Washington State Penitentiary
Walla Walla, WA

Remedial Investigation/ Feasibility Study (RI/FS) Final Work Plan

Produced for:

Toxics Cleanup Program
Eastern Regional Office
Washington State Department of Ecology
Spokane, Washington

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List of Abbreviations and Acronyms

AOCs	areas of concern
ARARs	applicable or relevant and appropriate requirements
COC	Chain of Custody
CSI/A	Contaminant Source Identification/Assessment
CSM	conceptual site model
DCI	Washington State Department of Corrections, Correctional Industries
DOC	Washington State Department of Corrections
E & E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
FS	Feasibility Study
GE	General Electric Apparatus and Engineering Services
HWA	HWA Geosciences, Inc.
LUST	leaking underground storage tank
MTCA	Model Toxics Control Act
O & M	Operations and Maintenance
PA	Preliminary Assessment
PCB	Polychlorinated biphenyls
PCE	tetrachloroethene
PCS	petroleum contaminated soil
PLP	Potentially Liable Party
QA/QC	quality assurance and quality control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SVOCs	Semi-volatile organic compounds

List of Abbreviations and Acronyms (Cont.)

TCE	trichloroethylene
TDS	Total Dissolved Solids
TEE	Terrestrial Ecological Evaluation
TPH	Total Petroleum Hydrocarbons
TPH-D	Total Petroleum Hydrocarbons-Diesel
UST	Underground Storage Tank
VOCs	volatile organic compounds
WSP	Washington State Penitentiary

1 Introduction

On behalf of the Washington State Department of Ecology (Ecology), Ecology and Environment, Inc., (E & E) prepared a Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Washington State Penitentiary (WSP), located in southeastern Washington on the northwestern boundary of the town of Walla Walla (Figure 1). This Work Plan (E&E 2009) presents the approach to complete a Remedial Investigation (RI) that will provide the data necessary to conduct a Feasibility Study (FS). The FS will evaluate remedial options for suspected contaminated soil and groundwater on the grounds of the WSP and within the WSP Landfill.[1]

The Washington State Department of Corrections (DOC) is the Potential Liable Party (PLP) responsible for completing the RI/FS at WSP. DOC retained Parametrix, Inc. to implement the RI/FS, including updating this RI/FS Work Plan with specific information regarding Areas of Concern, supporting historical information, investigation rationale, media to be sampled, sampling methods, sample types, sampling locations, chemicals to be analyzed, and the phasing and scheduling of the RI/FS. This Final RI/FS Work Plan retains the structure and much of the content of the Work Plan prepared by E & E), incorporates updates and revisions from a supplemental data search completed by Parametrix, and has been approved by Ecology subsequent to detailed discussions between Ecology and DOC.

1.1 Objectives and Purpose

The objectives of the RI/FS are as follows:

- To determine the source of the chlorinated solvents observed in downgradient groundwater monitoring wells.
- To determine whether any other historical activities at the WSP have caused on-site contamination that could affect off-site groundwater or surface water.

[1] The WSP Landfill has also been referred to as the "Construction Demolition Landfill" (CDL), "Construction Debris Landfill," and "Construction Rubble Landfill."

- To characterize the nature and extent of any contamination that can be reasonably identified in areas of concern (AOCs) at the WSP site.
- To determine if any known contaminants are migrating onto WSP property from upgradient suspect locations.

1.2 Precipitating Events

The RI/FS described in this Work Plan is stipulated under a 2008 Agreed Order (No. 6200) between Ecology and the Washington Department of Corrections. Two independent events precipitated the concerns and investigations that led to the Agreed Order. In 1991 an anonymous complainant alleged that hazardous waste was improperly disposed of in the WSP Landfill and the former power plant storm drain. In response to this allegation, Ecology conducted an Initial Investigation in 1992. This investigation was followed by an early notice letter informing WSP that it is a potentially liable party (PLP) under the state Model Toxics Control Act (MTCA). The WSP Landfill was added to Ecology's Confirmed and Suspected Contamination Sites List on June 8, 1992 (Ecology 1992).

The second event involved an assessment of results from groundwater sampling conducted in 1993 at locations west of WSP. Chlorinated solvents were detected in groundwater samples collected from wells located upgradient of the Sudbury Road Municipal Landfill (Sudbury Landfill) and downgradient of WSP Landfill (Figure 1) (Ecology 1993). The wells are owned and operated by the Sudbury Landfill. This landfill is approximately 2 miles to the west of the WSP.

From April 3, 1995, until June 29, 1995, Ecology conducted a Site Hazard Assessment at the WSP Landfill. Based on the data collected during this assessment, the WSP was given a ranking of "3" on August 22, 1995 (A "1" represents the highest relative risk, and a "5" is the lowest). The "3" ranking is based on the potential for human exposure through the groundwater pathway. Due to this ranking, the WSP was placed on the Hazardous Sites List.

