.19	0.34				0.29	0.05				
4	5,253,804	69,124	576,494	30	4	0.38	0.67				0.35	0.32				
5	5,315,370	61,566	513,460	26	4	0.38	0.75				0.38	0.37				
6	5,382,684	67,314	561,399	24	2	0.19	0.34				0.41	-0.07				
7	5,440,544	57,860	482,552	21	3	0.29	0.60				0.48	0.12				
8	5,512,179	71,635	597,436	18	3	0.29	0.48				0.46	0.02				
9	5,572,518	60,339	503,227	15	3	0.29	0.57				0.38	0.19				
10	5,635,701	63,183	526,946	11	4	0.38	0.73				0.32	0.41				
11	5,701,954	66,253	552,550	11	0	0.00	0.00				0.40	-0.40				
12	5,758,315	56,361	470,051	7	4	0.38	0.82				0.30	0.52				
13	5,812,630	54,315	452,987	5\55	2	0.19	0.42				0.27	0.15				46+4+5=55 rechared cl2 tank
14	5,878,659	66,029	550,682	50	5	0.48	0.87				0.38	0.49				
15	5,946,359	67,700	564,618	46	4	0.38	0.68				0.38	0.30				
16	6,006,680	60,321	503,077	44	2	0.19	0.38				0.54	-0.16				
17	6,061,472	54,792	456,965	40	4	0.38	0.84				0.59	0.25				
18	6,124,208	62,736	523,218	40	0	0.00	0.00				0.64	-0.64				air lock at cl2 pump. Corrected problem
19	6,199,343	75,135	626,626	36	4	0.38	0.61				0.45	0.16				
20	6,250,337	50,994	425,290	35	1	0.10	0.23				0.35	-0.12				
21	6,314,976	64,639	539,089	30	5	0.48	0.89				0.43	0.46				
22	6,379,616	64,640	539,098	28	2	0.19	0.36				0.38	-0.02				
23	6,448,089	68,473	571,065	24	4	0.38	0.67				0.45	0.22				
24	6,494,360	46,271	385,900	21	3	0.29	0.75				0.39	0.36				
25	6,571,511	77,151	643,439	17	4	0.38	0.60				0.47	0.12				
26	6,621,639	50,128	418,068	15	2	0.19	0.46				0.23	0.23				
27	6,696,584	74,945	625,041	10	5	0.48	0.77				0.36	0.41				
28	6,752,210	55,626	463,921	7	3	0.29	0.62				0.39	0.23				
29	6,826,947	74,737	623,307	3\53	4	0.38	0.62				0.32	0.30				46+4+3=53 rechared cl2 tank
30	6,885,705	58,758	490,042	45	8	0.77	1.57				0.37	1.20				

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: May | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
30th	3,161,270			33												
1	3,215,560	54,290	452,779	30	3	0.29	0.64				0.39	0.25		7.97		
2	3,277,915	62,355	520,041	27	3	0.29	0.55				0.37	0.18		7.98		
3	3,343,977	66,062	550,957	24	3	0.29	0.52				0.39	0.13		8.15		
4	3,413,749	69,772	581,898	20	4	0.38	0.66				0.35	0.31				
5	3,478,525	64,776	540,232	15	5	0.48	0.89				0.34	0.55				
6	3,530,876	52,351	436,607	12	3	0.29	0.66				0.43	0.23		8.14		
7	3,613,304	82,428	687,450	8	4	0.38	0.56				0.40	0.16		8.04		
8	3,663,397	50,093	417,776	5	3	0.29	0.69				0.31	0.38		8.06		
9	3,726,354	62,957	525,061	2\52	3	0.29	0.55				0.32	0.23		8.18		Recharge 2+4+46=52
10	3,783,168	56,814	473,829	50	2	0.19	0.41				0.41	0.00		7.87		
11	3,850,979	67,811	565,544	46	4	0.38	0.68				0.39	0.29				
12	3,915,162	64,183	535,286	43	3	0.29	0.54				0.22	0.32				
13	3,954,888	39,726	331,315	41	2	0.19	0.58				0.40	0.18		7.91		
14	4,015,721	60,834	507,356	38	3	0.29	0.57				0.40	0.17		8.06		
15	4,076,555	60,833	507,347	34	4	0.38	0.76				0.40	0.36		7.98		
16	4,146,338	69,783	581,990	30	4	0.38	0.66				0.37	0.29		8.13		
17	4,201,329	54,991	458,625	30	0	0.00	0.00				0.39	-0.39		8.05		
18	4,262,207	60,878	507,723	27	3	0.29	0.57				0.37	0.20				
19	4,322,536	60,329	503,144	26	1	0.10	0.19				0.23	-0.04				
20	4,366,064	43,528	363,024	25	1	0.10	0.26				0.23	0.03		8.16		
21	4,436,044	69,980	583,633	21	4	0.38	0.66				0.25	0.41		7.93		
22	4,486,267	50,223	418,860	18	3	0.29	0.69				0.29	0.40		8.02		
23	4,553,804	67,537	563,259	15	3	0.29	0.51				0.29	0.22		8.06		
24	4,584,462	30,658	255,688	14	1	0.10	0.38				0.28	0.10		8.14		
25	4,672,993	88,531	738,349	10	4	0.38	0.52				0.27	0.25				
26	4,722,169	49,176	410,128	7	3	0.29	0.70				0.30	0.40				
27	4,774,700	52,531	438,109	5	2	0.19	0.44				0.30	0.14		8.24		we cleaned CL2 tank and dumped the last 5 gal. and added
28	4,832,511	57,811	482,144	47	3	0.29	0.60				0.35	0.25		7.99		
29	4,902,292	69,781	581,974	44	3	0.29	0.49				0.41	0.08		8.01		
30	4,945,700	43,408	362,023	42	2	0.19	0.53				0.45	0.08		7.98		
31	5,011,679	65,979	550,265	38	4	0.38	0.70				0.46	0.24		7.97		

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Edward D. Burns

Title
Operator

City: Littlerock, WA | Report Month: April | Year: 2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
30th	1,435,951			24												
1	1,461,004	25,053	208,942	23	1	0.10	0.46				0.24	0.22		8.24		
2	1,547,622	86,618	722,394	18	5	0.48	0.66				0.22	0.44		7.99		
3	1,578,867	31,245	260,583	16	2	0.19	0.74				0.20	0.54		8.04		
4	1,665,970	87,103	726,439	13	3	0.29	0.40				0.20	0.20		8.13		
5	1,714,695	48,725	406,367	11	2	0.19	0.47				0.23	0.24		8.14		
6	1,769,531	54,836	457,332	8	3	0.29	0.63				0.19	0.44				
7	1,836,817	67,286	561,165	5\55	3	0.29	0.51				0.25	0.26				recharge (46÷4)+5=55
8	1,880,792	43,975	366,752	50	5	0.48	1.31				0.27	1.04		8.16		
9	1,944,416	63,624	530,624	48	2	0.19	0.36				0.24	0.12		8.12		
10	2,003,795	59,379	495,221	45	3	0.29	0.58				0.24	0.34		8.21		
11	2,037,584	33,789	281,800	44	1	0.10	0.34				0.29	0.05		8.20		
12	2,120,884	83,300	694,722	39	5	0.48	0.69				0.21	0.48		8.14		
13	2,172,908	52,024	433,880	36	3	0.29	0.66				0.22	0.44				
14	2,228,750	55,842	465,722	33	3	0.29	0.62				0.36	0.26				
15	2,269,789	41,039	342,265	30	3	0.29	0.84				0.32	0.52		7.93		
16	2,335,964	66,175	551,900	28	2	0.19	0.35				0.40	-0.05		8.18		
17	2,400,980	65,016	542,233	24	4	0.38	0.71				0.43	0.28		8.18		
18	2,435,609	34,629	288,806	22	2	0.19	0.66				0.41	0.25		8.04		
19	2,492,274	56,665	472,586	19	3	0.29	0.61				0.46	0.15		8.30		
20	2,548,939	56,665	472,586	16	3	0.29	0.61				0.39	0.22				
21	2,633,352	84,413	704,004	12	4	0.38	0.55				0.38	0.17				
22	2,678,978	45,626	380,521	9	3	0.29	0.76				0.29	0.47		7.95		
23	2,735,591	56,613	472,152	6	3	0.29	0.61				0.41	0.20		8.18		
24	2,798,934	63,343	528,281	3\52	1	0.10	0.18				0.21	-0.03		8.06		recharge (46÷4) +2= 52
25	2,833,340	34,406	286,946	50	2	0.19	0.67				0.31	0.36		8.28		
26	2,917,229	83,889	699,634	46	4	0.38	0.55				0.27	0.28		8.08		
27	2,966,078	48,849	407,401	44	2	0.19	0.47				0.28	0.19				
28	3,040,256	74,178	618,645	40	4	0.38	0.62				0.40	0.22				
29	3,088,240	47,984	400,187	37	3	0.29	0.72				0.29	0.43		7.76		
30	3,161,270	73,030	609,070	33	4	0.38	0.63				0.35	0.28		8.06		
31																

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Steven E. Blahut

Title: Operator

City: Littlerock, WA | Report Month: March | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Water Quality		Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	14 pH	15 Hardness	REMARKS
28th	9,674,006			8												
1	9,756,566	82,560	688,550	2\52	6	0.58	0.84				0.32	0.52		8.30		
2	9,784,576	28,010	233,603	51	1	0.10	0.41									
3	9,870,276	85,700	714,738	47	4	0.38	0.54									
4	9,917,000	46,724	389,678	45	2	0.19	0.49				0.39	0.10		8.26		
5	9,940,000	23,000	191,820	43	2	0.19	1.00				0.37	0.63		8.14		
6	37,836	60,000	500,400	40	3	0.29	0.58				0.39	0.19		8.24		
7	72,930	35,094	292,684	38	2	0.19	0.66				0.32	0.34		8.37		
8	157,131	84,201	702,236	34	4	0.38	0.55				0.32	0.23		8.31		
9	204,615	47,484	396,017	32	2	0.19	0.48									
10	264,136	59,521	496,405	29	3	0.29	0.58									
11	290,385	26,249	218,917	28	1	0.10	0.44				0.31	0.13		8.23		
12	376,078	85,693	714,680	24	4	0.38	0.54				0.23	0.31		8.14		
13	430,948	54,870	457,616	21	3	0.29	0.63				0.32	0.31		8.09		estimate
14	485,817	54,869	457,607	18	3	0.29	0.63				0.33	0.30		8.06		
15	551,457	65,640	547,438	15	3	0.29	0.53				0.30	0.23		8.16		
16	584,285	32,828	273,786	14	1	0.10	0.35									
17	651,237	66,952	558,380	10	4	0.38	0.69									
18	682,400	31,163	259,899	7	3	0.29	1.11				0.29	0.82		7.40		
19	740,897	58,497	487,865	5	2	0.19	0.39				0.31	0.08		7.99		
20	799,393	58,496	487,857	4\50	1	0.10	0.20				0.26	-0.06		7.92		Recharged (46+4)+4=54
21	883,459	84,066	701,110	49	5	0.48	0.68				0.28	0.40		7.99		
22	936,044	52,585	438,559	46	3	0.29	0.66				0.32	0.34		7.66		
23	977,956	41,912	349,546	45	1	0.10	0.27									
24	1,049,936	71,980	600,313	41	4	0.38	0.64									
25	1,096,221	46,285	386,017	40	1	0.10	0.25				0.53	-0.28		7.87		
26	1,142,506	46,285	386,017	37	3	0.29	0.75				0.44	0.31		7.85		
27	1,215,877	73,371	611,914	34	3	0.29	0.47				0.43	0.04		8.10		
28	1,251,905	36,028	300,474	32	2	0.19	0.64				0.31	0.33		8.18		
29	1,321,562	69,657	580,939	29	3	0.29	0.50				0.29	0.21		8.18		
30	1,383,781	62,219	518,906	26	3	0.29	0.56									
31	1,435,951	52,170	435,098	24	2	0.19	0.44									

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report)
Steven E. Blahut

Title
Operator

City
Littlerock, WA

Report Month
February

Year
2013

CHLORINATION PLANT & TURBIDITY REPORT

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas yes/no ....%
2. Liquid Hypochlorite [yes] 12.5%
3. Powdered Hypochlorite yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

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MAR 08 2013
DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other Chemicals added	Water Quality		Max. Consecutive 2 Day Avg. ____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	Pounds Used	7 Calculated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 Demand		14 pH	15 Hardness	REMARKS
31st	1,698,512															
1	8,179,295	9,756,566	81,369,760	33	3	0.29	0.00				0.30	-0.30		8.14	120<250	
2	8,237,664	58,369	486,797	30	3	0.29	0.59									
3	8,277,730	40,066	334,150	28	2	0.19	0.57									
4	8,318,539	40,809	340,347	25	3	0.29	0.85				0.36	0.49		7.63		
5	8,410,510	91,971	767,038	21	4	0.38	0.50				0.33	0.17		8.17		
6	8,421,806	11,296	94,209	20	1	0.10	1.02				0.31	0.71		8.14		
7	8,513,190	91,384	762,143	17	3	0.29	0.38				0.37	0.01		8.18		
8	8,560,093	46,903	391,171	14	3	0.29	0.74				0.35	0.39		7.83	120<250	
9	8,619,222	59,129	493,136	10	4	0.38	0.78									
10	8,679,998	60,776	506,872	7	3	0.29	0.57									
11	8,723,764	43,766	365,008	5\55	2	0.19	0.53				0.25	0.28		7.97		recharge
12	8,786,522	61,758	515,062	52	3	0.29	0.56				0.41	0.15		8.57		
13	8,845,984	60,462	504,253	48	4	0.38	0.76				0.34	0.42		8.18		
14	8,874,576	28,592	238,457	46	2	0.19	0.81				0.38	0.43		8.21		
15	8,962,537	87,961	733,595	43	3	0.29	0.39				0.35	0.04		8.08	>120<250	
16	9,002,924	40,387	336,828	40	3	0.29	0.86									
17	9,074,466	71,542	596,660	37	3	0.29	0.48									
18	9,119,894	45,428	378,870	35	2	0.19	0.51				0.35	0.16		8.02		
19	9,161,886	41,992	350,213	33	2	0.19	0.55				0.37	0.18		8.26		
20	9,234,348	72,462	604,333	29	4	0.38	0.64				0.34	0.30		8.14		
21	9,266,042	31,694	264,328	27	2	0.19	0.73				0.35	0.38		7.88		
22	9,354,873	88,831	740,851	24	3	0.29	0.39				0.34	0.05		8.20	>120<250	
23	9,402,222	47,349	394,891	21	3	0.29	0.73									
24	9,472,646	70,424	587,336	18	3	0.29	0.49									
25	9,501,260	28,614	238,641	16	2	0.19	0.80				0.36	0.44		8.23		
26	9,580,554	79,294	661,312	13	3	0.29	0.44				0.31	0.13		8.28		
27	9,636,178	55,624	463,904	10	3	0.29	0.62				0.37	0.25		8.05		
28	9,674,006	37,828	315,486	8	2	0.19	0.61				0.30	0.31		8.20		
29																
30																
31																

RECEIVED
MAR 08 2013
Department Of Health
SW Drinking Water Operations

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Larry Vene

Title: Operator

City: Littlerock, WA | Report Month: February | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	REMARKS
30th	8,093,851			36										
1	8,179,295	85,444	712,603	33	3	0.29	0.40				0.30	0.10		
2	8,237,664	58,369	486,797	30	3	0.29	0.59							
3	8,277,730	40,066	334,150	28	2	0.19	0.57							
4	8,318,539	40,809	340,347	25	3	0.29	0.85				0.36	0.49		
5	8,410,510	91,971	767,038	21	4	0.38	0.50				0.33	0.17		
6	8,421,866	11,356	94,709	20	1	0.10	1.01				0.31	0.70		
7	8,513,190	91,324	761,642	17	3	0.29	0.38				0.37	0.01		
8	8,560,093	46,903	391,171	14	3	0.29	0.74				0.35	0.39		
9	8,619,222	59,129	493,136	10	4	0.38	0.78							
10	8,679,998	60,776	506,872	7	3	0.29	0.57							
11	8,723,764	43,766	365,008	5	2	0.19	0.53				0.25	0.28		
12	8,785,522	61,758	515,062	5\52	3	0.29	0.56				0.41	0.15		
13	8,845,984	60,462	504,253	48	4	0.38	0.76				0.34	0.42		
14	8,874,576	28,592	238,457	46	2	0.19	0.81				0.38	0.43		
15	8,962,537	87,961	733,595	43	3	0.29	0.39				0.35	0.04		
16	9,002,924	40,387	336,828	40	3	0.29	0.86							
17	9,074,466	71,542	596,660	37	3	0.29	0.48							
18	9,119,894	45,428	378,870	35	2	0.19	0.51				0.35	0.16		
19	9,161,886	41,992	350,213	33	2	0.19	0.55				0.37	0.18		
20	9,234,348	72,462	604,333	29	4	0.38	0.64				0.34	0.30		
21	9,266,042	31,694	264,328	27	2	0.19	0.73				0.35	0.38		
22	9,354,873	88,831	740,851	24	3	0.29	0.39				0.34	0.05		
23	9,402,222	47,349	394,891	21	3	0.29	0.73							
24	9,472,646	70,424	587,336	18	3	0.29	0.49							
25	9,501,260	28,614	238,641	16	2	0.19	0.80				0.36	0.44		
26	9,580,554	79,294	661,312	13	3	0.29	0.44				0.31	0.13		
27	9,636,178	55,624	463,904	10	3	0.29	0.62				0.37	0.25		
28	9,674,006	37,828	315,486	8	2	0.19	0.61				0.3	0.31		
29														
30														
31														

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Steven E. Blahut

Title: Operator

City: Littlerock, WA | Report Month: February | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., qts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other	Max. Consecutive 2 Day Avg. _____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	6 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand	Chemicals added	REMARKS
30th	8,093,851			36										
1	8,179,295	85,444	712,603	33	3	0.29	0.40				0.30	0.10		
2	8,237,664	58,369	486,797	30	3	0.29	0.59							
3	8,277,730	40,066	334,150	28	2	0.19	0.57							
4	8,318,539	40,809	340,347	25	3	0.29	0.85				0.36	0.49		
5	8,410,510	91,971	767,038	21	4	0.38	0.50				0.33	0.17		
6	8,421,866	11,356	94,709	20	1	0.10	1.01				0.31	0.70		
7	8,513,190	91,324	761,642	17	3	0.29	0.38				0.37	0.01		
8	8,560,093	46,903	391,171	14	3	0.29	0.74				0.35	0.39		
9	8,619,222	59,129	493,136	10	4	0.38	0.78							
10	8,679,998	60,776	506,872	7	3	0.29	0.57							
11	8,723,764	43,766	365,008	5	2	0.19	0.53				0.25	0.28		
12	8,785,522	61,758	515,062	5\52	3	0.29	0.56				0.41	0.15		
13	8,845,984	60,462	504,253	48	4	0.38	0.76				0.34	0.42		
14	8,874,576	28,592	238,457	46	2	0.19	0.81				0.38	0.43		
15	8,962,537	87,961	733,595	43	3	0.29	0.39				0.35	0.04		
16	9,002,924	40,387	336,828	40	3	0.29	0.86							
17	9,074,466	71,542	596,660	37	3	0.29	0.48							
18	9,119,894	45,428	378,870	35	2	0.19	0.51				0.35	0.16		
19	9,161,886	41,992	350,213	33	2	0.19	0.55				0.37	0.18		
20	9,234,348	72,462	604,333	29	4	0.38	0.64				0.34	0.30		
21	9,266,042	31,694	264,328	27	2	0.19	0.73				0.35	0.38		
22	9,354,873	88,831	740,851	24	3	0.29	0.39				0.34	0.05		
23	9,402,222	47,349	394,891	21	3	0.29	0.73							
24	9,472,646	70,424	587,336	18	3	0.29	0.49							
25	9,501,260	28,614	238,641	16	2	0.19	0.80				0.36	0.44		
26	9,580,554	79,294	661,312	13	3	0.29	0.44				0.31	0.13		
27	9,636,178	55,624	463,904	10	3	0.29	0.62				0.37	0.25		
28	9,674,006	37,828	315,486	8	2	0.19	0.61				0.3	0.31		
29														
30														
31														

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FEB 06 2013

Department Of Health
SW Drinking Water Operations

CHLORINATION PLANT & TURBIDITY REPORT

Health Services Division

REPORT SUBMITTED BY:

Name (Person Completing Report): Steven E. Biahut

Title: Operator

City: Littlerock, WA | Report Month: JANUARY | Year: 2013

System Name: Cedar Creek Corrections Center

Source Name: SO4 118827

Type and strength of Chlorine as delivered:

1. Gas — yes/no ....%
2. Liquid Hypochlorite — [yes] 12.5%
3. Powdered Hypochlorite — yes/no ....%

Hypochlorite Solution Strength: 4 gallons (lbs., ozs., cts.) of compound added for every 46 gals of water.

0.096 pounds of available chlorine per gallon of solution.

	QUANTITY OF WATER TREATED			Chlorine Used 12.5 % available			System Evaluaion						13 PPM Other Chemicals added	Water Quality		Max. Consecutive 2 Day Avg. ____
1 Date	2 Meter Reading	3 Volume	4 Pounds	5 Tank Wt or Gals	Gals Used	5 Pounds Used	7 Calcu-lated	8 High Test	9 Low Test	10 Number of Tests	11 Avg Test	12 De-mand		14 pH	15 Hardness	REMARKS
[illegible]																
1	6,459,469	64,130	534,844	13	4	0.38	0.72									
2	6,523,598	64,129	534,836	9	4	0.38	0.72							7.88		
3	6,568,350	44,752	373,232	9	0	0.00	0.00				0.28	-0.28		7.99		
4	6,646,961	78,611	655,616	4	5	0.48	0.73				0.23	0.50		8.20	120<250	
5	6,696,918	49,957	416,641	2	2	0.19	0.46									Recharge 2 + [46 + 4] = 52
6	6,740,326	43,408	362,023	2\52	2	0.19	0.53									
7	6,806,266	65,940	549,940	48	2	0.19	0.35				0.30	0.05		8.22		
8	6,838,727	32,461	270,725	46	2	0.19	0.71				0.35	0.36		8.26		
9	6,927,840	89,113	743,202	43	3	0.29	0.39				0.35	0.04		8.06		
10	6,974,141	46,301	386,150	40	3	0.29	0.75				0.31	0.44		8.08		
11	7,023,919	49,778	415,149	37	3	0.29	0.69				0.34	0.35		8.21	120<250	
12	7,101,337	77,418	645,666	34	3	0.29	0.45									
13	7,145,221	43,884	365,993	32	2	0.19	0.52									
14	7,187,639	42,418	353,766	30	2	0.19	0.54				0.39	0.15		8.05		
15	7,259,251	71,612	597,244	27	3	0.29	0.48				0.35	0.13		8.00		
16	7,285,595	26,344	219,709	25	2	0.19	0.87				0.30	0.57		8.01		
17	7,370,652	85,057	709,375	22	3	0.29	0.41				0.31	0.10		8.14		
18	7,423,152	52,500	437,850	18	4	0.38	0.88				0.31	0.57		8.24	120<250	
19	7,479,474	56,322	469,725	16	2	0.19	0.41									
20	7,517,445	37,971	316,678	14	2	0.19	0.61									
21	7,568,692	51,247	427,400	10	4	0.38	0.90				0.27	0.63		8.25		
22	7,613,065	44,373	370,071	9	1	0.10	0.26				0.34	-0.08		8.20		
23	7,658,505	45,440	378,970	6	3	0.29	0.76				0.34	0.42		8.02		
24	7,740,249	81,744	681,745	3\53	3	0.29	0.42				0.32	0.10		8.06		Recharged 3 +[46+4]=53
25	7,784,805	44,556	371,597	51	2	0.19	0.52				0.34	0.18		8.20	120<250	
26	7,829,648	44,843	373,991	50	1	0.10	0.26									
27	7,909,297	79,649	664,273	45	5	0.48	0.72									
28	7,946,026	36,729	306,320	43	2	0.19	0.63				0.32	0.31		8.18		
29	8,001,408	55,382	461,886	40	3	0.29	0.62				0.37	0.25		8.20		
30	8,068,928	67,520	563,117	37	3	0.29	0.51				0.26	0.25		8.10		
31	8,093,851	24,923	207,858	36	1	0.10	0.46									

Larch Corrections Center

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year : **January 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	62999	62999		11.47	14.00		0.19	WWTP		
2	46189	46189		10.60	12.50		0.17	WWTP		
3	54312	54312		11.83	10.00		0.17	WWTP		
4	60,109	60,109		11.99	8.00		0.25	WWTP		
5	43,556	43,556		11.40	17.00	1.00	0.17	WWTP	0.29	Prog Bldg
6	65,801	65,801		11.39	14.25		0.23	WWTP		
7	41,588	41,588		8.88	12.75		0.31	WWTP		
8	45,553		45,553	10.63	11.75		0.35	WWTP		
9	53,182		53,182	11.45	10.75		0.34	WWTP		
10	52,763		52,763	10.00	9.75		0.34	WWTP		
11	61,545		61,545	10.82	8.50		0.31	WWTP		
12	62,405		62,405	9.67	7.50		0.27	WWTP		
13	44,094		44,094	9.71	17.25	1.00	0.25	WWTP		
14	62,278		62,278	8.89	16.00		0.27	WWTP		
15	68,411	68,411		9.74	13.75		0.20	WWTP		
16	59,765	59,765		10.09	12.25		0.25	WWTP		
17	85,496	85,496		10.10	9.75		0.28	WWTP	0.33	Silver Star
18	37,998	37,998		10.53	19.00	1.00	0.17	WWTP		
19	101,503	101,503		9.60	16.25		0.31	WWTP		
20	58,942	58,942		8.08	15.75		0.31	WWTP		
21	49,368	49,368		8.28	13.50		0.29	WWTP		
22	56,324		56,324	7.62	12.50		0.36	WWTP	0.17	Kitchen
23	70,312		70,312	9.88	11.00		0.27	WWTP		
24	67,768		67,768	9.79	10.00		0.32	WWTP		
25	58,269		58,269	10.03	8.50		0.25	WWTP		
26	62,682		62,682	10.17	17.75	1.00	0.28	WWTP		
27	67,484		67,484	9.66	16.25		0.27	WWTP		
28	49,210		49,210	8.43	15.00		0.27	WWTP		
29	64,993		64,993	9.02	14.25		0.26	WWTP		
30	63,505		63,505	10.44	13.25		0.24			
31	61,111	61,111		10.26	11.25		0.23	WWTP		
Total	1,839,515	897,148	942,367			4				
High	101,503	101,503	70,312	12			0.36		0.33	
Low	37,998	37,998	44,094	8			0.17		0.17	
Avg.	59,339	59,810	58,898	10			0.26		0.26	

Water Consumed in gallons	1,452,675
Unaccounted for Water in gallons	386,840
Percent of Unaccounted for Water	21%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year : **February 2012**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	58,867	58,867		10.64	9.25		0.25	WWTP		
2	63,804	63,804		10.46	7.25		0.29	WWTP	0.37	Yard
3	65,674	65,674		10.80	15.50	1.00	0.29	WWTP		
4	50,183	50,183		9.28	14.00		0.33	WWTP		
5	77,874	77,874		9.27	11.25		0.39	WWTP		
6	79,587	79,587		11.75	9.00		0.35	WWTP		
7	109,656		109,656	10.84	18.00	1.00	0.31	WWTP	0.12	Kitchen
8	84,823		84,823	11.24	16.50		0.26	WWTP		
9	84,022		84,022	10.05	15.00		0.22	WWTP		
10	93,455		93,455	11.26	13.25		0.24	WWTP		
11	80,582		80,582	9.86	11.75		0.24	WWTP		
12	80,410		80,410	10.06	10.00		0.24	WWTP		
13	90,732		90,732	10.62	8.50		0.17	WWTP		
14	93,051	93,051		11.23	15.75	1.00	0.21	WWTP		
15	44,528	44,528		10.38	14.50		0.23	WWTP		
16	51,140	51,140		9.96	13.00		0.23	WWTP		
17	55,576	55,576		10.49	10.75		0.30	WWTP		
18	42,785	42,785		8.84	8.75		0.33	WWTP		
19	50,490	50,490		10.33	8.00		0.45	WWTP		
20	53,729	53,729		9.18	7.25		0.27	WWTP		
21	49,503		49,503	10.09	16.25	1.00	0.33	WWTP	0.26	Yard
22	63,968		63,968	9.90	15.50		0.28	WWTP		
23	51,140		51,140	9.85	14.75		0.27	WWTP		
24	49,008		49,008	10.21	13.75		0.30	WWTP		
25	43,904		43,904	8.60	13.00		0.28	WWTP		
26	0		0	9.71	8.75		0.25	WWTP		
27	118,094	118,094		9.77	15.50	1.00	0.17	WWTP		
28	65,524	65,524		7.78	14.00		0.52	WWTP		
29								WWTP		
30								WWTP		
Total	1,852,109	970,906	881,203			5				
High	118,094	118,094	109,656	12			0.52		0.37	
Low	0	42,785	0	8			0.17		0.12	
Avg.	66,147	64,727	67,785	10			0.29		0.25	

Water Consumed in gallons	1,465,804
Unaccounted for Water in gallons	386,305
Percent of Unaccounted for Water	21%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

NOTE:Meters Read on 2-28-12 data for the 29th is on the march report

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year :**March 2012**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
FEB 29th	**53407**	**53407**		**9.34**	**12.75**		**0.46**	**WWTP**		
1	55,501	55,501		9.77	11.25		0.44	WWTP		
2	60,677	60,677		9.28	9.75		0.37	WWTP		
3	51,597	51,597		7.94	8.50		0.24	WWTP		
4	149		149	9.79	6.25		0.23	WWTP		
5	92,901	92,901		9.16	13.75	1.00	0.26	WWTP		
6	64,851	64,851		9.19	12.25		0.45	WWTP	0.37	Admin
7	56,174	56,174		10.03	10.25		0.45	WWTP		
8	57,820	57,820		8.52	8.25		0.33	WWTP		
9	60,662	60,662		9.43	6.25		0.28	WWTP	0.53	Yard
10	53,631	53,631		7.68	15.25	1.00	0.27	WWTP		
11	51,312	51,631		9.75	13.75		0.38	WWTP		
12	64,178	64,178		8.98	12.00		0.37	WWTP		
13	59,997	59,997		8.88	10.75		0.27	WWTP	0.40	Elkhorn
14	55,643	55,643		9.57	10.00		0.30	WWTP		
15	60,364	60,364		11.38	8.75		0.33	WWTP		
16	56,728	56,728		9.57	18.00	1.00	0.29	WWTP		
17	49,727	49,727		7.80	17.00		0.30	WWTP		
18	58,329	58,329		7.56	15.75		0.26	WWTP		
19	58,942	58,942		8.75	14.75		0.23	WWTP		
20	60,064	60,064		9.10	13.25		0.22	WWTP		
21	62,757	62,757		9.02	11.50		0.26	WWTP	0.24	Program
22	62,682	62,682		9.53	9.75		0.18	WWTP		
23	58,868	58,868		8.91	8.00		0.28	WWTP		
24	52,913	52,913		7.69	6.25		0.30	WWTP		
25	66,766	66,766		8.10	15.50	1.00	0.28	WWTP		
26	54,903	54,903		9.34	14.50		0.32	WWTP		
27	61,688	61,688		9.35	13.50		0.30	WWTP		
28	77,290	77,290		10.29	12.00		0.23	WWTP		
29	88,413		88,413	10.25	10.25		0.22	WWTP	0.22	Silverstar
30	85,197		85,197	10.16	8.50		0.27	WWTP		
31	81,180		81,180	10.17	7.00		0.27	WWTP		
1-Apr	91,982		91,982	11.34	15.00		0.19			
2-Apr	108,759		108,759	9.35	14.00	1.00	0.18			
Total	2,136,052	1,680,691	455,680			5				
High	108,759	92,901	108,759	11			0.46		0.53	
Low	149	49,727	149	8			0.18		0.22	
Avg.	62,825	60,025	75,947	9			0.29		0.35	

Water Consumed in gallons	1,806,275
Unaccounted for Water in gallons	329,777
Percent of Unaccounted for Water	15%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

