Drinking Water Source Protection Plan for the City of Lewiston & Lewiston Orchards Irrigation District

In collaboration with the Asotin County Public Utility District, Clarkston, WA

January 26, 2010

Date Reviewed	Reviewed By	Comments (attach additional document as needed)

REVIEW AND UPDATE SEMI-ANNUALLY

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EXECUTIVE SUMMARY

Groundwater, a life-sustaining resource for the world's population, is increasingly at risk for contamination. Regardless of how "pristine" a community's groundwater may be, the only way to ensure good water quality and quantity for future generations is to implement measures now to protect this invaluable resource.

Under the Safe Drinking Water Act Amendments of 1996, the State of Idaho is required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This requirement resulted in the generation of two reports (Source Water Assessment for the City of Lewiston, PWS 2350014 and Source Water Assessments for the Lewiston Orchards Irrigation District, PWS 2350015; DEQ 2009) by the State of Idaho Department of Environmental Quality that provides compliance assistance to the City of Lewiston (City) and Lewiston Orchards Irrigation District drinking (LOID or District) water systems. These assessments were based on a land-use inventory of the designated assessment areas, sensitivity factors associated with each well, and aquifer characteristics. Some cities and water districts, such as Lewiston and the Irrigation District, have utilized the information provided by the Source Water Assessments and have developed a protection plan for their drinking water sources.

This Drinking Water Source Protection Plan includes the following:

- Description of the City of Lewiston and Lewiston Orchards Irrigation District drinking water systems;
- Summary of other public regulated entities pumping water from the Lewiston Basin Aquifer, including the Asotin County Public Utility District #1;
- Development of a Community Planning Team and its duties;
- Analytical delineation of the area from which the Cities' and District's wells draw drinking water from the Lewiston Basin aquifer;
- Management tools that may be used to protect the sources of drinking water;
- A Management Plan and Implementation Schedule for protection activities; and
- Contingency planning in case of a drinking water emergency.

Regardless of how thoughtful and far-reaching a drinking water source protection plan may be, implementation and follow-through are critical to successful protection. The City of Lewiston and LOID must be diligent in their protection efforts in order to meet the growing demands of population growth, encroachment and the added threats of contamination.

The most important steps that the City and District must take to ensure protection of the drinking water for the community are as follows: (1) address and rectify noted deficiencies as identified in the latest sanitary survey; (2) work with local land owners, cities and conservation agencies to prevent contamination from entering well areas; and (3) develop and provide public awareness and education materials to water users.

This Drinking Water Source Protection Plan is a "living document" and as such, may be adjusted by the Community Planning Team and water system personnel to best reflect what has been accomplished, and what will be accomplished in the future. In **2009** volunteer planning team members developed this Drinking Water Source Protection Plan. This Plan was reviewed by the Department of Environmental Quality found to satisfy the eight elements required to be a "State Certified Plan.

1.0 INTRODUCTION

Drinking water source protection[1] is a voluntary program implemented at the local level. The City of Lewiston (City or Lewiston), Lewiston Orchard Irrigation District (LOID or District), community volunteers, with assistance from the Asotin County Public Utility District (PUD) and City of Clarkston residents, have developed this Drinking Water Source Protection Plan (DWSP) to outline the process that will be used to help prevent contamination of groundwater that supplies the community's drinking water. Because the groundwater from which the City of Lewiston, LOID, surrounding cities and communities, such as Lapwai, Idaho, and Clarkston and Asotin, Washington, draw water from, is designated a sole source aquifer—the Lewiston Basin Aquifer—protection of this resource is critical to the health and welfare of the community. Drinking water source protection will help protect this resource from groundwater contamination by monitoring land use and implementing protection efforts in the geographic area overlying the aquifer.

Although the City of Lewiston draws a majority of it's source of drinking water from the Clearwater River, it is the hope of City personnel and this Planning Team, that first developing a regional *groundwater* source protection plan will lay a pathway for future regional *surface water* source protection planning. Some implementation measures outlined in this Plan address surface water source protection as well.

Many materials such as pesticides, fertilizers, organic chemicals, human and animal wastes can contaminate groundwater. The degree of contamination depends on many factors, including soil characteristics, volume of contaminant, contaminant properties, climate and groundwater flow. Once groundwater becomes contaminated, it is often difficult and expensive to clean up. A public water system (PWS) that is supplied by an aquifer that has become contaminated may be required to conduct additional monitoring and may need to install water treatment equipment or find a new source of drinking water. The most cost-effective approach is to prevent contamination before it occurs, rather than attempting to remedy contamination problems after they have occurred.

1.1 Drinking Water System Information for Those Planning for Protection

The City of Lewiston and Lewiston Orchards Irrigation District are the primary water purveyor's for the City of Lewiston. The City of Lewiston is located in Nez Perce County of North-Central Idaho. Two major river bodies confine the City, the Clearwater River to the north and the Snake River to the west, which borders the Cities of Clarkston and Asotin, Washington. The City of Clarkston also pumps water from the same aquifer as Lewiston and LOID.

The City of Lewiston PWS serves approximately 15,000 people through 5,842 service connections. The system is comprised of four active groundwater wells (see Table 1 for construction information and Figure 1 for geographic location), including Well #3, which is primarily used for irrigating the Lewiston Cemetery, a surface water treatment plant for the Clearwater River, eight distribution pumping stations, a distribution system, and seven finished

[1] *The term "Drinking Water Source Protection" is synonymous with Source Water/Wellhead Protection and these terms may be used interchangeably throughout this Plan.*

water reservoirs for a combined storage capacity of 15.6 million gallons (MG). In addition, the City has two inactive wells that serve as emergency backup sources and are primarily used for irrigation; and the City and LOID share an emergency inter-tie between systems.

The Lewiston Orchards Irrigation District PWS serves approximately 18,000 people through 6,317 service connections. The system is comprised of three active groundwater wells (see Table 2 for construction information and Figure 1 for geographic location), three distribution pumping stations, a distribution system and three finished water reservoirs for a combined storage capacity of 4.5 MG.

The District also serves irrigation water to customers through a separate system from a surface water source. This source is Mann Lake Reservoir. The Reservoir is fed by a series of lakes and creeks. Beginning at the divide of the Salmon River drainage and collecting water through Soldiers Meadow Reservoir, Lake Waha, Sweetwater, and Webb Creek, water is transported through approximately 20 miles of canals owned by the U.S. Bureau of Reclamation and released into Mann Lake Reservoir and then transported to the Lewiston Orchards.

The Asotin County Public Utility District #1 in Clarkston, Washington, serves approximately 20,000 people through 6,900 connections. The PUD serves the City of Clarkston and the unincorporated surrounding area, covering a 20 square-mile geographical area. The system is comprised of seven groundwater wells, of which six are active (see Table 3 for construction information and Figure 1 for geographic location). Well #4 is maintained as a standby well. There are three distribution pumping stations, and eight finished water reservoirs for a total storage capacity of 9 MG.

Tested water for all wells in The City of Lewiston and LOID systems indicate no volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs) or total coliform bacteria in repeat samples have been detected. The naturally occurring radiological (RADs) chemicals such as alpha and beta emitters, radium and uranium, as well as the inorganic chemicals (IOCs) antimony, arsenic, barium, chromium, fluoride, nitrate, nickel and selenium have been detected in tested water from some or all of the wells. All detected RAD and IOC results were below the maximum contaminant levels (MCLs) as set forth in the *National Primary Drinking Water Standards* under the *Safe Drinking Water Act*. Although no contaminants have been detected at or above MCLs in water pumped from the deeper Lewiston Basin Aquifer, portions of the more shallow or upper aquifer are designated by the Idaho Department of Environmental Quality (DEQ) as the Lindsay Creek Nitrate Priority Area due to degraded groundwater quality. In addition, the upper aquifer is designated as the Lindsay Creek Groundwater Management Area by the Idaho Department of Water Resources (IDWR) for probable water quantity issues.

Tested water for all wells in the Asotin PUD indicate no VOCs, SOCs or total coliform bacteria in repeat samples have been detected. Radionuclides such as alpha and beta emitters, as well as the IOCs arsenic, fluoride and nitrate have been detected in tested water from some or all of the wells. All detected RAD and IOC results were below the MCLs as set forth in the *National Primary Drinking Water Standards* under the *Safe Drinking Water Act*.

Tables 1, 2 and 3 provide a summary of well construction information for all active groundwater wells in the Lewiston, LOID and Asotin PUD water systems. In addition to well completion data (where available), the water age is provided that was determined from an isotopic age dating study conducted by the Idaho DEQ and is described further in Section 3.1.

Table 1. City of Lewiston Well Construction Summary Information

Well	Well Depth bls/ Surface Elev. amsl (ft)	Water Level bls/ amsl (ft)	Casing: diameter/ thickness (in)	Casing: depth (ft)/ formation	Screened Interval (ft)	Surface Seal: depth (ft)/ formation	Drill Year	Sanitary Survey Elements (A/B) [3]	Age Date Years
Well #1A[1]	735/730	42/688	16/0.375	167/NA	No Screen, open hole 505-735	NA	1961	A/B	NI
Well #2[1] (Pepsi Park)	267/735	20/715	12/NI	71/Grey Basalt	No Screen, Open hole 71-153	71/Grey Basalt	1965	A/B	NI
Well #3 16th St.	600/855	124/ 731	26/0.312, 20/0.312, 16/0.280	394/Soft green shale	No screen, open hole 394-600	394/Soft green shale	1953	A/B	NI
Well #4 TPI[2]	358/790	121/ 669	16/NI, 12/NI	134/Hard basalt	No screen, open hole 134-358	134/Hard basalt	1951	A/B	NI
Well #5 Country Club	600/825	142/ 683	15/NI 12/NI 10/NI	40/Pink clay	290-600	40/Pink clay	1953; 2009	A/B	5,074
Well #6 Golf Course	1794/1275	549/ 726	20/ 0.375, 16/0.344, 13⅜/0.500	990/Hard gray basalt	No screen, open hole 990-1794	670/Grey Basalt	1995; 1998	A/B	24,600

[1]Wells #1 and #2 are emergency back-up sources and used for irrigation only, [2]TPI = Treatment Plant Intake, NI = No information was available, [3]A = Well and surface seal compliance; [3]B = Protected from surface flooding, bls = below land surface, amsl = above mean sea level

Table 2. LOID Well Construction Summary Information

Well	Well Depth bls/ Surface Elev. amsl (ft)	Water Level bls/ amsl (ft)	Casing: diameter/ thickness (in)	Casing: depth (ft)/ formation	Screened Interval (ft)	Surface Seal: depth (ft)/ formation	Drill Year	Sanitary Survey Elements (A/B)[1]	Age Date Years
Well #2	1957/1740	500/ 1240	20/0.375, 16/0.375, 13⅜/0.380	1376/ Gray basalt	NI	520/ Gray and black basalt	1986	A/B	12,164
Well #3	2617/1420	694/ 726	20/0.375, 16/0.375, 13⅜/0.380	1430/ Gray basalt	1035-1055, 1130-1150, 1215-1235, 1250-1270, 1375-1395	1430/ Gray basalt	1997	A/B	34,670
Well #4	1625/1555	845/ 710	20/0.375, 18/0.375, 16/0.375	1266.7/ Black scoria	866-1267, open hole 1267-1625	265/ Black and red fractured basalt	2002	A/B	NI

NI = No information was available, [1]A = Well and surface seal compliance, B = Protected from surface flooding, bls = below land surface, amsl = above mean sea level

Table 3. APUD Well Construction Summary Information

Well	Well Depth bgs/ Surface Elev. amsl (ft)	Water Level bls/ amsl (ft)	Casing: diameter/ thickness (in)	Casing: depth (ft)/ formation	Screened Interval (ft)	Surface Seal: depth (ft)/ formation	Drill Year	Sanitary Survey Elements (A/B)[1]	Age Date Years
Well #1	970/850	140/ 710	24,NI 16,NI 12,NI 10,NI	615/ black basalt	380	100/ broken basalt	1957	NI	NI
Well #2	1900/793	70/ 723	12,NI	119/ broken basalt	240	120/ broken basalt	1906	NI	10,000
Well #3	1103/999	275/ 724	24,NI 20,NI	559/ soft gray basalt	500	125/broken basalt	1960	NI	5,000
Well #4	1012/876	155/ 721	24,NI 20,NI 12,NI	451/ soft basalt	345	142/ soft basalt	1960	NI	NI
Well #5	1330/1147	440/ 707	30,NI 24,NI 20,NI	1087/ black basalt	652	175/ broken basalt	1961	NI	NI
Well #6	1069/993	262/ 731	30,NI 24,NI 20,NI	902/ black basalt	499	170/ black basalt	1961	NI	NI
Well# 7	1340/1180	464/ 716	20,NI 16,NI	653/ black basalt	653	100/ soft basalt	1977	NI	11,000

NI = No information was available, bls = below land surface, amsl = above mean sea level

In addition to the public drinking water systems described previously, the City of Lapwai, Idaho and Asotin, Washington pump water from the Lewiston Basin Aquifer; their summaries are provided in Table 4.

Table 4. City of Asotin & Lapwai Well Construction Data.

Well	Well Depth bgs/ Surface Elev. amsl (ft)	Water Level bls/ amsl (ft)	Casing: diameter/ thickness (in)	Casing: depth (ft)/ formation	Screened Interval (ft)	Surface Seal: depth (ft)/ formation	Drill Year	Sanitary Survey Elements (A/B)[1]	Age Date Years
Asotin Well #1	539/760	64/696	12/NI	419/ broken basalt	NI	100/ broken basalt	1961	NI	NI
Asotin Well #2	522/730	33/697	20/NI 16/NI	401/ broken basalt	NI	120/ broken basalt	1961	NI	NI
Lapwai Well #5	460/1055	NI	12/NI	NI	NI	NI	NI	A/B	NI
Lapwai JD Well	220/950	12/938	10/NI 8/NI	205/hard gray basalt	164-206	50/tan clay	1995	A/B	NI
Lapwai Ball Field Well #4	255/990	40/950	10/.278	198/hard gray basalt	NI	29/soft basalt	1970	A/B	NI

NI = No information was available, [1]A = Well and surface seal compliance, B = Protected from surface flooding, bls = below land surface, amsl = above mean sea level

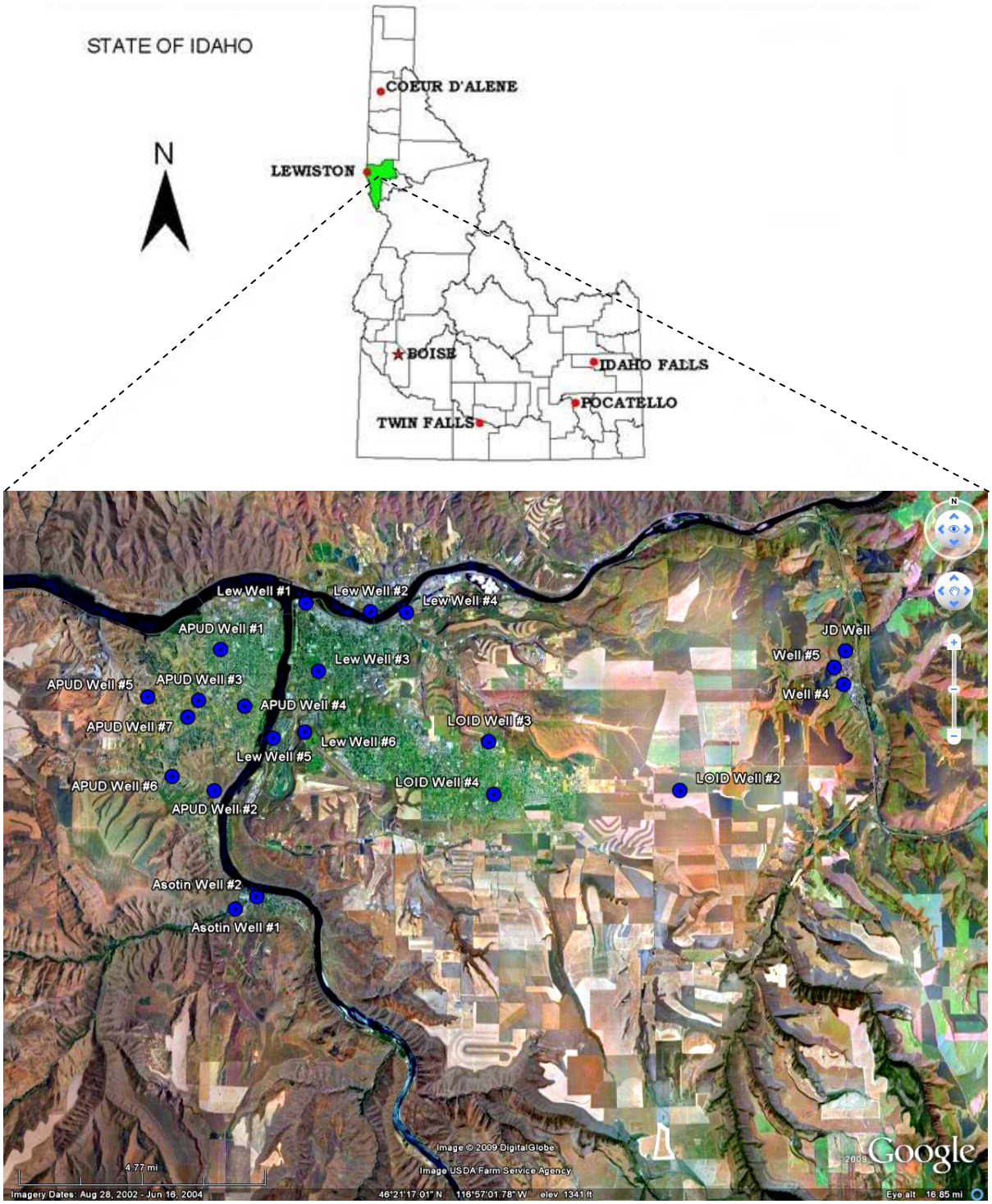

Figure 1. Geographic location of active City of Lewiston, LOID, Asotin PUD, City of Asotin, and Lapwai Wells.

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores (found in the Lewiston and LOID's Source Water Assessments, DEQ 2009 a & b) are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that is better protected from contaminants. If the casing and annular seal both extend into a low permeability unit, then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is greater than 100 feet below the water table, then the system is considered to have better buffering capacity. When information is adequate, a determination is made as to whether the casing and annular seals extend into low permeability units and whether all current PWS construction standards are met. (This section excerpted from DEQ 2009 a & b)

Each system's available well logs allowed for a determination as to whether current PWS standards are being met. Though the Lewiston and LOID wells may have been in compliance with Idaho standards when they were completed, current PWS well construction standards are more stringent. The IDWR *Well Construction Standards Rules* (IDAPA §37.03.09) require all PWSs to follow Idaho DEQ standards. The DEQ's *Idaho Rules for Public Drinking Water Systems* (IDAPA §58.01.08.510) include provisions for screening requirements, aquifer pump tests, surface casing vents, and thickness of casing. Table 5, reproduced from IDAPA §58.01.08.900.02, lists the required steel casing thickness for various diameter wells.

Table 5. Well Casing Standards for Public Water System Wells

Diameter of Steel Casing (inches)	Thickness (inches)
≤6	0.280
8	0.322
10	0.365
12-20	0.375
22-36	0.500

Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate. The City of Lewiston Well #3 (16th St), Well #5 (Country Club), and Well #6 (Golf Course) do not meet all well construction standards based on current IDWR requirements. Due to limited information it is unknown if Well #4 (Treatment Plant Intake, TPI) meets current well construction standards. LOID Well #3 does not meet all well construction standards based on current IDWR requirements and Wells #2 and #4 meet current standards. All wells that do not meet current construction standards were assessed an additional system construction point in their respective SWA Reports (DEQ 2009a & 2009b) susceptibility rating.

In June of 1995 Washington State Department of Health conducted source water assessments for the Asotin PUD's active wells. Their source water assessments are available upon request from Tim Simpson with the Asotin PUD.

1.2 Drinking Water Source Protection Steps

The City of Lewiston and Lewiston Orchards Irrigation District Community Planning Team prepared this Drinking Water Source Protection Plan in accordance with the Idaho Source Water/Wellhead Protection Plan, and followed the 5-step process for source water protection. These five steps are:

Step 1	Formation of a community planning team;
Step 2	Delineation of the land area to be protected;
Step 3	Identification of potential sources of contamination;
Step 4	Development and implementation of a management plan for the drinking water protection area;
Step 5	Planning for future drinking water sources and possible emergencies through the development of a contingency plan/emergency response plan.

This Plan was developed during **2009** with technical assistance from the Idaho Department of Environmental Quality, Lewiston Regional Office, University of Idaho Internship Program and the Technical Services Division of the Idaho DEQ in Boise.

1.3 Drinking Water Source Protection and Source Water Assessment

Source water assessment involves two of the five drinking water protection steps. These two steps are delineation (Step 2) and contaminant inventory (Step 3). An additional source water assessment step includes a susceptibility analysis, which helps identify contaminant threats to the system by evaluating land use, contaminant sources, well construction, and hydrologic conditions, such as geology and soil type. By pursuing drinking water source protection, the City of Lewiston and LOID are addressing the primary goal of the source water assessment process.

2.0 COMMUNITY TEAM (Planning Team)

The members of the City of Lewiston and Lewiston Orchards Irrigation District Drinking Water Source Protection Planning Team, and assistants from the Asotin Public Utility District and City of Clarkston, include the following individuals listed in Table 6.

Table 6. Lewiston and LOID PWS Drinking Water Protection Planning Team

Contact	Position
Barney Metz	Lewiston Orchards Irrigation District Manager, Team Coordinator
David Six	Water Wastewater Systems Manager, City of Lewiston
Gene McCollum	Watermaster, LOID
Tim Simpson	Asotin County Public Utilities District General Manager
Don Roberts	Resident, City of Lewiston
Margie Weber	Resident, City of Lewiston
Dick Wyatt	Retired Engineer & Resident, Lewiston Orchards
George Dekan	Asotin PUD Customer, Retired Idaho DEQ and City of Clarkston resident
Don Nuxoll	Asotin PUD Commissioner
Phil Shinn	City of Lewiston Forester

Team member list is in no particular order

Technical Assistance was provided by:

Anna Moody	Idaho DEQ, Lewiston Regional Office
Bill Bonner	University of Idaho, Moscow
Technical Services	Idaho DEQ, Boise State Office

2.1 Duties of the Planning Team

Barney Metz is selected to be the Team Coordinator and has the responsibility of planning future Team meetings and coordinating the Implementation Schedule. The Team Coordinator will be the lead contact for any outside references to this Plan. The Idaho DEQ is available to provide continued support and technical assistance to the Planning Team regarding any of the Plan's strategic components.

The Planning Team Will:

- Hold meetings at least semi-annually to review and update the Plan and its components, such as the Implementation Schedule for future and completed activities, and the Contingency Plan—meetings will be announced;
- Update the potential contaminant source inventory;
    - Remove potential contaminant sources that no longer exist or no longer pose a threat;
    - Add any new sources of potential contaminants found in the Source Water Assessment Area (see Appendix A Table A1);
    - Evaluate new potential contaminant sources for their risk to the drinking water systems;
    - Prioritize the risk of contaminant sources within Zones IA or IB; and

    - Develop and implement a protection strategy, and add new strategies to the Implementation Schedule;
- Use information materials found in "Protecting Drinking Water Sources in Idaho" (DEQ 2007) to implement public education and outreach activities in accordance with the Implementation Schedule;

Examples of potential activities include:

    - Host community resident workshops to inform, educate and seek public comment regarding the Protection Plan, potential contaminants in the area, and management strategies for drinking water source protection;
    - Make drinking water source protection materials available to city residents;
        - Develop/maintain/distribute fact sheet summarizing the Drinking Water Source Protection Plan;
        - Improve upon current websites to include drinking water source protection information;
        - Include frequent water quality remainders with the water bills;
    - Hold annual household hazardous waste collection events;
    - Develop and/or improve upon water conservation programs;
    - Work with City Parks and Recreation to implement Water-Wise Demonstration Project;
    - Continue annual Public Works Day;
- Evaluate the need and applicability of a City of Lewiston and LOID Wellhead/Drinking Water Source Protection Ordinance (Appendix B provides an example of a Wellhead/Drinking Water Source Protection Ordinance); and
- Initiate discussions with Nez Perce County Planning and Zoning to promulgate the process of establishing a County Wellhead/Drinking Water Source Protection Ordinance and/or Overlay District.

3.0 SOURCE WATER ASSESSMENT AREA DELINEATION

The Lewiston and LOID PWS *Source Water Assessment Reports* (DEQ 2009 a & b) provide detailed descriptions of the delineated Source Water Assessment Areas (See Appendices C and D for delineations and potential contaminate inventory's). These source water assessments are excerpted in the following sections.