1.3 Definition of the Site

For the purpose of this work plan, the "site" is defined by the property boundaries of the WSP, including the WSP facilities and the WSP Landfill. The site definition may be updated by new information as it becomes available. A site area map can be seen in Figure 1.

1.4 Document Organization

This work plan contains the following sections:

- **Section 1:** Introduction – summary of the scope and organization
- **Section 2:** Site Description and History – Description of current and historical activities at the WSP as well as the background and setting of the WSP
- **Section 3:** Evaluation of Existing Data and Identification of Data Gaps – Review of past investigations and current data gaps at the WSP
- **Section 4:** Statement of Work – Description of sampling objectives and data collection process
- **Section 5:** Submittal Requirements – Description of the initial submittal requirements of the RI/FS

The following RI documents are attached to this Work Plan:

- **Appendix A:** Sampling and Analysis Plan (SAP)
- **Appendix B:** Quality Assurance Project Plan (QAPP)
- **Appendix C:** Health and Safety Plan (HASP)

1.5 Limitations

It is possible that the findings produced by executing this Work Plan may not be sufficient to complete the FS. If this occurs, an additional phase of the RI will be defined to fill in any remaining data gaps that may impede completion of the FS.

Due to the size of the WSP facility and budgetary limitations, the RI does not examine all areas of the site equally. Instead, it focuses on AOCs identified by a review of available information about past investigations and activities that were known to have involved hazardous materials. It is assumed that current operations are in compliance with applicable regulations. If new information becomes available about past activities or current operations that suggest additional sources of contamination may exist, then further investigation may be necessary.

One of the AOCs is located on a privately owned parcel, and many of the areas within the penitentiary have strict access limitations. In addition, the WSP has a strict policy for the types of tools and equipment that can be brought into the confined areas of the penitentiary (see Appendix D). Therefore, accessibility to sampling locations and the types of equipment permitted in some areas may be limited.

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2 Site Description and History

2.1 Location

The WSP is an active state corrections facility located in the south-eastern corner of the state of Washington in the town of Walla Walla (Figure 1). The current address is 1313 N. 13th Avenue. The site consists of the WSP facility, the closed WSP Landfill, and the surrounding undeveloped and agricultural land. The WSP property, including all parcels, structures, and improvements both inside and outside the confined areas, has been expanded numerous times over the years and currently occupies 560 acres. The WSP Landfill is northwest of the facility and occupies 7.7 acres. The site is situated on the northern slope of the east-west-trending Walla Walla Valley. The valley is gently undulating and of low local relief. The site elevation generally ranges from 850 to 950 feet above mean sea level with general sloping toward the west (HWA 1998).

The facility is located within the SE ¼ section 13 and the NE ¼ Section 24, Township 7 North, Range 35 East, and the SW ¼ Section 18, and the NW ¼ Section 19, Township 7 North, Range 36 east, Willamette Meridian in Walla Walla County, Washington.

The site is bounded on the east by privately owned land and on the west by the wastewater application section of the Sudbury Landfill and several upgradient groundwater monitoring wells owned by Sudbury Landfill. State Highway 125 and more privately owned land bounds the site on the north. The site is bounded on the south by Mill Creek and a drainage pond located on a privately owned parcel that receives stormwater from the WSP and other properties in its vicinity. Properties to the east and south of the WSP include junkyards, industrial, fuel and agricultural-chemical facilities. A Burlington Northern Santa Fe Railroad line that serves local industries is located along the southern edge of the property. The city of Walla Walla also bounds the site on the south. The WSP is topographically and hydraulically upgradient of the Sudbury Landfill and downgradient of properties to the east and south (Figure 1).

The city of Walla Walla also bounds the site on the south. The WSP is topographically and hydraulically upgradient of the Sudbury Landfill (Figure 1).

2.2 Historical and Current Facility Use

In 1883, the Territorial Governor authorized the selection of a suitable site for a penitentiary. In 1885, Walla Walla was chosen. Construction began in 1886 using bricks manufactured in nearby Dixie from the fine clay beds there. The WSP opened for operation on May 10, 1887, as the historical starting point for Washington State Corrections. To provide needed jobs for the prisoners, a one-story jute mill for the manufacture of sacks was built in 1892. In 1921, the jute mill was transformed into a license-plate factory, which continues to operate today, producing approximately 3,000,000 sets of plates each year. Today, the property consists of multiple parcels that total 560 acres (DOC 2009a).

The WSP currently consists of approximately 90 buildings on site, and active expansion projects are under way (Figure 2). WSP employs approximately 1,289 staff members. Four different institutions house offenders at different custody levels: Maximum, Close, Medium, and Minimum security (DOC 2009a).