NOTE:Meters Read on 4-2-12

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year : **April 2012**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1						1.00	0.21	WWTP		
2							0.19	WWTP		
3	55,800		55,800	9.35	14.00		0.18	WWTP		
4	57,446	57,446		10.86	12.75		0.15	WWTP	0.22	Elkhorn
5	53,392	53,392		10.04	11.50		0.20	WWTP		
6	65,090	65,090		9.99	9.50		0.21	WWTP		
7	55,090	55,090		8.89	8.00		0.25	WWTP		
8	51,380	51,380		10.89	6.75		0.24	WWTP		
9	60,730	60,730		11.26	15.75	1.00	0.27	WWTP		
10	52,308	52,308		10.74	14.50		0.25	WWTP	0.26	Maintence
11	43,713	43,713		11.72	13.50		0.26	WWTP		
12	55,441	55,441		12.88	12.00		0.24	WWTP		
13	54,357	55,347		11.82	10.50		0.31	WWTP		
14	45,261	45,261		9.53	9.50		0.28	WWTP		
15	53,624	53,624		12.01	8.50		0.32	WWTP		
16	94,996	94,996		13.79	17.75	1.00	0.32	WWTP		
17	62,757		62,757	10.79	16.75		0.30	WWTP	0.26	Prgm Bldg
18	52,884		52,884	11.69	16.00		0.28	WWTP		
19	66,646		66,646	13.16	15.25		0.27	WWTP		
20	38,118		38,118	10.84	14.50		0.26	WWTP		
21	53,287		53,287	10.10	13.50		0.24	WWTP		
22	56,324		56,324	10.47	13.00		0.29	WWTP		
23	53,631		53,631	15.19	12.25		0.20	WWTP		
24	51,836	51,836		12.47	11.00		0.23	WWTP	0.23	Yard
25	52,435	52,435		15.36	9.25		0.24	WWTP		
26	49,218	49,218		15.39	8.00		0.24	WWTP		
27	51,312	51,312		12.87	17.50	1.00	0.25	WWTP		
28	45,665	45,665		12.22	16.50		0.32	WWTP		
29	50,826	50,826		12.91	15.25		0.29	WWTP		
30	55,128	55,128		12.14	14.25		0.28	WWTP		
Total	1,538,695	1,100,238	439,447			4				
High	94,996	94,996	66,646	15			0.32		0.26	
Low	38,118	43,713	38,118	9			0.15		0.22	
Avg.	54,953	55,012	54,931	12			0.25		0.24	

Water Consumed in gallons	1,239,265
Unaccounted for Water in gallons	299,430
Percent of Unaccounted for Water	19%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

NOTE: data for april 1-2 on the march report

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year : **May 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	52,285		52,285	12.09	13.50		0.25	WWTP	0.18	Maint Shop
2	42,935		42,935	12.53	12.75		0.23	WWTP		
3	67,170		67,170	12.32	11.75		0.24	WWTP		
4	57,895		57,895	12.14	11.00		0.17	WWTP		
5	45,336		45,336	12.10	10.00		0.15	WWTP		
6	43,974		43,974	12.68	9.50		0.06	WWTP		
7	62,981		62,981	13.30	8.25		0.14	WWTP	0.17	Rec Bldg
8	52,809	52,809		12.31	6.75		0.13	WWTP		
9	57,895	57,895		12.69	6.25		0.15	WWTP		
10	38,970	38,970		12.26	10.75	1.00	0.19	WWTP		
11	47,034	47,034		11.65	9.50		0.20	WWTP		
12	47,034	47,034		11.96	8.50		0.20	WWTP		
13	43,564	43,564		13.58	7.50		0.25	WWTP		
14	63,206	63,206		13.42	6.25		0.22	WWTP		
15	34,557		34,557	12.90	5.75		0.22	WWTP		
16	58,643		58,643	12.99	15.25	1.00	0.22	WWTP		
17	64,552		64,552	13.17	14.25		0.24	WWTP	0.17	Maint Office
18	44,655		44,655	14.07	13.75		0.24	WWTP		
19	44,281		44,281	13.46	12.75		0.25	WWTP		
20	40,990		40,990	13.83	12.00		0.27	WWTP		
21	59,540		59,540	14.12	11.00		0.24	WWTP		
22	63,206	63,206		13.56	9.25		0.27	WWTP		
23	40,766	40,766		13.34	8.25		0.23	WWTP		
24	52,360	52,360		13.39	17.75	1.00	0.21	WWTP	0.21	Admin
25	61,036	61,036		12.99	16.25		0.23	WWTP		
26	39,875	39,875		13.14	15.25		0.23	WWTP		
27	47,415	47,415		13.64	14.00		0.24	WWTP		
28	59,166	59,166		14.07	12.75		0.26	WWTP		
29	45,628	45,628		13.21	11.50		0.25	WWTP		
30	55,426	55,426		13.28	10.25		0.23	WWTP		
31	97,688		97,688	13.70	9.50		0.19	WWTP	0.24	Laundry
Total	1,632,872	815,390	719,794			3				
High	97,688	63,206	67,170	14			0.27		0.21	
Low	34,557	38,970	34,557	12			0.06		0.17	
Avg.	52,673	50,962	51,414	13			0.21		0.18	

Water Consumed in gallons	1,291,849
Unaccounted for Water in gallons	341,023
Percent of Unaccounted for Water	21%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**June 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	2,842		2,842	13.42	8.75		0.21	WWTP		
2	41,955		41,955	13.69	7.75		0.24	WWTP		
3	42,942		42,942	14.42	7.00		0.17	WWTP		
4	63,879		63,879	14.93	16.50	1.00	0.16	WWTP		
5	48,096	48,096		13.78	15.25		0.20	WWTP	0.27	Recreation
6	63,654	63,654		13.35	13.75		0.21	WWTP		
7	40,616	40,616		13.89	12.50		0.26	WWTP		
8	52,156	52,156		14.44	11.25		0.29	WWTP		
9	48,814	48,814		13.38	10.25		0.25	WWTP		
10	36,906	36,906		14.01	9.50		0.19	WWTP		
11	68,666	68,666		14.14	8.00		0.27	WWTP		
12	34,408		34,408	13.79	7.50		0.21	WWTP	0.25	Elkhorn
13	54,551		54,551	14.98	17.25	1.00	0.20	WWTP		
14	61,463		61,463	13.74	16.25		0.23	WWTP		
15	51,387		51,387	13.34	15.75		0.21	WWTP		
16	40,691		40,691	15.44	15.00		0.26	WWTP		
17	50,190		50,190	16.40	13.75		0.21	WWTP		
18	54,304		54,304	15.60	13.00		0.27	WWTP		
19	55,950		55,940	14.38	12.25		0.24	WWTP		
20	61,635	61,635		14.98	10.75		0.22	WWTP		
21	71,621	71,621		14.70	9.50		0.19	WWTP		
22	71,621	71,621		14.63	7.75		0.20	WWTP		
23	46,301	46,301		15.71	6.75		0.19	WWTP		
24	50,789	50,789		16.09	5.75		0.15	WWTP		
25	55,501	55,501		14.29	10.75	1.00	0.13	WWTP	0.21	Yard
26	50,041		50,041	14.84	10.25		0.17	WWTP		
27	47946		47946	14.36	9.25		0.17	WWTP		
28	52958		52958	14.73	8.50		0.20	WWTP		
29	41738		41738	14.65	7.75		0.21	WWTP		
30	40990		40990	14.73	7.00		0.17	WWTP		
1-Jul	40616		40616	15.62	6.25		0.18	WWTP		
2-Jul	64,328		64,328	14.69	15.75	1.00	0.17	WWTP		
Total	1,609,555	716,376	893,169			4				
High	71,621	71,621	64,328	16			0.29		0.27	
Low	2,842	36,906	2,842	13			0.13		0.21	
Avg.	50,299	55,106	47,009	15			0.21		0.24	

Water Consumed in gallons	1,330,376
Unaccounted for Water in gallons	279,179
Percent of Unaccounted for Water	17%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Meters read on July 2nd

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year : **July 2012**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2						1.00		WWTP		
3	62981	62981		14.66	14.00		0.16	WWTP		
4	29695	29695		14.70	13.50		0.19	WWTP		
5	61859	61859		14.72	12.25		0.20	WWTP		
6	38073	38073		14.96	11.25		0.24	WWTP	0.23	Maint Office
7	57,521	57,521		15.08	10.25		0.25	WWTP		
8	44,506	44,506		16.27	9.25		0.21	WWTP		
9	65,375	65,375		15.86	7.75		0.25	WWTP		
10	54,155	54,155		15.46	6.50		0.23	WWTP	0.16	Silver Star
11	39,120		39,120	15.44	6.00		0.23	WWTP		
12	68,442		58,442	15.85	5.00		0.19	WWTP		
13	68,591		68,591	14.97	14.75	1.00	0.19	WWTP		
14	53,781		53,781	14.53	13.75		0.17	WWTP		
15	52,360		52,360	15.96	13.25		0.18	WWTP		
16	66,422		66,422	15.50	12.00		0.24	WWTP		
17	62,009	62,009		18.76	10.25		0.20	WWTP		
18	53,706	53,706		16.70	8.75		0.20	WWTP		
19	55,052	55,052		16.03	7.25		0.17	WWTP		
20	13,090	13,090		17.16	17.50	1.00	0.24	WWTP		
21	80,784	80,784		17.04	15.25		0.28	WWTP		
22	39,718	39,718		16.25	14.25		0.28	WWTP		
23	49,592	49,592		15.96	13.25		0.25	WWTP		
24	59,989	59,989		15.98	12.00		0.29	WWTP		
25	55,277	55,277		16.59	10.75		0.25	WWTP		
26	44,206	44,206		15.57	9.75		0.24	WWTP		
27	48,171		48,171	15.42	19.25	1.00	0.22	WWTP	0.26	Kitchen
28	56,997		56,997	15.53	18.25		0.20	WWTP		
29	51,312		51,312	16.47	17.50		0.18	WWTP		
30	62,832		62,832	15.60	16.50		0.17	WWTP		
31	57,745	57,745		16.64	15.00		0.14	WWTP		
8/1/2012	59,092	59,092		15.48	13.50		0.15			
Total	1,612,453	1,044,425	558,028			4				
High	80,784	80,784	68,591	19			0.29		0.26	
Low	13,090	13,090	39,120	15			0.14		0.16	
Avg.	53,748	52,221	55,803	16			0.21		0.22	

Water Consumed in gallons	1,331,338
Unaccounted for Water in gallons	281,115
Percent of Unaccounted for Water	17%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

August 1st is the day we read the meters, July 1&2 on June report

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

Note: Re-submitting July's chlorination report because one of the meters was misread and the unaccounted fo water was not accurate.

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year : **August 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2	81,382	81,382		15.39	11.25		0.18	WWTP		
3	61,485	61,485		15.39	9.50		0.20	WWTP		
4	50,490	50,490		15.74	8.25		0.23	WWTP		
5	38,522	38,522		16.98	7.25		0.14	WWTP		
6	71,134	71,134		16.09	16.00	1.00	0.20	WWTP		
7	62,383		62,383	16.26	15.00		0.19	WWTP	0.20	Kitchen
8	58,493		58,493	16.60	14.00		0.18	WWTP		
9	58,119		58,119	15.95	13.25		0.18	WWTP		
10	57,296		57,296	16.98	12.00		0.16	WWTP		
11	40,990		40,994	16.05	11.25		0.13	WWTP		
12	43,832		48,832	17.27	10.50		0.16	WWTP		
13	38,671		38,671	16.38	9.75		0.18	WWTP		
14	86,282	86,282		16.25	7.50		0.19	WWTP		
15	34,669	34,669		16.30	17.50	1.00	0.19	WWTP	0.13	Admin
16	81,532	81,532		17.39	15.25		0.21	WWTP		
17	39,494	39,494		16.75	14.50		0.25	WWTP		
18	51,537	51,537		17.06	13.75		0.25	WWTP		
19	31,640	31,640		17.68	13.00		0.23	WWTP		
20	61,186	61,186		16.47	12.00		0.23	WWTP		
21	49,218	49,218		17.18	11.00		0.20	WWTP		
22	46,450		46,450	16.77	10.25		0.19	WWTP	0.16	Maint
23	36,203		36,203	16.43	9.50		0.19	WWTP		
24	42860		42860	15.79	19.50	1.00	0.17	WWTP		
25	69055		69055	20.15	18.75		0.16	WWTP		
26	35739		35739	17.66	17.75		0.13	WWTP		
27	60962		60962	16.04	16.50		0.19	WWTP		
28	61,336		61,336	16.36	15.50		0.17	WWTP		
29	53,332		53,332	16.06	14.25		0.21	WWTP		
30	52,734	52,734		15.38	13.50		0.19	WWTP		
31	43,458	43,458		16.39	12.50		0.21	WWTP		
Total	1,600,484	834,763	770,725			3				
High	86,282	86,282	69,055	20			0.25		0.20	
Low	31,640	31,640	35,739	15			0.13		0.13	
Avg.	53,349	55,651	51,382	17			0.19		0.16	

Water Consumed in gallons	1,283,739
Unaccounted for Water in gallons	316,745
Percent of Unaccounted for Water	20%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

August 1st is on the July report

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**September 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	35889	35,889		15.50	11.25		0.21	WWTP		
2	63968	63,968		17.65	10.75		0.16	WWTP		
3	41588	41588		15.80	9.75		0.18	WWTP		
4	71284	71284		15.48	8.00		0.20	WWTP	0.20	Elkhorn
5	54678		54678	16.32	7.00		0.24	WWTP		
6	49218		49218	15.98	16.75	1.00	0.22	WWTP		
7	52809		52809	15.83	16.00		0.20	WWTP		
8	40840		40840	16.15	15.50		0.23	WWTP		
9	38222		38222	17.14	15.00		0.27	WWTP		
10	48395		48395	16.44	14.25		0.27	WWTP		
11	36427	36427		15.84	13.75		0.22	WWTP		
12	102625	102625		14.74	11.75		0.22	WWTP		
13	35679	35679		15.65	21.50	1.00	0.23	WWTP	0.23	Elkhorn
14	39,120	39,120		15.61	20.50		0.20	WWTP		
15	59,765	59,765		15.75	19.50		0.19	WWTP		
16	48,320	48,320		15.62	18.50		0.19	WWTP		
17	84,374	84,374		15.12	16.50		0.17	WWTP		
18	67394		67394	15.78	16.00		0.18	WWTP		
19	57970		57970	16.05	15.00		0.19	WWTP		
20	58344		58344	15.57	14.25		0.15	WWTP		
21	34632		34632	16.25	13.50		0.15	WWTP		
22	60139		60139	18.25	12.75		0.14	WWTP		
23	46600		46600	15.76	12.00		0.17	WWTP		
24	50789	50,789		15.05	11.00		0.13	WWTP		
25	51,462	51,462		15.15	10.00		0.14	WWTP		
26	53,706	53,706		15.15	8.50		0.17	WWTP	0.24	Silver Star
27	50,116	50,116		15.03	7.00		0.20	WWTP		
28	62,234	62,234		15.83	5.75		0.18	WWTP		
29	47,348	47,348		16.39	6.50		0.18	WWTP		
30	46,226	46,226		16.54	5.50		0.23	WWTP		
Oct 1st	41,140	41,140		15.07	10.75	1.00	0.20	WWTP		
Total	1,631,302	1,022,060	609,241			3				
High	102,625	102,625	67,394	18			0.27		0.24	
Low	34,632	35,679	34,632	15			0.13		0.20	
Avg.	52,623	53,793	50,770	16			0.19		0.22	

Water Consumed in gallons	1,333,146
Unaccounted for Water in gallons	298,156
Percent of Unaccounted for Water	18%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year : **October 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2	70910		70910	14.83	9.75		0.21	WWTP	0.18	Maint
3	57820		57820	17.45	8.75		0.21	WWTP		
4	47348		47348	14.83	7.50		0.20	WWTP		
5	54679		54679	15.43	18.25	1.00	0.19	WWTP		
6	41664		41664	15.37	17.50		0.19	WWTP		
7	35604		35604	15.51	16.75		0.17	WWTP		
8	53482		53482	15.35	16.00		0.19	WWTP		
9	49068	49068		14.39	15.00		0.20	WWTP		
10	36801	36801		14.65	14.00		0.22	WWTP		
11	51762	51762		14.07	12.75		0.22	WWTP		
12	54155	54155		14.42	11.50		0.25	WWTP		
13	44356	44356		14.37	10.50		0.21	WWTP		
14	37101	37101		15.24	9.50		0.24	WWTP		
15	57880	57880		14.48	8.00		0.25	WWTP	0.28	Prgm. Bldg.
16	58269		58269	14.33	18.00	1.00	0.25	WWTP		
17	53706		53706	15.02	17.25		0.20	WWTP		
18	46002		46002	13.87	16.25		0.18	WWTP		
19	61132		61132	14.10	15.25		0.21	WWTP		
20	42038		42038	14.23	14.75		0.19	WWTP		
21	41439		41439	14.05	13.75		0.20	WWTP		
22	47348		47348	13.58	13.25		0.18	WWTP		
23	67554		67544	13.08	12.00		0.19	WWTP		
24	51911	51911		14.14	11.00		0.20	WWTP		
25	63281	63281		12.52	9.50		0.24	WWTP		
26	59092	59092		12.08	8.25		0.22	WWTP		
27	42412	42412		12.06	7.25		0.19	WWTP		
28	45703	45703		12.09	6.50		0.19	WWTP		
29	66871	66871		12.78	5.00		0.20	WWTP		
30	41514		41514	13.02	4.25	1.00	0.18	WWTP		
31	54828		54828	13.40	14.00		0.16	WWTP	0.17	Prgm. Bldg.
Nov 1st	54754		54754	13.35	13.00		0.22	WWTP		
Total	1,590,485	660,393	930,083			3				
High	70,910	66,871	70,910	17			0.25		0.28	
Low	35,604	36,801	35,604	12			0.16		0.18	
Avg.	51,191	50,799	51,281	14			0.20		0.23	

Water Consumed in gallons	1,255,741
Unaccounted for Water in gallons	334,744
Percent of Unaccounted for Water	21%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTES: Oct 1st data is on the September report

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**November 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2	56399		56399	12.99	11.75		0.22	WWTP		
3	43384		43,384	16.12	11.00		0.20	WWTP		
4	53856		53,856	15.64	9.75		0.21	WWTP		
5	57072		57,072	15.58	19.50	1.00	0.21	WWTP		
6	63056	63056		12.99	19.50		0.21	WWTP		
7	48,395	48,395		13.01	18.25		0.19	WWTP	0.18	Maint shop
8	62,084	62,084		13.89	16.75		0.16	WWTP		
9	46,002	46,002		12.90	16.00		0.23	WWTP		
10	61,934	61,934		13.52	14.75		0.22	WWTP		
11	48,545	48,545		14.01	13.75		0.21	WWTP		
12	38,297	38,297		13.74	13.00		0.22	WWTP		
13	64,852		64,852	12.35	12.00		0.20	WWTP		
14	51,388		51,388	12.36	11.25		0.18	WWTP		
15	51,762		51,762	11.59	10.75		0.16	WWTP		
16	53,781		53,781	11.74	9.25		0.17	WWTP		
17	46,824		46,824	12.33	8.75		0.19	WWTP		
18	36,054		36,054	12.56	8.00		0.15	WWTP		
19	69,639		69,639	11.89	6.50		0.15	WWTP		
20	51,836	51,836		12.53	16.00	1.00	0.14	WWTP		
21	62,383	62,383		11.26	14.50		0.15	WWTP		
22	61,635	61,635		11.89	13.25		0.19	WWTP		
23	61,635	61,635		11.62	11.75		0.18	WWTP		
24	75,099	75,099		11.64	9.75		0.17	WWTP		
25	87,815	87,815		12.10	7.50		0.18	WWTP	0.21	Elkhorn
26	39,868	39,868		11.28	6.75		0.21	WWTP		
27	58,045		58,045	10.95	16.25	1.00	0.22	WWTP		
28	60,662		60,662	11.21	15.50		0.20	WWTP		
29	53,332		53,332	11.03	14.75		0.20	WWTP		
30	61,410		61,410	10.91	14.00		0.19	WWTP	0.19	Silverstar
Dec 1st	60,139		60139	10.99	13.00		0.18	WWTP		
Dec 2nd	50,938		50938	11.15	12.00		0.19	WWTP		
3-Dec	55,501		55,501	11.08	11.50		0.22	WWTP		
Total	1,793,622	808,584	985,038			3				
High	87,815	87,815	69,639	16			0.23		0.21	
Low	36,054	38,297	36,054	11			0.14		0.18	
Avg.	56,105	57,756	54,564	12			0.19		0.19	

Water Consumed in gallons	1,520,241
Unaccounted for Water in gallons	273,381
Percent of Unaccounted for Water	15%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

Notes: Nov 1st data is on the oct report.

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**December 2012**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2								WWTP		
3								WWTP		
4	71359	71,359		11.06	10.25		0.15	WWTP		
5	46301	46,301		10.65	9.00		0.19	WWTP		
6	55127	55127		10.86	7.50		0.21	WWTP	0.23	Visiting
7	66,018	66,018		10.97	17.25	1.00	0.22	WWTP		
8	181,494		181,494	10.15	13.00		0.23	WWTP		
9	167,552		167,552	11.00	10.00		0.24	WWTP		
10	169,796		169,796	10.12	7.00		0.23	WWTP		
11	68,217		68,217	10.08	5.75		0.19	WWTP		
12	47,797		47,797	10.15	10.75	1.00	0.18	WWTP	0.22	Elkhorn
13	57,895		57,895	10.31	10.25		0.18	WWTP		
14	42,785		42,785	9.81	20.00	1.00	0.12	WWTP		
15	63,056		63,056	9.75	18.75		0.12	WWTP		
16	45,029		45,029	10.78	17.75		0.14	WWTP		
17	66,781		66,781	9.35	16.00		0.13	WWTP		
18	55,965		55,965	9.45	15.75		0.22	WWTP	0.22	Silverstar
19	59,765		59,765	9.14	14.75		0.23	WWTP		
20	51,215		51,215	9.07	13.75		0.25	WWTP		
21	56,122		56,122	8.57	12.50		0.22	WWTP		
22	51,911		51,911	10.34	11.75		0.21	WWTP		
23	37,355		37,355	8.88	10.75		0.22	WWTP	0.16	rec
24	62,577		62,577	7.94	9.75		0.16	WWTP		
25	43,159		43,159	9.11	9.00		0.16	WWTP		
26	53,108		53,108	7.54	8.00		0.12	WWTP		
27	70,611	70,611		8.16	15.25	1.00	0.09	WWTP	0.13	Maint
28	54,080	54,080		7.80	13.50		0.17	WWTP		
29	44,431	44,431		7.80	11.75		0.10	WWTP		
30	42,785	42,785		9.83	10.00		0.09	WWTP		
31	60,363	60,363		7.75	8.00		0.20	WWTP	0.24	Silverstar
1-Jan	55,501		55,501	9.10	6.50		0.20	WWTP		
2-Jan	54,604		54,604	8.23	14.50	1.00	0.22	WWTP		
3-Jan	54,155		54,155	9.57	13.25		0.24	WWTP		
Total	2,056,914	511,075	1,545,839			5				
High	181,494	71,359	181,494	11			0.25		0.24	
Low	37,355	42,785	37,355	8			0.09		0.13	
Avg.	66,352	56,339	72,715	9			0.18		0.20	

Water Consumed in gallons	1,364,781
Unaccounted for Water in gallons	692,133
Percent of Unaccounted for Water	34%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

Notes:

Dec 1,2,and 3rd is on the november report.

Dec 8,9 and 10th high water readings are due to the pump being left on over the weekend.
Unaccounted water is estimated to be around 22% due to the pump issue listed above.

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:

Washington State Department of Health

SOUTHWEST DRINKING WATER OPERATIONS

2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823

(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**January 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2								WWTP		
3								WWTP		
4	60363	60363		7.88	11.00		0.22	WWTP		
5	67694	67694		8.01	8.00		0.21	WWTP	0.28	Kitchen
6	27,601	27,601		9.31	7.00		0.21	WWTP		
7	65,824	65,824		7.22	15.00	1.00	0.24	WWTP		
8	72,705	72,705		8.28	11.75		0.27	WWTP		
9	58,867	58,867		8.26	9.50		0.32	WWTP		
10	54,304		54,304	8.07	8.25		0.32	WWTP		
11	62,906		62,906	8.05	6.75		0.34	WWTP		
12	44,640		44,640	7.98	16.00	1.00	0.26	WWTP		
13	54,020		54,020		14.75			WWTP		
14	87,142		87,142	8.39	13.00		0.28	WWTP	0.16	Maint Shop
15	65,973		65,973	9.59	11.75		0.31	WWTP		
16	46,600		46,600	7.97	10.50		0.29	WWTP		
17	55,202	55,202		7.94	19.75	1.00	0.31	WWTP		
18	61,111	61,111		7.73	18.75		0.28	WWTP		
19	43,713	43,713		7.81	17.50		0.21	WWTP		
20	76,415	76,415		11.71	15.25		0.24	WWTP		
21	24,310	24,310		9.81	15.00		0.26	WWTP		
22	58,194	58,194		7.05	13.50		0.26	WWTP		
23	71,209	71,209		7.55	12.00		0.28	WWTP	0.31	Silverstar
24	58,119		58,119	7.62	10.75		0.24	WWTP		
25	59,466		59,466	8.27	9.50		0.24	WWTP		
26	49,517		49,517	7.56	8.75		0.24	WWTP		
27	41,065		41,065	11.13	7.50		0.20	WWTP		
28	59,391		59,391	7.05	17.25	1.00	0.25	WWTP		
29	59,600		59,600	6.91	16.00		0.21	WWTP		
30	44,969		44,969	7.14	15.25		0.23	WWTP		
31	63,804	63,804		7.31	13.75		0.20	WWTP		
1-Feb	60,513	60,513		13.13	12.25		0.22	WWTP	0.26	Program
Total	1,655,237	867,525	787,712			4				
High	87,142	76,415	87,142	13			0.34		0.31	
Low	24,310	24,310	41,065	7			0.20		0.16	
Avg.	57,077	57,835	56,265	8			0.26		0.25	

Water Consumed in gallons	1,312,322
Unaccounted for Water in gallons	342,915
Percent of Unaccounted for Water	21%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: **Jan 1,2 and 3rd are on the December Report**
No CL2 reading or Potable water temp reading on 1-13-13 due to pipes being frozen.

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**February 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2	52,509	52,509		7.90	10.75		0.26	WWTP		
3	44,730	44,730		9.54	9.50		0.26	WWTP		
4	66,123	66,123		8.09	8.00		0.26	WWTP		
5	53,556	53,556		8.47	6.50		0.28	WWTP		
6	64,552	64,552		8.21	4.75		0.26	WWTP		
7	49,891		49,891	8.20	10.75	1.00	0.29	WWTP		
8	55,277		55,277	8.95	8.75		0.26	WWTP		
9	39,868		39,868	8.51	8.00		0.28	WWTP		
10	56,249		56,249	9.90	7.25		0.32	WWTP		
11	62,982		62,982	8.56	17.00	1.00	0.28	WWTP	0.20	Kitchen
12	56,548		56,548	8.67	16.25		0.25	WWTP		
13	63,879		63,879	8.48	15.25		0.24	WWTP		
14	52,809	52,809		8.73	14.25		0.22	WWTP		
15	52,809	52,809		8.59	13.25		0.21	WWTP		
16	41,738	41,738		8.60	12.50		0.24	WWTP		
17	50,565	50,565		8.90	11.00		0.20	WWTP		
18	49,218	49,218		8.33	9.75		0.20	WWTP		
19	72,855	72,855		8.51	7.75		0.26	WWTP		
20	33,959	33,959		8.50	6.75		0.30	WWTP		
21	74,950		74,950	8.81	16.00	1.00	0.30	WWTP	0.27	Silverstar
22	55,427		55,427	9.01	15.25		0.27	WWTP		
23	43,758		43,758	8.52	14.75		0.22	WWTP		
24	53,407		53,407	9.71	13.75		0.26	WWTP		
25	69,040		69,040	8.25	12.50		0.22	WWTP		
26	51,537		51,537	8.39	11.75		0.22	WWTP	0.18	Maint shop
27								WWTP		
28								WWTP		
29								WWTP		
30								WWTP		
Total	1,368,236	635,423	732,813			3				
High	74,950	72,855	74,950	10			0.32		0.27	
Low	33,959	33,959	39,868	8			0.20		0.18	
Avg.	54,729	52,952	56,370	9			0.25		0.22	

Water Consumed in gallons	1,121,068
Unaccounted for Water in gallons	247,168
Percent of Unaccounted for Water	18%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: Feb 1st data is on the January report
Feb 27th and the 28th data is on the march report

Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year : **March 2013**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
Feb 27th	**57745**		**57745**	**8.52**	**10.75**		**0.22**	**WWTP**		
Feb 28th	**35680**		**35680**	**8.91**	**10**		**0.24**	**WWTP**		
1	56,548	56,548		10.01	8.50		0.23	WWTP		
2	56,548	56,548		9.23	7.00		0.22	WWTP		
3	48,695	48,695		10.52	6.25		0.21	WWTP		
4	73,304	73,304		8.86	14.75	1.00	0.24	WWTP	0.27	Elkhorn
5	58,044	58,044		9.55	13.50		0.26	WWTP		
6	53,033	53,033		9.52	12.25		0.26	WWTP		
7	55,202		55,202	9.38	11.50		0.26	WWTP		
8	49,181		49,181	8.98	11.00		0.25	WWTP		
9	49,181		49,181	8.54	10.00		0.23	WWTP		
10	50,490		50,490	9.50	9.25		0.22	WWTP		
11	72,630		72,630	9.24	8.00		0.21	WWTP		
12	54,454		54,454	8.88	7.25		0.20	WWTP	0.17	Elkhorn
13	41,589	41,589		10.22	17.50	1.00	0.18	WWTP		
14	78,764	78,764		10.33	16.00		0.18	WWTP		
15	50,116	50,116		9.68	15.75		0.13	WWTP		
16	59,616	59,616		10.27	13.00		0.16	WWTP		
17	68,891	68,891		9.91	10.50		0.28	WWTP		
18	39,644	39,644		10.16	9.75		0.29	WWTP		
19	65,300	65,300		9.51	8.00		0.31	WWTP		
20	59,092	59,092		10.37	6.75		0.29	WWTP	0.17	Silverstar
21	65,524		65,524	9.82	5.50		0.29	WWTP		
22	46,151		46,151	9.73	15.25	1.00	0.26	WWTP		
23	54,454		54,454	9.12	14.50		0.26	WWTP		
24	41,664		41,664	10.85	13.25		0.24	WWTP		
25	73,753		73,753	10.43	12.50		0.24	WWTP		
26	54,679		54,679	9.62	11.25		0.20	WWTP		
27	54,679		54,679	9.45	10.50		0.22	WWTP		
28	65,824	65,824		9.98	8.75		0.21	WWTP		
29	52,472	52,472		10.30	7.00		0.21	WWTP		
30	51,472	51,472		9.79	6.25		0.26	WWTP		
31	48,545	48,545		11.78	16.00	1.00	0.24	WWTP		
April 1st	37,624	37,624		11.43	15.75		0.27	WWTP		
Total	1,880,588	1,065,121	815,467			4				
High	78,764	78,764	73,753	12			0.31		0.27	
Low	35,680	37,624	35,680	9			0.13		0.17	
Avg.	55,311	56,059	54,364	10			0.23		0.20	

Water Consumed in gallons	1,456,399
Unaccounted for Water in gallons	424,189
Percent of Unaccounted for Water	23%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: **Investigation showed that we had an inaccurate meter,so we replaced the meter on 4-2-13.**

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**April 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2	57,820	57,820		10.85	14.25		0.23	WWTP		
3	54,978	54,978		10.41	13.25		0.30	WWTP		
4	55,576		55,576	11.20	12.50		0.23	WWTP		
5	61,036		61,036	11.37	11.50		0.25	WWTP		
6	54,155		54,155	10.97	10.75		0.25	WWTP		
7	43,907		43,907	12.76	9.75		0.23	WWTP		
8	44,954		44,954	10.90	9.25		0.24	WWTP		
9	60,458		60,458	10.77	8.25		0.23	WWTP	0.17	Kitchen
10	48,844		48,844	10.88	7.50		0.17	WWTP		
11	47,797	47,797		10.98	17.75	1.00	0.20	WWTP		
12	51,686	51,686		10.78	16.25		0.19	WWTP		
13	67,544	67,544		10.72	15.00		0.16	WWTP		
14	45,328	45,328		12.78	13.75		0.20	WWTP		
15	30,780	30,780		10.33	13.00		0.19	WWTP		
16	56,100	56,100		10.78	11.75		0.22	WWTP	0.12	Maint
17	53,631	53,631		10.14	10.50		0.22	WWTP		
18	57,895		57,895	10.73	9.25		0.17	WWTP		
19	51,013		51,013	10.53	8.25		0.21	WWTP		
20	57,446		57,446	10.97	7.50		0.21	WWTP		
21	43,758		43,758	11.54	6.75		0.22	WWTP		
22	64,178		64,178	10.54	5.50		0.21	WWTP		
23	35,829		35,829	10.63	15.50	1.00	0.17	WWTP		
24	62,084		62,084	10.73	14.50		0.17	WWTP		
25	58,792	58,792		10.85	13.00		0.20	WWTP		
26	57,446	57,446		11.29	11.75		0.20	WWTP		
27	47,947	47,947		11.56	10.50		0.22	WWTP		
28	62,458	62,458		13.43	8.75		0.28	WWTP		
29	63,206	63,206		13.35	7.75		0.28	WWTP		
30	55,801	55,801		11.72	17.00	1.00	0.28	WWTP		
1-May	44,356	44,356		12.09	16.00		0.26	WWTP		
2-May	52,060	52,060		11.95	15.00		0.27	WWTP		
Total	1,648,863	907,730	741,133			3				
High	67,544	67,544	64,178	13			0.30		0.17	
Low	30,780	30,780	35,829	10			0.16		0.12	
Avg.	53,189	53,396	52,938	11			0.22		0.15	

Water Consumed in gallons	1,322,045
Unaccounted for Water in gallons	326,818
Percent of Unaccounted for Water	20%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

NOTE: data for april 1-2 on the march report

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: April 1st data is on the March report.