The delineation process establishes the physical area around each well, which becomes the focal point for assessment and protection. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones IA/IB, II, and III indicate the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. The Source Water Assessment Area (SWA) is divided into four TOT zones, all zones are designed to prevent microbial or chemical contamination of the Lewiston and LOID PWS drinking water supply wells.

- Zone IA is the sanitary setback zone designed to prevent microbial contamination within a 100-foot radius of the well. This setback zone is established in the *Idaho Rules for Drinking Water Systems* (IDAPA §58.01.08.900.01) and as of May, 2009 requires that: *sewer lines, livestock, canals, streams, ditches, lakes, ponds, tanks used to store non-potable substances, storm water facilities disposing storm water originating off the well lot, and any potential source of contamination must be 50 feet from the source water/wellhead and that: home septic tanks, seepage pits, disposal fields, and privies are 100 feet away*.
- Zone IB is the 0-3 year TOT zone;
- Zone II is the 3-6 year TOT zone; and
- Zone III is the 6-10 year TOT zone.

The computer model used to delineate each drinking water source included site-specific data. Some of that data came from driller's well logs (see Appendices E and F for available well logs) and hydrogeologic reports.

3.1 Hydrogeology

The Grande Ronde Formation of the Columbia River Basalt Flows provides the majority of the groundwater in the vicinity of Lewiston because of its great thickness, extensive lateral continuity, and lack of fine-grained interbeds. Grande Ronde wells in the vicinity of Lewiston produce up to 2000 gallons per minute. The Grande Ronde is easily accessible to drilling at the confluence of the Clearwater and Snake Rivers and some of the tributary valleys such as Lapwai Creek where it has been exposed by erosion (Crosthwaite 1989). The Grande Ronde aquifer at Lewiston is called the "Lewiston Aquifer" (EPA 1988), as well as the "Lewiston Basin Deep Aquifer" (Wyatt-Jaykim 1994).

Major faults, anticlinal folds, and a major topographic divide (the Blue Mountains) have been assumed by various parties (EPA 1988; Wyatt-Jaykim 1994) to form the regional impermeable boundaries of the Lewiston Basin Deep Aquifer. To the north, the aquifer is bounded by the Clearwater Escarpment, commonly referred to as the Lewiston Hill. Faults at the toe of Lewiston Hill include the Vista and Wilma faults. The northeastern boundary of the Lewiston Basin Deep Aquifer is considered to be the Cottonwood Creek Fault. The southeastern boundary

is the Limekiln fault along the front of the Craig Mountains, which meets the Snake River at Limekiln rapids. From the Snake River westward, the Grande Ronde fault is considered to be the southern boundary of the Aquifer, until it meets the Blue Mountain topographic divide. This major topographic divide is assumed to be a regional groundwater divide.

Within the Lewiston Basin Deep Aquifer, water is generally assumed to flow from recharge in the highlands to discharge into the Snake and Clearwater Rivers. In addition, Cohen and Ralston (1980) mapped areas of possible river/aquifer interconnection, and proposed that (a) the aquifer discharges to the Snake below Lewiston, (b) the aquifer is recharged from surface water from Lapwai Creek plus the Clearwater in the reach intersecting Lapwai Creek, and (c) that the aquifer is recharged from surface water in the vicinity of the confluence of the Snake River with Asotin Creek. These locations for surface water recharge to the aquifer were postulated where the basalt is dipping away from the creek.

Average precipitation in the Lewiston-Clarkston valley is 13 inches per year, whereas nearby higher elevation areas average close to 25 inches annually (Cohen and Ralston 1980). A modeling effort documented by Wyatt-Jaykim (1994), concluded on the basis of available data that 1 to 2 inches per year is a conservative estimate for recharge to the basalt aquifers in the vicinity of Lewiston and Lewiston Orchards. This ignores irrigation losses that would contribute to recharge of the basalts overlying the Grande Ronde in the vicinity of the Lewiston Orchards (DEQ 2002).

A study conducted by the Idaho DEQ in 2005 titled, 'Isotopic Age Dating of Municipal Water Wells in the Lewiston Basin, Idaho', resulted in an analysis of the aquifers hydrologic isotope data and correlating hydrogeology. The study concludes approximately half of the water is modern, or is input from rivers, suggesting surface water influence. Tests conducted in the study indicate the age range in the Lewiston Basin to be between 2,830 and 34,670 years (DEQ 2005). See tables 1, 2 and 3 for water age of some Lewiston, LOID and Asotin PUD wells sampled in this study.

4.0 POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION

An inventory of potential sources of contamination is the third step of a drinking water source protection plan. Sources that could potentially contaminate the drinking water supply for the Lewiston and LOID PWSs, as well as the Asotin PUDs water system, include both *point* and *nonpoint* sources of contamination. Point sources of contamination occur at distinct locations and nonpoint sources of contamination often occur over large areas.

Point sources of contamination are often regulated and require permits or registration for facilities and/or activities that sell, store, use, or produce potential contaminants regulated under the *Safe Drinking Water Act,* such as gas stations with underground storage tanks. There must be a potential for a release of those potential contaminants at a high enough level that could affect drinking water quality. It is important to understand that a release may never occur from a listed point source, particularly if the facility is using best management practices (BMPs) that are designed to reduce contamination risks. Nonpoint sources of contamination can result from normal every day activities such as lawn chemical usage, septic drain fields, household practices and agricultural activities.

If a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that they are in violation of any local, state, or federal environmental law or regulation. What it does mean is that the ***potential*** for contamination exists due to the nature of the business, industry, or operation. Many land and business owners may not be aware that they are located near a public water supply well, or that their operations have the potential to impact groundwater quality. Identifying those potential sources of contamination serves two purposes: 1) it provides local officials with an understanding of the potential for contamination; and 2) it provides basic information that can be useful for developing management tools and determining where they should be implemented.

There are a number of methods water systems can use to work cooperatively with facilities generating a potential contaminant source. These involve education about, and encouragement of regular inspections for stored materials, while encouraging land and business owners to implement BMPs. In addition, outreach and education for the community regarding the potential risks to the water supply can instill long-lasting, transferrable awareness.

4.1 Enhanced Inventory of Potential Sources of Contamination

A two-phased potential contaminant inventory of the source water assessment area was conducted in 2002 and again in 2008 by DEQ. The first phase involved identifying and documenting potential contaminant sources within the City of Lewiston and LOID source water assessment areas through the use of computer databases and geographic information systems (GIS). These sources were then identified on a map in proximity to the sources using GIS. The second or enhanced phase of the contaminant inventory, most recently conducted in 2009, involved contacting the water system operators to verify, identify, and add additional potential sources in the area.

Some of the potential sources of contamination identified (See tables in Appendices C and D) in the delineated SWA areas (See figures in Appendices C and D) include, among others, transportation corridors, service stations, and storm drains. Contaminants of concern are

primarily chemicals such as petroleum products, solvents and degreasers (VOCs), pesticides and herbicides (SOCs), and commercial nitrogen fertilizers (IOCs). Tables C1-D3 (Appendices C and D) list potential contaminant sources, the contaminants of concern, information sources and associated TOT zones.

Land use within the City of Lewiston's area of impact and surrounding the City include: urban and suburban residential land uses, small ranches, industrial business operations, non-industrial business operations and non-irrigated agriculture. Each of these land uses have associated nonpoint sources of contamination. Rural nonpoint sources include chemicals from pesticides (insecticides and herbicides) and fertilizers applied through agricultural practices, and leachate from private septic systems that have not been maintained. Nonpoint sources of contamination within the SWA areas and City boundaries include urban stormwater runoff and hazardous chemicals associated with incorrect household and business storage, usage and disposal such as; cleaning solvents, used motor oil, degreasers, landscaping fertilizers/pesticides, etc.

5.0 SOURCE WATER PROTECTION MANAGEMENT TOOLS

An effective drinking water source protection program is tailored to the local source water assessment and drinking water protection area. A community with a fully developed source water protection program will incorporate many strategies and activities. Due to the time involved with the movement of groundwater, source water protection activities should be directed toward long-term management strategies.

Two broad categories of management approaches are available for drinking water source protection; these are regulatory and non-regulatory approaches. Regulatory approaches rely on the assistance of city and county enforcement agencies, such as Planning and Zoning Commissions, to provide an "umbrella" of protection and address issues that might affect the SWA area. These methods can include zoning overlays or ordinances that address land uses, water conservation, design standards on new or existing facilities, and mandatory practices to prevent pollution. Non-regulatory approaches rely on the voluntary implementation of public awareness and educational outreach programs. Such methods may include backflow prevention education, news releases regarding conservation measures, a kids day out for storm drain marking, or lawn care maintenance workshops. The ultimate goal of both of these types of measures is to create awareness in order to empower the public so they can implement drinking water source protection efforts in their daily lives.

For the City of Lewiston and LOID, protection activities should first focus on correcting any deficiencies identified in each system's enhanced sanitary survey. Both water systems should maintain sanitary standards for each source in the sanitary setback protection area (Zone IA). In addition, a strong public education program should be a primary focus of any protection plan, and partnering with local agencies and industry groups may provide for the successful implementation of this plan.

A combination of regulatory and non-regulatory methods will be utilized to manage contaminant sources located within each SWA area.

5.1 Regulatory Approaches

The Planning Team will encourage the City to: (1) cite the *Idaho Rules for Public Drinking Water Systems*, which prohibits particular sources of contamination within the setback area (Zone IA) of a public drinking water well, (2) pursue a zoning change for the SWA areas for the City and LOID wells, and (3) pursue county development of an overlay district and zoning. An example of a Wellhead/Drinking Water Source Protection Ordinance can be found in Appendix B. Section 9.5.1 discusses regulatory measures that could be adopted by the City of Lewiston to protect water quality.

5.2 Non-regulatory and Voluntary Approaches

These management approaches are intended to reach as broad a spectrum of the community as possible. Protection of the communities' drinking water *is* possible, but only if the whole community cooperates to achieve protection. Public education is an essential tool for drinking water source protection, and the majority of the non-regulatory approaches discussed in the following sections rely on public education for effective implementation. The Implementation Strategy (Table 7 in Section 9) is also discussed in many of the following approaches.

5.2.1 Public Education

Ongoing public education will be provided to the general public, the business community, LOID board members and municipal officials on the necessity of protecting the water supply. Such education includes many of the public participation activities and events described within Sections 6.0 and 9.0. These public participation activities and events include Planning Team meetings, advertisement of this plan, informational mailings in water bills, annual public works days, water-wise demonstration projects, school district activities, website development, City Council presentations and LOID Board presentations, and storm drain marking.

5.2.2 Pollution Prevention

Pollution prevention is waste prevention and resource conservation. Today, the emphasis is on preventing waste from being generated in the first place, versus recycling an unused, over-purchased waste material. Goals of pollution prevention are to: conserve natural resources and protect the quality of the land, water and air, work toward the reuse of items, use products with long lives, use natural resources efficiently and use processes that reduce consumption and waste. Pollution prevention is source reduction or any practice that reduces the amount of any pollutant entering any waste stream.

A good example of a pollution problem is the runoff and downward leaching of lawn fertilizer applications. The primary source of such a problem is the over-application of fertilizer associated with an over-application of water, or a normal application of fertilizer associated with an over-application of water. One example of pollution prevention would be to address the appropriate application of fertilizer and other chemicals to a lawn, along with the proper application of water. The use of BMPs is strongly suggested (Section 5.2.3).

The City of Lewiston and LOID community Planning Team will provide information on pollution prevention practices relevant to homeowners and businesses alike. Pollution prevention will be most effective at reducing the amount of household hazardous waste stored on site by creating awareness of recycling opportunities. The Idaho DEQ regional and state office Pollution Prevention (P2) Program are available to assist with prevention activities and development of educational resources. The owners of each potential contaminant source identified in the inventories (Appendices C and D) will be informed of Idaho's "Voluntary Pollution Prevention Program" and the additional assistance these program personnel can provide, such as 'A Business Guide to Pollution Prevention, 2002' and 'Idaho Environmental Guide: A Resource for Local Governments, 2009' available at http://www.deq.state.id.us/ieg/.

5.2.3 Best Management Practices

Best Management Practices applicable to many potential contaminant sources may either be distributed to those listed in Appendices C-D, or made available through the City of Lewiston and LOID. These BMPs can be applicable to both point and nonpoint sources of contamination, such as abandoned wells, agricultural and homeowner usage of fertilizers and pesticides, spill prevention within businesses where chemicals are handled, USTs, and agrichemical mixing and storage. Information on how to obtain technical and financial assistance for BMP implementation will also be provided where available. The DEQ is available to assist the City of Lewiston and LOID in identifying appropriate BMPs or identifying agencies or entities that can help provide BMPs and implementation assistance. In concert with performance based zoning regulations, the City may also provide pollution prevention and BMP outreach tailored to specific business practices.

5.2.4 Water Conservation

Another non-regulatory management approach that will be pursued by the City of Lewiston and LOID, with assistance from the Planning Team, will be to encourage potable and irrigation water conservation. Water conservation can help a community in many ways, including:

- Reduce the total quantity of water withdrawn from groundwater aquifers, thus slowing the movement of contaminants within the aquifer and allowing a longer period of time for natural processes to degrade them;
- Reduce pumping and distribution costs associated with ground and surface water withdrawal;
- Reduce the load on municipal waste treatment facilities; and
- Control over-application of lawn and garden irrigation water to limit leaching of agricultural chemicals into the groundwater.

5.2.5 Water Quality Data Reviews

Water quality data from the City and LOID wells, and any groundwater quality monitoring results in the vicinity of the City of Lewiston and LOID SWA areas, will be reviewed by the Planning Team Coordinator and DEQ at least once every five years prior to recertification of this Plan (certification is for a period of five years), or more often if significant new data is made available or water quality problems are identified in the vicinity. This will help evaluate trends or identify threats to the City and District's drinking water sources. Groundwater quality monitoring results from private wells in the Lewiston and LOID area can be provided by the DEQ, the Idaho State Department of Agriculture, or the U.S. Geological Survey, where available. Relevant information will be made available to the community via the Planning Team Coordinator or the appropriate state or federal agency.

5.2.6 Home*A*Syst.

The Home*A*Syst Project (H*A*S) is designed to help homeowners become aware of conditions or practices on their property that increase the risk of drinking water contamination. The H*A*S materials allow a homeowner, farmer, or rancher to assess practices and activities for their potential to contaminate groundwater, and fact sheets are available to provide information about practices and structures that can help reduce the risk of groundwater contamination. The project is coordinated by the Idaho Association of Soil Conservation Districts and is available at no cost to interested parties. Copies of Home*A*Syst Project materials will be made available through (Lewiston/LOID/Planning Team), or on-line at http://homeasyst.idahoag.us/.

5.2.7 Hazardous Waste Collection

Planning Team members will encourage the development of a local household and small quantity generator businesses hazardous waste collection day and at a minimum, will inform residents of household hazardous waste collection events within Nez Perce and Asotin counties.

6.0 MANAGEMENT TOOLS AND PROTECTION MEASURES FOR PRIORITY POTENTIAL CONTAMINANT SOURCES

The Lewiston-Clarkston Valley DWSP Planning Team has prioritized public outreach and education efforts for homeowner's and their related activities that are potential nonpoint sources of contamination. The focus of this outreach and education will be to foster development of a valley-wide awareness about the importance of protecting our drinking water sources. Although the Team recognizes there are potential sources of contamination identified in the TOT zones for each drinking water source, implementation strategies are targeted for potential contaminant sources overlying the entire Lewiston Basin Aquifer.

The Planning Team will evaluate and identify any specific potential contaminant sources as part of the semi-annual plan review. Appropriate management tools and protection measures will be initiated or updated as potential contaminant sources are identified.

6.1 Management Tools

An education program will be initiated and utilized to create public awareness regarding the vulnerability of the Lewiston/LOID drinking water sources to potential contaminant sources. Section 9 outlines a proposed implementation strategy and schedule.

7.0 CONTINGENCY AND EMERGENCY RESPONSE PLAN

A contingency and emergency response plan (ERP) is designed to assist and facilitate community actions in the event of a drinking water emergency, as well as address the potential need for long-term replacement or augmentation of the existing drinking water supply. The ERP is the blueprint outlining roles and responsibilities in the event that the system experiences a disruption, whether a minor or major event. Such disruptions may be due to contamination, loss of power, natural disasters such as drought or flooding, or other circumstances where the system(s) cannot provide services. The ERP will assist the City and LOID officials to make difficult decisions in adverse conditions, as well as increase the likelihood that correct and immediate action will be taken to prevent or minimize damage or potential public health risk, both in the long and short term.

The City of Lewiston and LOID's respective Contingency and Emergency Response Plans are not included in this DWSP Plan, as they contain sensitive water system information and are maintained separately from the components of this Plan. Each system's plan include:

- Roles and responsibilities for water system, city, and county personnel as well as other state and federal agencies in the case of an emergency;
- A description of water system characteristics;
- Identification of potential emergency situations;
- General response procedures for each emergency situation; and
- Short-term contingency and long-term contingency plans, including alternative water supplies.

Long-term planning for additional water sources include development of new wells, additional or combined water rights and increased water system capacity. Each new potential water source and location will be evaluated based on *Idaho Rules for Public Drinking Water Systems* (IDAPA 58.01.08) for its proximity to potential sources of contamination in order to reduce risk and susceptibility to contamination.

The Lewiston Orchards Irrigation District is in the planning phase for developing a new well and expect to have a well site selection/approval, and possibly begin drilling by mid-2010. The City of Lewiston is in the process of applying to the IDWR in order to combine water rights from various sources for consistency in decreed pumping rights from the entire aquifer. In addition, the City is in the process of long-term planning to upgrade and/or replace the current Clearwater River treatment plant in order to increase production capacity from 13 million gallons per day (MGD) to 20 MGD.

7.1 Emergency Spill Response

The primary concern during any hazardous materials spill is immediate public health and safety. In the event of a release of hazardous materials, the designated personnel will contact appropriate state and federal agencies for a rapid and concise response. The Idaho Bureau of Hazardous Materials Action Plan and Emergency Spill Response Flow Chart (Appendix H) may be referred to. The City of Lewiston and LOID will also implement their respective ERPs in case the water systems are impacted.

8.0 PROTECTION STRATEGIES FOR NEW WELLS

This Plan includes a review of water quality and supply, and an evaluation of the need for new water sources. When a potential need is identified, SWA areas will be estimated to determine the safest location for a new water source. New drinking water sources will be delineated in a manner consistent with the delineation process for existing drinking water sources. In addition, if there are major changes to an existing sources construction, discharge rate or pumping rate, then the existing delineation should be reviewed to ensure that it still represents the appropriate source water protection zones. Delineations may be updated or modified if significant new information becomes available.

The delineation for any new or modified well site will be inventoried for any potential contaminant sources, and the risk evaluated. The anticipated pumping rate and existing knowledge of the aquifer will be used to determine which proposed location for potential new wells would provide the least risk of contamination. The City of Lewiston, LOID and the Protection Planning Team will then take appropriate actions to prevent unwanted development near the new well site.

9.0 IMPLEMENTATION STRATEGY

The strategy for implementing this Drinking Water Source Protection Plan is an important component of the local protection program. Without the continued efforts and support of the Community Planning Team and the community as a whole, the protection of the City of Lewiston and Lewiston Orchards Irrigation District's, as well as the Asotin PUD's drinking water sources, may not be accomplished as intended within this Plan. Table 7 contains the schedule outlining the protection strategy developed by the Planning Team.

The Implementation Schedule is a guide that the City Water Division, Irrigation District, Asotin PUD, and Community Planning Team can use to implement drinking water source protection activities. The schedule is designed to implement protection activities that will create a sustainable source water protection program.

In addition to activities targeting groundwater quality *and* quantity protection, some activities are applicable to surface water sources for drinking water. Because the Planning Team recognizes this Plan primarily addresses groundwater sources and not the City of Lewiston's surface water source (the Clearwater River), the Team has included activities that reach across sources and generally speak to water quality and quantity for the future of all sources of drinking water.

Although this is the first written source water protection plan for Lewiston and LOID, both systems have already been engaged in protection efforts. In addition, the Asotin PUD maintains its own wellhead protection plan, which is updated every six years. Some of the past and current Lewiston and LOID source water protection activities include:

- Developing water master plan's with contracted water resource professionals that allow for contingency planning, capacity development and sustainable infrastructure planning—all important mechanisms for source water protection;
- Maintaining metered domestic water services, which are widely shown to foster greater conservation through customer awareness gained from increased cost per unit of water;
- The City of Lewiston has conducted outreach and education for local school's by providing a tour of the water plant and teaching the cycle of water in our City from the river to the tap and back to the river; and annually, the City of Lewiston conducts outreach and education at the Nez Perce County Fair regarding water resources and conservation;
- Because the Irrigation District has a separate limited source of irrigation water, they have been hard-pressed to increase conservation and therefore, have routinely hired interns to conduct outreach and education on household BMPs related to indoor and outdoor water use and conservation.

Among other source water protection activities, the PUD is involved in water use efficiency projects and watershed planning for natural resource management and conservation. The Asotin PUD is involved with the City of Lewiston and LOID DWSP planning process to gain additional information of what other users drawing water form the same aquifer are doing in regards to protection. The Asotin PUD intends to develop and implement additional strategies that will compliment this Plan.

The PUD began work in 2007 to assist the Vinland Cemetery Association in improving water use efficiency at the Vineland Cemetery. This project included: an audit of the existing irrigation

system and design, development of a plan for the installation of a new water efficient system; installation of the new system; an educational component for training on landscape management with water use efficiency at the forefront; and grants, donations and in-kind labor for implementation.

The irrigation system audit estimated the project will save 4.5 to 5.0 million gallons of water per year; and energy savings from reduced water production at PUD facilities is calculated at 1 kilowatt for every 333 gallons or an estimated annual energy savings of 13,500 to 15,000 kilowatt hours. The irrigation system plan was developed based on this audit. The project was scheduled to be completed in the Fall of 2009.

Since 2002 the Asotin PUD (lead agency), along with Asotin, Columbia, Garfield, and Whitman Counties of Washington State, and the City of Clarkston have been involved in a collaborative watershed planning program for the Middle Snake Watershed. To date this group has: completed an assessment of the watershed, developed a watershed plan, developed a detailed implementation plan, and performed a hydro geological study of the area for addressing human water supply needs, in-stream flows, water quality, and habitat issues. Information regarding this program can be found online at: http://www.asotinpud.org.