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year : **May 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1								WWTP		
2								WWTP		
3	62,906		62,906	12.16	14.00		0.28	WWTP		
4	56,474		56,474	11.40	13.25		0.24	WWTP		
5	60,887		60,887	15.85	12.50		0.24	WWTP		
6	61,486		61,486	13.05	11.25		0.18	WWTP	0.20	Laundry
7	56,250		56,250	14.39	10.75		0.18	WWTP		
8	41,140		41,140	13.26	9.75		0.21	WWTP		
9	60,737	60,737		13.62	8.50		0.21	WWTP		
10	55,502	55,502		13.96	7.25		0.18	WWTP		
11	57,371	57,371		13.84	5.75		0.19	WWTP		
12	54,155	54,155		15.36	4.00		0.25	WWTP		
13	90,508	90,508		13.75	10.75	1.00	0.21	WWTP		
14	57,072	57,072		14.05	9.50		0.19	WWTP		
15	35,577	35,577		13.50	8.75		0.20	WWTP		
16	66,721		66,721	13.45	7.50		0.21	WWTP		
17	30,368		30,368	14.17	7.00		0.18	WWTP	0.23	Maint
18	53,257		53,257	13.85	6.00		0.21	WWTP		
19	53,257		53,257	15.19	5.00		0.18	WWTP		
20	30,518		30,518	13.77	15.25	1.00	0.23	WWTP		
21	74,052		74,052	14.36	14.25		0.22	WWTP		
22	57,596		57,596	14.05	13.50		0.23	WWTP		
23	42,112	42,112		14.05	13.00		0.20	WWTP		
24	50,116	50,116		13.33	12.00		0.21	WWTP		
25	53,930	53,930		11.55	10.75		0.20	WWTP		
26	62,158	62,158		14.41	9.00		0.22	WWTP		
27	44,805	44,805		9.11	8.50		0.20	WWTP		
28	70,910	70,910		14.36	7.25		0.24	WWTP		
29	49,927	49,927		14.42	16.75	1.00	0.22	WWTP		
30	55,127		55,127	13.45	15.70		0.26	WWTP		
31	55,127		55,127	11.50	14.75		0.25	WWTP		
Total	1,600,046	784,880	815,166			3				
High	90,508	90,508	74,052	16			0.28		0.23	
Low	30,368	35,577	30,368	9			0.18		0.20	
Avg.	55,174	56,063	54,344	14			0.21		0.22	

Authorized Comsumption	1,287,181
Waster lost	312,865
Percent of Water Lost	20%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: May 1st and 2nd are on the April Report

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**June 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	41,364		41,364	13.48	14.00		0.25	WWTP		
2	46,451		46,451	14.32	12.50		0.26	WWTP		
3	74,725		74,725	13.68	11.75		0.20	WWTP		
4	53,557		53,557	13.69	11.00		0.22	WWTP		
5	56,848		56,848	13.76	9.75		0.18	WWTP		
6	53,856	53,856		14.36	8.75		0.23	WWTP		
7	62,533	62,533		14.83	7.25		0.20	WWTP		
8	39,494	39,494		14.57	6.50		0.21	WWTP		
9	51,088	51,088		15.38	5.50		0.25	WWTP		
10	68,367	68,367		14.41	15.00	1.00	0.22	WWTP		
11	52,360	52,360		15.22	13.50		0.24	WWTP	0.22	Kitchen
12	52,884	52,884		14.64	12.50		0.25	WWTP		
13	53,706		53,706	15.22	11.50		0.21	WWTP		
14	45,179		45,179	15.11	10.75		0.21	WWTP		
15	56,100		56,100	15.34	10.00		0.19	WWTP		
16	41,514		41,514	16.02	9.50		0.18	WWTP		
17	68,816		68,816	14.36	8.25		0.15	WWTP		
18	51,163		51,163	15.69	18.00	1.00	0.14	WWTP		
19	54,005		54,005	15.13	17.25		0.17	WWTP		
20	52,360	52,360		15.99	16.25		0.18	WWTP		
21	52,883	52,883		15.90	15.25		0.25	WWTP	0.20	Maint
22	47,049	47,049		15.93	14.50		0.22	WWTP		
23	48,321	48,321		16.11	13.50		0.22	WWTP		
24	65,974	65,974		15.64	12.25		0.24	WWTP		
25	59,241	59,241		15.33	10.75		0.26	WWTP		
26	48,171		48,171	15.81	10.00		0.23	WWTP		
27	56616		56616	15.65	9.00		0.21	WWTP		
28	55875		55875	16.46	8.00		0.19	WWTP		
29										
30										
Total	1,510,500	706,410	804,090			2				
High	74,725	68,367	74,725	16			0.26		0.22	
Low	39,494	39,494	41,364	13			0.14		0.20	
Avg.	53,946	54,339	53,606	15			0.21		0.21	

Authorized Comsumption	1,173,544
Waster lost	336,956
Percent of Water Lost	22%

TYPE & STRENGTH OF CHLORINE USED:	
Liquid:	Sodium Hypochlorite 12.5%

Meters read on July 2nd

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

NOTE: June 29th and 30th on the July report.

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year : **July 2013**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
29-Jun	**41888**		**41888**	**17.22**	**7.25**		**0.16**	WWTP		
30-Jun	**45104**		**45104**	**17.48**	**6.5**		**0.18**	WWTP		
1	54828		54828	17.90	16.00	1.00	0.17	WWTP		
2	80559		80559	17.62	14.25		0.13	WWTP		
3	64926		64,926	16.94	13.25		0.17	WWTP		
4	46503	46503		17.06	12.25		0.15	WWTP		
5	57633	57633		16.77	10.75		0.20	WWTP		
6	54566	54566		16.21	9.50		0.20	WWTP		
7	48,866	48,866		18.45	8.00		0.23	WWTP		
8	56,347	56,347		16.84	6.50		0.24	WWTP		
9	63,407	63,407		16.80	15.75	1.00	0.23	WWTP	0.25	Elkhorn
10	61,575	61,575		17.59	14.50		0.28	WWTP		
11	58,919		58,919	16.28	13.25		0.26	WWTP		
12	54,305		54,305	15.77	12.25		0.22	WWTP		
13	40,534		40,534	16.84	11.50		0.19	WWTP		
14	57,835		57,835	16.85	10.50		0.23	WWTP	0.20	Warehouse
15	55,890		55,890	16.97	9.75		0.21	WWTP		
16	45,313		45,313	17.89	8.75		0.16	WWTP		
17	69,638		69,638	17.44	7.50		0.21	WWTP		
18	64,926	64,926		17.20	16.50	1.00	0.22	WWTP		
19	55,950	55,950		16.74	15.50		0.19	WWTP		
20	38,305	38,305		15.62	14.75		0.20	WWTP		
21	46,354	46,354		17.69	13.75		0.19	WWTP		
22	70,327	70,327		17.09	12.50		0.19	WWTP		
23	59,017	59,017		17.30	11.00		0.23	WWTP		
24	63,505	63,505		18.17	9.75		0.19	WWTP	0.20	Silverstar
25	51,911	51,911		17.16	8.50		0.21	WWTP		
26	50,789		50,789	17.33	18.25	1.00	0.18	WWTP		
27	39,569		39,569	17.33	18.50		0.18	WWTP		
28	48,395		48,395	19.54	16.75		0.21	WWTP		
29	67,170		67,170	17.99	15.25		0.19	WWTP		
30	50,565		50,565	18.02	14.75		0.17	WWTP	0.23	Program
31	41,738		41,738	17.18	13.50		0.20	WWTP		
Total	1,807,157	839,192	967,965			4				
High	80,559	70,327	80,559	20			0.28		0.25	
Low	38,305	38,305	39,569	16			0.13		0.20	
Avg.	54,762	55,946	53,776	17			0.20		0.22	

Authorized Comsumption	1,487,900
Waster lost	319,257
Percent of Water Lost	18%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER
CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**August 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in gallons	SO 3 Water Produced	SO 4 Water Produced	Temp. in C.	Chlorine Tank Level in inches	Gallons of Chlorine Added	Free Cl 2	Residual Cl 2 Sample Location	Free Cl 2	Residual Cl 2 Sample Location
1	64,627	64,627		17.44	12.75		0.19	WWTP		
2	49,690	49,690		16.89	11.50		0.20	WWTP		
3	42,374	42,374		17.65	10.75		0.22	WWTP		
4	44,670	44,670		17.48	9.50		0.22	WWTP		
5	61,934	61,934		17.69	18.75	1.00	0.20	WWTP	0.24	Kitchen
6	62,158	62,158		17.69	17.50		0.22	WWTP		
7	52,734	52,734		17.72	16.00		0.20	WWTP		
8	46,750		46,750	17.72	15.25		0.21	WWTP		
9	53,556		53,556	18.20	14.50		0.23	WWTP		
10	42,867		42,867	17.86	13.75		0.16	WWTP		
11	39,711		39,711	20.43	12.75		0.19	WWTP		
12	76,056		76,056	18.15	11.75		0.15	WWTP		
13	53,496		53,496	17.53	10.50		0.16	WWTP		
14	60,962		60,962	17.52	9.25		0.15	WWTP		
15	54,304	54,304		17.73	8.00		0.19	WWTP		
16	55,576	55,576		17.87	6.50		0.19	WWTP		
17	40,451	40,451		17.53	16.00	1.00	0.18	WWTP		
18	43,922	43,922		21.07	15.00		0.22	WWTP		
19	72,698	72,698		18.10	13.00		0.17	WWTP		
20	54,686	54,686		17.80	11.25		0.19	WWTP	0.17	Maint Office
21	60,887	60,887		17.57	7.95		0.22	WWTP		
22	860		860	17.05	6.25		0.24	WWTP		
23	87,703	87,703		18.35	10.71	1.00	0.25	WWTP		
24	75226	75,226		16.74	9.00		0.24	WWTP		
25	50886	50,886		20.48	7.50		0.25	WWTP		
26	61575	61,575		18.39	17.25	1.00	0.22	WWTP	0.23	Silverstar
27	61620	61,620		17.14	15.75		0.24	WWTP		
28	51,686		51,686	17.51	15.00		0.20	WWTP		
29	58,419		58,419	18.41	14.25		0.18	WWTP		
30	61,116		61,116	16.91	13.25		0.19	WWTP		
31								WWTP		
Total	1,643,200	1,097,721	545,479			4				
High	87,703	87,703	76,056	21			0.25		0.24	
Low	860	40,451	860	17			0.15		0.17	
Avg.	54,773	57,775	49,589	18			0.20		0.21	

Authorized Comsumption	1,309,112
Waster lost	334,088
Percent of Water Lost	20%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Eleanor Vernell, Superintendent of Larch Corrections Center

Aaron Markham WWTPO 3, CCS, WTPO 1, WDM 2

NOTE: 8-31-13 is on the September Report. The free CL2 test was actually for total chlorine. New kits have been ordered
Well # 4 had a blown fuse on 8-22-13

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**September 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417**

Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water	SO 3	SO 4 Water	Temp. in	Chlorine	Gallons of	Free Cl 2	Residual	Free Cl 2	Residual
8/31/2013	**44,648**		**44,648**	**15.54**	**12.75**			WWTP		
1	56,481		56,481	15.00	11.50		0.17	WWTP		
2	41,140		41,140	16.65	10.75		0.21	WWTP		
3	64,777		64,777	17.59	9.75		0.16	WWTP		
4	69,115		69,115	17.81	8.25		0.14	WWTP		
5	55,651	55,651		18.19	6.75		0.21	WWTP	0.19	Program
6	63,752	63,752		17.64	15.50	1.00	0.26	WWTP		
7	43,997	43,997		17.40	14.50		0.20	WWTP		
8	49,181	49,181		18.31	13.50		0.22	WWTP		
9	74,202	74,202		17.03	11.75		0.20	WWTP		
10	46,675	46,675		17.28	10.50		0.21	WWTP	0.24	Elkhorn
11	68,965	68,965		18.85	9.00		0.21	WWTP		
12	66,572		66,572	17.72	7.50		0.21	WWTP		
13	104,346		104,346	18.46	16.25	1.00	0.24	WWTP		
14	47,273		47,273	19.01	15.50		0.17	WWTP		
15	42,262		42,262	21.70	14.50		0.16	WWTP		
16	78,914		78,914	18.62	13.25		0.20	WWTP		
17	50,789		50,789	17.54	12.50		0.20	WWTP		
18	56,100		56,100	16.99	11.50		0.17	WWTP		
19	56,549	56,549		16.37	10.25		0.14	WWTP		
20	65,225	35,225		16.08	8.75		0.11	WWTP		
21	35,829	35,829		17.98	7.75		0.06	WWTP		
22	54,903	54,903		17.16	16.25	1.00	0.05	WWTP		
23	65,974	65,974		16.61	14.50		0.07	WWTP		
24	58,942	58,942		16.07	13.25		0.07	WWTP		
25	64,253	64,253		16.00	12.00		0.17	WWTP		
26	60,363		60,363	16.09	10.50		0.16	WWTP		
27	60,363		60,363	15.68	9.00		0.12	WWTP	0.15	Maint
28	40,541		40,541	16.12	8.25		0.12	WWTP		
29	56,623		56,623	15.87	7.50		0.14	WWTP		
30	59,765		59,765	15.35	6.75		0.19	WWTP		
1-Oct	59,915		59,915	15.09	10.75	1.00	0.19	WWTP		
2-Oct	49,218		49,218	15.05	10.00		0.11	WWTP		
3-Oct	58,493		58,493	15.54	8.75		0.12	WWTP		
								WWTP		
Total	1,971,796	774,098	1,167,698			4				
High	104,346	74,202	104,346	22			0.26		0.24	
Low	35,829	35,225	40,541	15			0.05		0.15	
Avg.	57,994	55,293	58,385	17			0.16		0.19	

Authorized Comsumption	1,711,532
Waster lost	260,264
Percent of Water Lost	13%

TYPE & STRENGTH OF CHLORINE USED:		
Liquid:	Sodium Hypochlorite	12.5%

Ms. Stefani Muesborn Marsh, Superintendent of Larch Corrections Center

Aaron Markham WWTPO 111, CCS, WTPO 1, WDM 2

NOTE: as of 9-17-13 now using chlorine residual test and not the Total chlorine tes
NOTE: on 9-21-13 DPD low due to leak in the chlorinator line. Problem was fixed

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 782
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**October 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in	SO 3 Water	SO 4 Water Produced	Temp. in C.	Chlorine Tank	Gallons of Chlorine	Free Cl 2	Residual Cl 2	Free Cl 2	Location
1								WWTP		
2								WWTP		
3								WWTP		
4	55,651	55,651		14.99	7.50		0.12	WWTP		
5	50,340	50,340		14.94	6.50		0.14	WWTP		
6	45,329	45,329		14.86	16.25	1.00	0.15	WWTP		
7	77,792	77,792		15.43	14.50		0.16	WWTP		
8	53,407	53,407		14.40	13.25		0.15	WWTP		
9	54,678	54,678		14.25	11.75		0.17	WWTP		
10	52,883	52,883		14.28	10.25		0.15	WWTP		
11	52,808		52,808	14.77	9.00		0.12	WWTP	0.21	Admin
12	42,262		42,262	14.60	8.00		0.13	WWTP		
13	61,186		61,186	14.14	17.25	1.00	0.15	WWTP		
14	51,761		51,761	14.14	15.75		0.10	WWTP		
15	80,185		80,185	13.30	14.00		0.11	WWTP		
16	58,269		58,269	13.51	12.50		0.15	WWTP		
17	50,864	50,864		13.93	10.75		0.19	WWTP		
18	63,711	63,711		13.57	8.50		0.23	WWTP	0.13	Maint
19	42,411	42,411		13.24	7.25		0.26	WWTP		
20	48,545	45,545		13.68	16.75	1.00	0.24	WWTP		
21	76,670	76,670		14.18	14.50		0.25	WWTP		
22	51,911	51,911		14.21	12.50		0.27	WWTP		
23	58,793	58,793		13.96	10.75		0.27	WWTP		
24	66,946		66,946	14.25	9.25		0.38	WWTP		
25	49,069		49,069	13.59	8.25		0.33	WWTP		
26	39,494		39,494	13.63	7.25		0.28	WWTP		
27	51,911		51,911	14.09	16.75	1.00	0.28	WWTP		
28	61,186		61,186	13.37	15.75		0.24	WWTP		
29	59,690		59,690	12.87	14.25		0.25	WWTP	0.27	silver star
30	39,942		39,942	12.69	13.50		0.25	WWTP		
31								WWTP		
Total	1,497,694	779,985	714,709			4				
High	80,185	77,792	80,185	15			0.38		0.27	
Low	39,494	42,411	39,494	13			0.10		0.13	
Avg.	55,470	55,713	54,978	14			0.20		0.20	

Authorized Consumption	1,253,392
Waster lost	244,302
Percent of Water Lost	16%

TYPE & STRENGTH OF CHLORINE USED:		
Liquid:	Sodium Hypochlorite	12.5%

Ms. Stefani Muesborn Marsh, Superintendent of Larch Corrections Center

Aaron Markham WWTPO 111, CCS, WTPO 1, WDM 2

NOTE: Oct 1,2,and 3rd are on the September Report

OCTOBER 31 ON THE NOVEMBER REPORT
Had to estimate 15 days of water usage for daytime only small water user, due to a broken water meter

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** | ID#: **0646IY** | County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** | Month and Year :**September 2013**

Yacolt, WA 98675 | Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** | Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water Treated in	SO 3 Water	SO 4 Water Produced	Temp. in C.	Chlorine Tank	Gallons of Chlorine	Free Cl 2	Location	Free Cl 2	Location
31-Oct	**76,221**		**76,221**	**13.21**	**11**		**0.28**	WWTP		
1	50,789	50,789		12.98	9.00		0.31	WWTP		
2	45,927	45,927		13.27	18.25	1.00	0.37	WWTP		
3	53,108	53,108		13.05	16.50		0.39	WWTP		
4	75,548	75,548		12.86	14.25		0.34	WWTP		
5	63,580	63,580		12.46	12.25		0.35	WWTP	0.34	Elkhorn
6	57,746	57,746		13.07	10.50		0.33	WWTP		
7	54,754		54,754	13.45	9.00		0.34	WWTP		
8	73,678		73,678	12.90	18.25	1.00	0.30	WWTP		
9	46,675		46,675	12.69	17.25		0.28	WWTP		
10	55,801		55,801	12.65	16.00		0.26	WWTP		
11	52,136		52,136	11.91	15.00		0.25	WWTP		
12	68,891		68,891	12.78	13.25		0.25	WWTP		
13	61,635		61,635	12.65	12.00		0.25	WWTP		
14	55,277	55,277		13.05	10.25		0.25	WWTP	0.23	Elkhorn
15	58,044	58,044		13.23	8.25		0.23	WWTP		
16	45,703	45,703		13.79	17.50	1.00	0.22	WWTP		
17	50,041	50,041		12.57	15.75		0.26	WWTP		
18	66,497	66,497		11.97	13.50		0.32	WWTP		
19	62,607	62,607		12.89	11.75		0.33	WWTP		
20	58,045		58,045	12.16	10.00		0.37	WWTP		
21	58,718		58,718	12.23	8.75		0.34	WWTP		
22	57,222		57,222	11.85	18.25	1.00	0.35	WWTP	0.32	Elkhon
23	42,000		42,000	10.89	17.00		0.35	WWTP		
24	42,000		42,000	10.99	16.00		0.31	WWTP		
25	71,434		71,434	11.61	15.00		0.30	WWTP		
26	56,698		56,698	11.40	14.00		0.30	WWTP		
27	49,892		49,892	11.85	13.25		0.27	WWTP		
28	55,576	55,576		10.29	11.00		0.31	WWTP		
29	38,447	38,447		9.62	10.00		0.27	WWTP		
30	53,108	53,108		12.08	8.50		0.25	WWTP		
1-Dec	49,667	49,667		12.13	17.50	1.00	0.33	WWTP		
2-Dec	65,300	65,300		11.64	15.75		0.34	WWTP		
								WWTP		
Total	1,872,765	946,965	925,800			5				
High	76,221	75,548	76,221	14			0.39		0.34	
Low	38,447	38,447	42,000	10			0.22		0.23	
Avg.	56,750	55,704	57,863	12			0.30		0.30	

Authorized Comsumption	1,534,937
Waster lost	337,828
Percent of Water Lost	18%

TYPE & STRENGTH OF CHLORINE USED:

Liquid: Sodium Hypochlorite 12.5%

Ms. Stefani Muesborn Marsh, Superintendent of Larch Corrections Center

Aaron Markham WWTPO 111, CCS, WTPO 1, WDM 2

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 782
(360) 664-0768 FAX (360) 664-805

LARCH CORRECTIONS CENTER

CHLORINATION REPORT

System Name: **Larch Corrections Center** ID#: **0646IY** County: **CLARK**

Mailing Address: **15314 NE Dole Valley Rd.** Month and Year :**December 2013**

Yacolt, WA 98675 Source# **SO3-SO4**

Manager: **Aaron Markham** **Cert # 011417** Contact Info. **(360) 260 - 6300 ext.284 aimarkham@DOC1.WA.GOV**

WATER PRODUCTION

Day	Water	SO 3	SO 4 Water	Temp. in	Chlorine	Gallons of	Free Cl 2	Location	Free Cl 2	Location
1								WWTP		
2								WWTP		
3	60,438	60,438		11.00	14.00		0.39	WWTP	0.32	**KITCHEN**
4	54,529	54,529		10.51	12.75		0.42	WWTP		
5	59,765		59,765	9.58	11.50		0.38	WWTP		
6	56,549		56,549	10.55	10.50		0.38	WWTP		
7	44,580		44,580	10.24	9.00		0.33	WWTP		
8	61,784		61,784	9.72	8.25		0.34	WWTP		
9	74,501		74,501	9.71	17.25	1.00	0.32	WWTP		
10	94,398		94,398		15.25		0.33	WWTP		
11	120,727		120,727	10.80	13.00		0.29	WWTP		
12	51,088	51,088		10.95	11.50		0.28	WWTP		
13	98,063	98,063		10.84	8.00		0.30	WWTP	0.31	**ELKORN**
14	94,846	94,846		11.85	16.50	1.00	0.24	WWTP		
15	84,973	84,973		10.98	14.00		0.31	WWTP		
16	84,224	84,224		11.46	11.75		0.30	WWTP		
17	84,224	84,224		10.84	9.25		0.29	WWTP		
18	62,757	62,757		10.56	7.25		0.30	WWTP		
19	48,872		48,872	11.11	6.50		0.27	WWTP	0.33	**REC**
20	44,655		44,655	9.65	16.25	1.00	0.28	WWTP		
21	57,372		57,372	10.29	15.00		0.32	WWTP		
22	57,297		57,297	9.53	14.00		0.28	WWTP		
23	58,419		58,419	10.17	13.00		0.30	WWTP		
24	57,521		57,521	10.24	12.00		0.28	WWTP		
25	41,140		41,140	9.55	11.25		0.20	WWTP		
26	61,635	61,635		9.98	9.00		0.23	WWTP	0.20	**MAIN**
27	60,737	60,737		9.50	19.00	1.00	0.27	WWTP		
28	44,880	44,880		10.23	18.00		0.23	WWTP		
29	41,364	41,364		10.27	17.00		0.22	WWTP		
30	67,305	67,305		9.72	15.00		0.22	WWTP		
Total	1,828,643	951,063	877,580			4				
High	120,727	98,063	120,727	12			0.42		0.33	
Low	41,140	41,364	41,140	10			0.20		0.20	
Avg.	65,309	67,933	62,684	10			0.30		0.29	

Authorized Comsumption	1,459,799
Waster lost	368,844
Percent of Water Lost	20%

TYPE & STRENGTH OF CHLORINE USED:

Liquid:	Sodium Hypochlorite	12.5%

Ms. Stefani Meusborn Marsh, Superintendent of Larch Corrections Center

Aaron Markham CCS, WTPO 1, WDM 2, WWTPO 3,

NOTE. On the date of Dec. 10, came into work and some of the pipes in the ceiling had busted could not proform all test…….

REPORT DUE BY THE 10TH OF THE FOLLOWING MONTH:
Washington State Department of Health
SOUTHWEST DRINKING WATER OPERATIONS
2410 Pacific Ave. PO. Box 47823 Olympia, Washington 98504 - 7823
(360) 664-0768 FAX (360) 664-8057

Maple Lane Correction Center

MAPLE LANE CORRECTIONS CENTER POTABLE WATER USAGE

2012		2013	
MONTH	**USAGE**	**MONTH**	**USAGE**
JANUARY	175,000	JANUARY	195,400
FEBRUARY	161,900	FEBRUARY	163,100
MARCH	285,170	MARCH	242,000
APRIL	171,700	APRIL	190,900
MAY	197,700	MAY	216,400
JUNE	235,000	JUNE	486,900
JULY	213,000	JULY	705,800
AUGUST	549,000	AUGUST	470,900
SEPTEMBER	440,300	SEPTEMBER	206,100
OCTOBER	270,800	OCTOBER	19,300
NOVEMBER	227,000	NOVEMBER	185,300
DECEMBER	316,200	DECEMBER	210,200
YEARLY TOTAL	**3,242,770**	YEARLY TOTAL	**3,292,300**

Mission Creek Corrections Center for Women

Date	Meter Reading	Usage in Gallons	Number of Days	Gallons per day	Daily Population	Gallons per person	Est. Gal/person w/out DNR
1/3/2012	41153200	41153200	33		298		
2/1/2012	41742200	589000	28	21036	298	71	70
3/2/2012	42421700	679500	31	21919	298	74	73
4/4/2012	43096600	674900	35	19283	298	65	64
5/1/2012	43696100	599500	26	23058	298	77	77
6/11/2012	44579800	883700	42	21040	298	71	70
7/9/2012	45187200	607400	28	21693	298	73	72
8/7/2012	45832600	645400	29	22255	298	75	74
9/4/2012	46429400	596800	28	21314	298	72	71
10/3/2012	47018400	589000	29	20310	298	68	67
11/6/2012	47705500	687100	34	20209	298	68	67
12/10/2012	48421800	716300	34	21068	300	70	70
1/15/2013	49198500	776700	36	21575	300	72	71
2/5/2013	49691600	493100	21	23481	300	78	78
3/6/2013	50359000	667400	29	23014	300	77	76
4/30/2013	51671400	1312400	54	24304	300	81	80
5/31/2013	52395000	723600	54	13400	300	45	44
8/30/2013	52884800	489800	91	5382	308	17	17
9/30/2013	53236400	351600	30	11720	312	38	37
10/31/2013	53497400	261000	30	8700	311	28	27
11/30/2013	53788500	291100	30	9703	314	31	30
12/31/2013	54239100	450600	30	15020	312	48	48
1/29/2014	54481500	242400	29	8359	312	27	26
2/26/2014	54984400	502900	28	17961	315	57	56

Well #2

Date	Meter Reading	Usage in Gallons	Number of Days	Gallons per day	Daily Population	Gallons per person	Est. Gal/person w/out DNR
8/30/2013	1239730						
9/30/2013	1550790	311060	30	10369	312	33	33
10/31/2013	1809210	258420	30	8614	311	28	28
11/30/2013	2091400	282190	30	9406	314	30	30
12/31/2013	2519970	428570	30	14286	312	46	46
1/31/2014	2744670	224700	30	7490	312	24	24
2/26/2014	3228090	483420	30	16114	315	51	51

McNeil Island Corrections Center

MICC Summary of Water Usage

1. Water usage is not available but water production is. All In K gals.
   a. 2012 Jan. 3,181 Feb. 4,508 Mar. 3,913 Apr. 3,129 May 4,634 Jun. 4,636 Jul. 5,677 Aug. 5,934 Sep. 6,078 Oct. 6,364 Nov. 6,364 (not a typo)Dec. 6,806
   b. 2013 Jan. 7,293 Feb. 6,186 Mar. 5,857 Apr. 5,113 May 5,491 Jun. 5,283 Jul. 7,426 Aug. 7,167 Sep. 4,472 Oct. 5,264 Nov. 5,130 Dec. 6,012.

Olympic Corrections Center

211/2012	810575	574852	436200	0	436200
2/8/2012	856552	574852	459770	0	459770
2115/2012	894053	574853	375010	75	375085
212212012	928826	577208	347730	176154	523884
2129/2012	955655	580482	268290	244895	513185
317/2012	979736	584003	240810	263371	504181
3/14/2012	5169	587047	254330	227691	482021
3/21/2012	37168	589434	319990	178548	498538
3/28/2012	54199	592491	170310	228664	398974
4/4/2012	78196	594969	239970	185354	425324
4/11/2012	96799	598148	186030	237789	423819
4/18/2012	122506	601354	257070	239809	496879
4/25/2012	146042	604140	235360	208393	443753
5/2/2012	163219	606388	171770	168150	339920
5/9/2012	176800	609041	135810	198444	334254
5/16/2012	195876	611167	190760	159025	349785
5/23/2012	209359	613765	134830	194330	329160
5/30/2012	228013	615610	186540	138006	324546
6/6/2012	241105	618297	130920	200988	331908
6/13/2012	258701	620190	175960	141596	317556
6/20/2012	271791	622973	130900	208168	339068
812212012	434245	645241	235020	170469	405489
8/29/2012	449368	648047	151230	209889	361119
9/512012	469850	650249	204820	164710	369530
9/1212012	486069	653603	162190	250879	413069
9/19/2012	506247	655505	201780	142270	344050
9/26/2012	520379	658362	141320	213704	355024
1013/2012	537909	660386	175300	151395	326695
10/1012012	552521	663127	146120	205027	3 1147
10/1712012	573697	664537	211760	105468	317228
1012412012	587496	667216	137990	200389	338379
10/31/2012	605580	669225	180840	150273	331113
11/712012	619178	671837	135980	195378	331358
11/14/2012	63887	673849	196960	150498	347458
11121/2012	655338	676635	164640	208393	373033
11/28/2012	670041	679755	147030	233376	380406
1215/2012	688764	681827	187230	154986	342216
1211212012	705597	684661	168330	211983	380313
12119/2012	725758	686820	201610	161493	363103
12126/2012	741034	689676	152760	213629	366389
1/30/2013	835184	703188	189120	218940	408060
216/2013	855897	705446	207130	168898	376028
2/13/2013	874033	708453	181360	224924	406284
2/20/2013	894373	710605	203400	160970	428324
2/27/2013	909398	713471	150250	214377	364627
3/6/2013	927751	715444	183530	147580	331110
3/13/2013	940560	717890	128090	182961	311051
3/20/2013	958050	719812	174900	143766	318666
3/27/2013	969839	722316	117890	187299	305189
4/3/2013	983962	725113	141230	209216	350446
4/10/2013	2448	727075	184860	146758	331618
4/17/2013	15187	729631	127390	191189	318579

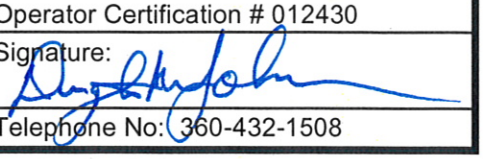
4/24/2013	34423	731741	192360	157828	350188
5/1/2013	46855	734145	124320	179819	304139
5/8/2013	63865	736043	170100	141970	312070
5/15/2013	76403	738546	125380	187224	312604
5/2212013	93779	739960	173760	105767	279527
5/29/2013	123658	739960	298790	0	298790
615i2013	139212	742171	155540	165383	320923
6/12/2013	157240	744126	180280	146234	326514
6/19/2013	173046	746620	158060	186551	344611
8/21/2013	353520	768435	150560	195976	346536
8/2812013	374815	770621	212950	163513	376463
9/4/2013	390634	773499	158190	215274	373464
9/11/2013	411041	775606	204070	157604	361674
9/18/2013	426895	778667	158540	228963	387503
9/25/2013	446890	780883	199950	165757	365707
10/212013	451873	785346	49830	333832	383662
10/9/2013	472856	787658	209830	172938	382768
10/16/2013	487390	790568	145340	217668	363008
10/23/2013	507745	792641	203550	155060	358610
10/30/2013	523047	795477	153020	212133	365153
11/6/2013	549451	797110	264040	122148	386188
11/13/2013	569516	799243	200650	159548	360198
11120/2013	585893	802070	163770	211460	375230
11/27/2013	602808	805812	169150	279902	449052
1214/2013	621323	808022	185150	165308	350458
12111/2013	640348	811170	190250	235470	425720
12/18/2013	668469	814272	281210	232030	513240
1212412013	685468	816880	169970	180118	350088
12/3112013	703947	819714	184810	226943	411753
				14592958	29879605	44472563	60921.32

Washington Corrections Center

For App C

Washington Corrections Center Annual Water Usage

WCC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Montly Ave	Ave day/mon	Ave daily
2011 Gallons	5,895,000	5,736,000	6,533,000	6,394,000	6,698,000	6,841,000	7,229,000	7,151,000	6,814,000	6,453,000	7,378,000	7,803,000	80,925,000	6,743,750	224,792	221,712
2012 Gallons	6,544,600	6,091,400	6,150,000	5,945,000	6,565,000	6,113,000	6,587,000	6,797,000	6,724,000	6,546,000	6,021,000	6,315,000	76,399,000	6,366,583	212,219	208,740

Water System Name: Washington Corrections Center	Month/Year: January 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements: Maximum Treatment Plant Pumping Rate: 640 gpm CL_2 Residual: .05 mg/L @ entry point	Signature:  Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
12/31/12	173,995,000	701,156,000		48,104,000	4714.2					
1/1/13						7.5	0.44	RES		Holiday
2/						7.4	0.47	APC	0.49	G Bldg DMJ
3/						7.5	0.30	BG	0.38	G Bldg DMJ
4/						7.4	0.33	BG	0.43	G Bldg DMJ
5/						7.5	0.33	BG		
6/						7.5	0.37	BG		
7/						7.6	0.45	RES	0.44	G Bldg DMJ
8/						7.4	0.46	RES	0.43	G Bldg DMJ
9/						7.5	0.54	APC	0.38	G Bldg DMJ
10/						7.6	0.36	BG	0.42	G Bldg DMJ
11/						7.5	0.38	BG	0.43	G Bldg DMJ
12/						7.8	0.26	BG		
13/						7.7	0.40	BG		
14/						7.6	0.47	RES	0.46	G Bldg DMJ
15/						7.6	0.43	RES	0.46	G Bldg DGM
16/						7.6	0.56	APC	0.42	G Bldg DMJ
17/						7.5	0.41	APC	0.42	G Bldg DMJ
18/						7.6	0.57	APC	0.39	G Bldg DMJ
19/						7.6	0.40	BG		
20/						7.6	0.39	RES		
21/						7.8	0.45	RES		Holiday
22/						8.0	0.47	RES	0.45	G Bldg DGM
23/						7.7	0.38	BG	0.42	G Bldg DGM
24/						7.7	0.39	BG	0.43	G Bldg DGM
25/						7.6	0.35	BG	0.43	G Bldg DGM
26/						7.7	0.35	BG		
27/						7.8	0.34	BG		
28/						8.4	0.38	RES	0.46	G Bldg DGM
29/						8.0	0.44	RES	0.33	G Bldg DGM
30/						8.1	0.37	BG	0.48	G Bldg DGM
31/	176,397,000	704,627,000		49,003,000	4755.9	7.8	0.31	BG	0.48	G Bldg DGM
Total	2,402,000	3,471,000	5,873,000	899,000	41.7					
Average	77,484	111,968		29,000	1.3	7.7	0.40		0.43	
			Total Water Produced SO3 & SO5	**6,772,000**				*Average Daily Water Use S03 & SO5 Combined*		**218,452**

***Sodium hypochlorite generator is an automated generate and fill system**

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO :

Department of Health, SWRO Drinking Water
P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: JAN Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight M Johnson Telephone Number: (360)432-1508

Signature: Dwight M Johnson Date: 2/4/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: February 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements: Maximum Treatment Plant Pumping Rate: 640 gpm CL_2 Residual: .05 mg/L @ entry point	Signature: Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
1/31/13	176,397,000	704,627,000		49,003,000	4755.9					
2/1/13						7.7	0.31	BG	0.44	G Bldg DMJ
2/						8.0	0.43	BG		
3/						8.0	0.41	BG		
4/						7.6	0.42	RES	0.44	G Bldg DMJ
5/						8.2	0.47	RES	0.42	G Bldg DMJ
6/						8.2	0.51	APC	0.48	G Bldg DMJ
7/						8.4	0.57	APC	0.45	G Bldg DMJ
8/						7.6	0.39	BG	0.44	G Bldg DMJ
9/						7.5	0.31	BG		
10/						7.4	0.44	BG		
11/						7.4	0.35	RES	0.41	G Bldg DMJ
12/						7.5	0.38	RES	0.50	G Bldg DGM
13/						7.7	0.45	BG	0.49	G Bldg DGM
14/	177,730,000	706,041,000		49,505,000	4776.6	7.7	0.38	BG	0.52	G Bldg DGM
15/						7.6	0.39	BG	0.46	G Bldg DMJ
16/						7.5	0.21	BG		
17/						7.4	0.44	RES		
18/						7.2	0.45	RES		
19/						7.3	0.39	RES	0.38	G Bldg DNS
20/						7.2	0.28	BG	0.38	G Bldg DGM
21/						7.4	0.29	BG	0.41	G Bldg DGM
22/						7.4	0.25	BG	0.45	G Bldg DGM
23/						7.5	0.36	BG		
24/						7.5	0.38	BG		
25/						7.4	0.37	RES	0.46	G Bldg DGM
26/						7.4	0.45	RES	0.40	G Bldg DMJ
27/						7.5	0.32	BG	0.47	G Bldg DGM
28/	179,161,000	707,417,000		50,044,000	4799.4	7.4	0.28	BG	0.47	G Bldg DGM
29/										
30/										
31/										
Total	2,764,000	2,790,000	5,554,000	1,041,000	43.5					
Average	98,714	99,643		37,179	1.6	7.6	0.38		0.45	
			Total Water Produced SO3 & SO5	**6,595,000**		*Average Daily Water Use S03 & SO5 Combined*				**235,536**

***Sodium hypochlorite generator is an automated generate and fill system**

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P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: February Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		28	28		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight M Johnson Telephone Number: (360)432-1508

Signature: Dwight M Johnson Date: March 1, 2013

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: March 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature: Dwight Johnson
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
2/29/	179,161,000	707,417,000		50,044,000	4799.4					
3/1/						7.4	0.42	BG	0.41	G Bldg DGM
2/						7.4	0.40	BG		
3/						7.5	0.32	BG		
4/						7.4	0.41	RES	0.38	R-6 DMJ
5/						7.5	0.46	RES	0.42	G Bldg DMJ
6/						7.4	0.55	BG	0.38	G Bldg DMJ
7/						7.4	0.32	BG	0.43	G Bldg DMJ
8/						7.4	0.48	BG	0.45	G Bldg DMJ
9/						7.5	0.40	BG		
10/						7.4	0.30	BG		
11/						7.6	0.42	RES	0.42	G Bldg DGM
12/						7.6	0.41	RES	0.41	G Bldg DMJ
13/						7.9	0.61	BG	0.47	G Bldg DGM
14/						7.8	0.39	BG	0.49	G Bldg DGM
15/	180,505,000	709,082,000		50,055,000	4821.4	7.9	0.37	BG	0.49	G Bldg DGM
16/						7.8	0.35	BG		
17/						7.7	0.28	BG		
18/						7.6	0.41	RES	0.45	G Bldg DGM
19/						7.7	0.36	RES	0.45	G Bldg DGM
20/						7.6	0.55	BG	0.46	G Bldg DGM
21/						8.2	0.56	BG	0.51	G Bldg DGM
22/						7.8	0.39	BG	0.39	G Bldg DMJ
23/						7.7	0.28	BG		
24/						7.6	0.28	BG		
25/						7.5	0.37	RES	0.42	G Bldg DMJ
26/						8.2	0.33	RES	0.40	G Bldg DMJ
27/						7.7	0.40	BG	0.42	G Bldg DMJ
28/						7.8	0.50	BG	0.39	G Bldg DMJ
29/						7.8	0.38	BG	0.40	G Bldg DMJ
30/						7.9	0.41	BG		
31/	181,893,000	711,099,000		51,074,000	4846.2	8.0	0.34	BG		
Total	2,732,000	3,682,000	6,414,000	1,030,000	46.8					
Average	88,129	118,774		33,226	1.5	7.7	0.40		0.41	
			Total Water Produced SO3 & SO5	**7,444,000**				*Average Daily Water Use S03 & SO5 Combined*		**240,129**

***Sodium hypochlorite generator is an automated generate and fill system**

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P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: March Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight M Johnson Telephone Number: (360) 432-1508

Signature: Dwight M Johnson Date: 4/2/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: April 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements: Maximum Treatment Plant Pumping Rate: 640 gpm CL_2 Residual: .05 mg/L @ entry point	Signature: Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
3/31/13	181,893,000	711,099,000		51,074,000	4846.2					
4/1/13						8.2	0.32	RES	0.45	G Bldg DMJ
2/						8.1	0.40	RES	0.43	WWLS DMG
3/						7.9	0.39	BG	0.42	G Bldg DMJ
4/						7.8	0.44	BG	0.43	G Bldg DMJ
5/						7.6	0.42	BG	0.39	G Bldg DMJ
6/						7.7	0.36	BG		
7/						7.6	0.34	BG		
8/						7.7	0.38	RES	0.42	G Bldg DMJ
9/						7.5	0.47	RES	0.41	G Bldg DMJ
10/						7.4	0.44	BG	0.40	G Bldg DMJ
11/						7.5	0.38	BG	0.43	G Bldg DMJ
12/						7.5	0.34	BG	0.43	G Bldg DMJ
13/						7.5	0.33	BG		
14/						8.0	0.36	BG		
15/	183,437,000	712,513,000		51,547,000	4866.0	7.5	0.43	RES	0.44	G Bldg DMJ
16/						7.7	0.40	RES	0.40	G Bldg DMJ
17/						7.7	0.48	BG	0.43	G Bldg DMJ
18/						7.7	0.38	BG	0.41	G Bldg DMJ
19/						8.0	0.35	BG	0.41	G Bldg DMJ
20/						8.0	0.31	BG		
21/						7.9	0.30	BG		
22/						8.0	0.41	APC	0.41	G Bldg DMJ
23/						8.2	0.43	APC	0.38	G Bldg DMJ
24/						7.9	0.37	BG	0.40	G Bldg DMJ
25/						7.8	0.32	BG	0.39	G Bldg DMJ
26/						7.8	0.35	BG	0.38	G Bldg DMJ
27/						7.8	0.30	BG		
28/						7.7	0.38	BG		
29/						7.5	0.37	RES	0.43	G Bldg DGM
30/	185,034,000	714,033,000		52,142,000	4890.7	7.4	0.45	RES	0.41	G Bldg DGM
31/										
Total	3,141,000	2,934,000	6,075,000	1,068,000	44.5					
Average	104,700	97,800		35,600	1.5	7.8	0.38		0.41	
			Total Water Produced SO3 & SO5	**7,143,000**				*Average Daily Water Use S03 & SO5 Combined*		**238,100**

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P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: April Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	503	505		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		30	30		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: 5/3/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: May 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature:
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
4/30/13	185,034,000	714,033,000		52,142,000	4890.7					
5/1/13						7.7	0.68	BG	0.45	G Bldg DMJ
2/						7.5	0.50	BG	0.47	G Bldg DMJ
3/						7.7	0.43	BG	0.50	G Bldg DMJ
4/						7.5	0.40	BG		
5/						7.5	0.33	BG		
6/						7.5	0.41	RES	0.45	G Bldg DGM
7/						7.8	0.37	RES	0.47	G Bldg DGM
8/						7.9	0.38	BG	0.48	G Bldg DGM
9/						7.9	0.26	BG	0.48	G Bldg DGM
10/						7.7	0.33	BG	0.42	G Bldg DMJ
11/						7.7	0.42	BG		
12/						7.8	0.31	BG		
13/						7.5	0.43	RES	0.40	G Bldg DMJ
14/						7.4	0.40	RES	0.44	G Bldg DMJ
15/						7.7	0.39	BG	0.44	G Bldg DMJ
16/						7.7	0.39	BG	0.39	G Bldg DMJ
17/						7.7	0.35	BG	0.42	G Bldg DMJ
18/						7.8	0.46	BG		
19/						7.6	0.35	BG		
20/						7.6	0.55	RES	0.53	G Bldg DGM
21/						7.7	0.44	RES	0.42	G Bldg DGM
22/						7.9	0.44	BG	0.49	G Bldg DGM
23/						8.0	0.39	BG	0.39	G Bldg DGM
24/						7.8	0.35	BG	0.45	G Bldg DGM
25/						8.0	0.43	RES		
26/						7.7	0.48	RES		
27/						7.7	0.43	RES		
28/						7.7	0.47	RES	0.46	G Bldg DMJ
29/						7.8	0.56	BG	0.43	G Bldg DMJ
30/						7.7	0.43	BG	0.43	G Bldg DMJ
31/	187,911,000	717,700,000		53,205,000	4939.0	7.6	0.60	APC	0.41	G Bldg DMJ
Total	2,877,000	3,667,000	6,544,000	1,063,000	48.3					
Average	92,806	118,290		34,290	1.6	7.7	0.42		0.45	
			Total Water Produced SO3 & SO5	**7,607,000**				*Average Daily Water Use S03 & SO5 Combined*		**245,387**

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Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: MAY Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: 5/31/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: June 2013
County: Mason | PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature: Dwight Johnson
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

Day/Date	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH mg/L @ entry	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
5/31/13	187,911,000	717,700,000		53,205,000	4939.0					
6/1/13						7.6	0.52	BG		
2/						7.6	0.27	BG		
3/						7.6	0.48	RES	0.54	G Bldg DGM
4/						7.3	0.38	RES	0.40	G Bldg DMJ
5/						7.9	0.41	BG	0.41	G Bldg DMJ
6/						7.9	0.41	BG	0.42	G Bldg DMJ
7/						7.8	0.40	BG	0.41	G Bldg DMJ
8/						7.8	0.39	BG		
9/						7.5	0.38	BG		
10/						7.6	0.42	RES	0.45	G Bldg DGM
11/						7.4	0.45	RES	0.46	G Bldg DGM
12/						7.8	0.40	BG	0.39	G Bldg DMJ
13/						7.7	0.35	BG	0.42	G Bldg DMJ
14/						7.8	0.41	BG	0.46	G Bldg DGM
15/						7.6	0.41	BG		
16/						7.6	0.38	BG		
17/						7.5	0.40	RES	0.40	G Bldg DMJ
18/						7.5	0.41	RES	0.39	G Bldg DMJ
19/						7.7	0.40	BG	0.38	G Bldg DMJ
20/						7.8	0.40	BG	0.42	G Bldg DMJ
21/						7.7	0.40	BG	0.38	G Bldg DMJ
22/						7.6	0.47	BG		
23/						7.7	0.42	BG		
24/						7.7	0.46	RES	0.42	G Bldg DMJ
25/						7.6	0.40	RES	0.41	G Bldg DMJ
26/						7.4	0.41	RES	0.42	G Bldg DMJ
27/						7.5	0.42	RES	0.46	G Bldg DMJ
28/						7.4	0.41	RES	0.41	G Bldg DMJ
29/						7.4	0.44	RES		
30/	191,017,000	720,305,000		54,459,000	4981.3	7.6	0.34	RES		
31/										
Total	3,106,000	2,605,000	5,711,000	1,254,000	42.3					
Average	103,533	86,833		41,800	1.4	7.6	0.41		0.42	
			Total Water Produced SO3 & SO5	**6,965,000**				*Average Daily Water Use S03 & SO5 Combined*		**232,167**

***Sodium hypochlorite generator is an automated generate and fill system**

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO :

Department of Health, SWRO Drinking Water
P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: JUNE Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month					
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: 7/2/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: July 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature:
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH mg/L @ entry	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
6/30/13	191,017,000	720,305,000		54,459,000	4981.3					
7/1/13						7.6	0.48	APC		
2/						7.6	0.44	APC	0.40	G Bldg DMJ
3/						7.8	0.41	APC	0.41	G Bldg DMJ
4/						7.8	0.44	APC	0.41	G Bldg APC
5/						7.8	0.53	APC	0.31	G Bldg MS
6/						7.5	0.41	RES		
7/						7.6	0.43	RES		
8/						7.5	0.38	RES	0.40	G Bldg DMJ
9/						7.4	0.43	RES	0.40	R-6 DMJ
10/						7.6	0.46	APC	0.45	G Bldg DMJ
11/						7.7	0.51	APC	0.41	G Bldg DMJ
12/						7.6	0.55	APC	0.47	G Bldg DMJ
13/						7.5	0.47	RES		
14/						7.5	0.50	RES		
15/						7.5	0.42	RES	0.38	G Bldg DMJ
16/						7.5	0.45	RES	0.43	G Bldg DGM
17/						7.7	0.43	APC	0.41	G Bldg DGM
18/						7.5	0.54	APC	0.44	G Bldg DGM
19/						7.7	0.47	APC	0.42	G Bldg DGM
20/						7.5	0.39	RES		
21/						7.4	0.41	RES		
22/						7.3	0.43	RES	0.41	G Bldg DMJ
23/						7.6	0.44	RES	0.41	G Bldg DMJ
24/						7.6	0.50	APC	0.33	G Bldg DMJ
25/						7.6	0.48	APC	0.40	G Bldg DGM
26/						7.3	0.43	RES	0.36	G Bldg DGM
27/						7.5	0.42	RES		
28/						7.5	0.46	RES		
29/						7.5	0.42	RES	0.37	G Bldg DMJ
30/						7.4	0.44	RES	0.38	G Bldg DMJ
31/	194,468,000	723,379,000		55,750,000	5029.9	7.8	0.63	APC	0.36	G Bldg DMJ
Total	3,451,000	3,074,000	6,525,000	1,291,000	48.6					
Average	111,323	99,161		41,645	1.6	7.6	0.46		0.40	
			Total Water Produced SO3 & SO5	7,816,000				*Average Daily Water Use S03 & SO5 Combined*		252,129

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P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;
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Washington State Department of Health
Division of Environmental Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: JULY Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	* N
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: 8/1/13

NOTE: * The distribution system disinfectant residual was not measured on Mon. July 1. The person assigned to perform the task got tied-up on an emergent issue and forgot to complete it. (cont.)

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

In an effort to make up for this we tested the disinfectant residual in the distribution system on the July 4th Holiday. Dwight Johnson

Water System Name: Washington Corrections Center	Month/Year: August 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature:
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360/482-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
7/31/13	194,468,000	723,379,000		55,750,000	5029.9					
8/1/13						7.9	0.53	APC	0.40	G Bldg DMJ
2/						8.0	0.43	APC	0.41	G Bldg DMJ
3/						7.7	0.45	RES		
4/						7.6	0.41	RES		
5/						7.7	0.55	APC	0.38	G Bldg DMJ
6/						7.7	0.49	APC	0.44	G Bldg DMJ
7/						7.6	0.51	APC	0.45	G Bldg DGM
8/						7.6	0.45	APC	0.46	G Bldg DGM
9/						7.6	0.52	APC	0.43	G Bldg DMJ
10/						7.5	0.46	RES		
11/						7.3	0.40	RES		
12/						7.5	0.51	RES	0.40	G Bldg DMJ
13/						7.5	0.42	RES	0.42	G Bldg DMJ
14/						7.8	0.60	APC	0.40	G Bldg DMJ
15/						7.9	0.53	APC	0.40	G Bldg DMJ
16/						7.6	0.39	RES	0.39	G Bldg DMJ
17/						7.9	0.45	RES		
18/						7.6	0.51	RES		
19/						7.5	0.43	RES	0.38	G Bldg DMJ
20/						7.5	0.40	RES	0.40	G Bldg DMJ
21/						7.6	0.41	BG	0.41	G Bldg DMJ
22/						7.6	0.43	BG	0.43	G Bldg DMJ
23/						7.5	0.38	BG	0.43	G Bldg DMJ
24/						7.6	0.41	BG		
25/						7.6	0.40	BG		
26/						7.6	0.44	RES	0.45	G Bldg DGM
27/						7.5	0.41	RES	0.42	G Bldg DMJ
28/						7.5	0.60	BG	0.41	G Bldg DMJ
29/						7.6	0.40	BG	0.41	G Bldg DMJ
30/						7.6	0.39	BG	0.40	G Bldg DMJ
31/	197,516,000	726,516,000		56,908,000	5078.1	7.5	0.53	BG		
Total	3,048,000	3,137,000	6,185,000	1,158,000	48.2					
Average	98,323	101,194		37,355	1.6	7.6	0.46		0.41	
			Total Water Produced SO3 & SO5	**7,343,000**		*Average Daily Water Use S03 & SO5 Combined*				**236,871**

***Sodium hypochlorite generator is an automated generate and fill system**

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P.O. Box 47823, Olympia, WA 98504-7823
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: August Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: [signature] Date: 9/3/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center		Month/Year: September 2013
County: Mason	PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3		Operator Certification # 012430
Water Quality Parameter Requirements: Maximum Treatment Plant Pumping Rate: 640 gpm CL_2 Residual: .05 mg/L @ entry point		Signature: Dwight M Johnson Telephone No: 360-432-1508

Day/Date	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
8/31/13	197,516,000	726,516,000		56,908,000	5078.1					
9/1/13						7.5	0.45	BG		
2/						7.4	0.56	APC		Holiday
3/						7.5	0.62	APC	0.39	G Bldg DMJ
4/						7.4	0.42	BG	0.37	G Bldg DMJ
5/						7.6	0.37	BG	0.43	G Bldg DMJ
6/						7.5	0.37	BG	0.39	G Bldg DMJ
7/						7.5	0.30	BG		
8/						7.4	0.38	BG		
9/						7.5	0.45	APC	0.48	G Bldg DS
10/						7.5	0.42	APC	0.39	G Bldg DMJ
11/						7.5	0.52	BG	0.40	G Bldg DMJ
12/						7.5	0.41	BG	0.40	G Bldg DMJ
13/						7.5	0.38	BG	0.37	G Bldg DMJ
14/						7.5	0.42	BG		
15/						7.5	0.54	BG		
16/						7.3	0.42	RES	0.39	G Bldg DGM
17/						7.5	0.47	RES	0.39	G Bldg DGM
18/						7.5	0.47	APC	0.38	G Bldg DMJ
19/						7.6	0.38	BG	0.39	G Bldg DMJ
20/						7.5	0.34	BG	0.36	G Bldg DMJ
21/						7.5	0.40	BG		
22/						7.5	0.43	BG		
23/						7.5	0.43	RES	0.40	G Bldg DMJ
24/						7.5	0.45	RES	0.48	G Bldg DGM
25/						7.8	0.40	BG	0.44	G Bldg DGM
26/						7.8	0.36	BG	0.40	G Bldg DGM
27/						7.8	0.52	APC	0.38	G Bldg DMJ
28/						7.6	0.43	BG		
29/						7.8	0.40	BG		
30/	200,197,000	729,067,000		57,938,000	5118.2	7.6	0.44	RES	0.40	G Bldg DMJ
31/										
Total	2,681,000	2,551,000	5,232,000	1,030,000	40.1					
Average	89,367	85,033		34,333	1.3	7.5	0.43		0.40	
			Total Water Produced SO3 & SO5	**6,262,000**				***Average Daily Water Use S03 & SO5 Combined***		**208,733**

***Sodium hypochlorite generator is an automated generate and fill system**

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P.O. Box 47823, Olympia, WA 98504-7823
sw.treatment.reports@doh.wa.gov

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: September Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1.	Number of **days** during which plant produced water during month	30	30		
	2.	Gross volume available between chlorine injection and first customer (gals)	378,807	378,807		
	3.	**Effective** contact time volume (gals) (based on approved design at max flow rate)	41,307	41,307		
	4.	Maximum flow rate (gpm) (based on approved design)	312	312		
	5.	Contact time (min) (based on approved design)	132	132		
	6.	Minimum free chlorine residual (mg/l) required at maximum flow rate	.05	.05		
	7.	Sampling location (based on approved design)	Steam Plant	Steam Plant		
	8.	Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y	Y		
	9.	Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**	Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360)432-1508

Signature: Dwight M Johnson Date: 10/3/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: October 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature:
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
9/30/13	200,197,000	729,067,000		57,938,000	5118.2					
10/1/13						7.5	0.48	RES	0.38	G Bldg DMJ
2/						7.6	0.44	BG	0.42	G Bldg DMJ
3/						7.6	0.47	APC	0.43	G Bldg DMJ
4/						7.6	0.41	BG	0.43	G Bldg DMJ
5/						7.5	0.38	BG		
6/						7.6	0.39	BG		
7/						7.3	0.42	RES	0.37	G Bldg DMJ
8/						7.5	0.44	RES	0.40	G Bldg DMJ
9/						7.6	0.43	BG	0.38	G Bldg DMJ
10/						7.3	0.43	BG	0.43	G Bldg DMJ
11/						7.4	0.40	BG	0.41	G Bldg DGM
12/						7.3	0.43	BG		
13/						7.3	0.40	BG		
14/						7.4	0.43	RES	0.46	G Bldg DMJ
15/						7.4	0.42	RES	0.41	G Bldg DMJ
16/						7.5	0.44	BG	0.39	G Bldg DMJ
17/						7.6	0.40	BG	0.46	G Bldg DMJ
18/						7.5	0.38	BG	0.42	G Bldg DMJ
19/						7.5	0.41	BG		
20/						7.5	0.39	BG		
21/						7.5	0.41	RES	0.47	G Bldg DMJ
22/						7.6	0.49	RES	0.43	G Bldg DMJ
23/						7.5	0.44	BG	0.38	G Bldg DNS
24/						7.8	0.50	BG	0.40	G Bldg DMJ
25/						7.7	0.45	BG	0.45	G Bldg DMJ
26/						7.5	0.40	BG		
27/						7.6	0.38	BG		
28/						7.3	0.42	RES	0.38	G Bldg DNS
29/						7.5	0.44	RES	0.36	G Bldg DNS
30/						7.4	0.40	BG	0.46	G Bldg DMJ
31/	202,842,000	732,342,000		58,955,000	5161.7	7.5	0.38	BG	0.40	G Bldg DMJ
Total	2,645,000	3,275,000	5,920,000	1,017,000	43.5					
Average	85,323	105,645		32,806	1.4	7.5	0.42		0.41	
			Total Water Produced SO3 & SO5	**6,937,000**				*Average Daily Water Use S03 & SO5 Combined*		**223,774**

***Sodium hypochlorite generator is an automated generate and fill system**

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

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Department of Health, SWRO Drinking Water

P.O. Box 47823, Olympia, WA 98504-7823

Washington State Department of Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: OCTOBER Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. Effective contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: 360-432-1508

Signature: Dwight Johnson Date: 10/4/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center	Month/Year: November 2013
County: Mason PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3	Operator Certification # 012430
Water Quality Parameter Requirements:	Signature:
Maximum Treatment Plant Pumping Rate: 640 gpm	
CL_2 Residual: .05 mg/L @ entry point	Telephone No: 360-432-1508

	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
Day/Date	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	pH	CL_2 Residual mg/L @ entry	Initials	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
10/31/13	202,842,000	732,342,000		58,955,000	5161.7					
11/1/13						7.5	0.37	BG	0.79	G Bldg MS
2/						7.5	0.37	BG		
3/						7.5	0.31	BG		
4/						7.5	0.41	RES	0.41	G Bldg DMJ
5/						7.5	0.39	RES	0.44	G Bldg DMJ
6/						7.5	0.43	APC	0.42	G Bldg DMJ
7/						7.6	0.43	APC	0.49	G Bldg DMJ
8/						7.7	0.38	BG	0.44	G Bldg DMJ
9/						7.6	0.36	BG		
10/						7.5	0.40	RES		
11/						7.4	0.38	RES		Holiday
12/						7.4	0.42	RES	0.39	G Bldg DMJ
13/						7.8	0.40	BG	0.40	R-6 DMJ
14/						7.6	0.34	BG	0.41	R-6 DMJ
15/						7.6	0.41	BG	0.40	G Bldg DMJ
16/						7.5	0.38	RES		
17/						7.4	0.43	RES		
18/						7.5	0.41	RES	0.44	G Bldg DMJ
19/						7.4	0.39	RES	0.39	G Bldg DMJ
20/						7.6	0.43	BG	0.46	G Bldg DGM
21/						7.6	0.40	BG	0.40	G Bldg DMJ
22/						7.6	0.38	BG	0.41	G Bldg DMJ
23/						7.8	0.30	BG		
24/						7.6	0.33	BG		
25/						7.6	0.38	RES	0.42	G Bldg DMJ
26/						7.5	0.40	RES	0.39	G Bldg DMJ
27/						7.7	0.44	APC	0.44	G Bldg DMJ
28/						7.7	0.40	APC		Holiday
29/						7.6	0.40	APC		Holiday
30/	205,497,000	735,314,000		59,971,000	5205.8	7.6	0.48	APC		
31/										
Total	2,655,000	2,972,000	5,627,000	1,016,000	44.1					
Average	88,500	99,067		33,867	1.5	7.6	0.39		0.44	
			Total Water Produced SO3 & SO5	**6,643,000**				*Average Daily Water Use S03 & SO5 Combined*		**221,433**

***Sodium hypochlorite generator is an automated generate and fill system**

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO :

Department of Health, SWRO Drinking Water
P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;

Washington State Department of Health
Division of Environmental Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: NOVEMBER Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	S03	S05		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		30	30		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: 12/2/13

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Water System Name: Washington Corrections Center		Month/Year: December 2013
County: Mason	PWS ID No: 93063K	Report Submitted by: Dwight Johnson
Source No: SO5 (WF SO2 & SO4) and SO3		Operator Certification # 012430
Water Quality Parameter Requirements: Maximum Treatment Plant Pumping Rate: 640 gpm CL_2 Residual: .05 mg/L @ entry point		Signature: Telephone No: 360-432-1508

Day/Date	Water Production (Gallons)				*Sodium Hypochlorite Generator	Treated Water Quality				
	SO2 Meter Reading	SO4 Meter Reading	SO5 Total Gallons (WF SO2 & SO4 Combined)	SO3 Meter Reading	Hour Meter Reading	CL_2 Residual mg/L @ entry	Initials	pH	Distribution CL_2 Residual mg/L	Sample Location & Sampler Initials
11/31/13	205,497,000	735,314,000		59,971,000	5205.8					
12/1/13						0.36	BG			
2/						0.40	RES	7.6	0.46	G-Bldg DJ
3/						0.43	RES	7.7	0.45	G-Bldg DJ
4/						0.38	BG	7.6	0.41	G-Bldg DJ
5/						0.41	BG	7.6	0.42	G-Bldg DJ
6/						0.37	BG	7.6	0.41	G-Bldg DJ
7/						0.39	BG			
8/						0.40	BG			
9/						0.42	RES	7.6	0.40	G-Bldg-DGM
10/						0.36	RES	7.6	0.46	G-Bldg-DGM
11/						0.39	BG	7.9	0.41	G-Bldg DJ
12/						0.44	BG	7.8	0.48	G-Bldg DJ
13/						0.41	BG	7.8	0.45	G-Bldg DJ
14/						0.38	BG			
15/						0.39	RES			
16/						0.37	RES	7.7	0.42	G-Bldg DJ
17/						0.39	RES	7.8	0.42	G-Bldg DJ
18/						0.36	BG	7.8	0.40	G-Bldg DJ
19/						0.39	BG	8.0	0.41	G-Bldg DJ
20/						0.40	APC	7.6	0.45	G-Bldg DJ
21/						0.41	BG			
22/						0.32	BG			
23/						0.40	APC	7.9	0.39	G-Bldg DJ
24/						0.40	APC	7.6	0.39	G-Bldg DGM
25/						0.44	APC			Holiday
26/						0.40	APC	7.7	0.40	G-Bldg DJ
27/						0.40	APC	7.8	0.41	G-Bldg DJ
28/						0.43	RES			
29/						0.38	RES			
30/						0.41	APC	7.6	0.39	G-Bldg DJ
31/	208,327,000	737,930,000		61,057,000	5247.2	0.42	APC	7.8	0.46	G-Bldg DJ
Total	2,830,000	2,616,000	5,446,000	1,086,000	41.4					
Average	91,290	84,387		35,032	1.3	0.40		7.7	0.42	
			Total Water Produced SO3 & SO5	**6,532,000**		*Average Daily Water Use S03 & SO5 Combined*				**210,710**

***Sodium hypochlorite generator is an automated generate and fill system**

If a treatment failure lasts longer than 4 hours, call your regional office at the number listed below.