Table 7. Five-Year Implementation Schedule

Goal Date/ (Assignments)	***Protection Activity Scope of Work***	***Potential Contaminant Source Addressed/Method***
Year 1 *December 2009*	*Achieve State Certification of this Drinking Water Source Protection Plan*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Continuous *(All)*	*Community Outreach* • *Newspaper articles* • *Workshop: What is our Protection Plan about?* • *Informational mailings on/with water bills* • *Lewiston Home and Garden Show* • *Nez Perce & Asotin County Fair booths* • *Other media outlets: Opinion Please*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
August 2009/ Continuous *(Water Systems)*	*Protection Plan Pamphlet* *Develop, post on websites, mail to valley's water customers, distribute, update as needed*	*All sources/Public awareness and education; water conservation; pollution prevention; BMPs.*
August 2009/ Continuous *(lead by Phil Shinn)*	*Modie Park Water Wise Demonstration and Outreach* • *Turf grass demonstration at Park* • *Native plant landscape demonstration at Park* • *Workshops* • *Weather station installation, information broadcasting* • *Farmer's Market outreach* • *Nez Perce & Asotin County Fair booths*	*All sources/Public awareness and education; water conservation; pollution prevention; BMPs.*
September 2009/ Continuous *(Barney & Dave)*	*Web Site Development* *Post Source Water Protection information (including BMP), Planning Team activity updates and contacts*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Fall 2009—'11 *(City & DEQ)*	*Storm Drain Marking* *In coordination with City Stormwater Program, Street Maintenance program and volunteer citizen groups*	*All Sources/Public awareness and education; pollution prevention*
Year 2 *Spring 2010* *(Water Systems)*	*Post Drinking Water Protection Area Signs*	*All Sources/Public awareness and education; pollution prevention preparedness;*

Table 7. Continued

Goal Date	*Protection Activity Scope of Work*	*Potential Contaminant Source Addressed/Method*
May 2010 – Annual *(Margie, Anna, Don)*	*School Outreach Activities* • *Water Awareness Week Activities*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Spring/Summer 2010 *(All)*	*Develop Household Hazardous Waste Outreach, Education and Collection Program* • *Post signs at the Nez Perce County waste transfer site, in coordination with Lewiston Solid Waste Services, directing homeowners where/when household hazardous wastes can be disposed of* • *Develop Annual County-Wide collection event, possibly in coordination with adjoining counties*	*Non-point sources/Public awareness and education; pollution prevention; threat preparedness; BMPs.*
Fall 2010 – Spring 2011	*Inventory Public and Private Wells in and above the Lewiston Basin Aquifer/Owner Education*	*All sources/Public awareness and education; pollution prevention; threat preparedness; BMPs.*
Fall 2010/ Ongoing *(TBD)*	*Septic Inventory/Maintenance Outreach* • *Using City of Lewiston GIS Septic Inventory Coverage, identify and target property owners with septic systems for BMP maintenance education*	*All sources/Public education; pollution prevention; BMPs.*
2010 /2011? *(TBD)*	*Aquifer Placemat* • *Develop placemat with assistance from community resident graphic artists such as LCSC students*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Winter 2010/ Continuous *(PWSs)*	*Develop/Implement Active Cross Connection Control Education Programs*	*All sources/Public awareness and education; pollution prevention; threat preparedness; BMPs.*
Fall/Winter 2010 *(PWSs)*	*Provide City Council and LOID Board with Implementation update*	*All sources/Public awareness and education*
Ongoing *(All)*	• *Community Outreach* • *Protection Plan Pamphlet* • *Modie Park Water Wise Demonstration and Outreach* • *Website Development* • *Storm Drain Marking*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*

Table 7. Continued

Goal Date	*Protection Activity Scope of Work*	*Potential Contaminant Source Addressed/Method*
Year 3 *January 2011* *(TBD)*	*Apply to DEQ for Source Water Protection Grant Funding (Potential outreach video)*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Ongoing *(All)*	• *Community Outreach* • *School Outreach Activities* • *Protection Plan Pamphlet* • *Modie Park Water Wise Demonstration and Outreach* • *Website Development* • *Storm Drain Marking* • *Provide Household Hazardous Waste Outreach, Develop Collection Program* • *Well Inventory/Outreach* • *Septic System Maintenance Outreach* • *Aquifer Placemat* • *Cross Connection Control Outreach/Education*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Fall 2011 *(TBD)*	*Seek Grant Funding from other Sources for Source Water Protection Implementation*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Fall/Winter 2011(PWSs)	*Update City Council and LOID Board Regarding Source Water protection Implementation*	*All sources/Public awareness and education*
Years 4 & 5 *2012* *(TBD)*	*Develop Educational DVD for Distribution* *~ Possibly through Grant funding sources*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
Ongoing *2012-2013* *(All)*	• *Community Outreach* • *School Outreach Activities* • *Protection Plan Pamphlet* • *Modie Park Water Wise Demonstration and Outreach* • *Website Development* • *Storm Drain Marking* • *Provide Household Hazardous Waste Outreach, Develop Collection Program* • *Well Inventory/Outreach* • *Septic System Maintenance Outreach* • *Aquifer Placemat* • *Cross Connection Control Outreach/Education*	*All sources/Public awareness and education; water conservation; pollution prevention; threat preparedness; BMPs.*
2013	*Approach City of Lewiston & Nez Perce County to Develop Overlay Districts in Critical Drinking Water Protection Areas For Land Use Planning and Source Protection*	*All sources/; pollution prevention; threat preparedness; BMPs.*

9.1 Plan for the future

To assure a safe drinking water supply for residents of the Lewiston-Clarkston Valley, the Community Planning Team will implement this DWSP Plan as a long-term protection strategy for the City of Lewiston and Lewiston Orchards Irrigation District. The strategy outlined in this Plan will be reviewed and updated as necessary to accommodate changes due to population growth, economic development or changes in land use. The Implementation Schedule in Table 7 is for 2009-2013. In addition to the DWSP Plan, the Contingency Plans will require regular updates. The Lewiston and LOID Source Water Assessment reports will be utilized as a tool to help assess potential hazards to drinking water quality. The DEQ is available to provide technical assistance to the Planning Team whenever new potential contaminant sources need to be addressed.

9.2 Planning Team

The Drinking Water Source Protection Planning Team for the City of Lewiston and Orchards Irrigation District, with collaboration from City of Clarkston residents and Asotin County PUD, will meet at least semi-annually to coordinate DWSP activities and to review and update the Implementation Schedule. The meetings should focus on evaluating how well the protection activities are working and to determine whether more outreach needs to be conducted. These meetings should also review and update the potential contaminant inventories, the Contingency Plan, and other sections as appropriate. Meeting notices should be made public to increase participation from members within the community.

9.3 Delineation

New drinking water sources will be delineated in a manner consistent with the delineation process used for the existing drinking water sources. If there are major changes to an existing source's construction, discharge rate or pumping rate, then the existing delineation should be reviewed to ensure that it still represents the appropriate drinking water source protection zones. Delineation's may be updated or modified if significant new information becomes available.

9.4 Potential Contaminant Inventory

The Community Planning Team will update the potential contaminant inventory for the SWA areas as new, significant potential contaminant sources are noted within the SWA areas through general observations. If new sources of contamination are found, they will be added to the existing inventory. New sources will also need to be assessed for pollution prevention.

9.5 Best Management Practice

The Planning Team will coordinate efforts to implement the contaminant management practices within Section 5.0 in accordance with the Implementation Schedule in Table 7. The implementation strategy for the City of Lewiston and LOID includes both regulatory and non-regulatory approaches, with the focus on non-regulatory approaches. Public education and community involvement are important implementation components. The Planning Team will organize public education with the assistance of partnering state and federal agencies.

9.5.1 Regulatory Approaches

The Planning Team will evaluate the need and desirability of the regulatory approaches described in this section.

Bonding- Facilities may be required to post a bond prior to operation in a drinking water source protection area. Bonds can cover costs associated with spill response or remediation efforts.

Building Codes- Local building codes offer protection through special standards applicable to facilities which are remodeled or constructed in a drinking water source protection area. Building codes can require low flow fixtures, backflow prevention and other design features to conserve and protect water quality.

Conservation Ordinance- Conservation Ordinances generally assign mandatory hours and days of outdoor irrigation during particular warm weather seasons/months and prohibit irrigation of impervious surfaces, unless otherwise stated or a variance is granted.

Design Standards- Design standards typically are regulations that apply to the design and construction of buildings or structures. This tool can be used to ensure that new buildings or structures placed within a drinking water source protection area are designed so as not to pose a threat to the water supply, such as requiring an impermeable liner on a settling pond or managing on-site storm water for the prevention of runoff.

Operating Standards- Operating standards are regulations that apply to ongoing land-use activities to promote safety or environmental protection. Such standards can minimize the threat to a drinking water source protection area from ongoing activities such as the storage and use of hazardous substances through requirements such as secondary containment and spill response capabilities, or requiring that septic systems be properly maintained.

Performance Standards- Performance standards are used to regulate development within drinking water source protection areas by enforcing predetermined standards for water quality. They may be applied at a predetermined groundwater monitoring compliance point, at the point of injection, or through the use of contaminant source modeling. One example is the requirement that the amount of storm water runoff be the same before and after construction when developing or improving a site.

Potential Source Prohibitions or Restrictions- Source prohibitions or restrictions are regulations that prohibit or place restrictions on the use of certain chemicals that pose a high risk to water contamination such as Atrazine or Trichloroethene, or prohibit or place restrictions on the placement of some high-risk potential contaminant sources such as underground storage tanks, underground injection wells, lagoons, feedlots, or landfills.

Site Plan Review- Site plan reviews are regulations requiring developers to submit for approval plans for developments occurring within a given area. This tool ensures compliance with regulations or other requirements made within a drinking water source protection area.

Special Permitting or Reviews- Special permits or reviews are used to set conditions for certain uses and activities that pose a high risk to water contamination within drinking water source protection areas if left unregulated. One example is to require that new feedlots within certain drinking water source protection area zones be required to have a city or county permit or review that requires groundwater quality monitoring and the use of certain water quality protection management practices.

Subdivision Ordinances- Subdivision ordinances are applied to land divided into two or more sub-units for sale or development. Local governments use this tool to protect drinking water areas in which ongoing development is causing contamination. An example of a subdivision ordinance would be to require a minimum lot size for single family homes using septic systems so as to limit septic system density and subsequent groundwater contamination.

Transport Prohibitions- The transport of chemical compounds, which pose a high risk to water quality if spilled, can be restricted within a drinking water source protection area by requiring alternative transportation routes.

Zoning Ordinance- Zoning ordinances typically are comprehensive land-use requirements designed to direct the development of an area. Many local governments have used zoning to restrict or regulate certain land uses, which have the potential to contaminate water within drinking water source protection areas.

Zoning Overlay-Overlay zones can be used in conjunction with conventional zoning to create special districts that protect a drinking water source protection area. Overlay zones are applied to areas singled out for special protection, such as a drinking water source protection area, and add regulations to those controls already in place. This method helps address "grandfathered" potential contaminant sources in drinking water source protection areas.

9.5.2 Non-regulatory Approaches

The Planning Team will coordinate efforts to implement non-regulatory approaches to drinking water source protection, with the City of Lewiston and LOID taking the lead role toward implementing many of the approaches found in Section 5.2. A major component of the Implementation Strategy is to work with the local community and the various local, state, and federal programs for implementation assistance. This includes obtaining assistance from the Home*A*Syst coordinator, DEQ Pollution Prevention Program personnel and the local DEQ Source Water Protection Coordinator as discussed under Sections 5.2.2 , 5.2.3 and 5.2.6.

The DEQ Lewiston Regional Source Water Protection Coordinator and other appropriate DEQ support personnel, as requested by the Planning Team, can assist in the area of coordinating support among the various local, state, and federal programs. The DEQ Source Water Protection Coordinator will also help with water quality data reviews (Section 5.2.5) and can provide technical assistance for public education outreach on best management practices (Sections 5.2.1 and 5.2.3).

The Planning Team will work with the local community where desirable to help identify and pursue available funding opportunities for implementing various drinking water source protection approaches. Funding sources may include:

- Environmental Quality Improvement Project funds for agricultural BMP implementation through the NRCS;
- Source Water Protection Grants through DEQ;
- Nonpoint Source Section 319 BMP implementation funding through DEQ (Chapter 4 of the Idaho Nonpoint Source Management Plan contains a comprehensive list of funding sources available for implementation of BMPs);
- Environmental Protection Agency Safewater/Sourcewater Grant funding; and
- The Environmental Finance Center at Boise State University or

9.6 Additional Implementation Considerations

The City of Lewiston and LOID Contingency Plans and efforts associated with planning for additional well source locations, will be updated on an as-needed basis, as determined by the Planning Team. Once source water assessment information is made available, the Planning Team will evaluate the information, particularly the susceptibility analyses, and decide if there are any needed modifications or additions to this Plan or its implementation. Information from capacity development and the City of Lewiston and LOID water system master plans will also be taken into consideration for drinking water source protection planning and implementation purposes, as determined by the Planning Team.

10.0 PUBLIC PARTICIPATION

Public participation during the development of this Drinking Water Source Protection Plan has included the following:

- Public notification;
- Public meetings;
- Board meeting;
- Onsite visits
- City Council presentation.

Additional public participation will be pursued as part of the implementation process. Citizens can obtain updated information on the City of Lewiston/LOID Drinking Water Source Protection Plan, implementation efforts, Source Water Assessments, and drinking water issues from the Team Coordinator, or through a public records request submitted to DEQ.

11.0 VULNERABILITY ASSESSMENT

Water systems are critical to every community. Protection of public drinking water systems must be a high priority for local officials and water system owners and operators. Water systems must be a high priority to ensure an uninterrupted water supply, which is essential for the protection of public health (safe drinking water and sanitation) and safety (fire fighting).

Adequate security measures will help prevent loss of service through vandalism, pranks or malicious acts. If a system is prepared, such actions may even be prevented. The appropriate level of security is best determined by the water system at the local level.

A "vulnerability assessment" is the identification of weaknesses in water system security, focusing on defined threats that could compromise its ability to provide adequate potable water, and/or water for fire fighting. The vulnerability assessment document is designed for use by water system personnel. Physical facilities pose a high degree of exposure to any security threat. This assessment should be conducted on all components of a system (wellhead or surface water intake, treatment plant, storage tank(s), pumps, distribution system, and other important components of the system).

The purpose of this document is to start the process of security vulnerability assessment and security enhancements. Security is not an end point, but a goal that can be achieved only through continued efforts to assess and upgrade a system.

This is a sensitive document and as such should be stored separately in a secure place at the water system. A duplicate copy should also be retained at a secure off-site location. Access to this document should be limited to key water system personnel and local officials as well as the state drinking water primacy agency and others on a need-to-know basis. Therefore, each system's respective Vulnerability Assessment will not be included in this report.

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GLOSSARY

Aquifer – A geologic formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

Aquitard - A low-permeability geologic unit that can store groundwater and also transmit it slowly from one aquifer to another.

AST (Aboveground Storage Tank) – Sites with aboveground storage tanks.

Best Management Practices (BMPs) – Conservation practices or systems of practices and management measures that (1) reduce water quality degradation caused by nutrients, animal waste, toxics, and sediment, as well as control soil loss; and (2) minimize adverse impacts on surface water, groundwater flow, and circulation patterns and on the biological, chemical, and physical characteristics of wetlands.

Capacity – The flow rate that a pump is capable of producing; a water utility's ability to have resources available to meet the water service needs of its customers. In this context, capacity is the combination of water plant- and service-related activities necessary to meet the quantity, quality, peak loads, and other service needs of the various customers or classes of customers served by the utility.

Community System – A public water system serving at least 15 service connections used by year-round residents or regularly serving at least 25 year-round residents.

Contaminant – Any physical, chemical, biological, or radiological substance or matter in water.

Contaminant Source Inventory – A record of the activities on a watershed or aquifer recharge area that have a potential to contaminate water.

Contingency Plan – A document that details the intended actions of a water utility under specified adverse conditions.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – A well discharging under pressure to a deep subsurface stratum. Such a well is often used to dispose of liquid waste streams to a suitable confined poor-water-quality aquifer that is generally considered unusable for other purposes; injection wells regulated under the Idaho Department of Water Resources generally for the disposal of storm water runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by

the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Groundwater Management Area – All or part of a groundwater basin that may be approaching critical where the basin does not have sufficient groundwater to provide a reasonably safe supply certain uses at the current or projected rates of withdrawal

Group I Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Inorganic Contaminant (IOC) – An inorganic substance regulated by the US Environmental Protection Agency in terms of compliance monitoring for drinking water. Contained on the agency's list are contaminants as diverse as asbestos, nitrate (NO_3^-), cyanide, and nickel. This abbreviation came into common use in the US Environmental Protection Agency's Phase V drinking water regulations. An inorganic contaminant is sometimes called an inorganic chemical.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Maximum Contaminant Level (MCL) – A value defined under the Safe Drinking Water Act Section 1401 (3) as the maximum permissible level (concentration) of a contaminant in water delivered to any user of a public water system. Maximum contaminant levels are the legally enforced standards in the United States.

Microbes – A microscopic organism, either plant or animal, invisible to the naked eye. Examples are algae, bacteria, fungi, protozoa, and viruses.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

Nonpoint Source – Waste material that enters a water body from overland flow rather than out of a pipe or channel; an unconfined discharge of waste.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

P2 – An acronym for pollution prevention.

Perched Aquifer – A small lens of unconfined groundwater separated from an underlying main body of groundwater by an impermeable unsaturated zone.

Point Source – A discharge that comes out of the end of a pipe – as opposed to runoff or a discharge from a field or similar source, which is called a nonpoint source.

Sanitary Survey – An on-site review of a water utility's water source, facilities, equipment, and operations and maintenance records for the purpose of evaluating the system's adequacy in producing and distributing safe drinking water.

Sole Source Aquifer – An aquifer that has been designated by the U.S. Environmental Protection Agency as a sole source or principal source that serves greater than 50 percent of an areas drinking water.

Synthetic Organic Chemical (SOC) – An organic compound that is commercially made. Some synthetic organic chemicals are contaminants in drinking water and are regulated by the US Environmental Protection Agency. The regulated synthetic organic contaminants include volatile organic chemicals, pesticides, herbicides, polychlorinated biphenyls, selected treatment chemicals (e.g. Acrylamide), and polynuclear aromatic hydrocarbons.

Time of Travel (TOT) – The determination, usually by modeling, of the time in years for groundwater recharge to travel from a certain field point to the wellhead.

Vadose Zone – The unsaturated portion of the soil column between the land surface and the water table. A better term is *unsaturated zone*.

Volatile Organic Compound (VOC) – A class or organic compounds that includes gases and volatile liquids. Many volatile organic chemicals are used as solvents. A number of these compounds are regulated by the US Environmental Protection Agency.

Wastewater Land Application Site – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

Zone IA – Sanitary setback zone designed to prevent microbial contamination within a 100-foot radius of the wellhead. This setback zone is established in the *Idaho Rules for Drinking Water Systems* (IDAPA §58.01.08) and requires that: sewer lines, livestock, canals, streams, ditches, lakes, ponds, tanks used to store non-potable substances, storm water facilities disposing storm water originating off the well lot, and any potential source of contamination must be 50 feet from the source water/wellhead and that: home septic tanks, seepage pits, disposal fields, and privies are 100 feet away

Zone IB – Corresponds with the 3-year time of travel for a contaminant to reach the wellhead.

Zone II – Corresponds with the 6-year time of travel for a contaminant to reach the wellhead.

Zone III – Corresponds with the 10-year time of travel for a contaminant to reach the wellhead.

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APPENDIX A Overview of Potential Contaminant Sources

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Table A1 provides an overview of potential contaminant sources and the contaminants that may be associated with each source. These sources represent many of the businesses, industries, operations, land uses, and environmental conditions that handle, generate, store, apply, dispose of, or provide a pathway for the contaminants of concern. The sources are separated into four categories:

1) Commercial/Industrial,
2) Agricultural/Rural,
3) Residential/ Municipal, and
4) Miscellaneous.

These sources can apply to either groundwater or surface water, and many can apply to both ground and surface water. Where a potential contaminant source generally applies to only groundwater or surface water, it is noted within Table A1.

Table A-1. Potential Contaminant Sources (Ground and Surface Water)

Source		Potential Contaminants [1,2,3]
Commercial/Industrial		
Automobile	Body Shops/ Repair Shops	Waste oils, gasoline and diesel fuels; solvents, acids, paints, automotive wastes[4], miscellaneous cutting oils.
	Car Washes	Soaps, detergents, waxes, miscellaneous chemicals, hydrocarbons.
	Gas Stations	Petroleum fuels, oil, solvents, miscellaneous wastes.
Boat Services/Repair/Refinishing		Gasoline and diesel fuels, oil, septage from boat waste disposal area, wood preservative and treatment chemicals, paints, waxes, varnishes, automotive wastes[4].
Cement/Concrete Plants		Diesel fuel, solvents, oils, miscellaneous wastes.
Chemical/Petroleum Processing/Storage		Hazardous chemicals, solvents, hydrocarbons, heavy metals.
Dry Cleaners		Solvents (tetrachloroethylene, petroleum solvents), spotting chemicals (trichloroethane, methyl chloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate).
Electrical/Electronic Manufacturing		Cyanides, metal sludge, caustic (chromic acid), solvents, oils, alkalis, acids, paints and paint sludges, PCBs.
Fleet/Trucking/Bus Terminals		Waste oil, solvents, gasoline and diesel fuel from vehicles and storage tanks, fuel oil, other automotive wastes[4].
Food Processing		Nitrates, salts, phosphorous, miscellaneous food wastes, chlorine, ammonia, ethylene glycol.
Furniture Repair/Manufacturing		Paints, solvents, degreasing and solvent recovery sludge's, lacquers, sealants.
Hardware/Lumber/Parts Stores		Hazardous chemical products in inventories, heating oil and fork lift fuel from storage tanks, wood-staining and treating products such as creosote, paints, thinners, lacquers, varnishes.

Source	Potential Contaminants [1,2,3]
Home Manufacturing	Solvents, paints, glues and other adhesives, waste insulation, lacquers, tars, sealants, epoxy wastes, miscellaneous chemical wastes.
Junk/Scrap/Salvage Yards	Automotive wastes[4], PCB contaminated wastes, any wastes from businesses[5] and households[6], oils, lead.
Machine Shops	Solvents, metals, miscellaneous organics, sludges, oily metal shavings, lubricant and cutting oils, degreasers (tetrachloroethylene), metal marking fluids, mold-release agents.
Metal Plating/Finishing/Fabricating	Sodium and hydrogen cyanide, metallic salts, hydrochloric acid, sulfuric acid, chromic acid, boric acid, paint wastes, heavy metals, plating wastes, oils, solvents.
Mines/Gravel Pits	Mine spills or tailings that often contain metals, acids, highly corrosive mineralized waters, metal sulfides, metals, acids, minerals sulfides, other hazardous and nonhazardous chemicals, petroleum products and fuels.
Photo Processing/Printing	Biosludges, silver sludges, cyanides, miscellaneous sludges, solvents, inks, dyes, oils, photographic chemicals.
Plastics/Synthetics Producers	Solvents, oils, miscellaneous organic and inorganics (phenols, resins), paint wastes, cyanides, acids, alkalis, wastewater treatment sludges, cellulose esters, surfactant, glycols, phenols, peroxides, etc.
Research/University/Hospital Laboratories	X-ray developers and fixers[7], infectious wastes, radiological wastes, biological wastes, disinfectants, asbestos, beryllium, solvents, infectious materials, drugs, disinfectants, miscellaneous chemicals.
Wood Preserving/Treating	Wood preservatives: creosote, pentachlorophenol, arsenic, heavy metals.
Wood/Pulp/Paper Processing and Mills	Metals, acids, sulfides, other hazardous and nonhazardous chemicals, organic sludges, sodium hydroxide, chlorine, hypochlorite, chlorine dioxide, hydrogen peroxide, methanol, paint sludges, solvents, creosote, coating and gluing wastes.
Agricultural/Rural	
Livestock Auction Lots/Boarding Stables	Nitrates, phosphorous, bacteria, and viruses, total dissolved solids.
Confined Animal Feeding Operations Slaughter House and Butcher Facilities	Nitrates, phosphorous, chloride, chemical sprays and dips for controlling insect, bacteria and viruses, total dissolved solids.
Farm Machinery Repair	Automotive wastes[4], solvents, fuel.
Crops - Irrigated and Non-irrigated	Pesticides[8], nitrate & phosphorous (from fertilizers), salts, sediment (from runoff)
Wastewater/Sludge/Manure Land Application or Disposal Locations	Nitrates, metals, salts, bacteria and viruses.
Lagoons/Liquid Wastes	Nitrates, livestock sewage wastes, salts, bacteria.

Source	Potential Contaminants [1,2,3]
Pesticide/Fertilizer/Petroleum Storage & Transfer Areas	Pesticides[8] , nitrate, phosphorous, petroleum residues.
Residential/Municipal	
Airports (Maintenance/Fueling Areas)	Jet fuels, deicers, diesel fuel, chlorinated solvents, automotive wastes[4], heating oil, building wastes[5].
Camp Grounds/RV Parks, Marinas	Septage, gasoline, diesel fuel from boats, pesticides[8], household hazardous wastes from recreational vehicles (RVs)[6].
Drinking Water Treatment plants	Treatment chemicals
Golf Courses	Pesticides[8], nitrate, phosphorous, arsenic.
Landfills/Dumps	Organic and inorganic chemical contaminants; waste from households[6] and businesses[5], nitrates, oils, metals, solvents.
Motor Pools	Automotive wastes[4]: solvents, waste oils, fuel storage.
Railroad Yards/Maintenance/Fueling Areas	Diesel fuel; herbicides for rights-of-way[8], creosote from preserving wood ties, solvents, paints, waste oils.
School Maintenance Facilities	Machinery/vehicle serving wastes, gasoline.[4].
Septic Systems (large community systems or 10 single systems on 40 acres)	Bacteria, viruses, nitrates, salts, dissolved solids, improperly disposed of household or business wastes[5,6,9].
Utility Stations/Maintenance Areas	PCBs from transformers and capacitors, oils, solvents, sludges, acid solution, metal plating solutions (chromium, nickel, cadmium).
Waste Transfer/Recycling Stations	Residential and commercial solid waste residues.
Wastewater Effluent to Surface Waters (primarily surface water concern)	Municipal wastewater, sludge[10], treatment chemicals[11], nitrates, heavy metals, bacteria, nonhazardous wastes
Miscellaneous	
Above Ground Storage Tanks	Diesel, gasoline, other chemicals.
Construction/Demolition Areas (Plumbing, Heating, and Air Conditioning, Painting, Carpentry, Flooring, Roofing and Sheet Metal etc.)	Solvents, asbestos, paints, glues and other adhesives, wastes insulation, lacquers, tars, sealants, epoxy waste, miscellaneous chemical wastes, explosives, sediment.
Historic Gas Stations	Diesel fuel, gasoline, kerosene.
Historic Waste Dumps/Landfills	Leachate, organic and inorganic chemicals, waste from households[6], and businesses[5], nitrates, oils, heavy metals, solvents.
Injection Wells/Dry Wells/Sumps (primarily groundwater concern)	Storm water runoff, used oils, antifreeze, gasoline, solvents, other petroleum products, pesticides[8], and other chemical substances.
Storm Water Drainage to Surface Waters (primarily surface water concern)	Storm water runoff, oils, antifreeze, metals, sediment, and pesticides, and a wide variety of other substances.

Source	Potential Contaminants [1,2,3]
Military Installations	Wide variety of hazardous and nonhazardous wastes depending on the nature of the facility, diesel fuels, jet fuels, solvents, paints, waste oils, heavy metals, radioactive wastes, explosives.
Surface Water - Stream/Lakes/Rivers/Recharge Sites	Groundwater: bacteria and viruses, cryptosporidium Surface Water: nitrates, pesticides, sediment from Ag. Return drains.
Transportation Corridors	Herbicides in highway right-of-way[8], road salt (sodium and calcium chloride), road salt anti-corrosives (phosphate and sodium ferrocyanide), automotive wastes[4], nitrate or phosphorous from fertilizer use.
Forest Roads /Logging (primarily surface water concern)	Sediment, fuel spills.
Landslides/Burn Areas (primarily surface water concern)	Sediment.
Underground Storage Tanks	Diesel, gasoline, heating oil, other chemical and petroleum products.
Unsealed or Abandoned Wells, and Test Holes (primarily groundwater concern)	Storm water runoff, solvents, nitrates, septic tanks, hydrocarbons, and a wide variety of other substances.

1 In general, surface or groundwater contamination stems from the misuse and improper disposal of liquid and solid wastes; the illegal dumping or abandonment of household, commercial, or industrial chemicals; the accidental spilling of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; or the improper siting, design, construction, operation, or maintenance of agricultural, residential, municipal, commercial, and industrial drinking water wells and liquid and solid waste disposal facilities. Contaminants also can stem from atmospheric pollutants, such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and percolate through the soil. When the sources list in these tables are used and managed properly, water contamination is not likely to occur.

2 Contaminants can reach groundwater from activities occurring on the land surface, such as industrial waste storage; from sources below the land surface but above the water table, such as septic systems; from structures beneath the water table, such as wells; or from contaminated recharge water.

3 This table lists the most common potential contaminants, but not all-potential contaminants. For example, it is not possible to list all potential contaminants contained in storm water runoff or from military installations.

4 Automobile wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

5 Common wastes from public and commercial buildings include automotive wastes; and residues from cleaning products that may contain chemicals such a xylenols, glycol esters, isopropanol, 1, 1, 1, -trichloroethane, sulfonates, chlorinated phenols, and cresol.

6 Households wastes include common household products that can contain a wide variety of toxic or hazardous components.

7 X-ray developers and fixers may contain reclaimable silver, glutaldehyde, hydroquinone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

8 Pesticides include herbicides, insecticides, rodenticides, and fungicide. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface.

9 Septic tank/cesspool cleaners include synthetic organic chemicals such as 1, 1, 1,-trichloroethane, tetrachloroethylene, carbon tetrachlorine, and methylene chloride.

10 Municipal wastewater treatment sludge can contain organic matter, nitrates; inorganic salts; heavy metals; coliform and noncoliform bacteria; and viruses.

11 Municipal wastewater treatment chemicals include calcium oxide; alum; activated alum; polymers; ion exchange resins; sodium hydroxide; chlorine; ozone; and corrosion inhibitors.

Source: Adapted from EPA (1993).

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APPENDIX B Sample Wellhead/Drinking Water Source Protection Ordinance

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SECTION 1. **Short Title and Purpose**.

A. This ordinance shall be known as the **"Wellhead/Drinking Water Source Protection Plan"**.

B. It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private loses due to contamination of the public water supply, and to formalize groundwater protection/pollution abatement and control procedures. Specific goals are to:

1. Protect human life and health;

2. Insure that the public is provided with a sustainable safe potable water supply;

3. Minimize expenditure of public money for pollution remediation projects;

4. Minimize regulations on land use; and,

5. Minimize business interruptions;

SECTION 2. **Definitions**. When used in this ordinance, the following words and phrases shall have the meanings given in this section:

A. **Agricultural Runoff Waste Water**. Water diverted for irrigation but not applied to crops, or runoff of irrigation tail water from the cropland as a result of irrigation.

B. **Aquifer Remediation Related Wells**. These wells shall include those used to prevent, control, or remediate aquifer pollution, including--but not limited to--Superfund sites.

C. **Community Water System**. A public system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least twenty-five (25) year-round residents.

D. **Facility**. Refers to any business or corporation that is built, installed, or established to serve a particular purpose.

E. **Hazardous Waste Disposal Facility**. A hazardous waste treatment, storage, or disposal facility which receives hazardous material as described in Part 40 Chapter 260.1 of the Code of Federal Regulations.

F. **Hazardous Waste or Material**. Any waste or material which because of its quantity, concentration, physical, chemical or infectious characteristics may:

1. Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or,

2. Pose a substantial present or potential hazard to human health or to the environment when improperly treated, stored, transported, disposed of or otherwise managed; or,

3. Any material or substance designated as a hazardous or toxic substance defined by Title 40 Part 261.3 of the Code of Federal Regulations, or any material or substance designated as a hazardous or toxic substance by the State of Idaho, acting through the Division of Environmental Quality or any successor agency.

G. **Injection**. The subsurface emplacement of fluids.

H. **Livestock Confinement Operation**. As defined elsewhere in the Code.

I. **Non-Community Water System**. A public water system that is not a community water system.

J. **Public Water System**. A system that provides the public with piped water for human consumption, if such system has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. Such term includes:

1. any collection, treatment, storage, and distribution facilities under control of the operator of such system, and used primarily in connection with such system; and,

2. any collection or pretreatment storage facilities not under such control that are used primarily in connection with such system.

A public water system is either a "community water system" or a "non-community water system."

K. **Sanitary Landfill**. A solid waste disposal operation where the wastes are spread on land in thin layers, compacted to the smallest practical volume, and covered with cover material once each day of operation in order to safeguard against environmental pollution, nuisances, and health hazards.

L. **Special Drainage Wells** are those used for disposing of water from sources other than direct precipitation. Examples of this well type include: landslide control drainage wells, potable water tank overflow drainage wells, swimming pool drainage wells, and lake level control drainage wells.

M. **Storm Water Runoff**. Water discharged as a result of rain, snow, or other precipitation.

N. **Time of Travel Districts (TOT)**. The time required for a contaminant to move in the ground from a specific point to a well.

O. **Underground Injection Well**. Any excavation or artificial opening into the ground which meets the following three criteria:

1. A bored, drilled or dug hole, or a driven mine shaft, or a driven well point; and,

2. It is deeper than its largest straight-line surface dimension; and,

3. It is used for or intended to be used for injection.

P. **Wellhead/Drinking Water Source Protection Overlay District (WHP/DWSP)**. A land use designation on the Land Use Map, or a zoning designation on a zoning map, that modifies the basic underlying designation in some specific manner. The Drinking Water Source Protection Overlay District will also appear in the Hazardous Component of the Comprehensive Plan. A map will define specific area districts centering around wells supplying drinking water to a public water system. The map is delineated using one of the following methods:

1. Calculated Fixed Radius;

2. Arbitrary Fixed Radius;

3. Simplified Variable Shapes;

4. Semi-analytical, and Analytical Methods;

5. Hydrogeologic Mapping;

6. Numerical Modeling

and follow the guidelines established in the Idaho Wellhead Protection Plan.

Q. **Community Wellhead**. The upper terminal of a well, including adapters, ports, seals, valves and other attachments.

R. **Wellhead/Drinking Water Source Protection Overlay District IA**. A minimum fixed radius extending no less than fifty (50) feet radially from the wellhead supplying potable water to the public water supplies.

S. **Wellhead/Drinking Water Source Protection Overlay District IB**. A three (3) year time of travel district (TOT) as defined in Section 2.

T. **Wellhead/Drinking Water Soruce Protection Overlay District II**. A six (6) year time of travel district (TOT) as defined in Section 2.

U. **Wellhead/Drinking Water Source Protection Overlay District III**. A ten (10) year time of travel district (TOT) as defined in Section 2.

SECTION 3. **Establishment of Wellhead/Drinking Water Source Protection Overlay District**. There is hereby established a wellhead/drinking water source protection overlay district identified and described as all the area within the ten (10) year TOT district around public water supplies as shown on the official zoning map. It is further established that these areas be composed of Four(4) districts, Wellhead/drinking water source Protection Overlay District IA, Wellhead/drinking water source Protection Overlay District IB, Wellhead/drinking water source Protection Overlay District II, and Wellhead/drinking water source Protection Overlay District III as they are defined in this Chapter. The Board of Commissioners may record with the County Recorder's Office a metes and bounds description of the Wellhead/drinking water source Protection Overlay District.

SECTION 4. **Prohibited uses within Zone IA of the Wellhead/Drinking Water Source Protection Area**. Uses permitted within Zone IA shall be limited to necessary public water supply wellhead equipment including the following, wellhead facility buildings, water storage tanks, disinfection equipment, disinfection chemical storage and approved landscaping. All other uses shall be prohibited.

SECTION 5. **Prohibited uses within Zone IB of the Wellhead/Drinking Water Source Protection Area**. The following uses or conditions shall be and are hereby prohibited within Zone IB of the Wellhead/drinking water source Protection areas:

A. Sanitary landfills.

B. Livestock Confinement Operations.

C. Hazardous waste Disposal Facility.

D. Injection well is a prohibited use **except for the following**:

1. Closed systems.

E. Existing sewer lines shall not be closer than one hundred (100) feet of a wellhead or of new sanitary system and sewer lines shall not be closer than one hundred fifty (150) feet of a wellhead.

F. Existing septic tanks or drain fields shall not be closer than one hundred (100) feet of a wellhead and new installation of septic tanks or drain fields shall not be closer than two hundred (200) feet away from the wellhead.

G. Junk or salvage yards.

H. Disposal of waste oil, oil filters, tires and all other petroleum products.

I. All manufacturing or industrial businesses involving the collection, handling, manufacture, use, storage, transfer or disposal of any hazardous solid or liquid material or waste having potential impact on groundwater, and any land use activities posing a hazard or threat to existing groundwater quality, except upon issuance of a Special Use Permit. The Special Use Permit process may be instigated by the Zoning Administrator during the application review process.

SECTION 6. **Prohibited Uses within Zone II of the Drinking Water Source Protection Area**. The following uses or conditions shall be and are prohibited within Zone II of the Wellhead/drinking water source Protection Area:

A. Sanitary landfills;

B. Hazardous Waste Disposal Facility;

C. Injection well is a prohibited use **except for the following**:

1. Deep well injection (below 18 feet in depth):

   a. Geothermal Heat;

   b. Heat Pump Return;

   c. Cooling Water Return.

2. Shallow well injection only (less than 18 feet in depth), including:

   a. Storm Runoff;

   b. Agricultural Runoff Waste Water;

   c. Special Drainage Water;

   d. Aquifer Recharge;

   e. Aquifer Remediation;

   f. Septic Systems (General).

D. All manufacturing or industrial businesses involving the collection, handling, manufacture, use, storage, transfer or disposal of any hazardous solid or liquid material or waste having potential impact on groundwater, and any land use activities posing a hazard or threat to existing groundwater quality, except upon issuance of a Special Use Permit. The Special Use Permit process may be instigated by the Zoning Administrator during the application review process.

SECTION 7. **Prohibited Uses within Zone III of the Wellhead/drinking water source Protection Area**. The following uses or conditions shall be and are prohibited within Zone III of the Wellhead/drinking water source Protection area:

A. Injection well is a prohibited use **except for the following**:

1. Deep well injection (below 18 feet in depth):

   a. Geothermal Heat;

   b. Heat Pump Return;

   c. Cooling Water Return.

2. Shallow well injection only (less than 18 feet in depth):

   a. Storm Runoff;

   b. Agricultural Runoff Waste Water;

   c. Special Drainage Water;

d. Aquifer Recharge;

e. Aquifer Remediation;

f. Septic Systems (General).

B. All manufacturing or industrial businesses involving the collection, handling, manufacture, use, storage, transfer or disposal of any hazardous solid or liquid material or waste having potential impact on groundwater, and any land use activities posing a hazard or threat to existing groundwater quality, except upon issuance of a Special Use Permit. The Special Use Permit process may be instigated by the Zoning Administrator during the application review process.

SECTION 8. **Notice of Proposed Action to Operator of Public or Community Water Supply**. Whenever there is a request which requires a Special Use Permit from the Planning and Zoning Commission for land lying within a Wellhead/drinking water source Protection District, written notice of the hearing shall be given to the entity operating the public or community water supply within that overlay district. The Planning and Zoning Commission may require a granting of easements for monitoring wells if the commission deems it appropriate for protection of the public water supply.

SECTION 9. **Non-Conforming Uses**. Any legal use existing at the time of the adoption of this ordinance and listed as a prohibited use herein, shall become a legal non-conforming use and may not be expanded or improved except as otherwise provided in the zoning ordinance.

SECTION 10. **Enforcement**. It shall be unlawful for any person, corporation, government entity or business to occupy or use the land within the area designated in the Wellhead/drinking water source Protection Overlay District of Zone I, II, and III contrary to, or in violation of, any of the provisions of this Chapter.

SECTION 11. **Amendments**. Proposed amendments will require advance notice to all entities operating public or community water supplies that this ordinance effects.

APPENDIX C City of Lewiston Source Delineations & Potential Contaminant Inventories

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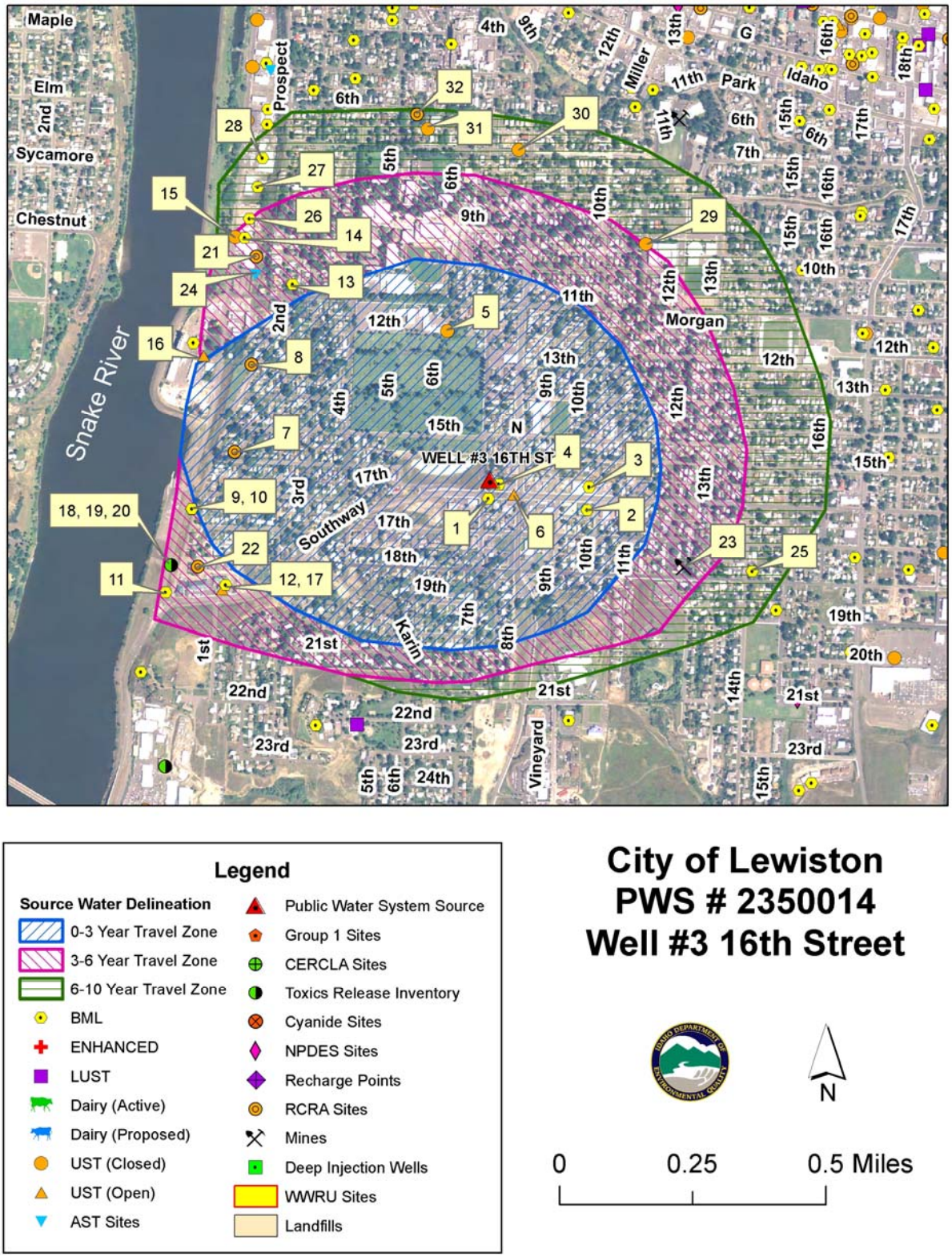

Figure C-1. City of Lewiston Well #3 16th St delineation and potential contaminant markers.

Table C-1. Potential Contaminant Sources for City of Lewiston Well #3.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants3
1	Convenience Store & Gasoline Station	0-3 YR	Database Search	VOC, SOC
2	Retail Produce & Garden Supplies	0-3 YR	Database Search	IOC, SOC, VOC
3	Plumbing, Heating, Air Conditioning, Ventilation	0-3 YR	Database Search	IOC, VOC, SOC
4	Veterinary Clinic	0-3 YR	Database Search	IOC, SOC, Microbial Contaminants
5	UST site; Closed	0-3 YR	Database Search	IOC, VOC
6	UST site; Open	0-3 YR	Database Search	IOC, VOC
7	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
8	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
9	Retail Light Truck Accessories & Service	3-6 YR	Database Search	IOC, VOC, SOC
10	Retail Golf Cars, Parts and Accessories, Service	3-6 YR	Database Search	IOC, VOC, SOC
11	RV Maintenance & Repair	3-6 YR	Database Search	IOC, VOC, SOC
12, 17	UST Site; Convenience Store and Gasoline Station	3-6 YR	Database Search	VOC, SOC
13	Ammunition Manufacturing	3-6 YR	Database Search	IOC, VOC, SOC
14	Full Service Glass Shop	3-6 YR	Database Search	VOC, SOC
15	UST Site; Closed	3-6 YR	Database Search	VOC, SOC
16	UST Site; Open	3-6 YR	Database Search	VOC, SOC
18, 19, 20	TRI Site	3-6 YR	Database Search	IOC, VOC, SOC
21	RCRA Site	3-6 YR	Database Search	IOC, VOC, SOC
22	RCRA Site	3-6 YR	Database Search	IOC, VOC, SOC
23	Gravel Pit	3-6 YR	Database Search	IOC, VOC, SOC
24	AST Site	3-6 YR	Database Search	VOC, SOC
25	Building Maintenance & Janitorial	6-10 YR	Database Search	IOC, VOC, SOC

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants3
26	Petroleum Site	6-10 YR	Database Search	VOC, SOC
27	Boat Repair and Custom Metal Fabrication	6-10 YR	Database Search	IOC, VOC, SOC
28	Boat Manufacturing & Retail	6-10 YR	Database Search	VOC, SOC
29	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
30	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
31	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
32	RCRA Site	6-10 YR	Database Search	IOC, VOC, SOC
n/a	City Park	0-3 YR	GIS Map	IOC, SOC
n/a	Snake River	0-3 YR 3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC, microbial contaminants
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants

1Refer to the glossary
2TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
3IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

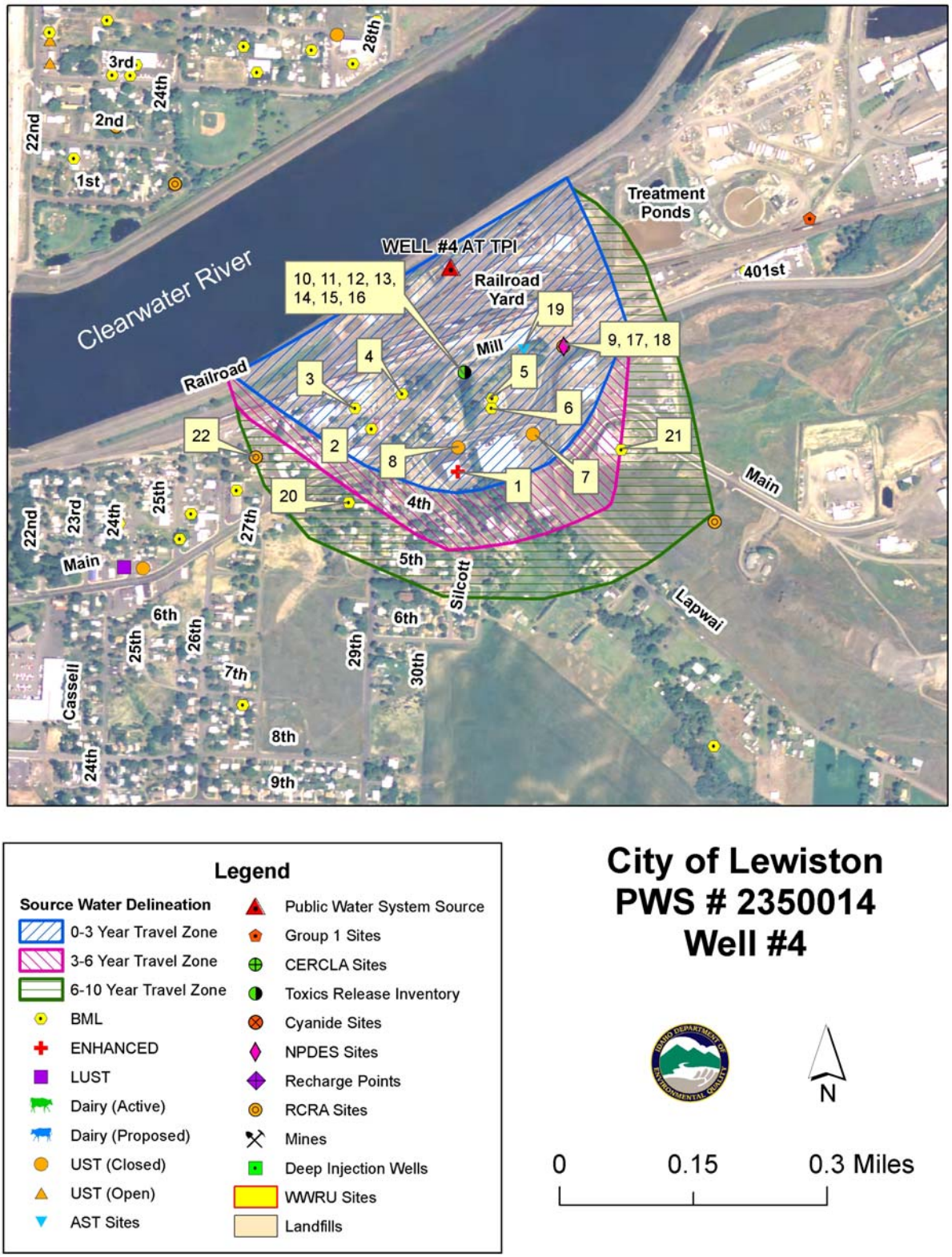

Figure C-2. City of Lewiston Well #4 TPI delineation and potential contaminant markers.

Table C-2. Potential Contaminant Sources for City of Lewiston Well #4.