PLEASE KEEP A COPY FOR YOUR RECORDS & SEND REPORT BY THE 10TH OF THE FOLLOWING MONTH TO :

Department of Health, SWRO Drinking Water
P.O. Box 47823, Olympia, WA 98504-7823
(360) 236-3030;

Washington State Department of Health
Division of Environmental Health

Ground Water Treatment Plant
Groundwater Rule Monthly Compliance Report for Small Systems

PWS ID: 93063 PWS Name: Washington Corrections Center County: MASON

Month: DECEMBER Year: 2013

		Treatment Plant ID #	93063K	93063K		
		Corresponding Source #	503	505		
Entry Point to Distribution System Residual Samples	1. Number of **days** during which plant produced water during month		31	31		
	2. Gross volume available between chlorine injection and first customer (gals)		378,807	378,807		
	3. **Effective** contact time volume (gals) (based on approved design at max flow rate)		41,307	41,307		
	4. Maximum flow rate (gpm) (based on approved design)		312	312		
	5. Contact time (min) (based on approved design)		132	132		
	6. Minimum free chlorine residual (mg/l) required at maximum flow rate		.05	.05		
	7. Sampling location (based on approved design)		Steam Plant	Steam Plant		
	8. Was the entry point to distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)		Y	Y		
	9. Number of **days** when residual fell below the residual shown on **Line 6 (see note below)**		Ø	Ø		

Distribution Residual Samples	10. Was the distribution system disinfectant residual measured at least once per day every Monday - Friday (except holidays)? (Y/N)	Y
	11. Number of **days** when no disinfectant residual was detected in the distribution system	Ø

Report Submitted by: Dwight Johnson Telephone Number: (360) 432-1508

Signature: Dwight Johnson Date: JAN 2, 2014

NOTE:

You may demonstrate that the inactivation requirement was met by documenting on an attached sheet of paper the following information for each day the measured residual is lower than the value shown on line 6:

A. Actual maximum flow rate for the day
B. Actual effective contact volume between the point of chlorine injection and the residual sampling location during maximum flow
C. Calculate contact time
D. Daily free chlorine residual measured at the approved sampling location
E. Actual water temperature and pH
F. Calculate "CT", and compare with what is required for 4-log virus inactivation as shown on the table to the right

Temperature °C	CT required for 4-log	
	pH 6-9	pH 10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Washington Corrections Center for Women

WCCW WELL #1 AND #2

		WELL #1				WELL #2					
DATE	TIME	METER READING	TOTAL			TIME	METER READING	TOTAL			
9-30-13	1147	95698318	17,382								
10-01-13	1135	95715700	17,670								
10-2-13	1148	95733370	18,130								
10-3-13	1205	95751500	16,750								
10-4-13	1140	95768250	52,850								
10-7-13	1150	95821100	17,700								
10-8-13	1200	95838800	17,210								
10-9-13	1125	95856010	17,510								
10-10-13	1125	95873520	17,610								
10-11-13	1126	95891130	52,830								
10-14-13	1131	95943960	17,540								
10-15-13	1131	95961500	17,800								
10-16-13	1145	95979300	17,330								
10-17-13	1125	95996630	17,870								
10-18-13	1150	96014500	52,730								
10-21-13	1142	96067230	17,490								
10-22-13	1131	96084720	17,800								
10-23-13	1148	96102520	17,340								
10-24-13	1134	96119860	17,510								
10-25-13	1118	96137370	38,340								
10-29-13	1148	96175710	16,110								
10-30-13	1138	96191820	16,580								
10-31-13	1145	96208400	17,410								
11-1-13	1145	96225810	20,145								

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL			WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL			
6-3-13		95209350									
6-4-13		95225619									
6-5-13		95244770									
6-6-13		95262590									
6-7-13		95278810									
6-11-13		95345065									
6-12-13		95345967	3883 #1 well Shutdown								
6-13-13		"									
6-14-13		"									
6-17-13		"									
6-18-13		"									
9-10-13	1250	95349850	16,251 ~~5883~~ 8mB	#1 well	back on	line					
9-11-13	1126	95366101	17,648 ~~16,251~~ +8mB								
9-12-13	1135	95383749	17,048								
9-13-13	1135	95400752	52,868								
9-16-13	1145	95453620	17,395								
9-17-13	1204	95471015	17,505								
9-18-13	1205	95488520	17,380								
9-19-13	1145	95505900	17,240								
9-20-13	1145	95523140	70,120								
9-24-13	1151	95593260	17,295								
9-25-13	1139	95610555	17,235								
9-26-13	1115	95627790	17,840								
9-27-13	1143	95645630	52,680								

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
4-25-13	1148	94573115	56,895			
4-29-13	1143	94630010	4,040			
4-30-13	1151	94634050	16,820			
5-1-13	1151	94650870	16,702			
5-2-13	1147	94667572	16,528			
5-3-13	1101	94684100	51,130			
5-6-13	1149	94735230	16,940			
5-7-13	1144	94752170	16,730			
5-8-13	1136	94768900	16,725			
5-9-13	1122	94785625	17,025			
5-10-13	1129	94802650	50,190			
5-13-13	1100	94852840	17,790			
5-14-13	1211	94870630	16,520			
5-15-13	1130	94887150	16,895			
5-16-13	1126	94904045	17,095			
5-17-13	1135	94921140				
5-20-13	1100	94972225				
5-21-13	1115	94990360				
5-22-13		95008125				
5-23-13		95025140				
5-24-13		95042075				
5-28-13		95108500				
5-29-13		95125300				
5-30-13		95141800				

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
3/19/13	1229	93948258	16,592			
3/20/13	1141	93964850	16,875			
3/21/13	1131	93981725	16,905			
3/22/13	1133	93998630	51,170			
3/25/13	1137	94049800	17,104			
3/26/13	1150	94066904	16,341			
3/27/13	1108	94083245	17,416			
3/28/13	1144	94100661	67,799			
4/1/13	1150	94168460	16,780			
4/2/13	1142	94185240	16,895			
4/3/13	1135	94202135	16,995			
4/4/13	1137	94219130	17,085			
4/5/13	1137	94236215	84,185			
4/10/13	1131	94320400	17,160			
4/11/13	1156	94337560	16,480			
4/12/13	1120	94354040	50,525			
4/15/13	1129	94404565	16,885			
4/16/13	1129	94421450	17,560			
4/17/13	1226	94439010	16,315			
4/18/13	1144	94455325	16,680			
4/19/13	1131	94472005	50,600			
4/22/13	1144	94522605	16,840			
4/23/13	1145	94539445	17,175			
4/24/13	1210	94556620	16,495			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
2-8-13	1121	93283840	51,248			
2-11-13	1141	93335088	16,852			
2-12-13	1141	93351940	17,065			
2-13-13	1145	93369005	17,025			
2-14-13	1145	93386030	16,820			
2-15-13	1132	93402850	68,172			
2-19-13	1141	93471022	16,918			
2-20-13	1134	93487940	17,210			
2-21-13	1141	93505150	16,572			
2-22-13	1118	93521722	52,578			
2-25-13	1330	93574300	15,700			
2-26-13	1131	93590000	51,260			
3-1-13	1141	93641260	51,560			
3-4-13	1150	93692820	16,628			
3-5-13	1125	93709448	17,060			
3-6-13	1127	93726508	17,504			
3-7-13	1159	93744012	16,738			
3-8-13	1131	93760750	50,400			
3-11-13	1122	93811150	17,080			
3-12-13	1125	93828230	17,021			
3-13-13	1123	93845251	17,375			
3-14-13	1143	93862626	16,606			
3-15-13	1115	93879232	51,413			
3-18-13	1131	93930645	17,613			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL		WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
12-28-12	1148	92660750	50,550				
12-31-12	1121	92711300	36,020				
1-2-13	1428	92747320	15,490				
1-3-13	1205	92762810	16,205				
1-4-13	1135	92779015	84,215				
1-9-13	1125	92863230	34,270				
1-11-13	1147	92897500	50,205				
1-14-13	1130	92947705	16,725				
1-15-13	1129	92964430	16,790				
1-16-13	1136	92981220	17,183				
1-17-13	1151	92998403	16,537				
1-18-13	1131	93014940	67,390				
1-22-13	1139	93082330	17,320				
1-23-13	1215	93099650	13,499				
1-24-13	1148	93113149		#1 well pmp off			
1-25-13	1122	93113149	1,751				
1-29-13	1221	93114900	16,430				
1-30-13	1131	93131330	17,395				
1-31-13	1151	93148725	16,435				
2-1-13	1124	93165160	51,180				
2-4-13	1155	93216340	16,830				
2-5-13	1143	93233170	17,036				
2-6-13	1144	93250206	16,726				
2-7-13	1129	93266932	16,908				

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
10-31-12	1145	91720660	17,080			
11-1-12	1145	91737740	17,070			
11-2-12	1148	91754810	30,788			
11-5-12	1148	91785598	1,902			
11-6-12	1141	91787500	10,550			
11-7-12	1146	91798050	8,310			
11-8-12	1132	91806360	85,870			
11-13-12	1133	91892230	17,175			
11-14-12	1132	91909405	17,095			
11-15-12	1135	91926500	342,690			
12-5-12	1136	92269190	17,210			
12-6-12	1142	92286400	18,320			
12-7-12	1328	92304720	49,890			
12-10-12	1133	92354610	16,912			
12-11-12	1128	92371522	17,690			
12-12-12	1220	92389212	17,113			
12-13-12	1226	92406325	16,388			
12-14-12	1131	92422713	50,896			
12-17-12	1121	92473609	51,321			
12-20-12	1141	92524930	17,000			
12-21-12	1141	92541930	50,880			
12-24-12	1141	92592810	34,005			
12-26-12	1145	92626815	17,045			
12-27-12	1143	92643860	16,890			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
9-21-12	1132	91102345	20,403			
9-25-12	1155	91122748	1582			
9-26-12	1143	91124330	17,110			
9-27-12	1209	91141440	17,460			
9-28-12	1209	91158900	50,715			
10-1-12	1145	91209615	17,435			
10-2-12	1218	91227050	16,450			
10-3-12	1132	91243500	17,200			
10-4-12	1147	91260700	16,970			
10-5-12	1145	91277670	51,175			
10-8-12	1158	91328845	16,585			
10-9-12	1127	91345430	17,058			
10-10-12	1132	91362488	17,142			
10-11-12	1131	91379630	16,912			
10-12-12	1118	91396542	51,128			
10-15-12	1131	91447670	17,340			
10-16-12	1135	91465010	16,910			
10-17-12	1131	91481920	17,220			
10-18-12	1145	91499140	68,060			
10-22-12	1131	91567200	17,330			
10-23-12	1156	91584530	17,075			
10-24-12	1209	91601605	85,245			
10-29-12	1209	91686850	18,165			
10-30-12	1341	91705015	15,645			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
8-13-12	1132	90436300	17,140			
8-14-12	1142	90453440	17,080			
8-15-12	1142	90470520	17,090			
8-16-12	1142	90487610	16,840			
8-17-12	1122	90504450	85,820			
8-22-12	1132	90590270	17,000			
8-23-12	1125	90607270	17,340			
8-24-12	1134	90624610	51,693			
8-27-12	1206	90676303	17,037			
8-28-12	1150	90693340	16,770			
8-29-12	1129	90710110	17,395			
8-30-12	1150	90727505	16,780			
8-31-12	1125	90744285	68,585			
9-4-12	1141	90812870	17,340			
9-5-12	1200	90830210	16,820			
9-6-12	1140	90847030	17,020			
9-7-12	1135	90864050	50,980			
9-10-12	1116	90915030	51,480			
9-13-12	1121	90966510	16,897			
9-14-12	1135	90983407	51,380			
9-17-12	1205	91034787	16,633			
9-18-12	1138	91051420	17,080			
9-19-12	1138	91068500	17,040			
9-20-12	1149	91085540	16,805			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
6-22-12	1155	89533810	54,920			
6-25-12	1126	89588730	19,100			
6-26-12	1145	89607830	54,880			
6-29-12	1145	89662710	55,640			
7-2-12	1228	89718350	17,570			
7-3-12	1132	89735920	128,280			
7-10-12	1123	89864200	18,760			
7-11-12	1200	89882960	17,910			
7-12-12	1135	89900870	18,690			
7-13-12	1204	89919560	54,350			
7-16-12	1135	89973910	18,420			
7-17-12	1148	89992330	18,170			
7-18-12	1140	90010500	18,125			
7-19-12	1132	90028625	169,085			
7-30-12	1142	90197710	16,900			
7-31-12	1122	90214610	17,520			
8-1-12	1148	90232130	16,870			
8-2-12	1145	90249000	16,740			
8-3-12	1118	90265740	51,730			
8-6-12	1158	90317470	16,860			
8-7-12	1155	90334330	17,280			
8-8-12	1208	90351610	16,460			
8-9-12	1132	90368070	17,140			
8-10-12	1135	90385210	51,090			

WCCW WELL #1 AND #2

		WELL #1		WELL #2		
DATE	TIME	METER READING	TOTAL	TIME	METER READING	TOTAL
5-9-12	1138	88667360	20,080			
5-10-12	1125	88687440	20,100			
5-11-12	1125	88707540	61,160			
5-14-12	1222	88768700	20,540			
5-15-12	1240	88789240	20,260			
5-16-12	1243	88809500	19,502			
5-17-12	1245	88829002	19,208			
5-18-12	1129	88848210	81,110			
5-22-12	1229	88929320	19,195			
5-23-12	1138	88948515	20,191			
5-24-12	1138	88968706	22,506			
5-25-12	1435	88991212	247,908			
6-5-12	1221	89209120	19,690			
6-6-12	1221	89228810	19,320			
6-7-12	1108	89248130	22,110			
6-8-12	1338	89270240	58,660			
6-11-12	1155	89328900	19,180			
6-12-12	1119	89348080	18,940			
6-13-12	1128	89367020	18,390			
6-14-12	1140	89385410	18,440			
6-15-12	1131	89403850	73,780			
6-19-12	1100	89477630	18,989			
6-20-12	1131	89496619	18,631			
6-21-12	1140	89515250	18,560			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
3-30-12	1122	87859948	102,612			
4-4-12	1149	87958460	21,065			
4-5-12	1232	87979525	19,475			
4-6-12	1132	87999000	61,110			
4-9-12	1133	88060110	20,600			
4-10-12	1147	88080710	19,960			
4-11-12	1122	88100670	41,180			
4-13-12	1142	88141850	80,853			
4-17-12	1125	88222703	20,217			
4-18-12	1132	88242920	20,185			
4-19-12	1135	88263105	20,095			
4-20-12	1120	88283200	61,160			
4-23-12	1135	88344360	21,070			
4-24-12	1228	88365430	19,640			
4-25-12	1142	88385070	20,160			
4-26-12	1145	88405230	20,375			
4-27-12	1148	88425605	60,435			
4-30-12	1132	88486040	20,370			
5-1-12	1145	88506410	20,230			
5-2-12	1152	88526640	20,470			
5-3-12	1218	88547110	19,760			
5-4-12	1145	88566870	60,110			
5-7-12	1122	88626980	20,230			
5-8-12	1128	88647210	20,150			

WCCW WELL #1 AND #2

		WELL #1				WELL #2					
DATE	TIME	METER READING	TOTAL			TIME	METER READING	TOTAL			
2-24-12	1130	87136830	64,200								
2-27-12	1355	87201030	19,410								
2-28-12	1224	87220440	20,580								
2-29-12	1219	87241020	20,210								
3-1-12	1148	87261230	20,420								
3-2-12	1129	87281650	61,680								
3-5-12	1119	87343330	22,020								
3-6-12	1156	87365350	19,460								
3-7-12	1140	87384830	41,091								
3-9-12	1131	87425921	61,119								
3-12-12	1142	87487040	20,570								
3-13-12	1142	87507610	20,640								
3-14-12	1155	87528250	20,750								
3-15-12	1206	87549000	20,110								
3-16-12	1132	87569110	62,720								
3-19-12	1222	87631830	19,480								
3-20-12	1138	87651310	20,410								
3-21-12	1131	87671720	21,180								
3-22-12	1218	87692900	19,940								
3-23-12	1136	87712840	62,080								
3-26-12	1215	87774920	19,880								
3-27-12	1140	87794800	20,920								
3-28-12	1214	87815720	20,980								
3-29-12	1245	87836700	19,248								

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
1-19-12	1325	86362708	18,352			
1-20-12	1155	86381060	58,960			
1-23-12	1155	86440020	39,286			
1-25-12	1157	86479306	25,204			
1-26-12	1157	86504510	23,695			
1-27-12	1155	86528205	72,855			
1-30-12	1158	86601060	24,640			
1-31-12	1238	86625700	23,670			
2-1-12	1200	86649370	24,360			
2-2-12	1225	86673730	24,280			
2-3-12	1138	86698010	64,810			
2-6-12	1140	86762820	21,190			
2-7-12	1205	86784010	20,630			
2-8-12	1145	86804640	20,768			
2-9-12	1140	86825408	20,892			
2-10-12	1140	86846300	63,090			
2-13-12	1220	86909390	20,320			
2-14-12	1145	86929710	22,090			
2-15-12	1300	86951800	20,040			
2-16-12	1245	86971840	19,970			
2-17-12	1140	86991810	83,500			
2-21-12	1200	87075310	20,360			
2-22-12	1146	87095670	21,040			
2-23-12	1205	87116710	20,120			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
11-18-11	1150	85122710	504,260			
12-13-11	1150	85626970	20,135			
12-14-11	1210	~~85647105~~ 85666940	19,835			
12-15-11	1155	85666940	19,960			
12-16-11	1150	85686900	60,118			
12-19-11	1155	85747018	21,704			
12-20-11	1155	85768722	18,398			
12-21-11	1200	85787120	19,691			
12-22-11	1150	85806811	19,797			
12-23-11	1155	85826608	80,103			
12-27-11	1205	85906711	19,695			
12-28-11	1155	85926406	19,944			
12-29-11	1158	85946350	19,380			
12-30-11	1130	85965730	80,180			
1-3-12	1205	86045910	19,295			
1-4-12	1140	86065205	20,085			
1-5-12	1155	86085290	19,816			
1-6-12	1155	86105106	58,734			
1-9-12	1125	86163840	20,420			
1-10-12	1155	86184260	19,360			
1-11-12	1140	86203640	39,290			
1-13-12	1145	86242930	78,500			
1-17-12	1120	86321430	20,290			
1-18-12	1150	86341720	20,988			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
10-13-11	1145	84385210	20,120			
10-14-11	1140	84405330	62,090			
10-17-11	1140	84467420	20,392			
10-18-11	1140	84487812	20,268			
10-19-11	1127	84508080	20,740			
10-20-11	1135	84528820	21,290			
10-21-11	1225	84550110	60,605			
10-24-11	1125	84610715	20,505			
10-25-11	1128	84631220	21,090			
10-26-11	1145	84652310	40,440			
10-28-11	1140	84692750	61,430			
10-31-11	1140	84754180	20,395			
11-1-11	1140	84774575	22,445			
11-2-11	1350	84797020	18,710			
11-3-11	1155	84815730	20,220			
11-4-11	1145	84835950	62,090			
11-7-11	1145	84898040	20,585			
11-8-11	1145	84918425	20,755			
11-9-11	1150	84939180	20,060			
11-10-11	1145	84959240	21,990			
11-14-11	1220	85041230	22,220			
11-15-11	1430	85063450	18,570			
11-16-11	1245	85082020	21,410			
11-17-11	1350	85103430	19,280			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
8-29-11	1150	83691150	21,410			
8-30-11	1150	83712560	20,880			
8-31-11	1150	83733440	20,535			
9-1-11	1150	83753975	54,825			
9-15-11	1230	83808800	19,940			
9-16-11	1200	83828740	61,580			
9-19-11	1140	83890320	20,830			
9-20-11	1149	83911150	20,200			
9-21-11	1140	83931350	20,990			
9-22-11	1140	83952340	20,760			
9-23-11	1150	83973100	61,855			
9-26-11	1150	84034955	20,875			
9-27-11	1213	84055830	20,980			
9-28-11	1238	84076810	20,220			
9-29-11	1210	84097030	19,970			
9-30-11	1122	84117000	62,340			
10-3-11	1150	84179340	20,380			
10-4-11	1139	84199720	20,690			
10-5-11	1145	84220410	20,630			
10-6-11	1145	84241040	20,380			
10-7-11	1135	84261420	61,880			
10-10-11	1140	84323300	20,320			
10-11-11	1128	84343620	20,920			
10-12-11	1130	84364540	20,670			

WCCW WELL #1 AND #2

DATE	TIME	WELL #1 METER READING	WELL #1 TOTAL	WELL #2 TIME	WELL #2 METER READING	WELL #2 TOTAL
10-28-09	1132	82659620	21,700			
10-29-09	1134	82681320	18,780			
10-30-09	1143	82700100	56,515			
11-2-09	1134	82756615	39,569			
11-4-09	1200	82795184	17,773			
11-5-09	1200	82812957	74,053			
11-9-09	1158	82887010	18,340			
11-10-09	1141	82905350	37,355			
11-12-09	1200	82942705				

Date	Large Meter Reading	Cubic Feet Used	Gallons Used	Small Meter Reading	Cubic Feet Used	Gallons Used	Total CCF Used Large Meter + Small Meter	Total Gallons Used Large Meter + Small Meter		Monthly Sum			Gas Meter	Degree Day	MUF Meter
01/03/11	30571020.0	7,110.0	53,186.5	3092581.0	3,039.0	22,733.3	10149.0	75,919.8					58645020.0		
01/04/11	30578130.0	5,720.0	42,788.6	3095620.0	4,681.0	35,016.3	10401.0	77,804.9					58737060.0		
01/05/11	30583850.0	6,347.0	47,478.9	3100301.0	2,544.0	19,030.4	8891.0	66,509.3					58825000.0		
01/06/11	30590197.0	7,613.0	56,949.2	3102845.0	3,086.0	23,084.9	10699.0	80,034.1					58897310.0		
01/07/11	30597810.0	18,860.0	141,082.6	3105931.0	11,023.0	82,457.8	29883.0	223,540.4					58968520.0		
01/10/11	30616670.0	8,507.0	63,636.8	3116954.0	3,471.0	25,964.9	11978.0	89,601.7					59232760.0		
01/11/11	30625177.0	5,113.0	38,247.9	3120425.0	3,622.0	27,094.4	8735.0	65,342.3					59330440.0		
01/12/11	30630290.0	6,212.0	46,469.0	3124047.0	4,143.0	30,991.8	10355.0	77,460.8					59420030.0		
01/13/11	30636502.0	5,690.0	42,564.2	3128190.0	3,888.0	29,084.3	9578.0	71,648.4					59488760.0		
01/14/11	30642192.0	26,738.0	200,014.1	3132078.0	12,984.0	97,127.1	39722.0	297,141.2					59551001.0		
01/18/11	30668930.0	6,290.0	47,052.5	3145062.0	4,209.0	31,485.5	10499.0	78,538.0					59793900.0		
01/19/11	30675220.0	6,602.0	49,386.4	3149271.0	4,070.0	30,445.7	10672.0	79,832.1					59873310.0		
01/20/11	30681822.0	4,588.0	34,320.6	3153341.0	4,304.0	32,196.2	8892.0	66,516.8					59961120.0		
01/21/11	30686410.0	21,900.0	163,823.4	3157645.0	9,886.0	73,952.4	31786.0	237,775.8					60034200.0		
01/24/11	30708310.0	6,310.0	47,202.1	3167531.0	3,313.0	24,783.0	9623.0	71,985.0					60240730.0		
01/25/11	30714620.0	13,450.0	100,613.0	3170844.0	6,118.0	45,765.8	19568.0	146,378.8					60304910.0		
01/27/11	30728070.0	30,110.0	225,238.5	3176962.0	14,139.0	105,767.1	44249.0	331,005.5					60438010.0		
01/31/11	30758180.0	5,560.0	41,591.7	3191101.0	3,958.0	29,607.9	9518.0	71,199.6					60722310.0		
02/01/11	30763740.0	7,780.0	58,198.4	3195059.0	4,124.0	30,849.7	11904.0	89,048.1					60799910.0		
02/02/11	30771520.0	6,500.0	48,623.4	3199183.0	4,763.0	35,629.7	11263.0	84,253.1					60883050.0		
02/03/11	30778020.0	22,990.0	171,977.2	3203946.0	17,277.0	129,240.9	40267.0	301,218.1					60952150.0		
02/07/11	30801010.0	6,820.0	51,017.1	3221223.0	3,845.0	28,762.6	10665.0	79,779.7					61209400.0		
02/08/11	30807830.0	14,680.0	109,814.0	3225068.0	8,330.0	62,312.7	23010.0	172,126.8					61281320.0		
02/10/11	30822510.0	5,920.0	44,284.7	3233398.0	3,302.0	24,700.7	9222.0	68,985.4					61449700.0		
02/11/11	30828430.0	17,690.0	132,330.4	3236700.0	13,030.0	97,471.2	30720.0	229,801.6					61521910.0		
02/14/11	30846120.0	7,010.0	52,438.4	3249730.0	3,984.0	29,802.4	10994.0	82,240.8					61711910.0		
02/15/11	30853130.0	6,430.0	48,099.7	3253714.0	3,906.0	29,218.9	10336.0	77,318.7					61785910.0		
02/16/11	30859560.0	39,955.0	298,884.2	3257620.0	23,866.0	178,530.1	63821.0	477,414.3					61863300.0		
02/22/11	30899515.0	6,665.0	49,857.7	3281486.0	4,321.0	32,323.3	10986.0	82,181.0					62352210.0		
02/23/11	30906180.0	8,140.0	60,891.4	3285807.0	2,855.0	21,356.9	10995.0	82,248.3					62435220.0		
02/24/11	30914320.0	5,682.0	42,504.3	3288662.0	4,371.0	32,697.4	10053.0	75,201.7					62528050.0		
02/25/11	30920002.0	17,268.0	129,173.6	3293033.0	14,431.0	107,951.4	31699.0	237,125.0					62630260.0		
02/28/11	30937270.0	5,810.0	43,461.8	3307464.0	4,507.0	33,714.7	10317.0	77,176.5					62920810.0		
03/01/11	30943080.0	6,030.0	45,107.5	3311971.0	3,469.0	25,949.9	9499.0	71,057.5					63001270.0		
03/02/11	30949110.0	6,860.0	51,316.4	3315440.0	4,621.0	34,567.5	11481.0	85,883.9					63077830.0		
03/03/11	30955970.0	6,670.0	49,895.1	3320061.0	4,940.0	36,953.8	11610.0	86,848.8					63157500.0		
03/04/11	30962640.0	15,320.0	114,601.6	3325001.0	14,060.0	105,176.1	29380.0	219,777.7					63244510.0		
03/07/11	30977960.0	6,560.0	49,072.2	3339061.0	3,719.0	27,820.1	10279.0	76,892.3					63463520.0		
03/08/11	30984520.0	7,310.0	54,682.6	3342780.0	2,771.0	20,728.5	10081.0	75,411.1					63537020.0		
03/09/11	30991830.0	6,930.0	51,840.0	3345551.0	4,184.0	31,298.5	11114.0	83,138.5					63605910.0		
03/10/11	30998760.0	8,852.0	66,217.6	3349735.0	3,599.0	26,922.4	12451.0	93,140.0					63668040.0		
03/11/11	31007612.0	18,579.0	138,980.6	3353334.0	10,092.0	75,493.4	28671.0	214,474.0					63746550.0		
03/14/11	31026191.0	13,409.0	100,306.3	3363426.0	6,675.0	49,932.5	20084.0	150,238.8					63941320.0		
03/16/11	31039600.0	33,585.0	251,233.3	3370101.0	18,273.0	136,691.5	51858.0	387,924.8					64069710.0		
03/21/11	31073185.0	5,029.0	37,619.5	3388374.0	4,688.0	35,068.7	9717.0	72,688.2					64408920.0		
03/22/11	31078214.0	6,860.0	51,316.4	3393062.0	3,651.0	27,311.4	10511.0	78,627.7					64474400.0		
03/23/11	31085074.0	8,596.0	64,302.5	3396713.0	3,193.0	23,885.3	11789.0	88,187.9					64538960.0		
03/24/11	31093670.0	7,070.0	52,887.3	3399906.0	3,575.0	26,742.9	10645.0	79,630.1					64592230.0		
03/25/11	31100740.0	14,250.0	106,597.4	3403481.0	14,085.0	105,363.1	28335.0	211,960.5					64655410.0		
03/28/11	31114990.0	6,880.0	51,466.0	3417566.0	3,795.0	28,388.6	10675.0	79,854.6					64850520.0		
03/29/11	31121870.0	6,330.0	47,351.7	3421361.0	3,185.0	23,825.5	9515.0	71,177.1					64912010.0		
03/30/11	31128200.0	6,665.0	49,857.7	3424546.0	3,901.0	29,181.5	10566.0	79,039.2					64972030.0		
03/31/11	31134865.0	6,465.0	48,361.6	3428447.0	3,718.0	27,812.6	10183.0	76,174.1					65030235.0		
04/01/11	31141330.0	19,750.0	147,740.3	3432165.0	11,472.0	85,816.5	31222.0	233,556.8					65090440.0		
04/04/11	31161080.0	8,250.0	61,714.3	3443637.0	2,924.0	21,873.0	11174.0	83,587.3					65283260.0		
04/05/11	31169330.0	5,490.0	41,068.1	3446561.0	3,976.0	29,742.5	9466.0	70,810.6					65352800.0		
04/06/11	31174820.0	6,590.0	49,296.6	3450537.0	3,649.0	27,296.4	10239.0	76,593.0					65425710.0		
04/07/11	31181410.0	6,455.0	48,286.8	3454186.0	3,744.0	28,007.1	10199.0	76,293.8					65500720.0		
04/08/11	31187865.0	20,145.0	150,695.1	3457930.0	11,091.0	82,966.4	31236.0	233,661.5					65573040.0		
04/11/11	31208010.0	7,920.0	59,245.7	3469021.0	3,114.0	23,294.3	11034.0	82,540.1					65750030.0		
04/12/11	31215930.0	6,240.0	46,678.4	3472135.0	3,751.0	28,059.4	9991.0	74,737.9					65818070.0		
04/13/11	31222170.0	7,995.0	59,806.8	3475886.0	3,064.0	22,920.3	11059.0	82,727.1					65879920.0		
04/14/11	31230165.0	7,740.0	57,899.2	3478950.0	2,766.0	20,691.1	10506.0	78,590.3					65944920.0		
04/15/11	31237905.0	19,445.0	145,458.7	3481716.0	10,394.0	77,752.5	29839.0	223,211.2					66017710.0		
04/18/11	31257350.0	6,400.0	47,875.3	3492110.0	3,536.0	26,451.1	9936.0	74,326.4					66199940.0		
04/19/11	31263750.0	7,080.0	52,962.1	3495646.0	3,816.0	28,545.7	10896.0	81,507.7					66265530.0		
04/20/11	31270830.0	6,620.0	49,521.0	3499462.0	3,489.0	26,099.5	10109.0	75,620.6					66329610.0		
04/21/11	31277450.0	6,030.0	45,107.5	3502951.0	3,981.0	29,780.0	10011.0	74,887.5					66392310.0		
04/22/11	31283480.0	39,700.0	296,976.6	3506932.0	21,260.0	159,035.9	60960.0	456,012.5					66453530.0		
04/28/11	31323180.0	6,170.0	46,154.8	3528192.0	3,542.0	26,496.0	9712.0	72,650.8					66796330.0		
04/29/11	31329350.0	19,660.0	147,067.0	3531734.0	10,312.0	77,139.1	29972.0	224,206.1					66861740.0		
05/02/11	31349010.0	6,190.0	46,304.4	3542046.0	4,115.0	30,782.3	10305.0	77,086.8					67014120.0		
05/03/11	31355200.0	6,300.0	47,127.3	3546161.0	3,571.0	26,712.9	9871.0	73,840.2					67073240.0		
05/04/11	31361500.0	7,162.0	53,575.5	3549732.0	3,850.0	28,800.0	11012.0	82,375.5					67125350.0		
05/05/11	31368662.0	6,300.0	47,127.3	3553582.0	4,001.0	29,929.6	10301.0	77,056.8					67171410.0		
05/06/11	31374962.0	17,726.0	132,599.7	3557583.0	11,289.0	84,447.6	29015.0	217,047.3					67223020.0		
05/09/11	31392688.0	5,796.0	43,357.1	3568872.0	3,954.0	29,578.0	9750.0	72,935.1					67376800.0		
05/10/11	31398484.0	7,176.0	53,680.2	3572826.0	3,436.0	25,703.1	10612.0	79,383.3					67426240.0		
05/11/11	31405660.0	7,480.0	55,954.3	3576262.0	3,358.0	25,119.6	10838.0	81,073.9					67470580.0		
05/12/11	31413140.0	6,052.0	45,272.1	3579620.0	2,856.0	21,364.4	8908.0	66,636.5					67529210.0		
05/13/11	31419192.0	23,985.0	179,420.3	3582476.0	9,641.0	72,119.7	33626.0	251,540.0					67579900.0		
05/16/11	31443177.0	7,233.0	54,106.6	3592117.0	2,839.0	21,237.2	10072.0	75,343.8					67708850.0		
05/17/11	31450410.0	6,782.0	50,732.9	3594956.0	3,154.0	23,593.6	9936.0	74,326.4					67760910.0		
05/18/11	31457192.0	6,858.0	51,301.4	3598110.0	3,443.0	25,755.4	10301.0	77,056.8					67805000.0		
05/19/11	31464050.0	35,240.0	263,613.5	3601553.0	16,963.0	126,892.1	52203.0	390,505.6					67846230.0		
05/24/11	31499290.0	6,220.0	46,528.8	3618516.0	4,561.0	34,118.7	10781.0	80,647.5					68045760.0		
05/25/11	31505510.0	40,800.0	305,205.2	3623077.0	20,436.0	152,871.9	61236.0	458,077.1					68082130.0		
05/31/11	31546310.0	4,730.0	35,382.9	3643513.0	4,006.0	29,967.0	8736.0	65,349.8					68351550.0		
06/01/11	31551040.0	6,250.0	46,753.3	3647519.0	4,041.0	30,228.8	10291.0	76,982.0					68390710.0		
06/02/11	31557290.0	6,312.0	47,217.0	3651560.0	4,241.0	31,724.9	10553.0	78,941.9					68432530.0		
06/03/11	31563602.0	20,693.0	154,794.4	3655801.0	11,265.0	84,268.1	31958.0	239,062.5					68473840.0		
06/06/11	31584295.0	7,760.0	58,048.8	3667066.0	5,070.0	37,926.2	12830.0	95,975.1					68551440.0		
06/07/11	31592055.0	13,975.0	104,540.3	3672136.0	7,105.0	53,149.1	21080.0	157,689.4					68581400.0		