Map ID	Contaminant Description1	TOT Zone2 (years)	Source of Information	Potential Contaminants3
1	Auto Body Repair	0-3 YR	Database Search	IOC, VOC, SOC
2	Auto Repair Service	0-3 YR	Database Search	IOC, VOC, SOC
3	Specialty Construction	0-3 YR	Database Search	IOC, VOC, SOC
4	Manufacturing, Powder Coating	0-3 YR	Database Search	IOC, VOC, SOC
5	Storage Warehouse & Manufacturing	0-3 YR	Database Search	IOC, VOC, SOC
6	Tractor Retail Sales	0-3 YR	Database Search	IOC, VOC, SOC
7	UST Site; Closed	0-3 YR	Database Search	VOC, SOC
8	UST Site; Closed	0-3 YR	Database Search	VOC, SOC
9, 17, 18	NPDES Site, RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
10, 11, 12, 13, 14, 15, 16	TRI Site	0-3 YR	Database Search	IOC, VOC, SOC
19	AST Site	0-3 YR	Database Search	VOC, SOC
20	Mobile RV Repair Service	6-10 YR	Database Search	IOC, VOC, SOC
21	Machine & Fabrication Shop	6-10 YR	Database Search	IOC, VOC, SOC
22	RCRA Site	6-10 YR	Database Search	IOC, VOC, SOC
n/a	Clearwater River	0-3 YR 3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC, microbial contaminants
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants
n/a	Railroad Yard	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC
n/a	Treatment Ponds	6-10 YR	GIS map	IOC, VOC, SOC

1Refer to the glossary
2TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
3IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

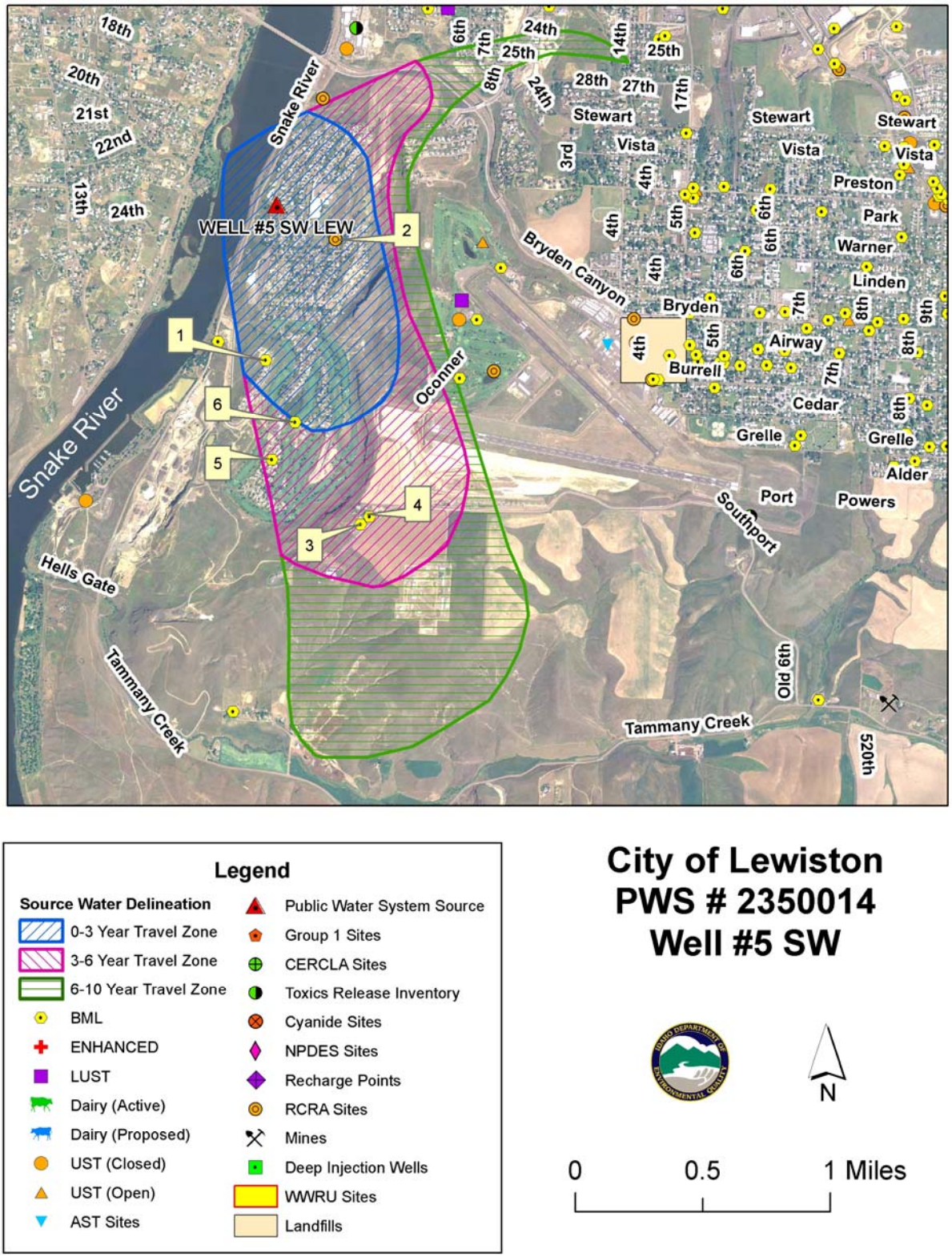

Figure C-3. City of Lewiston Well #5 Country Club delineation and potential contaminant markers

Table C-3. Potential Contaminant Sources for City of Lewiston Well #5.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants3
1	Aircraft Maintenance & Repair	0-3 YR	Database Search	IOC, VOC, SOC
2	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
3	Custom Welded Trailers Manufacturing & Sales	3-6 YR	Database Search	IOC, VOC, SOC
4	Manufacturing of Aluminum Jet Boats	3-6 YR	Database Search	IOC, VOC, SOC
5	Equipment Rental	3-6 YR	Database Search	IOC, VOC, SOC
6	Country Club	3-6 YR	Database Search	IOC, SOC
n/a	Snake River	0-3 YR 3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC, microbial contaminants
n/a	Golf Course	0-3 YR 3-6 YR	GIS Map	IOC, SOC
n/a	Airport	3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants

1Refer to the glossary
2TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
3IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

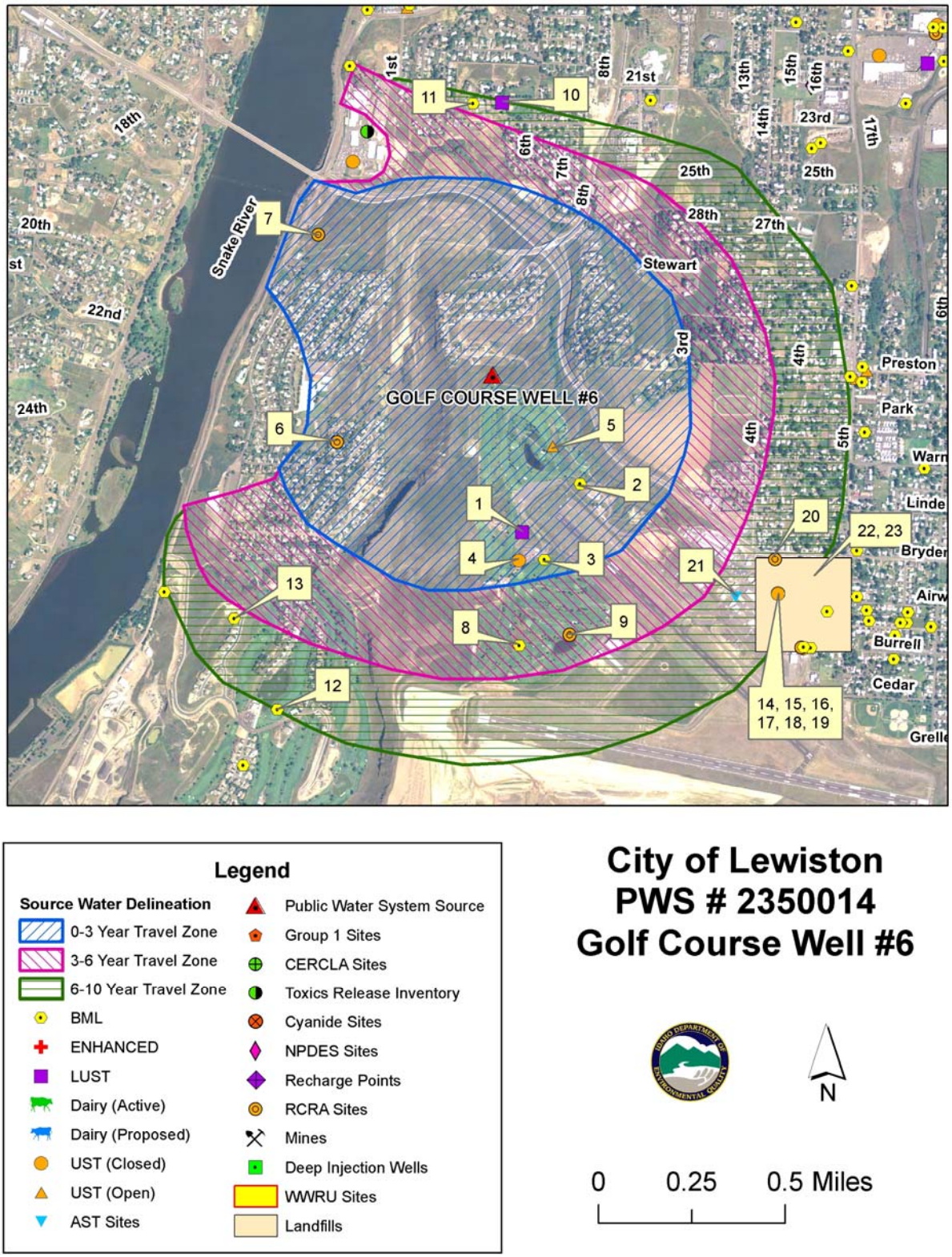

Figure C-4. City of Lewiston Golf Course Well delineation and potential contaminant markers.

TableC-4. Potential Contaminant Sources for City of Lewiston Well #6.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants3
1	LUST Site; Site Cleanup Completed Unknown	0-3 YR	Database Search	VOC, SOC
2	Solid Waste Site Collection & Haul	0-3 YR	Database Search	IOC, VOC, SOC, Microbial Contaminants
3	Rotorcraft Charters, Sales & Service	0-3 YR	Database Search	IOC, VOC, SOC
4	UST Site; Closed	0-3 YR	Database Search	VOC, SOC
5	UST Site; Open	0-3 YR	Database Search	VOC, SOC
6	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
7	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
8	Public Golf Course	3-6 YR	Database Search	IOC, SOC
9	RCRA Site	3-6 YR	Database Search	IOC, VOC, SOC
10	LUST Site; Site Cleanup Incomplete GROUND WATER	6-10 YR	Database Search	VOC, SOC
11	Residential Treatment Facility	6-10 YR	Database Search	IOC, VOC, SOC
12	Country Club	6-10 YR	Database Search	IOC, SOC
13	Aircraft Maintenance & Repair	6-10 YR	Database Search	IOC, VOC, SOC
14	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
15	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
16	UST Site: Closed	6-10 YR	Database Search	VOC, SOC
17	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
18	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
19	UST Site; Closed	6-10 YR	Database Search	VOC, SOC
20	RCRA Site	6-10 YR	Database Search	IOC, VOC, SOC

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants3
21	AST Site	6-10 YR	Database Search	VOC, SOC
22	Transfer Station, Active	6-10 YR	Database Search	IOC, VOC, SOC
23	Municipal Landfill, Closed	6-10 YR	Database Search	IOC, VOC, SOC
n/a	Snake River	0-3 YR 3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC, microbial contaminants
n/a	Golf Course	0-3 YR 3-6 YR	GIS Map	IOC, SOC
n/a	Airport	0-3 YR 3-6 YR 6-10 YR	GIS Map	IOC, VOC, SOC
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants

1Refer to the glossary
2TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
3IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

APPENDIX D Lewiston Orchards Irrigation District Source Delineations & Potential Contaminant Inventories

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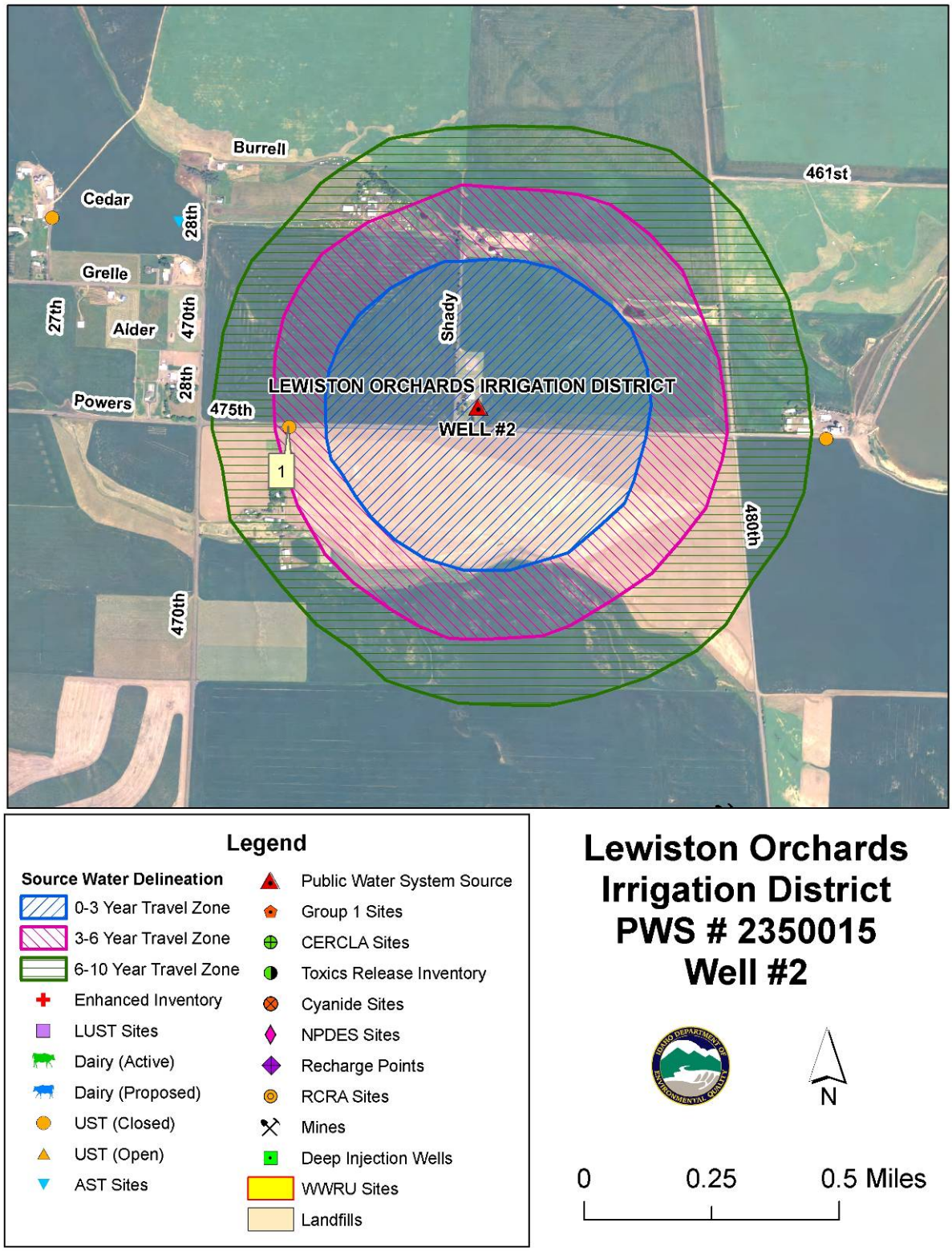

Figure D-1. LOID Well #2 delineation and potential contaminant markers.

Table D-1. Potential Contaminant Sources for Lewiston Orchards Irrigation District Well #2.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	UST Site	0-3 YR	Database Search	VOC, SOC
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants
n/a	Dryland agriculture	0-3 YR 3-6 YR 6-10 YR	Database Search / GIS Map	IOC, VOC, SOC, microbial contaminants

[1]Refer to the glossary
[2]TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

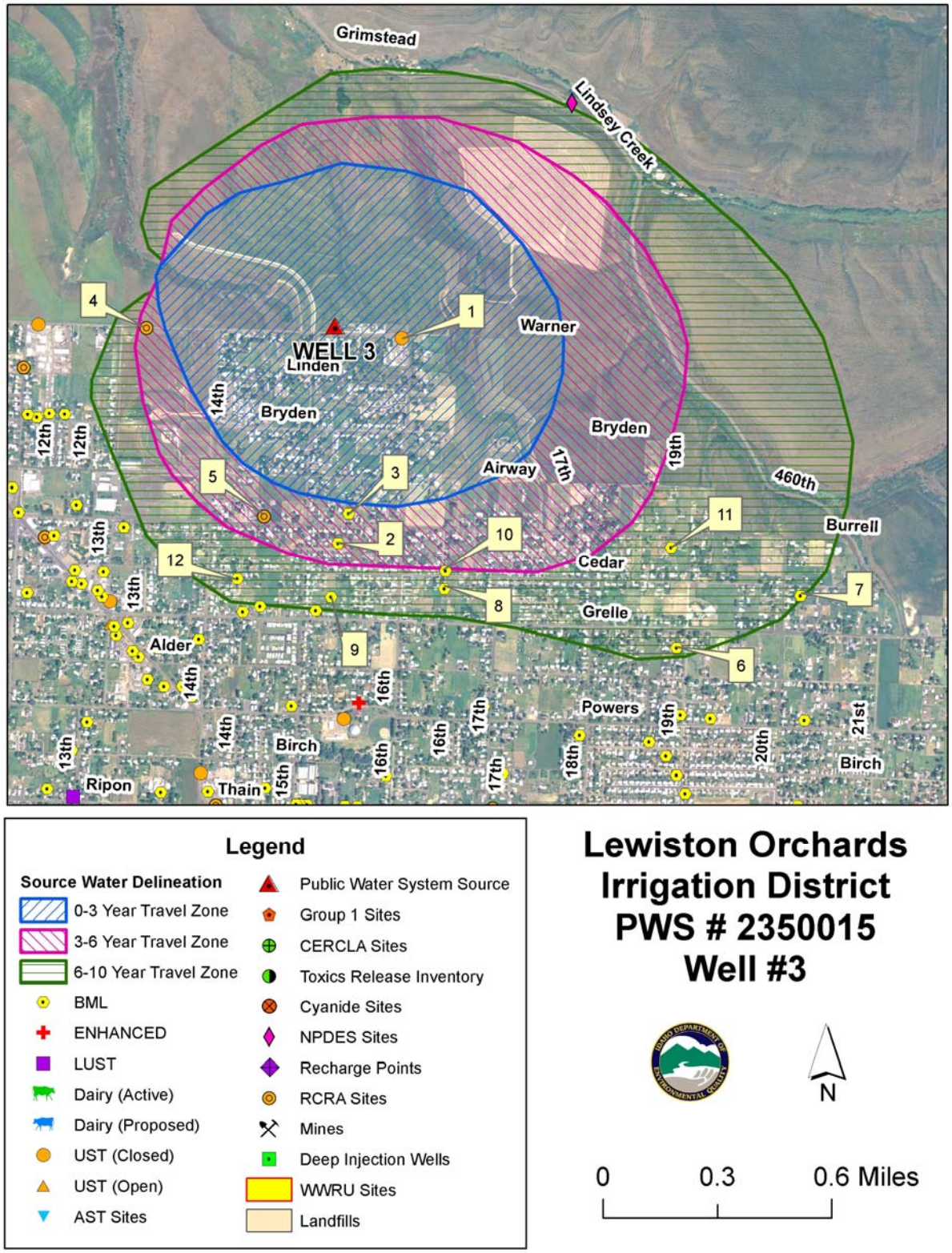

Figure D-2. LOID Well #3, delineation and potential contaminant markers.

Table D-2. Potential Contaminant Sources for Lewiston Orchards Irrigation District Well #3.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	UST Site; Closed	0-3 YR	Database Search	VOC, SOC
2	Installation of Floor Coverings - All Types	3-6 YR	Database Search	IOC, VOC, SOC
3	Portable Welding & Metal Fabrication - off site	3-6 YR	Database Search	IOC, VOC, SOC
4	RCRA Site	3-6 YR	Database Search	IOC, VOC, SOC
5	RCRA Site	3-6 YR	Database Search	IOC, VOC, SOC
6	Installation of Floor Coverings	6-10 YR	Database Search	IOC, VOC, SOC
7	Manufacturing of Bullets	6-10 YR	Database Search	IOC, VOC, SOC
8	Dental Restorations, Products & Castings	6-10 YR	Database Search	IOC, VOC, SOC
9	Excavation and Installation of Septic Systems	6-10 YR	Database Search	IOC, VOC, SOC
10	Used Auto Parts Locating Service	6-10 YR	Database Search	IOC, VOC, SOC
11	Manufacturing - Aluminum Boats	6-10 YR	Database Search	IOC, VOC, SOC
12	Hydraulic Hose Maintenance, Repair & Installation	6-10 YR	Database Search	IOC, VOC, SOC
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants
n/a	Dryland agriculture	0-3 YR 3-6 YR 6-10 YR	Database Search / GIS Map	IOC, VOC, SOC, microbial contaminants

[1]Refer to the glossary
[2]TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

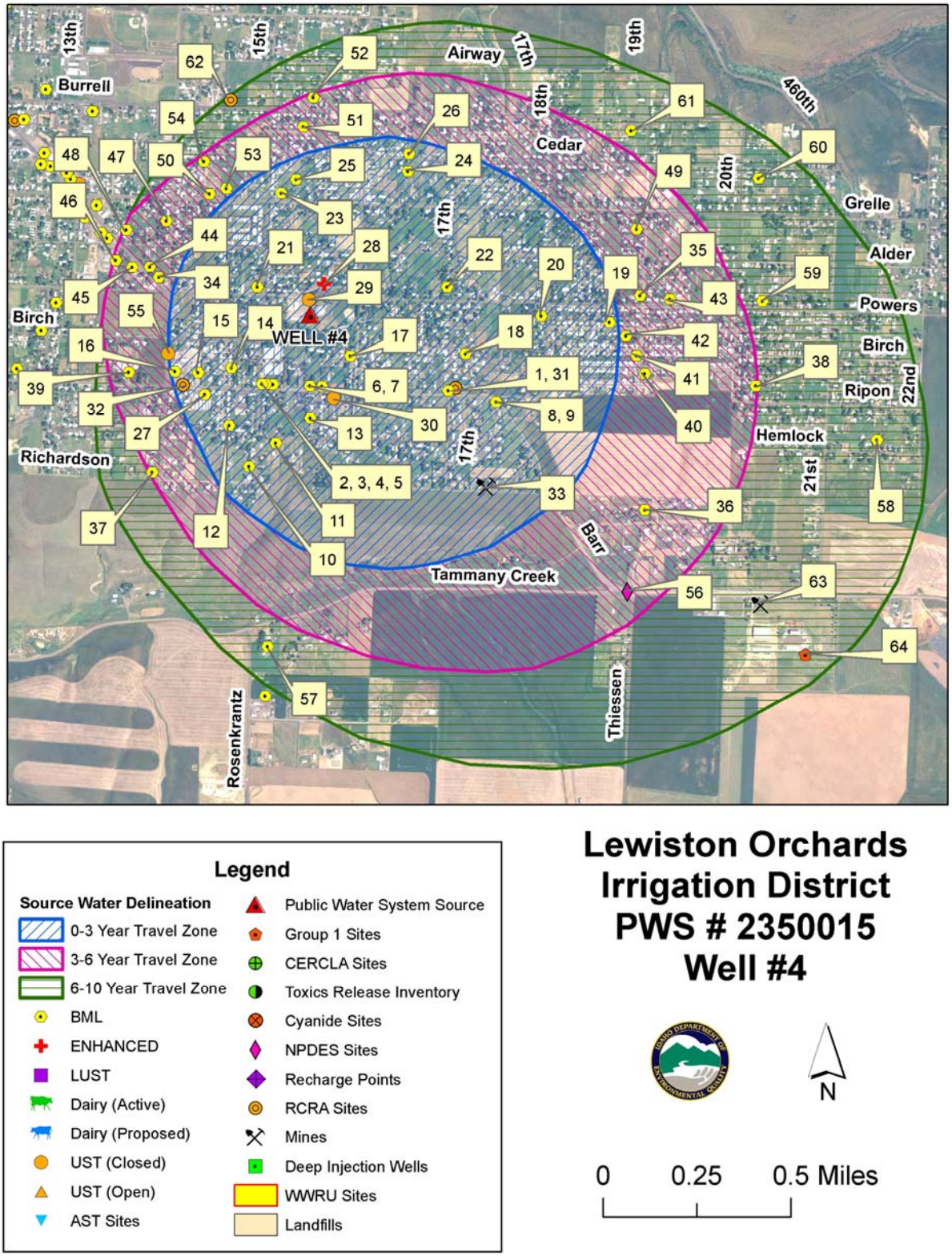

Figure D-3. LOID Well #4 delineation and potential contaminant markers.

Table D-3. Potential Contaminant Sources for Lewiston Orchards Irrigation District Well #4.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Sign Manufacturing	0-3 YR	Database Search	IOC, VOC, SOC
2	Retail Building Specialty Materials	0-3 YR	Database Search	IOC, VOC, SOC
3	Automobile Towing & Repossession	0-3 YR	Database Search	IOC, VOC, SOC
4	Wholesale/Retail Sale of Floor, Wall & Window Co	0-3 YR	Database Search	VOC, SOC
5	Auto Body & Paint Repair & Service	0-3 YR	Database Search	IOC, VOC, SOC
6	Taxidermy	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
7	Laundromat	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
8	Retail & Mail Order Auto Parts	0-3 YR	Database Search	IOC, VOC, SOC
9	Household Appliance Repair & Service	0-3 YR	Database Search	IOC, VOC, SOC
10	Mobile Welding Service	0-3 YR	Database Search	IOC, VOC, SOC
11	Lawn & Tree Trimming Services (Private Property	0-3 YR	Database Search	IOC, VOC, SOC
12	Photography	0-3 YR	Database Search	IOC, VOC
13	Cleaning and Painting Services	0-3 YR	Database Search	IOC, VOC, SOC
14	Conifer Seedling Nursery (Greenhouse Site)	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
15	Truss Manufacturing	0-3 YR	Database Search	IOC, VOC, SOC
16	Retail Livestock Feed, Log Home Kits & Hillsboro	0-3 YR	Database Search	IOC, SOC, Microbial bacteria
17	Taxicab Company	0-3 YR	Database Search	IOC, VOC, SOC
18	Taxidermy	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
19	Matting & Framing	0-3 YR	Database Search	IOC, VOC
20	Garage Door Sales, Installation & Repair	0-3 YR	Database Search	IOC, VOC, SOC
21	Solidworks Modeling and Training, CNC Programming	0-3 YR	Database Search	IOC, VOC, SOC
22	Taxidermy	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
23	Hardwood Floor Installation & Finishing	0-3 YR	Database Search	IOC, VOC, SOC
24	Dental Restorations, Products & Castings	0-3 YR	Database Search	IOC, VOC, SOC
25	Excavation and Installation of Septic Systems	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
26	Used Auto Parts Locating Service	0-3 YR	Database Search	IOC, VOC, SOC
27	Garage Doors Sales & Service, Mini Storage	0-3 YR	Database Search	IOC, VOC, SOC
28	Utility Station/Maintenance Area	0-3 YR	Enhanced Inventory	IOC, VOC, SOC
29	UST Site; closed	0-3 YR	Database Search	VOC, SOC
30	UST Site; closed	0-3 YR	Database Search	VOC, SOC
31	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
32	RCRA Site	0-3 YR	Database Search	IOC, VOC, SOC
33	Mine; sand and gravel	0-3 YR	Database Search	IOC, VOC, SOC, Microbial bacteria
34	Retail Used Autos & New Campers	3-6 YR	Database Search	VOC, SOC
35	Construction, Residential Remodel & Windows	3-6 YR	Database Search	IOC, VOC, SOC
36	Construction, Pole Buildings	3-6 YR	Database Search	IOC, VOC, SOC
37	Pesticides & Herbicides Application, Service & A	3-6 YR	Database Search	IOC, SOC
38	Tree Trimming Service	3-6 YR	Database Search	IOC, VOC, SOC
39	Manufacturing of Pallets, Lathes & Stakes	3-6 YR	Database Search	IOC, VOC, SOC
40	Water Tender Support, Dust Abatement, Construction	3-6 YR	Database Search	IOC, VOC, SOC
41	Concrete, Excavation	3-6 YR	Database Search	IOC, VOC, SOC
42	Mobile Fabrication Services	3-6 YR	Database Search	IOC, VOC, SOC
43	Construction - Concrete, Excavation	3-6 YR	Database Search	IOC, VOC, SOC
44	Used Auto Sales	3-6 YR	Database Search	VOC, SOC
45	Pool Installation & Service	3-6 YR	Database Search	IOC, SOC
46	Auto Repair & Service	3-6 YR	Database Search	IOC, VOC, SOC
47	Tractor Service, Landscaping, Tilling, Mowing &	3-6 YR	Database Search	IOC, VOC, SOC
48	Portable Toilet Rentals & Septic Pumping	3-6 YR	Database Search	IOC, VOC, SOC
49	Installation of Floor Coverings	3-6 YR	Database Search	IOC, VOC, SOC
50	Pest Control Services	3-6 YR	Database Search	IOC, SOC
51	Installation of Floor Coverings - All Types	3-6 YR	Database Search	IOC, VOC, SOC
52	Portable Welding & Metal Fabrication - off site	3-6 YR	Database Search	IOC, VOC, SOC
53	Tractor Service	3-6 YR	Database Search	IOC, VOC, SOC
54	Hydraulic Hose Maintenance, Repair & Installation	3-6 YR	Database Search	IOC, VOC, SOC
55	UST Site; closed	3-6 YR	Database Search	VOC, SOC
56	NPDES Site	3-6 YR	Database Search	IOC, SOC

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
57	Excavation & Utilities	6-10 YR	Database Search	IOC, VOC, SOC
58	Carpet & Upholstery Cleaning Service	6-10 YR	Database Search	IOC, VOC, SOC
59	Transport Service	6-10 YR	Database Search	IOC, VOC, SOC
60	Manufacturing of Bullets	6-10 YR	Database Search	IOC, VOC, SOC
61	Manufacturing - Aluminum Boats (Business Office	6-10 YR	Database Search	IOC, VOC, SOC
62	RCRA Site	6-10 YR	Database Search	IOC, VOC, SOC
63	Mine; clay	6-10 YR	Database Search	IOC, VOC, SOC
64	Group 1 Site	6-10 YR	Database Search	IOC, VOC, SOC
n/a	Transportation Corridors	0-3 YR 3-6 YR 6-10 YR	GIS map	IOC, VOC, SOC, microbial contaminants
n/a	Dryland agriculture	0-3 YR 3-6 YR 6-10 YR	Database Search/ GIS Map	IOC, VOC, SOC, microbial contaminants

[1]Refer to the glossary
[2]TOT = time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = inorganic chemical; VOC = volatile organic chemical; SOC = synthetic organic chemical

APPENDIX E City of Lewiston Well Logs

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1A

WELL LOG AND REPORT TO THE STATE RECLAMATION ENGINEER OF IDAHO

RECEIVED
JUL 7 1961
Department of Reclamation

Log No.
Rec.
Well No.
Permit No.

(DO NOT FILL IN)

Owner City of Lewiston Address Lewiston, Idaho

Driller Midland Drilling Co., P.O.Box 637 Address Walla Walla Lic. No. 147

Location of Well: SE ¼ NE ¼ Sec. 36, T. 36 N/S, R 6WBN E/W Nez Perce County,

and feet N/S, and feet E/W from Corner of ¼ ¼ Sec.

Size of Drilled Hole 24" x 20" Total depth of Well 505 feet

Give depth of standing water from surface 32'6" Water Temp. 63 °Farenheit

On pumping test delivery was 617 g.p.m. or c.f.s. Drawdown was 113.5 feet.

Size of pump and motor used to make the test 6-71 Twin GMC-1.37 to 1 stepdown; 1200 GPM Turbine

Length of time pumped during check was Twenty five hr., thirty minutes.

If flowing well, give flow in c.f.s. or g.p.m. and shut in pressure

If flowing well, describe control works
(TYPE AND SIZE OF VALVE, ETC.)

Water will be used for Domestic use Weight of casing per linear foot 24"-94.62#; 20"-78.60#

Thickness of casing 3/8" Casing material Steel
E.G., PIPE, CONCRETE, WOOD.

Diameter, length and location of casing 24" - 88.17' @ 88.17'; 20" - 182' @ 182'
(CASING 12" IN DIAMETER AND UNDER GIVE INSIDE DIAMETER; CASING OVER 12" IN DIAMETER GIVE OUTSIDE DIAMETER.)

Number and size of perforations -- located feet to feet from surface of ground.

Other perforations

Date of commencement of well Feb. 5, 1960 Date of completion of well May 5, 1960

Type of well rig 36L2 BE cable rig

CASING RECORD

DIAM. CASING	FROM FEET	TO FEET	LENGTH	"REMARKS" -- SEALS, GROUTING, ETC.
24"	0	88.17'	88.17'	40 bags cement at 88' - 102'
20"	0	182.0'		

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

Water clear - Good quality

SE NE S. 36, 36 N 6 W.

Figure E-1a, City of Lewiston Well #1.

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Min.	Water-bearing Formation Ans. Yes or No	Casing Perforated Ans. Yes or No
0	15	Topsoil - Gravel	10			
15	40	Coarse gravel- water 35'-38'	15		yes	
40	75	Cemented gravel	23			
75	138	Basalt-Broken dk. & med. dk. (cem't. hole)	160			
138	167	Sand- lite and md. hard	30			
167	195	Clay on shells - brokn bas.	50			
195	228	Bas.-dk. md. hd.- brok	30			
228	235	Bas.-gray hd.	18			
235	245	Bas.-Dk med. hd.	20			
245	253	" gray hd.	14			
253	270	" gray med. hd.	25			
270	275	" black, soft	2			
275	313	" dk. broken	20			
313	331	" " gray md. hd.	50			
331	336	" dk. md. hd.	5		yes	
336	354	" br. md.-brok.	20			
354	373	" dk. md. hd.-brok	20			
373	408	" dk. md. hd.-some black	36		yes	
cont'd on page 2.		If more space is required use Sheet No. 2				

WELL DRILLERS STATEMENT

This well was drilled under my jurisdiction and the above information is true and correct to the best of my knowledge and belief.

Signed Midland Drilling Co.

By Charles Jungmann

Charles Jungmann, Vice President

License No. 147

Dated July 6, 1961.

Figure E-1b, City of Lewiston Well #1

SHEET NO. 2

Well Driller Midland Drilling Co.

Well Location Lewiston, Idaho

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Min.	Water-bearing Formation Ans. Yes or No	Casing Perforated Ans. Yes or No
408	413	Bas. gray. hd.	8			
413	418	" Dk. md. hd	2			
418	434	" gray. hd.	26			
434	444	" dk. med. hd.	15			
444	448	" gray med. hd.	20			
448	463	" gray hd.	20		yes	
463	469	" gr. md. to hd.	10		yes	
469	486	" lite br. md.	22		yes	
486	492	" dk. md. hd.	9		yes	
492	505	" br. md. hd.	18		yes	no

Figure E-1c, City of Lewiston Well #1

RECEIVED
JUN 28 1962
Department of Reclamation

WELL LOG AND REPORT OF THE STATE RECLAMATION ENGINEER OF IDAHO

Permit No. _____ Well No. 1A County Nez Perce

Owner City of Lewiston, Idaho

Address Lewiston, Idaho

Driller Charles Jungmann Drilling Company

Address Box 423, Walla Walla, Washington

Well location SE ¼ NE ¼ Sec. 36, T. 36 N/S, R. 6WEN E/W

Size of drilled hole 20" x 16"

Total depth of well 735'

Locate well in section

NW¼	NE¼
SW¼	SE¼

Give depth to standing water from the ground 42'3" Water temp. 63 °Fahr.

On "Pumping Test" delivery was 1677 g.p.m. or _____ c.f.s. Drawdown was 212 feet.

Size of pump and motor used to make test 6-71 GMC Diesels with pump capacity of 3000 GPM

Length of time of test 24 hours _____ minutes.

If flowing well, give flow _____ c.f.s. or _____ g.p.m. and of shut off pressure _____

If flowing well, described control works _____
(TYPE AND SIZE OF VALVE, ETC.)

Water will be used for Domestic Weight of casing per lineal foot 16" - 62.57 lbs

Thickness of casing 3/8" wall Casing material Steel
(STEEL, CONCRETE, WOOD, ETC.)

Diameter, length and location of casing 338'-10" of 16" from 167' to 505'
(CASING 12" IN DIAMETER OR LESS, GIVE INSIDE DIAMETER; CASING OVER 12" IN DIAMETER, GIVE OUTSIDE DIAMETER)

CASING RECORD

Diam. Casing	From Feet	To Feet	Length	Remarks—seals, grouting, etc.
16"	167'	505'	338'-10"	Liner

Number and size of perforations 3" x ¼" (12 perforations per ft.) located 190' feet to 503' feet from ground

Date of commencement of well Nov. 15, 1961 Date of completion of well Jan. 28, 1962

SENE S.36 36N 6W

Figure E-1d, City of Lewiston Well #1

WELL LOG

From Feet	To Feet	Type of Material	Water-bearing Formation Ans. Yes or No	Casing Perforated Ans. Yes or No
505	521	Hard grey basalt		
521	547	Hard dark basalt		
547	598	Brown soft basalt	Yes	no casing
598	606	Dark hard basalt		
606	646	Grey basalt, very hard		
646	679	Dark hard basalt		
679	698	Hard grey basalt		
698	732	Variegated basalt	Yes	no casing
732	735	Hard grey basalt		
		This well was deepened in this operation from		
		505' to 735'		
		If more space is required use Sheet No. 2		

WELL DRILLER'S STATEMENT

This well was drilled under my supervision and the above information is true and correct to the best of my knowledge and belief.

Signed O. Jungmann Drilling Company

By Charles Jungmann

License No. 484 A

Dated Feb. 17, 19 62.

Figure E-1e, City of Lewiston Well #1

WELL LOG AND REPORT TO THE

STATE RECLAMATION ENGINEER OF IDAHO

Log No. _____

Roc. _____, 19___

Well No. _____

Permit No. _____

(DO NOT FILL IN)

Owner: Potlatch Forests, Inc. Address: Lewiston, Idaho

Driller: Charles Jungmann Drilling Co. Address: 115 Rees Ave., Walla Walla, Wash. Lic. No. 194

Location of Well: ____ ¼ ____ ¼ Sec. ____, T. ____ N/S, R ____ E/W ____ County,

and ____ feet N/S, and ____ feet E/W from ____ Corner of ____ ¼ ____ ¼ Sec. ____

Size of Drilled Hole: 12 " x 10 " Total depth of Well: 153 ' 0

Give depth of standing water from surface: 52 ' Water Temp.: 59 °Farenheit

On pumping test delivery was: 240 g.p.m. or ____ c.f.s. Drawdown was: 3 feet.

Size of pump and motor used to make the test: Hercules Gas 35 HP

Length of time pumped during check was: 8 hr., ____ minutes.

If flowing well, give flow in c.f.s. ____ or g.p.m. ____ and shut in pressure ____

If flowing well, describe control works ____
(TYPE AND SIZE OF VALVE, ETC.)

Water will be used for: Domestic Weight of casing per linear foot: 12 " at 45 #; 10 " at 32 #

Thickness of casing ____ Casing material: Steel
E.G., PIPE, CONCRETE, WOOD.

Diameter, length and location of casing: 12 " Casing 53 ' 11 " at 53 ' , 10 " Casing 71 ' at 70 '
(CASING 12" IN DIAMETER AND UNDER GIVE INSIDE DIAMETER; CASING OVER 12" IN DIAMETER GIVE OUTSIDE DIAMETER.)

Number and size of perforations: None located ____ feet to ____ feet from surface of ground.

Other perforations ____

Date of commencement of well: January 21, 1965 Date of completion of well: February 26, 1965

Type of well rig: Cable Tool 22 W Bucyrus Erie

CASING RECORD

DIAM. CASING	FROM FEET	TO FEET	LENGTH	"REMARKS" -- SEALS, GROUTING, ETC.
12 "	+ 1	53 '	53 ' 11 "	Cement Seal Between 10 " and 12 " Casing
10 "	+ 1	70 '	71 '	

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

Figure E-2a, City of Lewiston Well #2

Drinking water Well
#2. West of Main Offi
Gr Elev. 740.4

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Min.	Water-bearing Formation Ans. Yes or No	Casing Perforated Ans. Yes or No
0	4	Silt				
4	16	Cobbles & Boulders			Yes	
16	25	Cemented Gravel				
25	54	Sand-Clay				
54	68	Broken Basalt				
68	103	Grey Basalt				
103	114	Black Basalt				
114	128	Grey Hard Basalt				
128	145	Dark Basalt- Brown Basalt			Yes	
145	153	Hard Grey Basalt				
		If more space is required use Sheet No. 2				

WELL DRILLER'S STATEMENT

This well was drilled under my jurisdiction and the above information is true and correct to the best of my knowledge d belief.

Signed Charles Jungmann Drilling Co.

By Owner,

License No. 434 A

ted March 24, 1965

Figure E-2b, City of Lewiston Well #2

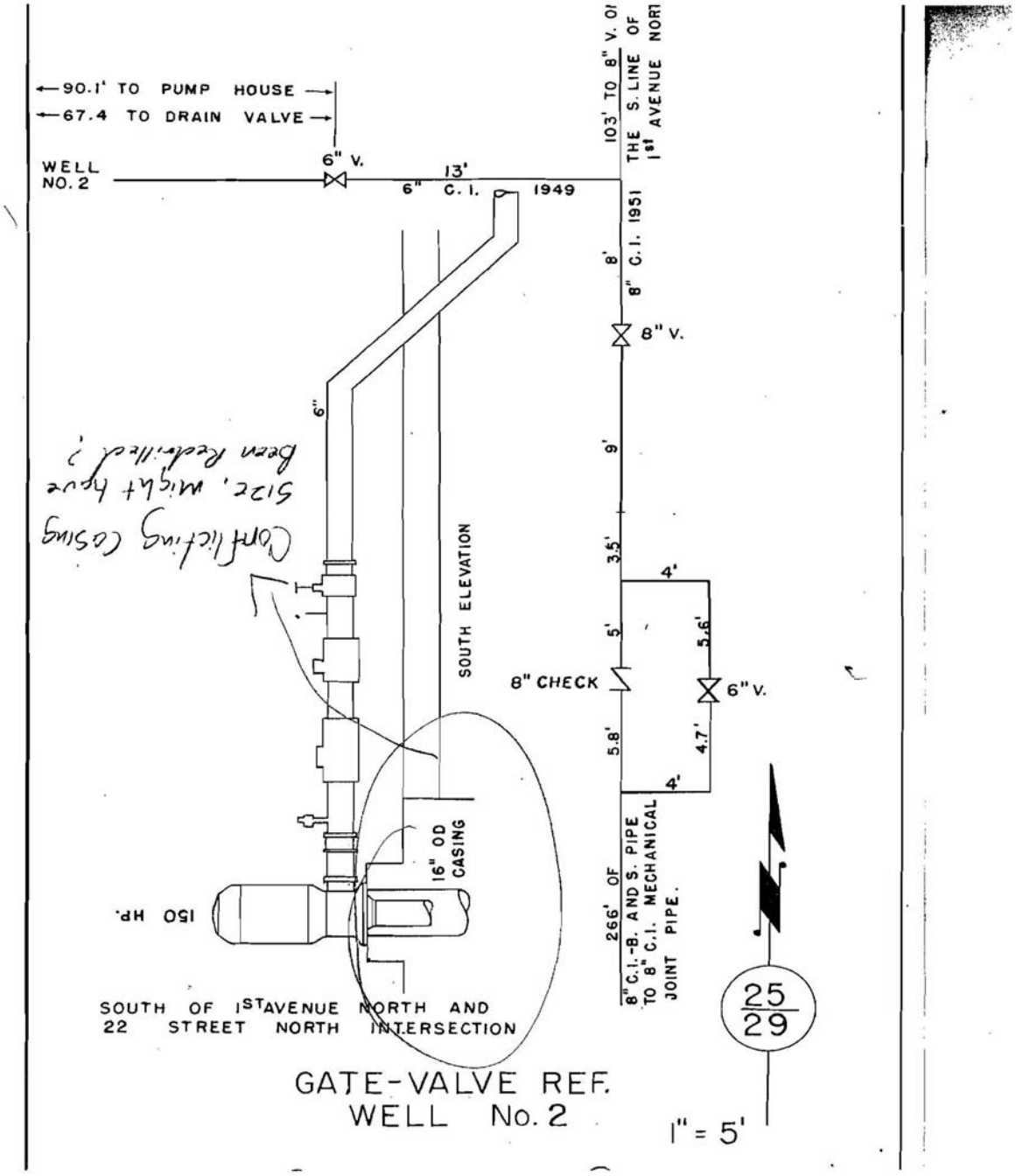

Figure E-2c, City of Lewiston Well #2

File Well #2

Well #2 (Pepsi Park)

N 46°
25.286' mins.
W 117°
00.027 mins.

Well Head # (DEQ) E0005527

No Record on Net @ DEQ for this Number?

Figure E-2d, City of Lewiston Well #2

CITY WELL NO. 2

ELEVATION: 735'

DEPTH: 275' 1996 MAR. 262'

STATIC WATER LEVEL 20' 1996 MAR. 11'

NOTE: Indication of most water.
Up to 4" cobbles. Caved in &
couldn't go lower.
H_2S odor at first - Since disappeared.

Ran 48 hour pump test & water draw down
to 215 ft. from 20 ft.. Temp 60°F at end of
test and only 3°F higher than water in Well #1.
Yield 720 gpm.

DIAMETER: 12"

SW 1/4; NW 1/4; SEC. 32; T 36N: R5W; BM

600 g.p.m. - 1.33 cfs - underground 13 STAGE 75 Hp MOTOR

PUMP TYPE: Turbine 30" BORE HOLE

PUMP TEST TO BE PERFORMED IN APRIL

Figure E-2e, City of Lewiston Well #2

Log No. .....

Rec. ..... 19.....

Well No. 85-53-N-2

Permit No. P-24350

85-2099

DO NOT FILL IN

WELL LOG AND REPORT TO THE STATE RECLAMATION ENGINEER OF IDAHO

027817

Owner CITY OF LEWISTON WELL NO. 3 Driller A. A. DURAND & SON

Address c/o R. C. Lowrie, City Engineer Address Walla Walla, Washington Lic. No. 565

Location of Well: NW ¼ SW ¼ Sec. 6, T. 35 N, R. 5 W/E BM Nez Pierce County.
N½ of Lot 7 Block 8 Riverview Addition - on Corner 7th & 16th Ave.
and .....feet N/S, and.....feet E/W from.....corner of.....¼.....¼ Sec.

Water will be used for Municipal Water Supply Total depth of well 600'

Size of drilled hole Shown Below Weight of casing per linear foot Shown Below

Thickness of casing Standard Weights Casing Material Steel
e.g., pipe, concrete, wood.

Diameter, length and location of casing Shown Below
(Casing 12" in diameter and under give inside diameter; casing over 12" in diameter give outside diameter.)

Number and size of perforations ——— located ——— feet to ——— feet

from surface of ground. Rock Well - No alluviums or perforations functioning to yield present supply

Other Perforations: .....

If flowing well, give flow in c.f.s. NO or g.p.m.....and shut in pressure .....

If nonflowing well, give depth of standing water from surface 107' 6" (7/1/53 Confined Water)

If flowing well, describe control works .....
(Type and size of valve, etc.)

On pumping test delivery was 1200 g.p.m. or July, 1953 c.f.s. Drawdown was 52 feet

Length of time pumped during check was 6 hr. — min. Water temp. 68 °Fahrenheit.

Date of commencement of well 3/12/53 Date of Completion of well 7/3/53

Type of well rig 36L-3 Bucyrus Erie Oil Field Spudder

Telescope Hole w/Underground Reductions CASING ~~RECORD~~ And Completed Open Hole Record

Diam. Casing	From Feet	To Feet	Length	Wt.	"Remarks" — Seals, Grouting, Etc.
26 O.D.	G.S.	122	122	5/16"	Continuous Pressure Grout Seal Within Annular
20 O.D.	G.S.	177' 8"	177' 8"	5/16"	Space between Ground Surface & 177' 8".
16 O.D.	90	394	304	9/32"	16" O.D. Casing Mills Knife Perforated between 371' - 386' For Pump Test #2 but Pressure Grouted afterwards including footing of casing before Final Pump Test #3.
15 I.D.	394	600	206		Open Basalt Rock Hole

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

Final Well Pumping Test #3 on July 1, 1953 - Static Water Level - 107' 6" Drawdown of Following Stabilized Pumping Rates: 700 G.P.M. at 23' - 818 G.P.M. at 28' - 1000 G.P.M. at 38' - 1218 G.P.M. at 53' - 1272 G.P.M. at 60'. Water Temp. 68 deg. F. Air Temp. 88 deg. F. Water Quality : PH 8 - Total Hardness 39 - Turbidity -0 - Fluorides 1.2p.p.m. Analysis by City of Lewiston Laboratory.

NWSW S6 35N 5EW

81

Figure E-3, City of Lewiston Well #3.