06/09/11	31606030.0	5,410.0	40,469.6	3679241.0	4,615.0	34,522.6	10025.0	74,992.2					68659960.0
06/10/11	31611440.0	20,040.0	149,909.6	3683856.0	10,406.0	77,842.3	30446.0	227,751.9					68692040.0
06/13/11	31631480.0	6,500.0	48,623.4	3694262.0	2,890.0	21,618.7	9390.0	70,242.1					68790220.0
06/14/11	31637980.0	7,440.0	55,655.1	3697152.0	3,219.0	24,079.8	10659.0	79,734.9					68823960.0
06/15/11	31645420.0	6,681.0	49,977.4	3700371.0	2,795.0	20,908.1	9476.0	70,885.4					68861530.0
06/16/11	31652101.0	25,749.0	192,615.9	3703166.0	16,985.0	127,056.6	42734.0	319,672.5					68900200.0
06/20/11	31677850.0	9,500.0	71,064.9	3720151.0	3,163.0	23,660.9	12663.0	94,725.8					69031530.0
06/21/11	31687350.0	7,300.0	54,607.8	3723314.0	2,476.0	18,521.8	9776.0	73,129.6					69058910.0
06/22/11	31694650.0	7,635.0	57,113.8	3725790.0	3,684.0	27,558.2	11319.0	84,672.0					69081700.0
06/23/11	31702285.0	6,315.0	47,239.5	3729474.0	4,376.0	32,734.8	10691.0	79,974.2					69115620.0
06/24/11	31708600.0	22,310.0	166,890.4	3733850.0	11,413.0	85,375.2	33723.0	252,265.6					69148710.0
06/27/11	31730910.0	14,330.0	107,195.9	3745263.0	7,314.0	54,712.5	21644.0	161,908.4					69237140.0
06/29/11	31745240.0	8,200.0	61,340.3	3752577.0	3,523.0	26,353.9	11723.0	87,694.1					69280910.0
06/30/11	31753440.0	7,980.0	59,694.5	3756100.0	3,103.0	23,212.1	11083.0	82,906.6					69315930.0
07/01/11	31761420.0	28,210.0	211,025.5	3759203.0	15,641.0	117,002.8	43851.0	328,028.3					69351730.0
07/05/11	31789630.0	8,890.0	66,501.8	3774844.0	4,050.0	30,296.1	12940.0	96,797.9					69449660.0
07/06/11	31798520.0	5,230.0	39,123.1	3778894.0	5,058.0	37,836.5	10288.0	76,959.6					69469210.0
07/07/11	31803750.0	5,310.0	39,721.6	3783952.0	6,118.0	45,765.8	11428.0	85,487.4					69492200.0
07/08/11	31809060.0	21,210.0	158,661.8	3790070.0	10,285.0	76,937.1	31495.0	235,599.0					69521320.0
07/11/11	31830270.0	6,538.0	48,907.6	3800355.0	3,979.0	29,765.0	10517.0	78,672.6					69602060.0
07/12/11	31836808.0	8,742.0	65,394.7	3804334.0	3,469.0	25,949.9	12211.0	91,344.6					69626240.0
07/13/11	31845550.0	7,645.0	57,188.6	3807803.0	2,860.0	21,394.3	10505.0	78,582.9					69654130.0
07/14/11	31853195.0	98,685.0	738,215.1	3810663.0	40,540.0	303,260.3	139225.0	1,041,475.4					69682120.0
07/26/11	31951880.0	8,590.0	64,257.7	3851203.0	4,247.0	31,769.8	12837.0	96,027.4					70005210.0
07/27/11	31960470.0	4,555.0	34,073.8	3855450.0	2,657.0	19,875.7	7212.0	53,949.5					70031050.0
07/28/11	31965025.0	6,605.0	49,408.8	3858107.0	4,849.0	36,273.0	11454.0	85,681.9					70057820.0
07/29/11	31971630.0	14,190.0	106,148.6	3862956.0	11,789.0	88,187.9	25979.0	194,336.4					70080540.0
08/01/11	31985820.0	4,905.0	36,692.0	3874745.0	4,316.0	32,285.9	9221.0	68,977.9					70144100.0
08/02/11	31990725.0	5,595.0	41,853.5	3879061.0	4,054.0	30,326.0	9649.0	72,179.5					70168640.0
08/03/11	31996320.0	6,510.0	48,698.2	3883115.0	3,463.0	25,905.0	9973.0	74,603.2					70189110.0
08/04/11	32002830.0	6,360.0	47,576.1	3886578.0	2,243.0	16,778.8	8603.0	64,354.9					70210240.0
08/05/11	32009190.0	9,330.0	69,793.3	3888821.0	17,280.0	129,263.4	26610.0	199,056.6					70230570.0
08/08/11	32018520.0	5,530.0	41,367.3	3906101.0	3,780.0	28,276.4	9310.0	69,643.6					70298200.0
08/09/11	32024050.0	4,380.0	32,764.7	3909881.0	4,191.0	31,350.9	8571.0	64,115.5					70323220.0
08/10/11	32028430.0	7,820.0	58,497.7	3914072.0	2,631.0	19,681.2	10451.0	78,178.9					70350210.0
08/11/11	32036250.0	3,980.0	29,772.5	3916703.0	3,803.0	28,448.4	7783.0	58,220.9					70377620.0
08/12/11	32040230.0	15,440.0	115,499.2	3920506.0	11,327.0	84,731.9	26767.0	200,231.1					70406440.0
08/15/11	32055670.0	6,750.0	50,493.5	3931833.0	3,978.0	29,757.5	10728.0	80,251.0					70480630.0
08/16/11	32062420.0	3,910.0	29,248.8	3935811.0	5,595.0	41,853.5	9505.0	71,102.3					70507610.0
08/17/11	32066330.0	4,290.0	32,091.4	3941406.0	4,413.0	33,011.5	8703.0	65,103.0					70534040.0
08/18/11	32070620.0	27,870.0	208,482.1	3945819.0	17,722.0	132,569.8	45592.0	341,051.9					70559320.0
08/23/11	32098490.0	3,510.0	26,256.6	3963541.0	5,030.0	37,627.0	8540.0	63,883.6					70671600.0
08/24/11	32102000.0	4,940.0	36,953.8	3968571.0	4,670.0	34,934.0	9610.0	71,887.8					70690090.0
08/25/11	32106940.0	7,010.0	52,438.4	3973241.0	2,936.0	21,962.8	9946.0	74,401.3					70710300.0
08/26/11	32113950.0	12,250.0	91,636.4	3976177.0	13,946.0	104,323.3	26196.0	195,959.7					70729360.0
08/29/11	32126200.0	6,340.0	47,426.5	3990123.0	3,509.0	26,249.1	9849.0	73,675.6					70789410.0
08/30/11	32132540.0	4,160.0	31,119.0	3993632.0	3,640.0	27,229.1	7800.0	58,348.1					70814230.0
08/31/11	32136700.0	5,920.0	44,284.7	3997272.0	2,769.0	20,713.6	8689.0	64,998.2					70844020.0
09/01/11	32142620.0	34,578.0	258,661.4	4000041.0	16,604.0	124,206.6	51182.0	382,868.0					70874350.0
09/06/11	32177198.0	7,422.0	55,520.4	4016645.0	4,388.0	32,824.5	11810.0	88,344.9					70997720.0
09/07/11	32184620.0	9,142.0	68,386.9	4021033.0	2,150.0	16,083.1	11292.0	84,470.0					71019340.0
09/08/11	32193762.0	7,468.0	55,864.5	4023183.0	3,160.0	23,638.4	10628.0	79,503.0					71038660.0
09/09/11	32201230.0	24,820.0	185,666.5	4026343.0	9,291.0	69,501.5	34111.0	255,168.0					71057200.0
09/12/11	32226050.0	5,146.0	38,494.8	4035634.0	6,413.0	47,972.6	11559.0	86,467.3					71114320.0
09/13/11	32231196.0	7,002.0	52,378.6	4042047.0	3,142.0	23,503.8	10144.0	75,882.4					71137310.0
09/14/11	32238198.0	5,704.0	42,668.9	4045189.0	4,130.0	30,894.5	9834.0	73,563.4					71162460.0
09/15/11	32243902.0	4,088.0	30,580.4	4049319.0	2,504.0	18,731.2	6592.0	49,311.6					71186260.0
09/16/11	32247990.0	10,420.0	77,947.0	4051823.0	10,560.0	78,994.3	20980.0	156,941.3					71218520.0
09/19/11	32258410.0	4,930.0	36,879.0	4062383.0	2,437.0	18,230.0	7367.0	55,109.0					71314610.0
09/20/11	32263340.0	4,639.0	34,702.1	4064820.0	3,099.0	23,182.1	7738.0	57,884.3					71348420.0
09/21/11	32267979.0	4,481.0	33,520.2	4067919.0	3,379.0	25,276.7	7860.0	58,796.9					71370410.0
09/22/11	32272460.0	3,240.0	24,236.9	4071298.0	3,765.0	28,164.2	7005.0	52,401.0					71391800.0
09/23/11	32275700.0	10,070.0	75,328.8	4075063.0	11,402.0	85,292.9	21472.0	160,621.7					71411820.0
09/26/11	32285770.0	4,330.0	32,390.7	4086465.0	3,239.0	24,229.4	7569.0	56,620.1					71488010.0
09/27/11	32290100.0	5,120.0	38,300.3	4089704.0	2,485.0	18,589.1	7605.0	56,889.4					71523510.0
09/28/11	32295220.0	4,268.0	31,926.9	4092189.0	3,060.0	22,890.4	7328.0	54,817.3					71563570.0
09/29/11	32299488.0	3,582.0	26,795.2	4095249.0	3,789.0	28,343.7	7371.0	55,138.9					71600620.0
09/30/11	32303070.0	10,960.0	81,986.5	4099038.0	9,239.0	69,112.5	20199.0	151,099.0					71626510.0
10/03/11	32314030.0	5,052.0	37,791.6	4108277.0	2,479.0	18,544.2	7531.0	56,335.8					71732810.0
10/04/11	32319082.0	4,148.0	31,029.2	4110756.0	3,781.0	28,283.8	7929.0	59,313.0					71774980.0
10/05/11	32323230.0	2,480.0	18,551.7	4114537.0	4,223.0	31,590.2	6703.0	50,141.9					71820020.0
10/06/11	32325710.0	3,920.0	29,323.6	4118760.0	3,906.0	29,218.9	7826.0	58,542.5					71868770.0
10/07/11	32329630.0	11,462.0	85,741.7	4122666.0	9,139.0	68,364.5	20601.0	154,106.2					71911720.0
10/10/11	32341092.0	3,908.0	29,233.9	4131805.0	3,240.0	24,236.9	7148.0	53,470.8					72047080.0
10/11/11	32345000.0	2,595.0	19,411.9	4135045.0	4,283.0	32,039.1	6878.0	51,451.0					72092610.0
10/12/11	32347595.0	3,635.0	27,191.7	4139328.0	4,112.0	30,759.9	7747.0	57,951.6					72144200.0
10/13/11	32351230.0	3,100.0	23,189.6	4143440.0	3,644.0	27,259.0	6744.0	50,448.6					72197340.0
10/14/11	32354330.0	10,400.0	77,797.4	4147084.0	10,038.0	75,089.5	20438.0	152,886.9					72247410.0
10/17/11	32364730.0	4,260.0	31,867.0	4157122.0	3,164.0	23,668.4	7424.0	55,535.4					72415680.0
10/18/11	32368990.0	3,790.0	28,351.2	4160286.0	4,111.0	30,752.4	7901.0	59,103.6					72464200.0
10/19/11	32372780.0	4,009.0	29,989.4	4164397.0	3,018.0	22,576.2	7027.0	52,565.6					72502940.0
10/20/11	32376789.0	2,636.0	19,718.7	4167415.0	4,758.0	35,592.3	7394.0	55,311.0					72550320.0
10/21/11	32379425.0	11,305.0	84,567.3	4172173.0	8,678.0	64,916.0	19983.0	149,483.2					72600120.0
10/24/11	32390730.0	2,870.0	21,469.1	4180851.0	4,883.0	36,527.4	7753.0	57,996.5					72736410.0
10/25/11	32393600.0	3,930.0	29,398.4	4185734.0	3,289.0	24,603.4	7219.0	54,001.9					72797740.0
10/26/11	32397530.0	7,290.0	54,533.0	4189023.0	6,015.0	44,995.3	13305.0	99,528.3					72863120.0
10/28/11	32404820.0	11,950.0	89,392.2	4195038.0	8,495.0	63,547.0	20445.0	152,939.2					72988430.0
10/31/11	32416770.0	4,830.0	36,130.9	4203533.0	2,316.0	17,324.9	7146.0	53,455.8					73161620.0
11/01/11	32421600.0	4,595.0	34,373.0	4205849.0	2,388.0	17,863.5	6983.0	52,236.5					73227740.0
11/02/11	32426195.0	3,890.0	29,099.2	4208237.0	3,171.0	23,720.7	7061.0	52,820.0					73301910.0
11/03/11	32430085.0	4,945.0	36,991.2	4211408.0	1,875.0	14,026.0	6820.0	51,017.1					73362500.0
11/04/11	32435030.0	10,330.0	77,273.8	4213283.0	10,080.0	75,403.6	20410.0	152,677.4					73437440.0
11/07/11	32445360.0	4,550.0	34,036.4	4223363.0	3,308.0	24,745.6	7858.0	58,781.9					73662610.0
11/08/11	32449910.0	3,820.0	28,575.6	4226671.0	3,472.0	25,972.4	7292.0	54,548.0					73725050.0
11/09/11	32453730.0	2,880.0	21,543.9	4230143.0	3,300.0	24,685.7	6180.0	46,229.6					73780510.0
11/10/11	32456610.0	13,775.0	103,044.2	4233443.0	14,760.0	110,412.5	28535.0	213,456.6					73834220.0
11/14/11	32470385.0	6,175.0	46,192.2	4248203.0	2,759.0	20,638.8	8934.0	66,831.0					74109160.0
11/15/11	32476560.0	2,590.0	19,374.5	4250962.0	2,778.0	20,780.9	5368.0	40,155.4					74195010.0

11/16/11	32479150.0	3,542.0	26,496.0	4253740.0	3,782.0	28,291.3	7324.0	54,787.3					74267740.0
11/17/11	32482692.0	4,408.0	32,974.1	4257522.0	2,871.0	21,476.6	7279.0	54,450.7					74342610.0
11/18/11	32487100.0	98,322.0	735,499.7	4260393.0	78,747.0	589,068.5	177069.0	1,324,568.2					74420510.0
12/13/11	32585422.0	3,048.0	22,800.6	4339140.0	4,288.0	32,076.5	7336.0	54,877.1					76329260.0
12/14/11	32588470.0	2,560.0	19,150.1	4343428.0	4,182.0	31,283.5	6742.0	50,433.7					76411610.0
12/15/11	32591030.0	4,551.0	34,043.8	4347610.0	2,371.0	17,736.3	6922.0	51,780.2					76488010.0
12/16/11	32595581.0	13,109.0	98,062.1	4349981.0	9,435.0	70,578.7	22544.0	168,640.8					76556120.0
12/19/11	32608690.0	6,713.0	50,216.7	4359416.0	3,423.0	25,605.8	10136.0	75,822.6					76752260.0
12/20/11	32615403.0	3,120.0	23,339.2	4362839.0	2,037.0	15,237.8	5157.0	38,577.0					76827960.0
12/21/11	32618523.0	4,037.0	30,198.9	4364876.0	4,161.0	31,126.4	8198.0	61,325.3					76895750.0
12/22/11	32622560.0	4,650.0	34,784.4	4369037.0	2,912.0	21,783.3	7562.0	56,567.7					76971640.0
12/23/11	32627210.0	16,198.0	121,169.5	4371949.0	15,419.0	115,342.1	31617.0	236,511.6					77055070.0
12/27/11	32643408.0	4,987.0	37,305.4	4387368.0	2,839.0	21,237.2	7826.0	58,542.5					77333010.0
12/28/11	32648395.0	4,744.0	35,487.6	4390207.0	3,080.0	23,040.0	7824.0	58,527.6					77393340.0
12/29/11	32653139.0	4,991.0	37,335.3	4393287.0	2,526.0	18,895.8	7517.0	56,231.1					77455640.0
12/30/11	32658130.0	15,510.0	116,022.9	4395813.0	14,004.0	104,757.2	29514.0	220,780.1					77522520.0
01/03/12	32673640.0	4,220.0	31,567.8	4409817.0	3,521.0	26,338.9	7741.0	57,906.7					77814040.0
01/04/12	32677860.0	3,780.0	28,276.4	4413338.0	3,798.0	28,411.0	7578.0	56,687.4					77874310.0
01/05/12	32681640.0	4,338.0	32,450.5	4417136.0	3,607.0	26,982.2	7945.0	59,432.7					77940670.0
01/06/12	32685978.0	13,302.0	99,505.9	4420743.0	8,186.0	61,235.5	21488.0	160,741.4					78018210.0
01/09/12	32699280.0	5,645.0	42,227.5	4428929.0	2,788.0	20,855.7	8433.0	63,083.2					78218510.0
01/10/12	32704925.0	4,515.0	33,774.5	4431717.0	2,362.0	17,669.0	6877.0	51,443.5					78291720.0
01/11/12	32709440.0	9,610.0	71,887.8	4434079.0	5,460.0	40,843.6	15070.0	112,731.4					78369310.0
01/13/12	32719050.0	14,542.0	108,781.7	4439539.0	16,089.0	120,354.1	30631.0	229,135.8					78542720.0
01/17/12	32733592.0	4,748.0	35,517.5	4455628.0	2,220.0	16,606.8	6968.0	52,124.3					78891220.0
01/18/12	32738340.0	4,190.0	31,343.4	4457848.0	3,103.0	23,212.1	7293.0	54,555.4					78990310.0
01/19/12	32742530.0	4,400.0	32,914.3	4460951.0	2,673.0	19,995.4	7073.0	52,909.7					79096710.0
01/20/12	32746930.0	13,660.0	102,183.9	4463624.0	8,357.0	62,514.7	22017.0	164,698.6					79185480.0
01/23/12	32760590.0	9,700.0	72,561.0	4471981.0	6,021.0	45,040.2	15721.0	117,601.3					79430140.0
01/25/12	32770290.0	3,700.0	27,677.9	4478002.0	3,935.0	29,435.8	7635.0	57,113.8					79581010.0
01/26/12	32773990.0	4,120.0	30,819.7	4481937.0	3,416.0	25,553.5	7536.0	56,373.2					79653900.0
01/27/12	32778110.0	10,500.0	78,545.5	4485353.0	9,792.0	73,249.3	20292.0	151,794.7					79733730.0
01/30/12	32788610.0	4,860.0	36,355.3	4495145.0	3,609.0	26,997.2	8469.0	63,352.5					79943420.0
01/31/12	32793470.0	3,738.0	27,962.2	4498754.0	2,476.0	18,521.8	6214.0	46,484.0					80010850.0
02/01/12	32797208.0	4,322.0	32,330.8	4501230.0	2,480.0	18,551.7	6802.0	50,882.5					80072870.0
02/02/12	32801530.0	3,810.0	28,500.8	4503710.0	2,665.0	19,935.6	6475.0	48,436.4					80142710.0
02/03/12	32805340.0	11,170.0	83,557.4	4506375.0	9,966.0	74,550.9	21136.0	158,108.3					80211400.0
02/06/12	32816510.0	4,700.0	35,158.4	4516341.0	3,020.0	22,591.2	7720.0	57,749.6					80391040.0
02/07/12	32821210.0	3,960.0	29,622.9	4519361.0	3,581.0	26,787.7	7541.0	56,410.6					80450110.0
02/08/12	32825170.0	4,340.0	32,465.5	4522942.0	2,718.0	20,332.1	7058.0	52,797.5					80505360.0
02/09/12	32829510.0	4,390.0	32,839.5	4525660.0	3,761.0	28,134.2	8151.0	60,973.7					80564230.0
02/10/12	32833900.0	13,880.0	103,829.6	4529421.0	8,699.0	65,073.0	22579.0	168,902.7					80626150.0
02/13/12	32847780.0	4,350.0	32,540.3	4538120.0	3,057.0	22,867.9	7407.0	55,408.2					80813420.0
02/14/12	32852130.0	5,890.0	44,060.3	4541177.0	3,343.0	25,007.4	9233.0	69,067.6					80879470.0
02/15/12	32858020.0	3,510.0	26,256.6	4544520.0	2,283.0	17,078.0	5793.0	43,334.7					80959510.0
02/16/12	32861530.0	4,830.0	36,130.9	4546803.0	2,284.0	17,085.5	7114.0	53,216.4					81029810.0
02/17/12	32866360.0	18,910.0	141,456.6	4549087.0	10,704.0	80,071.5	29614.0	221,528.1					81093710.0
02/21/12	32885270.0	4,980.0	37,253.0	4559791.0	2,630.0	19,673.8	7610.0	56,926.8					81368000.0
02/22/12	32890250.0	4,740.0	35,457.7	4562421.0	3,303.0	24,708.2	8043.0	60,165.8					81426240.0
02/23/12	32894990.0	5,060.0	37,851.4	4565724.0	2,750.0	20,571.4	7810.0	58,422.9					81496450.0
02/24/12	32900050.0	15,590.0	116,621.3	4568474.0	8,932.0	66,816.0	24522.0	183,437.3					81560940.0
02/27/12	32915640.0	3,452.0	25,822.8	4577406.0	2,623.0	19,621.4	6075.0	45,444.2					81788100.0
02/28/12	32919092.0	5,428.0	40,604.3	4580029.0	2,677.0	20,025.4	8105.0	60,629.6					81861240.0
02/29/12	32924520.0	4,020.0	30,071.7	4582706.0	3,053.0	22,838.0	7073.0	52,909.7					81940380.0
03/01/12	32928540.0	4,600.0	34,410.4	4585759.0	3,039.0	22,733.3	7639.0	57,143.7					82019910.0
03/02/12	32933140.0	14,020.0	104,876.9	4588798.0	7,643.0	57,173.6	21663.0	162,050.5					82091270.0
03/05/12	32947160.0	6,425.0	48,062.3	4596441.0	3,136.0	23,458.9	9561.0	71,521.3					82273970.0
03/06/12	32953585.0	4,485.0	33,550.1	4599577.0	2,685.0	20,085.2	7170.0	53,635.3					82358460.0
03/07/12	32958070.0	9,280.0	69,419.2	4602262.0	5,016.0	37,522.3	14296.0	106,941.5					82433070.0
03/09/12	32967350.0	14,890.0	111,384.9	4607278.0	7,263.0	54,331.0	22153.0	165,716.0					82561120.0
03/12/12	32982240.0	4,710.0	35,233.2	4614541.0	3,822.0	28,590.5	8532.0	63,823.8					82756630.0
03/13/12	32986950.0	4,460.0	33,363.1	4618363.0	2,439.0	18,245.0	6899.0	51,608.1					82834630.0
03/14/12	32991410.0	4,380.0	32,764.7	4620802.0	2,548.0	19,060.4	6928.0	51,825.0					82914760.0
03/15/12	32995790.0	4,930.0	36,879.0	4623350.0	2,708.0	20,257.2	7638.0	57,136.2					82982340.0
03/16/12	33000720.0	14,540.0	108,766.8	4626058.0	7,893.0	59,043.7	22433.0	167,810.5					83049330.0
03/19/12	33015260.0	5,100.0	38,150.7	4633951.0	2,310.0	17,280.0	7410.0	55,430.7					83264820.0
03/20/12	33020360.0	5,846.0	43,731.1	4636261.0	2,947.0	22,045.1	8793.0	65,776.2					83332630.0
03/21/12	33026206.0	4,954.0	37,058.5	4639208.0	2,723.0	20,369.5	7677.0	57,428.0					83409030.0
03/22/12	33031160.0	5,230.0	39,123.1	4641931.0	2,430.0	18,177.7	7660.0	57,300.8					83480350.0
03/23/12	33036390.0	14,490.0	108,392.7	4644361.0	8,294.0	62,043.4	22784.0	170,436.2					83549320.0
03/26/12	33050880.0	4,260.0	31,867.0	4652655.0	2,675.0	20,010.4	6935.0	51,877.4					83720910.0
03/27/12	33055140.0	4,920.0	36,804.2	4655330.0	2,862.0	21,409.2	7782.0	58,213.4					83776330.0
03/28/12	33060060.0	4,490.0	33,587.5	4658192.0	3,358.0	25,119.6	7848.0	58,707.1					83833610.0
03/29/12	33064550.0	4,235.0	31,680.0	4661550.0	3,797.0	28,403.5	8032.0	60,083.5					83896000.0
03/30/12	33068785.0	22,895.0	171,266.5	4665347.0	14,203.0	106,245.8	37098.0	277,512.3					83957230.0
04/04/12	33091680.0	3,408.0	25,493.6	4679550.0	3,273.0	24,483.7	6681.0	49,977.4					84277860.0
04/05/12	33095088.0	4,197.0	31,395.7	4682823.0	2,976.0	22,262.0	7173.0	53,657.8					84347410.0
04/06/12	33099285.0	13,442.0	100,553.1	4685799.0	7,724.0	57,779.5	21166.0	158,332.7					84411340.0
04/09/12	33112727.0	5,213.0	38,996.0	4693523.0	3,096.0	23,159.7	8309.0	62,155.6					84563230.0
04/10/12	33117940.0	4,600.0	34,410.4	4696619.0	2,840.0	21,244.7	7440.0	55,655.1					84605130.0
04/11/12	33122540.0	9,510.0	71,139.7	4699459.0	5,255.0	39,310.1	14765.0	110,449.9					84647620.0
04/13/12	33132050.0	24,810.0	185,591.7	4704714.0	11,616.0	86,893.7	36426.0	272,485.4					84763920.0
04/17/12	33156860.0	14,120.0	105,624.9	4716330.0	3,580.0	26,780.3	17700.0	132,405.2	began flushing of fire hydrants				84966110.0
04/18/12	33170980.0	7,010.0	52,438.4	4719910.0	2,923.0	21,865.6	9933.0	74,304.0	continue flushing fire hydrants				85026470.0
04/19/12	33177990.0	4,820.0	36,056.1	4722833.0	2,640.0	19,748.6	7460.0	55,804.7					85084330.0
04/20/12	33182810.0	14,380.0	107,569.9	4725473.0	8,798.0	65,813.6	23178.0	173,383.5					85139360.0
04/23/12	33197190.0	7,092.0	53,051.8	4734271.0	2,131.0	15,941.0	9223.0	68,992.8					85268070.0
04/24/12	33204282.0	5,916.0	44,254.8	4736402.0	2,093.0	15,656.7	8009.0	59,911.5					85304520.0
04/25/12	33210198.0	5,722.0	42,803.5	4738495.0	1,945.0	14,549.6	7667.0	57,353.1					85348040.0
04/26/12	33215920.0	6,520.0	48,773.0	4740440.0	2,333.0	17,452.1	8853.0	66,225.0					85396310.0
04/27/12	33222440.0	13,748.0	102,842.2	4742773.0	6,643.0	49,693.1	20391.0	152,535.3					85450330.0
04/30/12	33236188.0	5,732.0	42,878.3	4749416.0	2,347.0	17,556.8	8079.0	60,435.1					85580200.0
05/01/12	33241920.0	4,930.0	36,879.0	4751763.0	2,880.0	21,543.9	7810.0	58,422.9					85638610.0
05/02/12	33246850.0	4,780.0	35,756.9	4754643.0	2,608.0	19,509.2	7388.0	55,266.1					85698710.0
05/03/12	33251630.0	6,280.0	46,977.7	4757251.0	2,469.0	18,469.4	8749.0	65,447.1					85751530.0
05/04/12	33257910.0	14,860.0	111,160.5	4759720.0	6,001.0	44,890.6	20861.0	156,051.1					85808020.0
05/07/12	33272770.0	5,360.0	40,095.6	4765721.0	3,393.0	25,381.4	8753.0	65,477.0					85960200.0