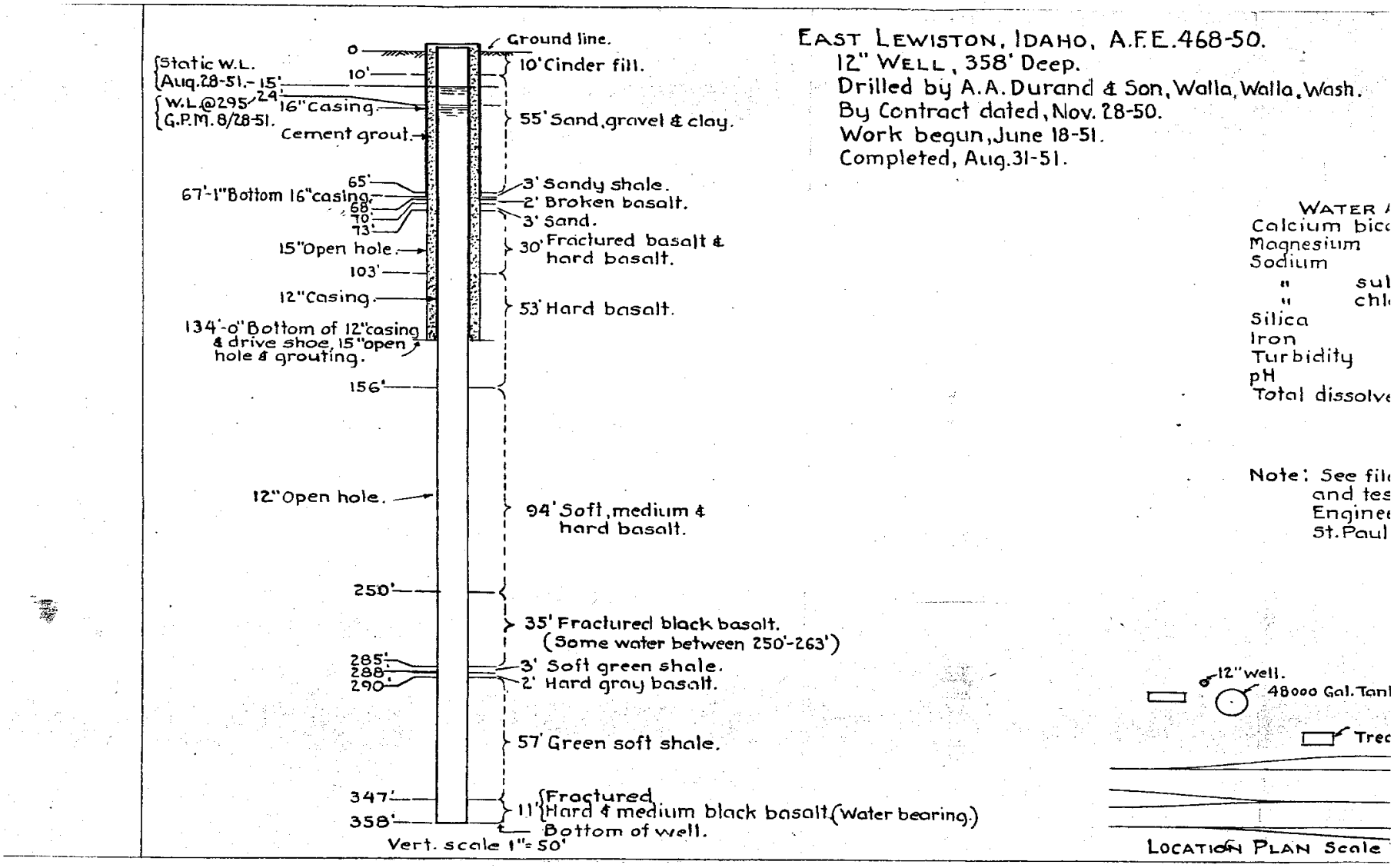

Figure E-4, City of Lewiston Well #4.

WELL LOG AND REPORT TO THE

STATE RECLAMATION ENGINEER OF IDAHO

Log No. ____

Rec. ____ 19____

Well No. ____

Permit No. 9-24618

DO NOT FILL IN

Owner Roy Huffman — Driller A. A. Durand & Son

Address 5100 Country Club Drive, Lewiston, Idaho — Address P. O. Box 437, Walla Walla, Wash. No. 47

Location of Well: Lot 4 N/ ¼ Sec. 12 T. 35 N/S R. 6 E/W Nez Perce County. Boise Meridian

and ____ feet N/S, and ____ feet E/W from ____ corner of ____ ¼ ____ ¼ Sec. ____

Water will be used for Domestic-Industrial — Total depth of well 600'

Size of drilled hole 15¼" x 12" x 10" — Weight of casing per linear foot 16" 62.5 lb. 10" 33 lb.

Thickness of casing See Weights — Casing Material Standard Steel Pipe (e.g., pipe, concrete, wood.)

Diameter length and location of casing See Log Below

(Casing 12" in diameter and under give inside diameter; casing over 12" in diameter give outside diameter.)

Number and size of perforations None located ____ feet to ____ feet

from surface of ground.

Other Perforations: None

If flowing well, give flow in c.f.s. ____ or g.p.m. ____ and shut in pressure ____

If nonflowing well, give depth of standing water from surface ____

If flowing well, describe control works ____ (Type and size of valve, etc.)

On pumping test delivery was 800 g.p.m. or ____ c.f.s. Drawdown was 108' feet

Length of time pumped during check was 12 hr. ____ min. Water temp. 63 °Fahrenheit

Date of commencement of well 8/18/53 — Date of Completion of well 11/14/53

Type of well rig Bucyrus-Erie 29T Oil Field Spudder

FINISHED OPEN ROCK HOLE AND CASING RECORD — DEPTH OF WELL 600'

Diam. Casing	From Feet	To Feet	Length	"Remarks" — Seals, Grouting, Etc.
16" OD x 15¼" ID	G.S.	40'	40'	Casing - Natural Clay Seal (15' of Yellow & pink clay)
15¼"	40'	65	25'	Open Rock Hole
12"	65	300	220'	Open Rock Hole
10" I.D. x 10-3/4"	300	330	30'	Casing - Liner
10"	330	600	270'	Open Rock Hole

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

PUMP TEST NO. 1 - FINAL - NOVEMBER 13, 14, 1953 - 12 hrs. S. W. L. 128'

GPM	PUMPING LEVEL	DRAWDOWN	
805'	236'	108'	Water Temp. 63 deg. F.
554	192'	64'	Well Cleared Up And In
370'	156'	38'	Good Useable Condition
			Water Pure

S.12 35N 6W

Figure E-5a, City of Lewiston Well #5.

WELL NAME: ROY HUFFMAN IRRIGATION WELL WORKS NO. 1

T. 35 N, R. 5 W, S. 12, STATE Idaho COUNTY Nez Perce CITY Lewiston

LOCATED: 3100 Country Club Drive ELEV.

WANTS:

START: August 18, 1953 FINISH November 14, 1953

DIAM.	DEPTH FROM	DEPTH TO	FT.	SWL	FORMATIONS & CONTENTS - WATER
	0	8	8		Black Boulders & Top Soil - No
	8	22	14		" " " Only - No
	22	25	3		Coarse Black Basalt Gravel No
	25	33	8		Yellow clay - No
	33	40	7		Pink Clay
	40	88	48		Dark, Dense, Fine Grain Basalt - No
	88	128	40		Very Hard Black Basalt - No
	128	145	17		Brown Clay Interbed - No
	145	205	60		Medium Hard Black Basalt Solid - No
	205	217	12		Broken Black Basalt (Aquifer) - S.W.L. 170'
	217	261	44		Very Hard Black Basalt " " " "
	261	300	39		Medium And Ver Hard Black Basalt " " " 160'
	300	310	10		Soft Blue Clay
	310	317	7		Green Soft Clay
	317	485	168		Very Hard Black Basalt " " " 150'
	485	490	5		Brown Honeycomb Basalt (Aquifer) " " " 140'
	490	496	6		Hard Black Basalt " " " 140'
	496	500	4		Soft Black Basalt (Aquifer) " " " 130'
	500	535	35		Dense Hard Black Basalt " " " 130
	535	545	10		Soft Black Basalt " " " 136
	545	554	9		Broken Black Basalt " " " 136'
	554	600	46		Very Hard To Medium Black
					Basalt - Intermittent aquifer zones caving

S.12 35N 6W

Figure E-5b, City of Lewiston Well #5.

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Mins.	Water-bearing Formation Ans. Yes or No	Casing Perforated Ans. Yes or No

If more space is required use Sheet No. 2

WELL DRILLERS STATEMENT

This well was drilled under my jurisdiction and the above information is true and correct to the best of my knowledge and belief.

Signed

By Paul Durand

License No. 47

Dated Nov 20, 1953

Subscribed and sworn before me this 19th day of November 1953

Paul B. Sherkine
Notary Public

Walla Walla, Washington
Residing at

My Commission expires Jan. 13, 1953

Figure E-5c, City of Lewiston Well #5.

PAGE 1

RECEIVED
DEC 13 1995
IDWR

Form 238-7
7/94

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ball Point Pen

POSTED

1/2

1. DRILLING PERMIT NO. 85-94-C-0082 - 000
Other IDWR No. 85-076601

2. OWNER:
Name City of Lewiston, Idaho
Address P.O. Box 617
City Lewiston State ID Zip 83501

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 35 North ☒ or South ☐
Rge. 6 East ☐ or West ☒
Sec. 12, NW (10 acres) 1/4 SE (40 acres) 1/4 SE (160 acres) 1/4
Gov't Lot ____ County ____

Address of Well Site 445 Oconner Road
City Lewiston
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. PROPOSED USE:
☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK
☐ New Well ☒ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☒ Mud Rotary ☒ Air Rotary ☒ Cable ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Neat Cement	0	60	3 yds	poured into
				hole around cas
Neat Cement	0	670	45 yds	pumped

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) ____
Was drive shoe seal tested? Y ☐ N ☒ How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
20"	0	60	375	Steel	☒	☐	☒	☐
16"	0	638	344	Steel	☒	☐	☒	☐
13.375	625	990	500	Steel	☐	☒	☒	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS N/A
☐ Perforations Method ____
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
560 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

NWSESE 12 35N 6W

11. WELL TESTS:
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
1500 GPM	Approx 400'	850	6 Hrs.

Water Temp. 81 F Bottom hole temp. 81 F
Water Quality test or comments: N/A
* distance from kelly bushing approx 10'

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
26	*0	4	Topsoil		X
26	4	60	Clay and broken basalt *1		X
18½	60	120	Black basalt soft		X
18½	120	220	Black basalt fractured		X
18½	220	255	Basalt with clay		X
18½	255	277	Black and brown basalt		X
18½	277	300	Black basalt hard		X
18½	300	420	Clay, sand and broken basalt		X
18½	420	484	Black basalt soft		X
18½	484	494	White Sand	X	
18½	494	510	Sand and broken basalt	X	
18½	510	610	Gray basalt fractured hard		X
18½	610	647	Gray basalt hard *2		X
18½	647	670	Black basalt soft		X
18½	670	700	Gray basalt hard		X
18½	700	730	Black basalt		X
18	730	755	Black and brown basalt		X
15	755	796	Gray basalt medium hard		X
14½	796	840	Gray basalt hard		X
14½	840	946	Basalt hard		X
14½	946	988	Black basalt & Red soft	X	
14½	988	1010	Basalt Gray hard *3		X
12¼	1110	1126	Basalt gray med hard		X
12¼	1126	1137	Basalt red and black soft	X	
12¼	1137	1156	Basalt gray hard		X
12¼	1156	1178	Basalt red & black soft	X	
12¼	1178	1270	Basalt gray		X
12¼	1270	1298	Basalt red & black soft	X	
12¼	1298	1401	Gray basalt fractured	X	
12¼	1401	1430	Basalt Black & Red	X	
			*1 Set 20" casing to this depth		
			*2 Set 16" casing to this depth		
			*3 Set 13.375" liner to this depth		

Completed Depth 1430 from ground level (Measurable)
Date: Started 5/2/95 Completed December 4/95

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name AQUA DRILLING and ENGINEERING Firm No. 553
Firm Official Doug Galipeau Date 12/8/95
and
Supervisor or Operator Doug Galipeau Date 12/8/95
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure E-6a, City of Lewiston Well #6, Golf Course Well.

RECEIVED

mailed to Cd'A 9-23-98

Form 238-7
3/9

SEP 24 1998

NORTHERN REGION
IDWR

IDAHO DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

076055

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____1/4____1/4____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 85 - 94 - C - 0082 100
Other IDWR No. Tag #D0003670
Water Right #85-07601

2. OWNER:
Name City of Lewiston
Address PO BOx 617
City Lewiston, State ID Zip 83501

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

POSTED

N / W / E / S

Twp. 35 North ☒ or South ☐
Rge. 06 East ☐ or West ☒
Sec. 12, NW 1/4 (10 acres) SE 1/4 (40 acres) SE 1/4 (160 acres)
Gov't Lot ____ County Nez Perce
Lat: : : Long: : :
Address of Well Site 445 O'Conner Rd. City Lewiston
(Give at least name of road + Distance to Road or Landmark)

Lt.____ Blk.____ Sub. Name____

4. USE:
☐ Domestic ☒ Municipal ☐ Monitor ☒ Irrigation
☐ Thermal ☐ Injection ☐ Other____

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☐ Abandonment ☒ Other deepen

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
deepen only			N/A	

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s)____
Was drive shoe seal tested? ☐Y ☐N How?____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
open hole				N/A	☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe____ Length of Tailpipe____

9. PERFORATIONS/SCREENS
☐ Perforations Method____
☐ Screens Screen Type____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
N/A						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
565 ft. below ground Artesian pressure ____lb.
Depth flow encountered ____ft. Describe access port or control devices: airline at pump test

35N 6W 12

11. WELL TESTS:
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
500	2ft	960	6 hr
1000	4ft	960	18 hr
1330	7ft	960	1 hr

Water Temp. 83.8° Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 1428

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
			This log is for deepening		
			Lewiston City Well #6,		
			previously drilled to		
			1428' (±) by Aqua Drilling		
			& Engineering.		
9-7/8" dia.					
	1428	1440	Basalt, maroon, vesicular,		
			soft	x	
	1440	1555	Basalt, med,dk.gray,dense,	hard	x
	1555	1565	Basalt,maroon,vesic,soft	x	
	1565	1575	Basalt,med.dk.gray,dense,hard		x
	1575	1595	Basalt,maroon,rubble,soft	x	
	1595	1613	Basalt,dk dk gray,glassy,		
			frag.,soft		?
	1613	1635	Basalt,yellow gray, rubble,		
			soft	x	
	1635	1655	Basalt,red-brn,rubble,soft	x	
	1655	1738	Basalt,med.gray,dense,hard		x
	1738	1760	Basalt,red-brn,vesic,soft	x	
	1760	1794	Basalt,med,dk.gray,dense		
			soft		x
			Note: major aquifer at		
			1635-1655; minor aquifers		
			at 1428-1440, 1555-1565,		
			1575-1600, 1613-1625,		
			1738-1755.		
			All aquifers are part of		
			the Grande Ronde aquifer		
			system and have common SWLs.		

Completed Depth 1793' (Measurable)
Date: Started 7-27-98 Completed 8-29-98

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name FEDCO Firm No. 463
Firm Official Nancy Edwards Date 9-22-98
and
Supervisor or Operator____ Date____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure E-6b, City of Lewiston Well #6, Golf Course Well, deepening log .

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APPENDIX F Lewiston Orchards Irrigation District Well Logs

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Form 238-7
1/78

copy to Northern

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

RECEIVED JUN 26 1987 Department of Water Resources

1. WELL OWNER

Name Lewiston Orchard Irrigation District

Address 1520 Powers Avenue
Lewiston, Idaho 83501

Owner's Permit No. 85-86-N-3

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☒ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.375 inches	20 inches +	0 feet	60 feet
.375 inches	16 inches +	3 feet	520 feet
.380 inches	13 3/8 inches	508 feet	1376 feet
inches	inches	feet	feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

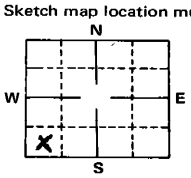
Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 60' Material used in seal: ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

MICROFILMED MAR 14 1988

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____

County Nez Perce

SW ¼ SW ¼ Sec. 17, T. 35 N/S, R. 4 E/W.

7. WATER LEVEL

Static water level 192 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ____ °F. Quality good

8. WELL TEST DATA Pg 1 of 2

Test by others
☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
24	0	17	sandy loam		
	17	22	broken basalt		
	22	36	gray basalt (hard)		
	36	51	black basalt broken		
17½	51	153	gray basalt		
	153	226	black & gray basalt		
	226	417	black basalt w/ clay		
	417	455	gray basalt lost cir.		
	455	498	lost circulation area		
			cem. back to 340' SWL 150'		
	498	520	gray basalt (hard)		
143/4520		564	gray & black basalt		
	564	629	black basalt		
	~~629~~	~~727~~			
	629	727	black basalt w/ clay		
	729	773	gray & blacl basalt		
	773	782	gray basalt		
	782	851	black basalt		
	851	908	gray & black basalt		
	908	1356	black basalt		
	1356	1376	gray basalt		
12¼	1376	1443	gray & black basalt		
	1443	1543	black & brown basalt		
	1543	1606	gray & black basalt		
	1606	1780	soft red-brown basalt	X	
TD	1780	1959	soft red-brown basalt	X	
			011205		
			16" casing cemented fron 520'		
			tosurface, w/ 175 sacks-using		
			float shoe thru injection line.		
			13 3/8 casing from 508' to 1376'		
			w/ 175 sacks using float shoe		
			and injection line.		

10.

Work started 5/02/86 finished 8/05/86

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Holman Drilling Corp.
Firm Name _____ Firm No. 108
E. 3410 Ninth Avenue
Address Spokane, WA 99202 Date 6/17/87

Signed by (Firm Official) Arnold E. Holman PRES.
and
(Operator) Arnold E. Holman

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Figure F-1, LOID Well #2.

Form 238-7
3/95

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

Office Use Only
Inspected by ____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 85-97-N-0024-000
Other IDWR No. WELL TAG D 000 3071

2. OWNER:
Name LEWISTON ORCHARDS IRRIGATION DIST
Address 1520 POWERS AVE
City LEWISTON State ID Zip 83501

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / E / S

Twp. 35 North ☒ or South ☐
Rge. 5 East ☐ or West ☒
Sec. 10 . SW 1/4 SE 1/4 SW 1/4 (10 acres, 40 acres, 160 acres)
Gov't Lot ____ County NEZ PERCE
Lat: : : Long: : :
Address of Well Site 15TH ST + WARNER AVE City LEWISTON ID
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☒ Mud Rotary ☐ Other REVERSE AIR ROTARY

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
				PRESSURE
NEAT CEMENT	0	119	180 SKS	GROUTED
NEAT CEMENT	0	1020	594 SKS	FROM BOTTOM
NEAT CEMENT	1390	1430	9 SKS	TO SURFACE

Was ~~drive~~ FLOAT shoe used? ☒Y ☐ N Shoe Depth(s) 119 - 1020 - 1430
Was drive shoe seal tested? ☐Y ☒N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
20"	+1	119	.375	STEEL	☒	☐	☒	☐
16"	+3	1020	.375	STEEL	☒	☐	☒	☐
13 3/8	1000	1430	.330	STEEL	☐	☒	☒	☐

Length of Headpipe N/A Length of Tailpipe N/A

9. PERFORATIONS/SCREENS
☒ Perforations Method MILL CUT
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
1035	1055	1/4 x 3	480	13 3/8	STEEL	☐	☒
1130	1150	1/4 x 3	480	13 3/8	STEEL	☐	☒
1215	1235	1/4 x 3	480	13 3/8	STEEL	☐	☒
1255	1275	1/4 x 3	480	13 3/8	STEEL		X
1375	1395	1/4 x 3	480	13 3/8	STEEL		X

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
675 ft. below ground Artesian pressure N/A lb.
Depth flow encountered 1035-2360 Describe access port or control devices: 2" PIPE WITH 2" PLUG

11. WELL TESTS:
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
500	122	797	4 HRS
1270	268	943	72 HRS
1540	337	1012	80 HRS

Water Temp. 78° Bottom hole temp. 99°
Water Quality test or comments: GOOD
Depth first Water Encountered 1035

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
24	0	5	LOESS BRN		X
24	5	25	BASALT GRY		X
24	25	32	CLAY BRN + GRY		X
24	32	114	BASALT GRY		X
24	114	120	BASALT + CLAY BRN	X	
18 5/8	120	227	BASALT GRY		X
18 5/8	227	425	BASALT + CLAY GRY		X
18 5/8	425	559	BASALT GRY		X
18 5/8	559	555	BASALT BRN + GRY		X
18 5/8	555	570	BASALT GRY		X
18 5/8	570	627	BASALT GRY TO PURPLE		X
18 5/8	627	630	CLAYSTONE GRN		X
18 5/8	630	648	BASALT GRY		X
18 5/8	648	668	CLAYSTONE GRN + GRY		X
18 5/8	668	922	BASALT GRY		X
18 5/8	922	934	BASALT GRY TO RED		X
18 5/8	934	960	BASALT GRY	X	
18 5/8	960	978	BASALT GRY		X
18 5/8	978	982	BASALT GRY TO BLU	X	
18 5/8	982	1020	BASALT GRY		X
14 3/4	1020	1058	BASALT GRY + RED	X	
14 3/4	1058	1123	BASALT GRY		X
14 3/4	1123	1137	BASALT MAROON + GRY 72°	X	
	1137	1200	BASALT GRY		X
	1200	1213	BASALT MAROON + GRY		X
	1213	1232	BASALT GRY		X
	1232	1270	BASALT MAROON + GRY	X	
	1270	1360	BASALT GRY		X
	1360	1385	BASALT MAROON PORUS 75°	X	
	1385	1430	BASALT GRY		X
12 1/4	1430	1468	BASALT GRY		X
12 1/4	1468	1492	BASALT GRY + RED	X	
			CONTINUED ON SHEET #2		

Completed Depth 2617 (Measurable)
Date: Started 7-7-97 Completed 10-20-97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name HOLMAN DRILLING CORP Firm No. 108
Firm Official Arnold E. Holman Date 11-17-97
and
Supervisor or Operator Arnold E. Holman Date 11-17-97
(Sign once if Firm Official & Operator)

SHEET 1 OF 2
FORWARD WHITE COPY TO WATER RESOURCES

Figure F-2a, LOID Well #3.

Form 238-7
95

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 85-97-N-0024-000
Other IDWR No. WELL TAG D 000 3471

2. OWNER:
Name LEWISTON ORCHARDS IRRIGATION DIST
Address 1520 POWERS AVE
City LEWISTON State ID Zip 83501

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / E / S

Twp._____ North ☐ or South ☐
Rge. _____ East ☐ or West ☐
Sec. _____, _____1/4 (10 acres) _____1/4 (40 acres) _____1/4 (160 acres)
Gov't Lot _____ County_____
Lat: : : Long: : :
Address of Well Site_____
_____ City_____
(Give at least name of road + Distance to Road or Landmark)
Lt._____ Blk._____ Sub. Name_____

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other_____

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☐ Abandonment ☐ Other_____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other_____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	

Was drive shoe used? ☐Y ☐N Shoe Depth(s) _____
Was drive shoe seal tested? ☐Y ☐N How?_____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe_____ Length of Tailpipe_____

9. PERFORATIONS/SCREENS
☐ Perforations Method_____
☐ Screens Screen Type_____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
_____ft. below ground Artesian pressure _____lb.
Depth flow encountered _____ft. Describe access port or control devices:_____

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____
_____ Depth first Water Encountered _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12¼	1492	1524	BASALT GRY		X
	1524	1546	BASALT GRY + BRN 74°	X	
	1546	1569	BASALT BRN		X
	1569	1624	BASALT GRY + BRN 76.5°	X	
	1624	1674	BASALT GRY		X
	1674	1804	BASALT BRN + GRY 76°	X	
	1804	1830	BASALT GRY		X
	1830	1888	BASALT GRY FORUS 76.5°	X	
	1888	1965	BASALT GRY		X
	1965	2028	BASALT GRY + BRN		X
	2028	2213	BASALT GRY		X
	2213	2242	BASALT GRY FRACTURED 77°	X	
	2242	2312	BASALT GRY		X
	2312	2333	BASALT GRY + RED		X
	2333	2349	BASALT GRY		X
	2349	2360	BASALT GRY CLINKERY 80°	X	
	2360	2617	BASALT GRY 78°		X
			ALL CASING AND LINER WERE GROUTED WITH NEAT CEMENT USING CEMENT FLOAT SHOES AND INJECTION LINE FROM SURFACE		

Completed Depth 2617 (Measurable)
Date: Started 7-7-97 Completed 10-30-97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name HOLMAN DRILLING CORP Firm No. 108
Firm Official Arnold E. Holman Date 11-17-9
and
Supervisor or Operator Arnold E. Holman Date 11-17-9
(Sign once if Firm Official & Operator)

SHEET # 2 OF 2

FORWARD WHITE COPY TO WATER RESOURCES

Figure F-2b, LOID Well #3.

DE: 1-16-03 85

Form 238-7
11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0022736
DRILLING PERMIT NO. 784458
Other IDWR No. WATER RIGHT No. 85-15356

2. OWNER:
Name LEWISTON ORCHARDS IRRIGATION DIST.
Address 1520 POWERS AVE
City LEWISTON State ID Zip 83501

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S — X

Twp. 35 North ☒ or South ☐
Rge. 05 East ☐ or West ☒
Sec. 22, NW 1/4, NE 1/4 NW 1/4
Gov't Lot ____ County NEZ PERCE
Lat: : : Long: : :
Address of Well Site 1520 POWERS AVE.
City LEWISTON
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
CEMENT	0	265	330 SKS	TREMMIE
CEMENT	856	866	20 SKS	TREMMIE

Was drive shoe used? ☐Y ☒ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
20"	0	457	.375	STEEL	☒	☐	☒	☐
18"	444'	866	.375	STEEL	☒	☐	☒	☐
16"	SEE ATTACHED				☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
Perforations Method ____
Screens Screen Type CARBON STEEL

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
SEE ATTACHED						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
845 ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
1000+GPM	N/A	N/A	4 HRS
DRILL STEM AT 1600'			

Water Temp. 76°F - 81° Bottom hole temp. 81°F
Water Quality test or comments: ____
Depth first Water Encounter 1026

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
			SEE ATTACHED SHEET		

RECEIVED
JAN 13 2003
Department of Water Resources

Completed Depth 1625 FEET (Measurable)
Date: Started 9/12/02 Completed 12/16/02

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name GEO-TECH EXPLORATIONS Firm No. 610
Firm Official [signature] Date 1/8/03
and
Driller or Operator [signature] Date 1-8-03
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure F-3a, LOID Well #4.

Geo-Tech Explorations, Inc.
19700 SW Teton
Tualatin, OR 97062
Ph: (503) 692-6400, Fax: (503) 692-4759

Well Name:	Lewiston Orchards Irrigation District Well No. 4
Well Tag No.	[redacted]
Drilling Permit #	784458
Well ID #	355519
Water Right No.	85-15356

Bore Dia.	From	To	LITHOLOGIC LOG	Water Yes	Water No
24"	0	2	Fill Rock		x
" "	2	3	Top Soil		x
" "	3	18	Silty Clay, Brown, some gravels		x
" "	18	60	Basalt weathered fractured		x
" "	60	76	Clay brown sticky		x
" "	92	260	Basalt fractured medium		x
" "	260	265	Basalt fractured lenses of shale black coal like		x
20"	265	283	Basalt fractured lenses of shale black coal like		x
" "	283	310	Basalt fractured with gray claystone		x
" "	310	320	Basalt medium		x
" "	320	371	Claystone soft green some tan		x
" "	371	396	Basalt cuttings rounded gray with clay foam color brown to green		x
" "	396	423	Med soft cuttings same as above foam color brown		x
" "	423	456	Extremely soft holding back on bit cuttings same as above foam color brownish		x
" "			gray. Large chunks of gray claystone on bit when removed. Caving problems		x
" "			from 230' to 456'		x
" "	456	465	Basalt vesicular black		x
" "	465	487	Basalt gray to black medium		x
" "	487	492	Basalt vesicular black		x
" "	492	640	Basalt fractured black		x
" "	640	680	Claystone brown		x
" "	680	701	Basalt broken weathered		x
" "	701	735	Basalt fractured black		x
" "	735	759	Basalt gray hard		x
" "	759	767	Basalt vesicular black		x
" "	767	837	Basalt fractured black		x
" "	837	866	Basalt fractured black some red		x
18"	866	952	Basalt black		x
" "	952	963	Basalt black with brown claystone		x
" "	963	988	Basalt black fractured		x
" "	988	1028	Basalt black		x
" "	1028	1049	Basalt black with brown scoria	x	
" "	1049	1060	Basalt black		x
" "	1060	1110	Basalt black with brown		x
" "	1110	1168	Basalt black		x
" "	1168	1182	Basalt black with brown scoria	x	
" "	1182	1208	Basalt black		x
" "	1208	1229	Basalt black with gray		x
" "	1229	1246	Basalt black with brown scoria	x	
" "	1246	1252	Basalt black		x
" "	1252	1264	Scoria black		x
" "	1264	1266	Basalt black with gray		x
12"	1266	1390	Basalt black with gray		x
" "	1390	1415	Scoria brown	x	
10"	1417	1577	Basalt black		x
" "	1577	1601	Basalt black with brown	x	
" "	1601	1625	Basalt black		x

Figure F-3b, LOID Well #4

Figure F-3c, LOID Well #4

Geo-Tech Explorations, Inc.
19700 SW Teton
Tualatin, OR 97062
Ph: (503) 692-6400, Fax: (503) 692-4759

Well Name:	Lewiston Orchards Irrigation District Well No. 4
Well Tag No.	D0022736
Drilling Permit #	784458
Well ID #	355519
Water Right No.	85-15356

Bore Dia.	From	To	LITHOLOGIC LOG	Water Yes	Water No
24"	0	2	Fill Rock		x
" "	2	3	Top Soil		x
" "	3	18	Silty Clay, Brown, some gravels		x
" "	18	60	Basalt weathered fractured		x
" "	60	76	Clay brown sticky		x
" "	92	260	Basalt fractured medium		x
" "	260	265	Basalt fractured lenses of shale black coal like		x
20"	265	283	Basalt fractured lenses of shale black coal like		x
" "	283	310	Basalt fractured with gray claystone		x
" "	310	320	Basalt medium		x
" "	320	371	Claystone soft green some tan		x
" "	371	396	Basalt cuttings rounded gray with clay foam color brown to green		x
" "	396	423	Med soft cuttings same as above foam color brown		x
" "	423	456	Extremely soft holding back on bit cuttings same as above foam color brownish		x
" "			gray. Large chunks of gray claystone on bit when removed. Caving problems		x
" "			from 230' to 456'		x
" "	456	465	Basalt vesicular black		x
" "	465	487	Basalt gray to black medium		x
" "	487	492	Basalt vesicular black		x
" "	492	640	Basalt fractured black		x
" "	640	680	Claystone brown		x
" "	680	701	Basalt broken weathered		x
" "	701	735	Basalt fractured black		x
" "	735	759	Basalt gray hard		x
" "	759	767	Basalt vesicular black		x
" "	767	837	Basalt fractured black		x
" "	837	868	Basalt fractured black some red		x
18"	868	952	Basalt black		x
" "	952	963	Basalt black with brown claystone		x
" "	963	988	Basalt black fractured		x
" "	988	1028	Basalt black		x
" "	1028	1049	Basalt black with brown scoria	x	
" "	1049	1060	Basalt black		x
" "	1060	1110	Basalt black with brown		x
" "	1110	1168	Basalt black		x
" "	1168	1182	Basalt black with brown scoria	x	
" "	1182	1208	Basalt black		x
" "	1208	1229	Basalt black with gray		x
" "	1229	1246	Basalt black with brown scoria	x	
" "	1246	1252	Basalt black		x
" "	1252	1264	Scoria black		x
" "	1264	1266	Basalt black with gray		x
12"	1266	1390	Basalt black with gray		x
" "	1390	1415	Scoria brown	x	
10"	1417	1577	Basalt black		x
" "	1577	1601	Basalt black with brown	x	
" "	1601	1625	Basalt black		x

Geo-Tech Explorations, Inc.
19700 SW Teton
Tualatin, OR 97062
Ph: (503) 692-6400, Fax: (503) 692-4759

Well Name:	Lewiston Orchards Irrigation District Well No. 4
Well Tag No.	D0022736
Drilling Permit #	784458
Well ID #	355519
Water Right No.	85-15356

Bore Dia.	From	To	LITHOLOGIC LOG	Water Yes	Water No
24"	0	2	Fill Rock		x
" "	2	3	Top Soil		x
" "	3	18	Silty Clay, Brown, some gravels		x
" "	18	60	Basalt weathered fractured		x
" "	60	76	Clay brown sticky		x
" "	92	260	Basalt fractured medium		x
" "	260	265	Basalt fractured lenses of shale black coal like		x
20"	265	283	Basalt fractured lenses of shale black coal like		x
" "	283	310	Basalt fractured with gray claystone		x
" "	310	320	Basalt medium		x
" "	320	371	Claystone soft green some tan		x
" "	371	396	Basalt cuttings rounded gray with clay foam color brown to green		x
" "	396	423	Med soft cuttings same as above foam color brown		x
" "	423	456	Extremely soft holding back on bit cuttings same as above foam color brownish		x
" "			gray. Large chunks of gray claystone on bit when removed. Caving problems		x
" "			from 230' to 456'		x
" "	456	465	Basalt vesicular black		x
" "	465	487	Basalt gray to black medium		x
" "	487	492	Basalt vesicular black		x
" "	492	640	Basalt fractured black		x
" "	640	680	Claystone brown		x
" "	680	701	Basalt broken weathered		x
" "	701	735	Basalt fractured black		x
" "	735	759	Basalt gray hard		x
" "	759	767	Basalt vesicular black		x
" "	767	837	Basalt fractured black		x
" "	837	866	Basalt fractured black some red		x
18"	866	952	Basalt black		x
" "	952	963	Basalt black with brown claystone		x
" "	963	988	Basalt black fractured		x
" "	988	1028	Basalt black		x
" "	1028	1049	Basalt black with brown scoria	x	
" "	1049	1060	Basalt black		x
" "	1060	1110	Basalt black with brown		x
" "	1110	1168	Basalt black		x
" "	1168	1182	Basalt black with brown scoria	x	
" "	1182	1208	Basalt black		x
" "	1208	1229	Basalt black with gray		x
" "	1229	1246	Basalt black with brown scoria	x	
" "	1246	1252	Basalt black		x
" "	1252	1264	Scoria black		x
" "	1264	1266	Basalt black with gray		x
12"	1266	1390	Basalt black with gray		x
" "	1390	1415	Scoria brown	x	
10"	1417	1577	Basalt black		x
" "	1577	1601	Basalt black with brown	x	
" "	1601	1625	Basalt black		x

Figure F-3d, LOID Well #4

Figure F-3e, LOID Well #4

Geo-Tech Explorations, Inc.
19700 SW Teton
Tualatin, OR 97062
Ph: (503) 692-6400, Fax: (503) 692-4759

Well Name:	Lewiston Orchards Irrigation District Well No. 4
Well Tag No.	D0022736
Drilling Permit #	784458
Well ID #	355519
Water Right No.	85-15356

Bore Dia.	From	To	LITHOLOGIC LOG	Water Yes	Water No
24"	0	2	Fill Rock		x
" "	2	3	Top Soil		x
" "	3	18	Silty Clay, Brown, some gravels		x
" "	18	60	Basalt weathered fractured		x
" "	60	76	Clay brown sticky		x
" "	92	260	Basalt fractured medium		x
" "	260	265	Basalt fractured lenses of shale black coal like		x
20"	265	283	Basalt fractured lenses of shale black coal like		x
" "	283	310	Basalt fractured with gray claystone		x
" "	310	320	Basalt medium		x
" "	320	371	Claystone soft green some tan		x
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" "	396	423	Med soft cuttings same as above foam color brown		x
" "	423	456	Extremely soft holding back on bit cuttings same as above foam color brownish		x
" "			gray. Large chunks of gray claystone on bit when removed. Caving problems		x
" "			from 230' to 456'		x
" "	456	465	Basalt vesicular black		x
" "	465	487	Basalt gray to black medium		x
" "	487	492	Basalt vesicular black		x
" "	492	640	Basalt fractured black		x
" "	640	680	Claystone brown		x
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" "	701	735	Basalt fractured black		x
" "	735	759	Basalt gray hard		x
" "	759	767	Basalt vesicular black		x
" "	767	837	Basalt fractured black		x
" "	837	866	Basalt fractured black some red		x
18"	866	952	Basalt black		x
" "	952	963	Basalt black with brown claystone		x
" "	963	988	Basalt black fractured		x
" "	988	1028	Basalt black		x
" "	1028	1049	Basalt black with brown scoria	x	
" "	1049	1060	Basalt black		x
" "	1060	1110	Basalt black with brown		x
" "	1110	1168	Basalt black		x
" "	1168	1182	Basalt black with brown scoria	x	
" "	1182	1208	Basalt black		x
" "	1208	1229	Basalt black with gray		x
" "	1229	1246	Basalt black with brown scoria	x	
" "	1246	1252	Basalt black		x
" "	1252	1264	Scoria black		x
" "	1264	1266	Basalt black with gray		x
12"	1266	1390	Basalt black with gray		x
" "	1390	1415	Scoria brown	x	
10"	1417	1577	Basalt black		x
" "	1577	1601	Basalt black with brown	x	
" "	1601	1625	Basalt black		x

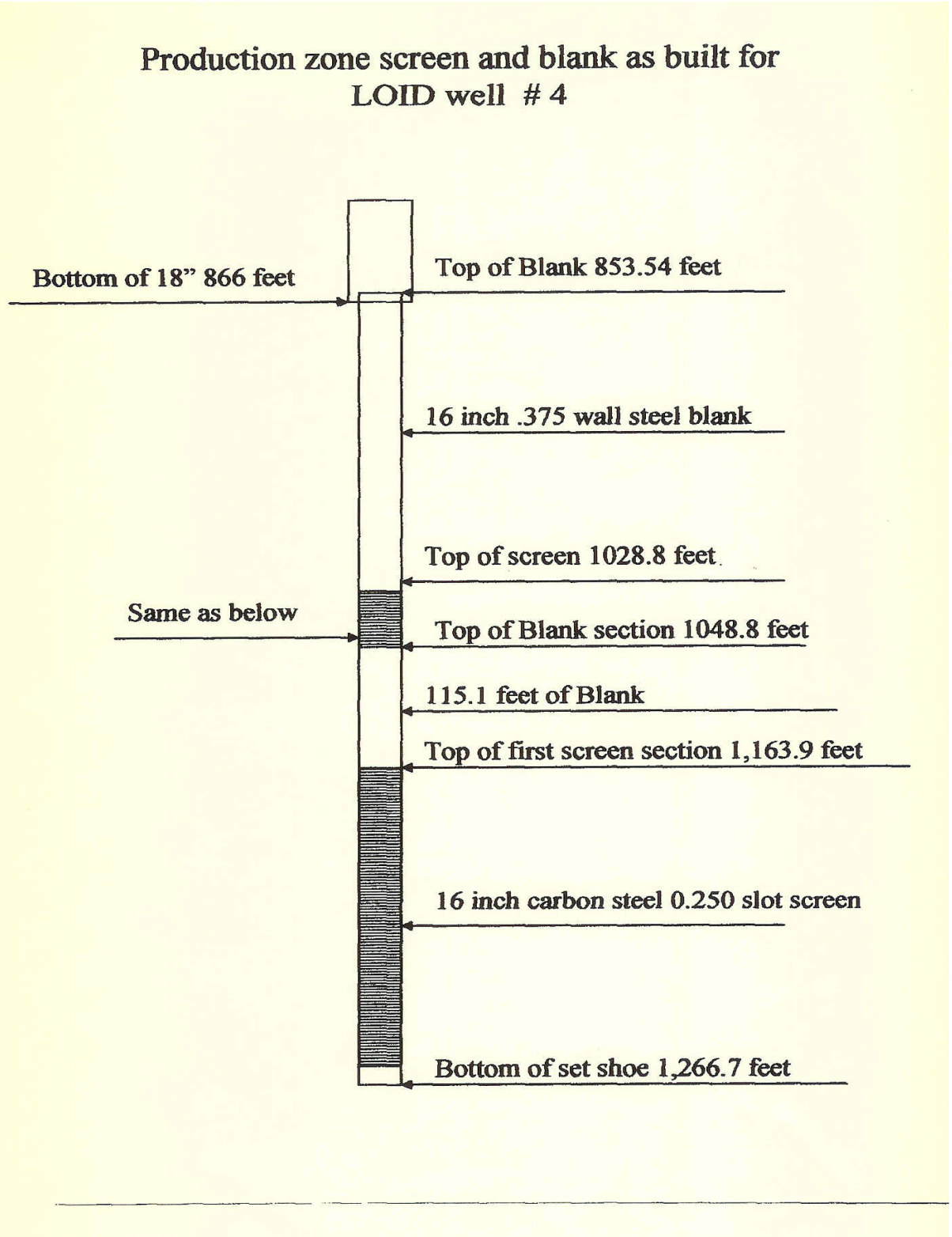

Figure F-3f, LOID Well #4

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APPENDIX G DWSP Plan Certification Checklist

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Drinking Water Source Protection Plan Certification Checklist

Public Water System Name: _____

Local Contact: _____

Date Returned to Water System: _____

Drinking Water Source Protection Plan **Approved** _____ **Disapproved** _____

Idaho Source Water Protection Plan guidance - *Protecting Drinking Water Sources in Idaho, August 2000* Pg. 28 of the document states "If a plan is found to satisfy all eight elements, then the community will be recognized by DEQ as having a "State Certified Plan". Additionally, supporting information describing each of the required elements is referenced as well.

Required Elements of Certified Drinking Water Source Protection Plan Element Addressed

Element 1 Description of Planning Team Participant Roles and Duties
Yes **No**
(Reference *Step 1:* Formation *of a Community Planning Team*)

Element 2 Delineation of the Source Water Protection Area
Yes **No**
(Reference *Step 2: Delineation of the Land Area to be Protected*)

Element 3 An Inventory of Potential Sources of Contamination
Yes **No**
(Reference *Step 3: Identification of Potential Contaminant Sources*)

Element 4 Management Tools and Protection Measures that will be Pursued to Manage Potential Sources of Contamination
Yes **No**
(Reference *Step 4: Development and Implementation of a Management Plan for Source Water Protection Area*)

Element 5 A Contingency Plan
Yes **No**
(Reference *Step 5a: Development of a Contingency Plan*)

Element 6 A Protection Strategy for New Wells or Intakes
Yes **No**
(Reference *Step 5b: Planning for Future Drinking Water Sources*)

Element 7 A Public Participation and Education component
Yes **No**

Element 8 An Implementation Strategy
Yes **No**
(what will be done, when will it be done, and by whom)

If a plan is found to satisfy all eight elements, then the community will be recognized by DEQ as having a "State Certified Plan". This certification will cover a three year period, after which re-certification can be pursued by the community. Re-certification will include an evaluation of the community's success in implementing source water protection as a measure of the community's strategy. (element 8)

Reviewers	Agency/Affiliation
_____	_____
_____	_____
_____	_____
_____	_____

APPENDIX H Emergency Response Flow Chart

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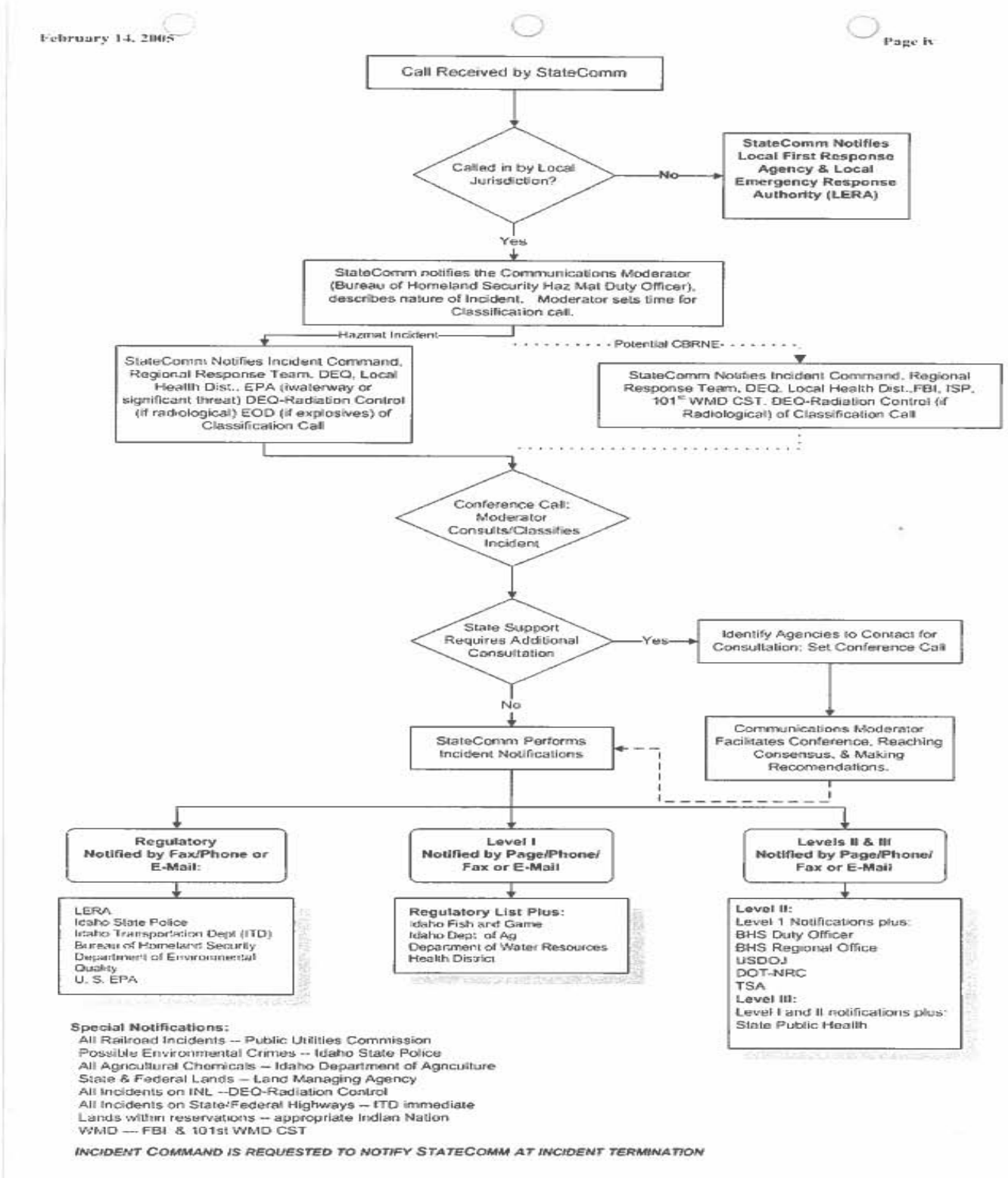

Figure H. Emergency Response Flow Chart.

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APPENDIX I City of Lewiston Water Rights

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CITY OF LEWISTON WATER RIGHT CLAIMS					
IDENTIFICATION NO. WATER RIGHT CLAIM	PRIORITY DATE	LOCATION	AMOUNT CLAIMED		STATUS OF SOURCE
			CFS	GALS.	
A86-04034	6/1/1890	Clearwater River Intake	10.7	6,915,110	Primary Intake
A86-04032	6/1/1951	Well #2	1	646,272	Irrigation- Standby Domestic
A85-02099	8/6/1953	Well #3	2.67	1,725,546	Irrigation - Standby domestic
A85-04017	7/1/1960	Well #1	4	2,585,088	Standby Domestic/Fire Flow
A85-04019	7/1/1960	Well #4	2.3	1,486,425	Domestic Use
A85-02131	9/25/1964	Supplements for well #4/0.7 #3/1.2, #1//1.0, #2/1.0	3.9	2,520,460	See status of wells 1, 2, 3, & 4
A85-07015	1/15/1970	Well #5	0.85	578,684	Operational
A85-07158	6/23/1977	Well #5	1.38	891,855	Operational
A86-07090	9/13/1978	Clearwater River Intake	7.9	5,105,548	Primary Intakes
A86-07324	10/7/1993	Clearwater River Intake	18.6	12,020,659	Secondary Intakes
A85-07601	7/7/1997	Well #6	1.11	717,362	Irrigation/Domestic
		Total	**54.41**	**35,193,009**	

Figure I-1, City of Lewiston Water Rights Claims.

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APPENDIX J Lewiston Orchards Irrigation District Water Rights

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LOID WATER RIGHT CLAIMS					
IDENTIFICATION NO. WATER RIGHT CLAIM	**PRIORITY DATE**	**LOCATION**	**AMOUNT CLAIMED**		**STATUS OF SOURCE**
			CFS	**GALS.**	
85-7428	2-28-1985	Well #2	2.13		Municipal
85-7638	4-12-1997	Well #3	2.76		Municipal
85-15356	11-16-2007	Well #4	3.34		Municipal
		Total	**8.32**		

Figure J-1, LOID Rights Claims

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