05/08/12	33278130.0	6,110.0	45,706.0	4769114.0	2,397.0	17,930.8	8507.0	63,636.8					85993410.0
05/09/12	33284240.0	5,210.0	38,973.5	4771511.0	2,141.0	16,015.8	7351.0	54,989.3					86038930.0
05/10/12	33289450.0	5,080.0	38,001.0	4773652.0	2,971.0	22,224.6	8051.0	60,225.7					86092140.0
05/11/12	33294530.0	18,300.0	136,893.5	4776623.0	7,868.0	58,856.7	26168.0	195,750.2					86144410.0
05/14/12	33312830.0	5,240.0	39,197.9	4784491.0	3,622.0	27,094.4	8862.0	66,292.4					86242010.0
05/15/12	33318070.0	6,940.0	51,914.8	4788113.0	2,361.0	17,661.5	9301.0	69,576.3					86269520.0
05/16/12	33325010.0	5,285.0	39,534.5	4790474.0	3,725.0	27,864.9	9010.0	67,399.5					86299840.0
05/17/12	33330295.0	6,410.0	47,950.1	4794199.0	2,734.0	20,451.7	9144.0	68,401.9					86336410.0
05/18/12	33336705.0	21,555.0	161,242.6	4796933.0	13,824.0	103,410.7	35379.0	264,653.3					86377230.0
05/22/12	33358260.0	6,365.0	47,613.5	4810757.0	2,805.0	20,982.9	9170.0	68,596.4					86543310.0
05/23/12	33364625.0	5,300.0	39,646.8	4813562.0	3,455.0	25,845.2	8755.0	65,492.0					86591520.0
05/24/12	33369925.0	7,015.0	52,475.8	4817017.0	4,071.0	30,453.2	11086.0	82,929.0					86637710.0
05/25/12	33376940.0	59,990.0	448,756.4	4821088.0	39,230.0	293,460.8	99220.0	742,217.2					86685610.0
06/05/12	33436930.0	4,920.0	36,804.2	4860318.0	2,364.0	17,683.9	7284.0	54,488.1					87070910.0
06/06/12	33441850.0	7,151.0	53,493.2	4862682.0	3,260.0	24,386.5	10411.0	77,879.7					87115740.0
06/07/12	33449001.0	5,409.0	40,462.1	4865942.0	4,569.0	34,178.5	9978.0	74,640.6					87158270.0
06/08/12	33454410.0	11,840.0	88,569.4	4870511.0	11,139.0	83,325.5	22979.0	171,894.9					87210570.0
06/11/12	33466250.0	5,630.0	42,115.3	4881650.0	3,674.0	27,483.4	9304.0	69,598.8					87330060.0
06/12/12	33471880.0	5,325.0	39,833.8	4885324.0	4,050.0	30,296.1	9375.0	70,129.9					87358030.0
06/13/12	33477205.0	2,930.0	21,917.9	4889374.0	5,847.0	43,738.6	8777.0	65,656.5					87394370.0
06/14/12	33480135.0	7,905.0	59,133.5	4895221.0	3,242.0	24,251.8	11147.0	83,385.4					87431940.0
06/15/12	33488040.0	18,850.0	141,007.8	4898463.0	15,869.0	118,708.4	34719.0	259,716.2					87473220.0
06/19/12	33506890.0	8,640.0	64,631.7	4914332.0	2,709.0	20,264.7	11349.0	84,896.4					87602050.0
06/20/12	33515530.0	5,100.0	38,150.7	4917041.0	4,596.0	34,380.5	9696.0	72,531.1					87642210.0
06/21/12	33520630.0	5,985.0	44,770.9	4921637.0	3,810.0	28,500.8	9795.0	73,271.7					87672190.0
06/22/12	33526615.0	10,693.0	79,989.2	4925447.0	13,839.0	103,522.9	24532.0	183,512.1					87703510.0
06/25/12	33537308.0	6,504.0	48,653.3	4939286.0	3,507.0	26,234.2	10011.0	74,887.5					87823120.0
06/26/12	33543812.0	16,688.0	124,834.9	4942793.0	13,337.0	99,767.7	30025.0	224,602.6					87861650.0
06/29/12	33560500.0	19,110.0	142,952.7	4956130.0	8,408.0	62,896.2	27518.0	205,848.9					87967830.0
								1,846,940.4					
07/02/12	33579610.0	6,840.0	51,166.8	4964538.0	2,183.0	16,330.0	9023.0	67,496.7					88050770.0
07/03/12	33586450.0	28,460.0	212,895.6	4966721.0	26,101.0	195,249.1	54561.0	408,144.7					88085300.0
07/09/12	33614910.0	8,313.0	62,185.6	4992822.0	2,501.0	18,708.8	10814.0	80,894.3					88262620.0
07/10/12	33623223.0	5,782.0	43,252.4	4995323.0	3,069.0	22,957.7	8851.0	66,210.1					88293020.0
07/11/12	33629005.0	7,115.0	53,223.9	4998392.0	4,109.0	30,737.5	11224.0	83,961.4					88319930.0
07/12/12	33636120.0	7,130.0	53,336.1	5002501.0	2,662.0	19,913.1	9792.0	73,249.3					88343910.0
07/13/12	33643250.0	15,765.0	117,930.4	5005163.0	10,103.0	75,575.7	25868.0	193,506.1					88371620.0
07/16/12	33659015.0	6,845.0	51,204.2	5015266.0	2,908.0	21,753.4	9753.0	72,957.5					88448070.0
07/17/12	33665860.0	4,220.0	31,567.8	5018174.0	4,174.0	31,223.7	8394.0	62,791.5					88469340.0
07/18/12	33670080.0	7,540.0	56,403.1	5022348.0	2,714.0	20,302.1	10254.0	76,705.3					88496460.0
07/19/12	33677620.0	66,402.0	496,721.5	5025062.0	34,440.0	257,629.1	100842.0	754,350.6					88521830.0
07/30/12	33744022.0	8,003.0	59,866.6	5059502.0	2,916.0	21,813.2	10919.0	81,679.8					88829100.0
07/31/12	33752025.0	5,425.0	40,581.8	5062418.0	2,615.0	19,561.6	8040.0	60,143.4					88857870.0
08/01/12	33757450.0	6,580.0	49,221.8	5065033.0	4,115.0	30,782.3	10695.0	80,004.2					88888960.0
08/02/12	33764030.0	3,944.0	29,503.2	5069148.0	5,220.0	39,048.3	9164.0	68,551.5					88918950.0
08/03/12	33767974.0	18,951.0	141,763.3	5074368.0	8,466.0	63,330.1	27417.0	205,093.4					88946570.0
08/06/12	33786925.0	8,225.0	61,527.3	5082834.0	3,187.0	23,840.4	11412.0	85,367.7					89007230.0
08/07/12	33795150.0	4,240.0	31,717.4	5086021.0	3,491.0	26,114.5	7731.0	57,831.9					89028820.0
08/08/12	33799390.0	7,690.0	57,525.2	5089512.0	2,737.0	20,474.2	10427.0	77,999.4					89053150.0
08/09/12	33807080.0	6,105.0	45,668.6	5092249.0	2,628.0	19,658.8	8733.0	65,327.4					89075230.0
08/10/12	33813185.0	14,275.0	106,784.4	5094877.0	12,686.0	94,897.9	26961.0	201,682.3					89101420.0
08/13/12	33827460.0	6,932.0	51,855.0	5107563.0	4,665.0	34,896.6	11597.0	86,751.6					89167390.0
08/14/12	33834392.0	6,338.0	47,411.5	5112228.0	2,386.0	17,848.5	8724.0	65,260.1					89189760.0
08/15/12	33840730.0	8,600.0	64,332.5	5114614.0	3,423.0	25,605.8	12023.0	89,938.3					89211040.0
08/16/12	33849330.0	6,750.0	50,493.5	5118037.0	2,510.0	18,776.1	9260.0	69,269.6					89230910.0
08/17/12	33856080.0	31,450.0	235,262.4	5120547.0	14,419.0	107,861.6	45869.0	343,124.0					89250550.0
08/22/12	33887530.0	7,275.0	54,420.8	5134966.0	3,329.0	24,902.7	10604.0	79,323.4					89367370.0
08/23/12	33894805.0	5,355.0	40,058.2	5138295.0	2,828.0	21,154.9	8183.0	61,213.1					89393120.0
08/24/12	33900160.0	18,040.0	134,948.6	5141123.0	10,649.0	79,660.1	28689.0	214,608.6					89428660.0
08/27/12	33918200.0	4,470.0	33,437.9	5151772.0	4,850.0	36,280.5	9320.0	69,718.4					89512650.0
08/28/12	33922670.0	4,430.0	33,138.7	5156622.0	4,820.0	36,056.1	9250.0	69,194.8					89538640.0
08/29/12	33927100.0	4,560.0	34,111.2	5161442.0	5,561.0	41,599.2	10121.0	75,710.3					89564160.0
08/30/12	33931660.0	3,032.0	22,680.9	5167003.0	5,514.0	41,247.6	8546.0	63,928.5					89591930.0
08/31/12	33934692.0	13,313.0	99,588.2	5172517.0	20,487.0	153,253.4	33800.0	252,841.6					89621650.0
09/04/12	33948005.0	5,080.0	38,001.0	5193004.0	5,184.0	38,779.0	10264.0	76,780.1					89744120.0
09/05/12	33953085.0	3,965.0	29,660.3	5198188.0	5,368.0	40,155.4	9333.0	69,815.7					89771640.0
09/06/12	33957050.0	3,150.0	23,563.6	5203556.0	5,507.0	41,195.2	8657.0	64,758.9					89795270.0
09/07/12	33960200.0	9,030.0	67,549.1	5209063.0	15,879.0	118,783.2	24909.0	186,332.3					89817620.0
09/10/12	33969230.0	2,975.0	22,254.5	5224942.0	5,879.0	43,978.0	8854.0	66,232.5					89891570.0
09/11/12	33972205.0	4,515.0	33,774.5	5230821.0	4,844.0	36,235.6	9359.0	70,010.2					89925260.0
09/12/12	33976720.0	3,050.0	22,815.6	5235665.0	5,110.0	38,225.5	8160.0	61,041.0					89952310.0
09/13/12	33979770.0	4,160.0	31,119.0	5240775.0	4,487.0	33,565.1	8647.0	64,684.1					89972410.0
09/14/12	33983930.0	9,780.0	73,159.5	5245262.0	13,713.0	102,580.4	23493.0	175,739.9					89996610.0
09/17/12	33993710.0	3,220.0	24,087.3	5258975.0	5,046.0	37,746.7	8266.0	61,834.0					90079620.0
09/18/12	33996930.0	4,190.0	31,343.4	5264021.0	4,050.0	30,296.1	8240.0	61,639.5					90104110.0
09/19/12	34001120.0	4,060.0	30,370.9	5268071.0	5,147.0	38,502.2	9207.0	68,873.1					90131320.0
09/20/12	34005180.0	3,270.0	24,461.3	5273218.0	5,194.0	38,853.8	8464.0	63,315.1					90160720.0
09/21/12	34008450.0	19,975.0	149,423.4	5278412.0	20,558.0	153,784.5	40533.0	303,207.9					90190700.0
09/25/12	34028425.0	3,325.0	24,872.7	5298970.0	5,875.0	43,948.1	9200.0	68,820.8					90322880.0
09/26/12	34031750.0	5,020.0	37,552.2	5304845.0	3,621.0	27,087.0	8641.0	64,639.2					90359360.0
09/27/12	34036770.0	6,335.0	47,389.1	5308466.0	2,625.0	19,636.4	8960.0	67,025.5					90395030.0
09/28/12	34043105.0	11,985.0	89,654.0	5311091.0	11,919.0	89,160.3	23904.0	178,814.4					90422850.0
10/01/12	34055090.0	5,405.0	40,432.2	5323010.0	3,573.0	26,727.9	8978.0	67,160.1					90512850.0
10/02/12	34060495.0	4,295.0	32,128.8	5326583.0	3,481.0	26,039.7	7776.0	58,168.5					90541220.0
10/03/12	34064790.0	6,120.0	45,780.8	5330064.0	3,398.0	25,418.8	9518.0	71,199.6					90583440.0
10/04/12	34070910.0	5,640.0	42,190.1	5333462.0	2,215.0	16,569.4	7855.0	58,759.5					90620630.0
10/05/12	34076550.0	13,643.0	102,056.7	5335677.0	10,028.0	75,014.7	23671.0	177,071.4					90656040.0
10/08/12	34090193.0	5,122.0	38,315.2	5345705.0	3,846.0	28,770.1	8968.0	67,085.3					90757580.0
10/09/12	34095315.0	4,736.0	35,427.7	5349551.0	3,566.0	26,675.5	8302.0	62,103.3					90793910.0
10/10/12	34100051.0	4,736.0	35,427.7	5353117.0	3,566.0	26,675.5	8302.0	62,103.3					90842610.0
10/11/12	34104787.0	4,928.0	36,864.0	5356683.0	3,731.0	27,909.8	8659.0	64,773.8					90891320.0
10/12/12	34109715.0	12,355.0	92,421.8	5360414.0	11,068.0	82,794.4	23423.0	175,216.2					90939140.0
10/15/12	34122070.0	5,370.0	40,170.4	5371482.0	3,541.0	26,488.5	8911.0	66,658.9					91054610.0
10/16/12	34127440.0	3,675.0	27,490.9	5375023.0	3,469.0	25,949.9	7144.0	53,440.8					91095260.0
10/17/12	34131115.0	3,535.0	26,443.6	5378492.0	4,350.0	32,540.3	7885.0	58,983.9					91145710.0
10/18/12	34134650.0	12,120.0	90,663.9	5382842.0	16,089.0	120,354.1	28209.0	211,018.0					91200160.0
10/22/12	34146770.0	4,345.0	32,502.9	5398931.0	4,159.0	31,111.5	8504.0	63,614.3					91419760.0
10/23/12	34151115.0	3,805.0	28,463.4	5403090.0	4,160.0	31,119.0	7965.0	59,582.3					91487660.0
10/24/12	34154920.0	17,960.0	134,350.1	5407250.0	20,612.0	154,188.5	38572.0	288,538.6					91548640.0

10/29/12	34172880.0	3,970.0	29,697.7	5427862.0	3,900.0	29,174.0	7870.0	58,871.7					91810900.0
10/30/12	34176850.0	4,880.0	36,504.9	5431762.0	3,085.0	23,077.4	7965.0	59,582.3					91847220.0
10/31/12	34181730.0	5,173.0	38,696.7	5434847.0	3,006.0	22,486.4	8179.0	61,183.2					91884940.0
11/01/12	34186903.0	4,372.0	32,704.8	5437853.0	3,876.0	28,994.5	8248.0	61,699.3					91931030.0
11/02/12	34191275.0	14,630.0	109,440.0	5441729.0	10,679.0	79,884.5	25309.0	189,324.5					91976160.0
11/05/12	34205905.0	5,598.0	41,876.0	5452408.0	3,292.0	24,625.9	8890.0	66,501.8					92096950.0
11/06/12	34211503.0	4,687.0	35,061.2	5455700.0	4,209.0	31,485.5	8896.0	66,546.7					92150410.0
11/07/12	34216190.0	5,182.0	38,764.1	5459909.0	3,660.0	27,378.7	8842.0	66,142.8					92205050.0
11/08/12	34221372.0	18,048.0	135,008.4	5463569.0	18,702.0	139,900.7	36750.0	274,909.1					92267930.0
11/13/12	34239420.0	4,590.0	34,335.6	5482271.0	4,311.0	32,248.5	8901.0	66,584.1					92613820.0
11/14/12	34244010.0	2,400.0	17,953.2	5486582.0	4,114.0	30,774.9	6514.0	48,728.1					92670140.0
11/15/12	34246410.0	78,700.0	588,716.9	5490696.0	73,062.0	546,541.8	151762.0	1,135,258.7					92737630.0
12/05/12	34325110.0	4,485.0	33,550.1	5563758.0	3,023.0	22,613.6	7508.0	56,163.7					94040870.0
12/06/12	34329595.0	4,385.0	32,802.1	5566781.0	4,009.0	29,989.4	8394.0	62,791.5					94110640.0
12/07/12	34333980.0	10,450.0	78,171.4	5570790.0	10,773.0	80,587.6	21223.0	158,759.1					94187850.0
12/10/12	34344430.0	4,210.0	31,493.0	5581563.0	3,754.0	28,081.9	7964.0	59,574.9					94394020.0
12/11/12	34348640.0	4,100.0	30,670.1	5585317.0	3,696.0	27,648.0	7796.0	58,318.1					94461640.0
12/12/12	34352740.0	4,460.0	33,363.1	5589013.0	3,776.0	28,246.4	8236.0	61,609.6					94531810.0
12/13/12	34357200.0	3,950.0	29,548.1	5592789.0	3,478.0	26,017.2	7428.0	55,565.3					94604133.0
12/14/12	34361150.0	12,575.0	94,067.5	5596267.0	11,038.0	82,570.0	23613.0	176,637.5					94673300.0
12/17/12	34373725.0	13,505.0	101,024.4	5607305.0	11,282.0	84,395.2	24787.0	185,419.6					94904830.0
12/20/12	34387230.0	4,855.0	36,317.9	5618587.0	3,325.0	24,872.7	8180.0	61,190.7					95151460.0
12/21/12	34392085.0	13,015.0	97,359.0	5621912.0	11,347.0	84,881.5	24362.0	182,240.4					95239720.0
12/24/12	34405100.0	8,750.0	65,454.6	5633259.0	7,149.0	53,478.2	15899.0	118,932.8					95470360.0
12/26/12	34413850.0	4,820.0	36,056.1	5640408.0	3,731.0	27,909.8	8551.0	63,965.9					95628900.0
12/27/12	34418670.0	5,070.0	37,926.2	5644139.0	3,860.0	28,874.8	8930.0	66,801.0					95702210.0
12/28/12	34423740.0	12,430.0	92,982.9	5647999.0	11,162.0	83,497.6	23592.0	176,480.4					95777960.0
12/31/12	34436170.0	8,820.0	65,978.2	5659161.0	7,946.0	59,440.2	16766.0	125,418.4					96008870.0
						9,405,183.0							
01/02/13	34444990.0	4,590.0	34,335.6	5667107.0	3,400.0	25,433.8	7990.0	59,769.4					96194560.0
01/03/13	34449580.0	4,697.0	35,136.0	5670507.0	3,685.0	27,565.7	8382.0	62,701.7					96278630.0
01/04/13	34454277.0	20,463.0	153,073.9	5674192.0	18,335.0	137,155.3	38798.0	290,229.2					96357250.0
01/09/13	34474740.0	9,020.0	67,474.3	5692527.0	7,341.0	54,914.5	16361.0	122,388.8					96702880.0
01/11/13	34483760.0	12,550.0	93,880.5	5699868.0	10,893.0	81,485.3	23443.0	175,365.8					96881760.0
01/14/13	34496310.0	4,960.0	37,103.4	5710761.0	3,561.0	26,638.1	8521.0	63,741.5					97160740.0
01/15/13	34501270.0	4,440.0	33,213.5	5714322.0	3,687.0	27,580.7	8127.0	60,794.2					97250180.0
01/16/13	34505710.0	4,360.0	32,615.1	5718009.0	3,460.0	25,882.6	7820.0	58,497.7					97338760.0
01/17/13	34510070.0	4,380.0	32,764.7	5721469.0	3,678.0	27,513.4	8058.0	60,278.0					97428420.0
01/18/13	34514450.0	16,500.0	123,428.6	5725147.0	14,571.0	108,998.7	31071.0	232,427.2					97515340.0
01/22/13	34530950.0	4,150.0	31,044.2	5739718.0	3,530.0	26,406.2	7680.0	57,450.4					97853700.0
01/23/13	34535100.0	5,312.0	39,736.5	5743248.0	3,251.0	24,319.2	8563.0	64,055.7					97935720.0
01/24/13	34540412.0	6,503.0	48,645.8	5746499.0	3,459.0	25,875.1	9962.0	74,520.9					98017180.0
01/25/13	34546915.0	17,635.0	131,919.0	5749958.0	12,723.0	95,174.7	30358.0	227,093.6					98090370.0
01/28/13	34564550.0	6,037.0	45,159.9	5762681.0	3,681.0	27,535.8	9718.0	72,695.7					98311430.0
01/29/13	34570587.0	4,733.0	35,405.3	5766362.0	3,718.0	27,812.6	8451.0	63,217.9					98387950.0
01/30/13	34575320.0	4,402.0	32,929.2	5770080.0	3,624.0	27,109.4	8026.0	60,038.7					98452150.0
01/31/13	34579722.0	4,608.0	34,470.2	5773704.0	3,738.0	27,962.2	8346.0	62,432.4					98515600.0
02/01/13	34584330.0	11,140.0	83,333.0	5777442.0	11,463.0	85,749.2	22603.0	169,082.2					98579870.0
02/04/13	34595470.0	4,260.0	31,867.0	5788905.0	3,484.0	26,062.1	7744.0	57,929.1					98791260.0
02/05/13	34599730.0	4,445.0	33,250.9	5792389.0	3,710.0	27,752.7	8155.0	61,003.6					98856100.0
02/06/13	34604175.0	4,525.0	33,849.4	5796099.0	3,489.0	26,099.5	8014.0	59,948.9					98928730.0
02/07/13	34608700.0	4,298.0	32,151.3	5799588.0	3,580.0	26,780.3	7878.0	58,931.5					98998520.0
02/08/13	34612998.0	11,402.0	85,292.9	5803168.0	11,215.0	83,894.0	22617.0	169,186.9					99075210.0
02/11/13	34624400.0	4,430.0	33,138.7	5814383.0	3,785.0	28,313.8	8215.0	61,452.5					99291740.0
02/12/13	34628830.0	3,990.0	29,847.3	5818168.0	3,865.0	28,912.2	7855.0	58,759.5					99361420.0
02/13/13	34632820.0	3,510.0	26,256.6	5822033.0	3,786.0	28,321.2	7296.0	54,577.9					99428810.0
02/14/13	34636330.0	4,180.0	31,268.6	5825819.0	3,743.0	27,999.6	7923.0	59,268.2					99496210.0
02/15/13	34640510.0	15,410.0	115,274.8	5829562.0	15,145.0	113,292.5	30555.0	228,567.3					99562810.0
02/19/13	34655920.0	3,950.0	29,548.1	5844707.0	3,566.0	26,675.5	7516.0	56,223.6					99832460.0
02/20/13	34659870.0	4,310.0	32,241.0	5848273.0	4,114.0	30,774.9	8424.0	63,015.9					99909510.0
02/21/13	34664180.0	3,930.0	29,398.4	5852387.0	3,646.0	27,274.0	7576.0	56,672.4					99985160.0
02/22/13	34668110.0	11,660.0	87,222.9	5856033.0	11,091.0	82,966.4	22751.0	170,189.3					56650.0
02/25/13	34679770.0	4,260.0	31,867.0	5867124.0	3,500.0	26,181.8	7760.0	58,048.8					272250.0
02/26/13	34684030.0	13,367.0	99,992.1	5870624.0	10,838.0	81,073.9	24205.0	181,066.0					339760.0
03/01/13	34697397.0	11,263.0	84,253.1	5881462.0	11,020.0	82,435.3	22283.0	166,688.4					532420.0
03/04/13	34708660.0	5,720.0	42,788.6	5892482.0	3,130.0	23,414.0	8850.0	66,202.6					716060.0
03/05/13	34714380.0	4,440.0	33,213.5	5895612.0	3,635.0	27,191.7	8075.0	60,405.2					782520.0
03/06/13	34718820.0	4,485.0	33,550.1	5899247.0	3,756.0	28,096.8	8241.0	61,647.0					853650.0
03/07/13	34723305.0	4,135.0	30,932.0	5903003.0	3,764.0	28,156.7	7899.0	59,088.6					924750.0
03/08/13	34727440.0	10,780.0	80,640.0	5906767.0	11,317.0	84,657.0	22097.0	165,297.1					989340.0
03/11/13	34738220.0	4,785.0	35,794.3	5918084.0	4,102.0	30,685.1	8887.0	66,479.4					1181160.0
03/12/13	34743005.0	4,425.0	33,101.3	5922186.0	4,030.0	30,146.5	8455.0	63,247.8					1238910.0
03/13/13	34747430.0	4,095.0	30,632.7	5926216.0	4,035.0	30,183.9	8130.0	60,816.6					1292800.0
03/14/13	34751525.0	3,290.0	24,610.9	5930251.0	3,479.0	26,024.7	6769.0	50,635.6					1347340.0
03/15/13	34754815.0	13,305.0	99,528.3	5933730.0	11,891.0	88,950.9	25196.0	188,479.2					1399260.0
03/18/13	34768120.0	4,555.0	34,073.8	5945621.0	3,846.0	28,770.1	8401.0	62,843.8					1591100.0
03/19/13	34772675.0	4,535.0	33,924.2	5949467.0	3,636.0	27,199.2	8171.0	61,123.3					1659540.0
03/20/13	34777210.0	4,360.0	32,615.1	5953103.0	3,498.0	26,166.9	7858.0	58,781.9					1719430.0
03/21/13	34781570.0	4,390.0	32,839.5	5956601.0	3,530.0	26,406.2	7920.0	59,245.7					1790870.0
03/22/13	34785960.0	13,010.0	97,321.6	5960131.0	10,890.0	81,462.9	23900.0	178,784.4					1864310.0
03/25/13	34798970.0	4,440.0	33,213.5	5971021.0	3,460.0	25,882.6	7900.0	59,096.1					2069530.0
03/26/13	34803410.0	5,070.0	37,926.2	5974481.0	3,980.0	29,772.5	9050.0	67,698.7					2118940.0
03/27/13	34808480.0	4,550.0	34,036.4	5978461.0	3,491.0	26,114.5	8041.0	60,150.9					2163960.0
03/28/13	34813030.0	4,770.0	35,682.1	5981952.0	3,954.0	29,578.0	8724.0	65,260.1					2214640.0
03/29/13	34817800.0	13,120.0	98,144.4	5985906.0	10,582.0	79,158.9	23702.0	177,303.3					2261380.0
04/01/13	34830920.0	4,870.0	36,430.1	5996488.0	3,573.0	26,727.9	8443.0	63,158.0					2382150.0
04/02/13	34835790.0	4,870.0	36,430.1	6000061.0	3,462.0	25,897.6	8332.0	62,327.7					2426120.0
04/03/13	34840660.0	4,840.0	36,205.7	6003523.0	3,552.0	26,570.8	8392.0	62,776.5					2474560.0
04/04/13	34845500.0	4,630.0	34,634.8	6007075.0	3,527.0	26,383.8	8157.0	61,018.6					2518640.0
04/05/13	34850130.0	23,361.0	174,752.4	6010602.0	18,564.0	138,868.4	41925.0	313,620.8					2566550.0
04/10/13	34873491.0	4,479.0	33,505.2	6029166.0	3,542.0	26,496.0	8021.0	60,001.3					2846380.0
04/11/13	34877970.0	4,580.0	34,260.8	6032708.0	3,634.0	27,184.2	8214.0	61,445.0					2900710.0
04/12/13	34882550.0	12,365.0	92,496.6	6036342.0	10,475.0	78,358.4	22840.0	170,855.1					2960100.0
04/15/13	34894915.0	4,703.0	35,180.9	6046817.0	3,258.0	24,371.5	7961.0	59,552.4					3145130.0
04/16/13	34899618.0	4,432.0	33,153.7	6050075.0	3,719.0	27,820.1	8151.0	60,973.7					3203910.0
04/17/13	34904050.0	4,370.0	32,689.9	6053794.0	3,748.0	28,037.0	8118.0	60,726.9					3263820.0
04/18/13	34908420.0	4,475.0	33,475.3	6057542.0	3,128.0	23,399.1	7603.0	56,874.4					3313560.0
04/19/13	34912895.0	13,435.0	100,500.8	6060670.0	10,319.0	77,191.5	23754.0	177,692.3					3366850.0

04/22/13	34926330.0	4,895.0	36,617.1	6070989.0	3,333.0	24,932.6	8228.0	61,549.7					3522270.0
04/23/13	34931225.0	5,025.0	37,589.6	6074322.0	3,470.0	25,957.4	8495.0	63,547.0					3573430.0
04/24/13	34936250.0	4,900.0	36,654.5	6077792.0	3,779.0	28,268.9	8679.0	64,923.4					3619250.0
04/25/13	34941150.0	18,819.0	140,775.9	6081571.0	14,898.0	111,444.8	33717.0	252,220.7					3654520.0
04/29/13	34959969.0	5,906.0	44,180.0	6096469.0	4,634.0	34,664.7	10540.0	78,844.7					3808610.0
04/30/13	34965875.0	5,025.0	37,589.6	6101103.0	3,793.0	28,373.6	8818.0	65,963.2					3865950.0
05/01/13	34970900.0	4,690.0	35,083.6	6104896.0	3,788.0	28,336.2	8478.0	63,419.8					3923480.0
05/02/13	34975590.0	4,610.0	34,485.2	6108684.0	3,696.0	27,648.0	8306.0	62,133.2					3966930.0
05/03/13	34980200.0	13,530.0	101,211.4	6112380.0	11,587.0	86,676.8	25117.0	187,888.2					4004760.0
05/06/13	34993730.0	4,620.0	34,560.0	6123967.0	3,905.0	29,211.4	8525.0	63,771.4					4077520.0
05/07/13	34998350.0	5,545.0	41,479.5	6127872.0	4,237.0	31,695.0	9782.0	73,174.4					4102750.0
05/08/13	35003895.0	4,530.0	33,886.8	6132109.0	4,212.0	31,508.0	8742.0	65,394.7					4134260.0
05/09/13	35008425.0	4,670.0	34,934.0	6136321.0	4,111.0	30,752.4	8781.0	65,686.4					4168400.0
05/10/13	35013095.0	11,035.0	82,547.5	6140432.0	13,499.0	100,979.5	24534.0	183,527.1					4199510.0
05/13/13	35024130.0	7,570.0	56,627.5	6153931.0	5,136.0	38,420.0	12706.0	95,047.5					4274220.0
05/14/13	35031700.0	4,640.0	34,709.6	6159067.0	4,753.0	35,554.9	9393.0	70,264.5					4320070.0
05/15/13	35036340.0	4,090.0	30,595.3	6163820.0	4,620.0	34,560.0	8710.0	65,155.3					4358110.0
05/16/13	35040430.0	4,140.0	30,969.4	6168440.0	4,751.0	35,540.0	8891.0	66,509.3					4393770.0
05/17/13	35044570.0	12,380.0	92,608.8	6173191.0	13,639.0	102,026.8	26019.0	194,635.6					4426560.0
05/20/13	35056950.0	5,150.0	38,524.7	6186830.0	4,030.0	30,146.5	9180.0	68,671.2					4538190.0
05/21/13	35062100.0	5,370.0	40,170.4	6190860.0	5,410.0	40,469.6	10780.0	80,640.0					4579370.0
05/22/13	35067470.0	4,780.0	35,756.9	6196270.0	4,600.0	34,410.4	9380.0	70,167.3					4628840.0
05/23/13	35072250.0	4,000.0	29,922.1	6200870.0	3,760.0	28,126.8	7760.0	58,048.8					4677000.0
05/24/13	35076250.0	15,950.0	119,314.3	6204630.0	17,780.0	133,003.6	33730.0	252,317.9					4721610.0
05/28/13	35092200.0	4,800.0	35,906.5	6222410.0	4,810.0	35,981.3	9610.0	71,887.8					4870900.0
05/29/13	35097000.0	5,100.0	38,150.7	6227220.0	4,580.0	34,260.8	9680.0	72,411.4					4911100.0
05/30/13	35102100.0	17,424.0	130,340.6	6231800.0	19,790.0	148,039.5	37214.0	278,380.1					4950500.0
06/03/13	35119524.0	4,676.0	34,978.9	6251590.0	4,633.0	34,657.2	9309.0	69,636.2					5074580.0
06/04/13	35124200.0	6,490.0	48,548.6	6256223.0	6,420.0	48,024.9	12910.0	96,573.5					6101210.0
06/05/13	35130690.0	4,485.0	33,550.1	6262643.0	4,637.0	34,687.2	9122.0	68,237.3					5127330.0
06/06/13	35135175.0	4,655.0	34,821.8	6267280.0	4,437.0	33,191.1	9092.0	68,012.9					5161460.0
06/07/13	35139830.0	18,355.0	137,304.9	6271717.0	18,402.0	137,656.5	36757.0	274,961.5					5174550.0
06/11/13	35158185.0	7,630.0	57,076.4	6290119.0	6,028.0	45,092.6	13658.0	102,168.9					5284810.0
06/12/13	35165815.0	5,073.0	37,948.7	6296147.0	4,298.0	32,151.3	9371.0	70,100.0					5317590.0
06/13/13	35170888.0	7,102.0	53,126.7	6300445.0	6,882.0	51,480.9	13984.0	104,607.6					5346330.0
06/14/13	35177990.0	15,030.0	112,432.2	6307327.0	14,893.0	111,407.4	29923.0	223,839.6					5378270.0
06/17/13	35193020.0	8,130.0	60,816.6	6322220.0	5,342.0	39,960.9	13472.0	100,777.6					5447110.0
06/18/13	35201150.0	6,390.0	47,800.5	6327562.0	5,289.0	39,564.5	11679.0	87,365.0					5471220.0
06/19/13	35207540.0	6,090.0	45,556.4	6332851.0	5,328.0	39,856.2	11418.0	85,412.6					5497030.0
06/20/13	35213630.0	5,170.0	38,674.3	6338179.0	5,692.0	42,579.1	10862.0	81,253.4					5523540.0
06/21/13	35218800.0	28,111.0	210,284.9	6343871.0	28,712.0	214,780.7	56823.0	425,065.6					5555310.0
06/26/13	35246911.0	4,879.0	36,497.5	6372583.0	5,095.0	38,113.2	9974.0	74,610.7					5674140.0
06/27/13	35251790.0	5,518.0	41,277.5	6377678.0	5,702.0	42,653.9	11220.0	83,931.4					5692440.0
06/28/13	35257308.0	22,482.0	168,177.1	6383380.0	15,681.0	117,302.0	38163.0	285,479.1					5710350.0
07/01/13	35279790.0	10,600.0	79,293.5	6399061.0	3,547.0	26,533.4	14147.0	105,826.9					5767010.0
07/02/13	35290390.0	9,670.0	72,336.6	6402608.0	4,372.0	32,704.8	14042.0	105,041.5					5786830.0
07/03/13	35300060.0	13,142.0	98,309.0	6406980.0	10,394.0	77,752.5	23536.0	176,061.5					5807440.0
07/05/13	35313202.0	20,128.0	150,567.9	6417374.0	15,596.0	116,666.2	35724.0	267,234.1					5852600.0
07/08/13	35333330.0	6,910.0	51,690.4	6432970.0	5,051.0	37,784.1	11961.0	89,474.5					5919020.0
07/09/03	35340240.0	7,480.0	55,954.3	6438021.0	6,110.0	45,706.0	13590.0	101,660.3					5939320.0
07/10/13	35347720.0	7,800.0	58,348.1	6444131.0	4,991.0	37,335.3	12791.0	95,683.3					5961550.0
07/11/13	35355520.0	9,480.0	70,915.3	6449122.0	4,768.0	35,667.1	14248.0	106,582.4					5987500.0
07/12/13	35365000.0	27,000.0	201,974.0	6453890.0	13,918.0	104,113.9	40918.0	306,087.9					6013520.0
07/15/13	35392000.0	10,110.0	75,628.1	6467808.0	2,446.0	18,297.4	12556.0	93,925.4					6087500.0
07/16/13	35402110.0	18,401.0	137,649.0	6470254.0	7,608.0	56,911.8	26009.0	194,560.8					6107130.0
07/18/13	35420511.0	8,519.0	63,726.5	6477862.0	4,576.0	34,230.9	13095.0	97,957.4					6149050.0
07/19/13	35429030.0	22,570.0	168,835.3	6482438.0	13,689.0	102,400.8	36259.0	271,236.2					6171130.0
07/22/13	35451600.0	9,320.0	69,718.4	6496127.0	3,075.0	23,002.6	12395.0	92,721.0					6237270.0
07/23/13	35460920.0	10,310.0	77,124.2	6499202.0	3,508.0	26,241.7	13818.0	103,365.8					6267150.0
07/24/13	35471230.0	10,360.0	77,498.2	6502710.0	2,646.0	19,793.5	13006.0	97,291.6					6274920.0
07/25/13	35481590.0	8,900.0	66,576.6	6505356.0	3,245.0	24,274.3	12145.0	90,850.9					6294210.0
07/26/13	35490490.0	24,970.0	186,788.6	6508601.0	13,070.0	97,770.4	38040.0	284,559.0					6314750.0
07/29/13	35515460.0	9,270.0	69,344.4	6521671.0	2,702.0	20,212.4	11972.0	89,556.8					6383240.0
07/30/13	35524730.0	9,740.0	72,860.3	6524373.0	3,952.0	29,563.0	13692.0	102,423.3					6404960.0
07/31/13	35534470.0	8,190.0	61,265.5	6528325.0	2,625.0	19,636.4	10815.0	80,901.8					6427230.0
08/01/13	35542660.0	8,550.0	63,958.4	6530950.0	4,532.0	33,901.7	13082.0	97,860.2					6450770.0
08/02/13	35551210.0	27,310.0	204,293.0	6535482.0	8,659.0	64,773.8	35969.0	269,066.8					6474510.0
08/05/13	35578520.0	6,930.0	51,840.0	6544141.0	4,374.0	32,719.8	11304.0	84,559.8					6537510.0
08/06/13	35585450.0	9,300.0	69,568.8	6548515.0	4,575.0	34,223.4	13875.0	103,792.2					6558360.0
08/07/13	35594750.0	8,320.0	62,237.9	6553090.0	4,594.0	34,365.5	12914.0	96,603.4					6578730.0
08/08/13	35603070.0	7,200.0	53,859.7	6557684.0	4,806.0	35,951.4	12006.0	89,811.1					6599370.0
08/09/13	35610270.0	21,800.0	163,075.3	6562490.0	15,303.0	114,474.4	37103.0	277,549.7					6619630.0
08/12/13	35632070.0	8,390.0	62,761.6	6577793.0	5,582.0	41,756.3	13972.0	104,517.8					6680460.0
08/13/13	35640460.0	6,850.0	51,241.6	6583375.0	4,616.0	34,530.1	11466.0	85,771.6					6700840.0
08/14/13	35647310.0	7,310.0	54,682.6	6587991.0	5,005.0	37,440.0	12315.0	92,122.6					6720520.0
08/15/13	35654620.0	31,100.0	232,644.2	6592996.0	17,017.0	127,296.0	48117.0	359,940.2					6740320.0
08/19/13	35685720.0	6,110.0	45,706.0	6610013.0	5,126.0	38,345.1	11236.0	84,051.1					6819970.0
08/20/13	35691830.0	8,540.0	63,883.6	6615139.0	6,135.0	45,893.0	14675.0	109,776.6					6839970.0
08/21/13	35700370.0	9,760.0	73,009.9	6621274.0	3,019.0	22,583.7	12779.0	95,593.6					6861920.0
08/22/13	35710130.0	9,400.0	70,316.9	6624293.0	2,902.0	21,708.5	12302.0	92,025.4					6882350.0
08/23/13	35719530.0	26,260.0	196,438.5	6627195.0	9,766.0	73,054.8	36026.0	269,493.2					6901410.0
08/26/13	35745790.0	6,750.0	50,493.5	6636961.0	3,490.0	26,107.0	10240.0	76,600.5					6961970.0
08/27/13	35752540.0	7,080.0	52,962.1	6640451.0	4,913.0	36,751.8	11993.0	89,713.9					6982750.0
08/28/13	35759620.0	9,510.0	71,139.7	6645364.0	2,887.0	21,596.3	12397.0	92,736.0					7001930.0
08/29/13	35769130.0	8,870.0	66,352.2	6648251.0	2,689.0	20,115.1	11559.0	86,467.3					7021910.0
08/30/13	35778000.0	35,730.0	267,279.0	6650940.0	12,017.0	89,893.4	47747.0	357,172.4					7041350.0
09/03/13	35813730.0	7,390.0	55,281.0	6662957.0	4,243.0	31,739.8	11633.0	87,020.9					7118200.0
09/04/13	35821120.0	7,005.0	52,401.0	6667200.0	3,743.0	27,999.6	10748.0	80,400.6					7138850.0
09/05/13	35828125.0	25,625.0	191,688.3	6670943.0	22,059.0	165,012.8	47684.0	356,701.1					7158820.0
09/09/13	35853750.0	5,190.0	38,823.9	6693002.0	5,951.0	44,516.6	11141.0	83,340.5					7241430.0
09/10/13	35858940.0	4,920.0	36,804.2	6698953.0	4,534.0	33,916.7	9454.0	70,720.8					7262820.0
09/11/13	35863860.0	5,570.0	41,666.5	6703487.0	5,063.0	37,873.9	10633.0	79,540.4					7280240.0
09/12/13	35869430.0	4,160.0	31,119.0	6708550.0	4,678.0	34,993.9	8838.0	66,112.8					7299210.0
09/13/13	35873590.0	15,070.0	112,731.4	6713228.0	14,122.0	105,639.9	29192.0	218,371.3					7317470.0
09/16/13	35888660.0	5,050.0	37,776.6	6727350.0	3,960.0	29,622.9	9010.0	67,399.5					7381300.0
09/17/13	35893710.0	4,890.0	36,579.7	6731310.0	4,172.0	31,208.7	9062.0	67,788.5					7406140.0
09/18/13	35898600.0	5,290.0	39,572.0	6735482.0	3,679.0	27,520.8	8969.0	67,092.8					7433820.0
09/19/13	35903890.0	3,930.0	29,398.4	6739161.0	4,536.0	33,931.6	8466.0	63,330.1					7462250.0

09/20/13	35907820.0	17,030.0	127,393.3	6743697.0	18,434.0	137,895.9	35464.0	265,289.2						7490680.0
09/24/13	35924850.0	5,190.0	38,823.9	6762131.0	4,547.0	34,013.9	9737.0	72,837.8						7607420.0
09/25/13	35930040.0	6,210.0	46,454.0	6766678.0	4,652.0	34,799.4	10862.0	81,253.4						7644710.0
09/26/13	35936250.0	4,480.0	33,512.7	6771330.0	3,880.0	29,024.4	8360.0	62,537.1						7687320.0
09/27/13	35940730.0	12,685.0	94,890.4	6775210.0	13,547.0	101,338.6	26232.0	196,229.0						7725330.0
09/30/13	35953415.0	4,925.0	36,841.6	6788757.0	4,595.0	34,373.0	9520.0	71,214.6						7848670.0
10/01/13	35958340.0	3,600.0	26,929.9	6793352.0	4,271.0	31,949.3	7871.0	58,879.2						7898000.0
10/02/13	35961940.0	5,030.0	37,627.0	6797623.0	4,149.0	31,036.7	9179.0	68,663.7						7943020.0
10/03/13	35966970.0	5,000.0	37,402.6	6801772.0	3,916.0	29,293.7	8916.0	66,696.3						7991110.0
10/04/13	35971970.0	12,580.0	94,104.9	6805688.0	12,485.0	93,394.3	25065.0	187,499.2						8040060.0
10/07/13	35984550.0	4,775.0	35,719.5	6818173.0	4,429.0	33,131.2	9204.0	68,850.7						8151940.0
10/08/13	35989325.0	3,635.0	27,191.7	6822602.0	4,220.0	31,567.8	7855.0	58,759.5						8194330.0
10/09/13	35992960.0	5,330.0	39,871.2	6826822.0	4,460.0	33,363.1	9790.0	73,234.3						8248030.0
10/10/13	35998290.0	4,310.0	32,241.0	6831282.0	3,919.0	29,316.2	8229.0	61,557.2						8284920.0
10/11/13	36002600.0	12,740.0	95,301.8	6835201.0	12,742.0	95,316.8	25482.0	190,618.6						8341460.0
10/14/13	36015340.0	4,130.0	30,894.5	6847943.0	4,198.0	31,403.2	8328.0	62,297.8						8492020.0
10/15/13	36019470.0	4,720.0	35,308.1	6852141.0	4,408.0	32,974.1	9128.0	68,282.2						8544950.0
10/16/13	36024190.0	3,560.0	26,630.7	6856549.0	3,832.0	28,665.4	7392.0	55,296.0						8593060.0
10/17/13	36027750.0	4,100.0	30,670.1	6860381.0	4,159.0	31,111.5	8259.0	61,781.6						8641870.0
10/18/13	36031850.0	13,550.0	101,361.0	6864540.0	11,932.0	89,257.6	25482.0	190,618.6						8694810.0
10/21/13	36045400.0	4,680.0	35,008.8	6876472.0	3,732.0	27,917.3	8412.0	62,926.1						8859260.0
10/22/13	36050080.0	5,050.0	37,776.6	6880204.0	3,952.0	29,563.0	9002.0	67,339.6						8914410.0
10/23/13	36055130.0	3,680.0	27,528.3	6884156.0	3,696.0	27,648.0	7376.0	55,176.3						8966450.0
10/24/13	36058810.0	4,260.0	31,867.0	6887852.0	3,848.0	28,785.0	8108.0	60,652.1						9022040.0
10/25/13	36063070.0	20,940.0	156,642.1	6891700.0	16,927.0	126,622.8	37867.0	283,264.9						9077140.0
10/29/13	36084010.0	4,910.0	36,729.4	6908627.0	3,876.0	28,994.5	8786.0	65,723.8						9291660.0
10/30/13	36088920.0	4,280.0	32,016.6	6912503.0	4,138.0	30,954.4	8418.0	62,971.0						9351150.0
10/31/13	36093200.0	3,860.0	28,874.8	6916641.0	3,754.0	28,081.9	7614.0	56,956.7						9402040.0
11/01/13	36097060.0	15,135.0	113,217.7	6920395.0	12,616.0	94,374.2	27751.0	207,591.9						9448430.0
11/04/13	36112195.0	7,695.0	57,562.6	6933011.0	3,829.0	28,642.9	11524.0	86,205.5						9612970.0
11/05/13	36119890.0	6,930.0	51,840.0	6936840.0	3,891.0	29,106.7	10821.0	80,946.7						9672030.0
11/06/13	36126820.0	6,715.0	50,231.7	6940731.0	3,971.0	29,705.1	10686.0	79,936.8						9731720.0
11/07/13	36133535.0	6,863.0	51,338.8	6944702.0	3,813.0	28,523.2	10676.0	79,862.0						9785760.0
11/08/13	36140398.0	24,079.0	180,123.4	6948515.0	16,884.0	126,301.1	40963.0	306,424.5						9840620.0
11/12/13	36164477.0	7,153.0	53,508.2	6965399.0	4,069.0	30,438.2	11222.0	83,946.4						10060210.0
11/13/13	36171630.0	6,290.0	47,052.5	6969468.0	5,103.0	38,173.1	11393.0	85,225.6						10105830.0
11/14/13	36177920.0	6,050.0	45,257.1	6974571.0	3,324.0	24,865.2	9374.0	70,122.4						10158230.0
11/15/13	36183970.0	24,069.0	180,048.6	6977895.0	12,069.0	90,282.4	36138.0	270,331.0						10218230.0
11/18/13	36208039.0	2,321.0	17,362.3	6989964.0	3,625.0	27,116.9	5946.0	44,479.2						10399450.0
11/19/13	36210360.0	12,400.0	92,758.4	6993589.0	8,570.0	64,108.1	20970.0	156,866.5						10467120.0
11/21/13	36222760.0	5,850.0	43,761.0	7002159.0	3,698.0	27,663.0	9548.0	71,424.0						10628950.0
11/22/13	36228610.0	17,240.0	128,964.2	7005857.0	14,223.0	106,395.4	31463.0	235,359.6						10713840.0
11/25/13	36245850.0	5,780.0	43,237.4	7020080.0	4,507.0	33,714.7	10287.0	76,952.1						10942140.0
11/26/13	36251630.0	5,250.0	39,272.7	7024587.0	4,652.0	34,799.4	9902.0	74,072.1						11020650.0
11/27/13	36256880.0	25,855.0	193,408.8	7029239.0	23,054.0	172,455.9	48909.0	365,864.8						11079030.0
12/02/13	36282735.0	8,095.0	60,554.8	7052293.0	6,651.0	49,752.9	14746.0	110,307.7						11417040.0
12/03/13	36290830.0	5,740.0	42,938.2	7058944.0	4,774.0	35,712.0	10514.0	78,650.2						11499980.0
12/04/13	36296570.0	5,480.0	40,993.2	7063718.0	4,853.0	36,303.0	10333.0	77,296.2						11584930.0
12/05/13	36302050.0	5,800.0	43,387.0	7068571.0	4,537.0	33,939.1	10337.0	77,326.1						11675730.0
12/06/13	36307850.0	16,640.0	124,475.9	7073108.0	14,641.0	109,522.3	31281.0	233,998.1						11766590.0
12/09/13	36324490.0	7,070.0	52,887.3	7087749.0	4,874.0	36,460.1	11944.0	89,347.3						12089380.0
12/10/13	36331560.0	4,354.0	32,570.2	7092623.0	4,214.0	31,522.9	8568.0	64,093.1						12190150.0
12/11/13	36335914.0	5,406.0	40,439.7	7096837.0	4,574.0	34,215.9	9980.0	74,655.6						12278130.0
12/12/13	36341320.0	4,075.0	30,483.1	7101411.0	5,304.0	39,676.7	9379.0	70,159.8						12366590.0
12/13/13	36345395.0	17,095.0	127,879.5	7106715.0	12,904.0	96,528.6	29999.0	224,408.1						12445370.0
12/16/13	36362490.0	6,608.0	49,431.3	7119619.0	4,375.0	32,727.3	10983.0	82,158.6						12630850.0
12/17/13	36369098.0	6,352.0	47,516.3	7123994.0	4,364.0	32,645.0	10716.0	80,161.3						12707120.0
12/18/13	36375450.0	5,510.0	41,217.7	7128358.0	4,649.0	34,776.9	10159.0	75,994.6						12779570.0
12/19/13	36380960.0	6,440.0	48,174.5	7133007.0	4,381.0	32,772.2	10821.0	80,946.7						12866280.0
12/20/13	36387400.0	17,530.0	131,133.5	7137388.0	14,538.0	108,751.8	32068.0	239,885.3						12956730.0
12/23/13	36404930.0	5,630.0	42,115.3	7151926.0	4,749.0	35,525.0	10379.0	77,640.3						13177270.0
12/24/13	36410560.0	12,370.0	92,534.0	7156675.0	9,507.0	71,117.3	21877.0	163,651.3						13250640.0
12/26/13	36422930.0	6,760.0	50,568.3	7166182.0	4,094.0	30,625.2	10854.0	81,193.6						13424880.0
12/27/13	36429690.0	22,490.0	168,236.9	7170276.0	20,137.0	150,635.2	42627.0	318,872.1						13514170.0
12/31/13	36452180.0	11,040.0	82,584.9	7190413.0	9,766.0	73,054.8	20806.0	155,639.7						13820350.0
01/02/14	36463220.0	6,850.0	51,241.6	7200179.0	4,857.0	36,332.9	11707.0	87,574.4						13968550.0
01/03/14	36470070.0	17,190.0	128,590.1	7205036.0	14,534.0	108,721.9	31724.0	237,312.0						14041120.0
01/06/14	36487260.0	5,380.0	40,245.2	7219570.0	5,522.0	41,307.4	10902.0	81,552.6						14302060.0
01/07/14	36492640.0	5,960.0	44,583.9	7225092.0	4,778.0	35,741.9	10738.0	80,325.8						14384820.0
01/08/14	36498600.0	5,850.0	43,761.0	7229870.0	5,777.0	43,215.0	11627.0	86,976.0						14459180.0
01/09/14	36504450.0	6,065.0	45,369.4	7235647.0	4,567.0	34,163.5	10632.0	79,532.9						14531620.0
01/10/14	36510515.0	16,915.0	126,533.0	7240214.0	14,548.0	108,826.6	31463.0	235,359.6						14605130.0
01/13/14	36527430.0	6,990.0	52,288.8	7254762.0	4,578.0	34,245.8	11568.0	86,534.7						14798060.0
01/14/14	36534420.0	6,210.0	46,454.0	7259340.0	3,726.0	27,872.4	9936.0	74,326.4						14860820.0
01/15/14	36540630.0	11,970.0	89,541.8	7263066.0	10,523.0	78,717.5	22493.0	168,259.3						14925720.0
01/17/14	36552600.0	20,960.0	156,791.7	7273589.0	19,887.0	148,765.1	40847.0	305,556.8						15073090.0
01/21/14	36573560.0	6,330.0	47,351.7	7293476.0	5,385.0	40,282.6	11715.0	87,634.3						15378010.0
01/22/14	36579890.0	5,960.0	44,583.9	7298861.0	4,331.0	32,398.1	10291.0	76,982.0						15443890.0
01/23/14	36585850.0	6,470.0	48,399.0	7303192.0	5,198.0	38,883.7	11668.0	87,282.7						15513120.0
01/24/14	36592320.0	17,220.0	128,814.6	7308390.0	15,088.0	112,866.1	32308.0	241,680.6						15588050.0
01/27/14	36609540.0	6,600.0	49,371.4	7323478.0	5,253.0	39,295.2	11853.0	88,666.6						15813100.0
01/28/14	36616140.0	5,861.0	43,843.3	7328731.0	4,869.0	36,422.7	10730.0	80,266.0						15887730.0
01/29/14	36622001.0	5,229.0	39,115.6	7333600.0	5,100.0	38,150.7	10329.0	77,266.3						15953040.0
01/30/14	36627230.0	24,460.0	182,973.5	7338700.0	18,956.0	141,800.7	43416.0	324,774.3						16021320.0
02/03/14	36651690.0	6,704.0	50,149.4	7357656.0	4,864.0	36,385.2	11568.0	86,534.7						16323050.0
02/04/14	36658394.0	6,246.0	46,723.3	7362520.0	4,787.0	35,809.2	11033.0	82,532.6						16417700.0
02/05/14	36664640.0	6,490.0	48,548.6	7367307.0	4,431.0	33,146.2	10921.0	81,694.8						16521480.0
02/06/14	36671130.0	6,610.0	49,446.2	7371738.0	4,579.0	34,253.3	11189.0	83,699.5						16628530.0
02/07/14	36677740.0	16,920.0	126,570.4	7376317.0	14,461.0	108,175.8	31381.0	234,746.2						16736450.0
02/10/14	36694660.0	6,370.0	47,650.9	7390778.0	4,955.0	37,066.0	11325.0	84,716.9						17004430.0
02/11/14	36701030.0	4,945.0	36,991.2	7395733.0	4,733.0	35,405.3	9678.0	72,396.5						17075620.0
02/12/14	36705975.0	6,385.0	47,763.1	7400466.0	4,744.0	35,487.6	11129.0	83,250.7						17141370.0
02/13/14	36712360.0	6,020.0	45,032.7	7405210.0	4,829.0	36,123.4	10849.0	81,156.2						17204350.0
02/14/14	36718380.0	21,970.0	164,347.0	7410039.0	18,438.0	137,925.8	40408.0	302,272.9						17266770.0
02/18/14	36740350.0	6,910.0	51,690.4	7428477.0	4,994.0	37,357.7	11904.0	89,048.1						17582440.0
02/19/14	36747260.0	6,560.0	49,072.2	7433471.0	5,061.0	37,858.9	11621.0	86,931.1						17640950.0
02/20/14	36753820.0	5,990.0	44,808.3	7438532.0	4,733.0	35,405.3	10723.0	80,213.6						17716330.0
02/21/14	36759810.0	16,530.0	123,653.0	7443265.0	14,088.0	105,385.6	30618.0	229,038.6						17791970.0

02/24/14	36776340.0	6,620.0	49,521.0	7457353.0	4,615.0	34,522.6	11235.0	84,043.6					18031730.0
02/25/14	36782960.0	6,800.0	50,867.5	7461968.0	4,688.0	35,068.7	11488.0	85,936.2					18112270.0
02/26/14	36789760.0	6,470.0	48,399.0	7466656.0	4,771.0	35,689.6	11241.0	84,088.5					18187170.0
02/27/14	36796230.0	7,040.0	52,662.9	7471427.0	5,025.0	37,589.6	12065.0	90,252.5					18252120.0
02/28/14	36803270.0	18,030.0	134,873.8	7476452.0	14,303.0	106,993.9	32333.0	241,867.7					18320540.0
03/03/14	36821300.0	6,920.0	51,765.2	7490755.0	5,028.0	37,612.1	11948.0	89,377.3					18529060.0
03/04/14	36828220.0	6,960.0	52,064.4	7495783.0	5,147.0	38,502.2	12107.0	90,566.7					18591830.0
03/05/14	36835180.0	5,750.0	43,013.0	7500930.0	5,556.0	41,561.8	11306.0	84,574.8					18647610.0
03/06/14	36840930.0	5,940.0	44,434.3	7506486.0	5,004.0	37,432.5	10944.0	81,866.8					18702450.0
03/07/14	36846870.0	17,150.0	128,290.9	7511490.0	15,573.0	116,494.1	32723.0	244,785.1					18765330.0
03/10/14	36864020.0	5,330.0	39,871.2	7527063.0	5,528.0	41,352.3	10858.0	81,223.5					18939560.0
03/11/14	36869350.0	6,880.0	51,466.0	7532591.0	5,204.0	38,928.6	12084.0	90,394.6					19007320.0
03/12/14	36876230.0	7,440.0	55,655.1	7537795.0	5,395.0	40,357.4	12835.0	96,012.5					19072430.0
03/13/14	36883670.0	5,910.0	44,209.9	7543190.0	4,757.0	35,584.8	10667.0	79,794.7					19134260.0
03/14/14	36889580.0	17,770.0	132,928.8	7547947.0	14,952.0	111,848.7	32722.0	244,777.6					19189620.0
03/17/14	36907350.0	12,980.0	97,097.1	7562899.0	9,692.0	72,501.2	22672.0	169,598.3					19374170.0
03/19/14	36920330.0	6,780.0	50,717.9	7572591.0	4,978.0	37,238.0	11758.0	87,956.0					19507730.0
03/20/14	36927110.0	6,350.0	47,501.3	7577569.0	4,617.0	34,537.6	10967.0	82,038.9					19582620.0
03/21/14	36933460.0	18,780.0	140,484.2	7582186.0	14,207.0	106,275.7	32987.0	246,759.9					19653170.0
03/24/14	36952240.0	6,940.0	51,914.8	7596393.0	4,934.0	36,908.9	11874.0	88,823.7					19845850.0
03/25/14	36959180.0	5,900.0	44,135.1	7601327.0	5,235.0	39,160.5	11135.0	83,295.6					19893220.0
03/26/14	36965080.0	7,040.0	52,662.9	7606562.0	5,060.0	37,851.4	12100.0	90,514.3					19958410.0
03/27/14	36972120.0	6,620.0	49,521.0	7611622.0	5,094.0	38,105.8	11714.0	87,626.8					20024020.0
03/28/14	36978740.0	17,730.0	132,629.6	7616716.0	14,578.0	109,051.0	32308.0	241,680.6					20085460.0
03/31/14	36996470.0	6,770.0	50,643.1	7631294.0	4,951.0	37,036.1	11721.0	87,679.2					20278350.0
04/01/14	37003240.0	5,880.0	43,985.5	7636245.0	5,084.0	38,031.0	10964.0	82,016.4					20334600.0
04/02/14	37009120.0	33,670.0	251,869.1	7641329.0	26,011.0	194,575.8	59681.0	446,444.9					20389030.0
04/07/14	37042790.0	7,060.0	52,812.5	7667340.0	5,147.0	38,502.2	12207.0	91,314.7					20656850.0
04/08/14	37049850.0	6,020.0	45,032.7	7672487.0	5,518.0	41,277.5	11538.0	86,310.2					20696140.0
04/09/14	37055870.0	6,260.0	46,828.1	7678005.0	4,786.0	35,801.8	11046.0	82,629.8					20747550.0
04/10/14	37062130.0	5,620.0	42,040.5	7682791.0	5,443.0	40,716.5	11063.0	82,757.0					20800970.0
04/11/14	37067750.0	16,920.0	126,570.4	7688234.0	16,845.0	126,009.4	33765.0	252,579.8					20851960.0
04/14/14	37084670.0	7,170.0	53,635.3	7705079.0	4,647.0	34,762.0	11817.0	88,397.3					20984210.0
04/15/14	37091840.0	4,310.0	32,241.0	7709726.0	4,480.0	33,512.7	8790.0	65,753.8					21026140.0
04/16/14	37096150.0	16,470.0	123,204.2	7714206.0	7,475.0	55,916.9	23945.0	179,121.1					21077650.0
04/18/14	37112620.0	23,510.0	175,867.0	7721681.0	8,400.0	62,836.4	31910.0	238,703.4					21183410.0
04/21/14	37136130.0	7,930.0	59,320.5	7730081.0	3,848.0	28,785.0	11778.0	88,105.6					21336220.0
04/22/14	37144060.0	7,490.0	56,029.1	7733929.0	4,453.0	33,310.8	11943.0	89,339.9					21383970.0
04/23/14	37151550.0	6,990.0	52,288.8	7738382.0	2,901.0	21,701.0	9891.0	73,989.8					21441040.0
04/24/14	37158540.0	7,590.0	56,777.1	7741283.0	3,169.0	23,705.8	10759.0	80,482.9					21491150.0
04/25/14	37166130.0	23,500.0	175,792.2	7744452.0	11,559.0	86,467.3	35059.0	262,259.6					21547460.0
04/28/14	37189630.0	6,690.0	50,044.7	7756011.0	3,601.0	26,937.4	10291.0	76,982.0					21712130.0
04/29/14	37196320.0	8,170.0	61,115.8	7759612.0	4,585.0	34,298.2	12755.0	95,414.0					21753370.0
04/30/14	37204490.0	6,980.0	52,214.0	7764197.0	2,113.0	15,806.3	9093.0	68,020.4					21783500.0
05/01/14	37211470.0	7,580.0	56,702.3	7766310.0	5,081.0	38,008.5	12661.0	94,710.9					21806510.0
05/02/14	37219050.0	19,190.0	143,551.2	7771391.0	14,560.0	108,916.4	33750.0	252,467.6					21830060.0
05/05/14	37238240.0	6,590.0	49,296.6	7785951.0	5,042.0	37,716.8	11632.0	87,013.4					21967110.0
05/06/14	37244830.0	6,800.0	50,867.5	7790993.0	4,780.0	35,756.9	11580.0	86,624.4					22018040.0
05/07/14	37251630.0	6,440.0	48,174.5	7795773.0	4,687.0	35,061.2	11127.0	83,235.7					22054350.0
05/08/14	37258070.0	6,690.0	50,044.7	7800460.0	5,030.0	37,627.0	11720.0	87,671.7					22107530.0
05/09/14	37264760.0	17,250.0	129,039.0	7805490.0	15,890.0	118,865.5	33140.0	247,904.4					22160110.0
05/12/14	37282010.0	6,530.0	48,847.8	7821380.0	4,860.0	36,355.3	11390.0	85,203.1					22301460.0
05/13/14	37288540.0	6,570.0	49,147.0	7826240.0	6,428.0	48,084.8	12998.0	97,231.8					22327820.0
05/14/14	37295110.0	7,250.0	54,233.8	7832668.0	4,605.0	34,447.8	11855.0	88,681.6					22352450.0
05/15/14	37302360.0	31,800.0	237,880.5	7837273.0	25,304.0	189,287.1	57104.0	427,167.6					22373960.0
05/20/14	37334160.0	7,230.0	54,084.2	7862577.0	4,984.0	37,282.9	12214.0	91,367.1					22541810.0
05/21/14	37341390.0	7,700.0	57,600.0	7867561.0	5,919.0	44,277.2	13619.0	101,877.2					22578870.0
05/22/14	37349090.0	7,520.0	56,253.5	7873480.0	3,666.0	27,423.6	11186.0	83,677.1					22611430.0
05/23/14	37356610.0	26,310.0	196,812.5	7877146.0	20,625.0	154,285.7	46935.0	351,098.2					22638510.0
05/27/14	37382920.0	7,790.0	58,273.3	7897771.0	5,061.0	37,858.9	12851.0	96,132.2					22793970.0
05/28/14	37390710.0	#########	#########	7902832.0	#########	(59,117,292.8)	-45293542.0	(338,819,246.8)					22835840.0
05/29/14		-	-		-	-	0.0	-					
05/30/14		-	-		-	-	0.0	-					

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Draft WSP Comments and Responses

To be included in Final WSP