The Washington State Department of Corrections, Correctional Industries (DCI) provides jobs for offenders in a metal fabrication shop, a license plate factory, a welding shop, and a garment factory, where offender clothing, staff uniforms, and other similar items are made. There is also a sign shop that makes road signs for the state and counties, and a furniture refurbishing shop that does wood and upholstery restoration (DOC 2009a). Other site activities that provide jobs for the offenders include food service, janitorial, and various prison operation and maintenance (O & M) functions including a photo processing shop; X-ray, dental and medical laboratories; laundry and dry cleaning operations; motor pool; fix-it shop; and grounds maintenance facility (Ecology 2000).

2.3 Environmental Setting

2.3.1 Regional and Site Geology

The stratigraphy of the WSP area consists of a basement rock composed of Columbia River Basalt Group superimposed by a poorly defined sequence of weakly consolidated sediments. The sequence is comprised of 250 to 300 feet of older basal clay overlain by 200 feet of lacustrine deposits comprised of gravels and sand interbedded with silts and clay. This unit is overlain by approximately 30 to 60 feet of Touchet Beds consisting of semi-consolidated lacustrine silt and alluvial sand and gravel deposits. Surficial deposits in the area of the WSP are mapped as the Palouse silt formation, typically consisting of loess (windblown non-stratified glacial silt) approximately 25 to 47 feet thick (Ecology 2000).

2.3.2 Regional and Site Hydrology

Two main aquifers occur in the Walla Walla region and are referenced as the gravel aquifer and the deeper basalt aquifer. The deeper basalt aquifer is located within the Columbia River basalt group. The shallow aquifer is located on top of the clay unit within the lacustrine unit of gravels and sands interbedded with silts and clays (Ecology 2000). The gravel aquifer is approximately 200 feet thick in the WSP area and is overlain by the

Palouse Formation loess (HWA 1998). Depth to groundwater in the shallow aquifer is typically 30 to 65 feet below ground surface (bgs). Depth to groundwater in the deep basalt aquifer is approximately 500 feet bgs (Ecology 2000).

The two aquifers are separated by 250 to 300 feet of clay. The basal clay unit serves as an effective confining unit between the deep basalt aquifer system and the groundwater in the upper-most sedimentary sequence. The shallow ground water aquifer is a source of surface water recharge and irrigation supply wells. The deep basalt aquifer is the source for public groundwater supply wells in the area (Ecology 1999).

A number of VOCs have been detected in the shallow sedimentary aquifer, including trichlorofluoromethane, tetrachloroethene (PCE), trichloroethylene (TCE), and chloroform. These contaminants were detected in the upgradient Sudbury Landfill groundwater monitoring wells and the WSP Landfill groundwater monitoring wells. The contaminants have fluctuated below and above the MTCA Method A cleanup standards from 1991 until 1998, the only period of groundwater monitoring data available for review. According to sample results they have been persistent during the time period when samples were collected. Such characteristics suggest a continuous source may be present in the vicinity or upgradient. Because of the historical operations at the WSP as well as the allegations made in 1991, the WSP is a potential source of the contamination (Ecology 2000).

The closest perennial surface water feature to the WSP property is Mile 6 of Mill Creek (Figure 3). Mile 6 is located ¾ miles south of the prison complex. According to USGS topographic maps, the main branch of this drainage network flows southwest across the upland terrace and disappears approximately ½ mile north of Mile 4¾ of Mill Creek. According to past investigations conducted in this area, this point, where the drainage network disappears, is the area where the majority of the run-off from the WSP discharges into shallow groundwater (Figure 3) (Ecology 2000). However, except in cases of very high precipitation, stormwater runoff from the WSP property is believed to infiltrate into the ground before reaching this point.

It is estimated that the probable point where groundwater, that may include stormwater from WSP, discharges to Mill Creek is between Mile 3 and Mile 4 (Figure 3). This location is about 2 miles southwest of the WSP property boundary and nearly three miles from the WSP facility and the WSP Landfill (Ecology 2000).

Mill Creek joins the Walla Walla River at about River Mile 3½ (Figure 4). This location is the apparent area of discharge for the shallow groundwater that could include groundwater flow from WSP. A major tributary, the Touchet River, joins the Walla Walla River at about Mile 21½. Wetland and riparian zones are abundant along Mill Creek and the Walla Walla River for 15 miles downstream (Ecology 2000).

WSP records indicate that one of the irrigation wells (No. 4) is located near the WSP Landfill. As of the time of the initial investigation conducted by Ecology this well was left open and not abandoned properly (Ecology 1992b). The log of this well shows an

upper well casing 24 inches in diameter to a depth of 525 feet and completion as an open hole from 525 feet to the depth of the basalt aquifer at approximately 1,004 feet bgs. An open well casing observed at the WSP Landfill site by Ecology in 1992 was believed to have been well No. 4. The Ecology data sheet described the well as open and not properly abandoned, and it noted that a copy of the Ecology water well closure regulations would be sent to the WSP officials. That well was subsequently closed and abandoned by sealing and capping; however, it is unknown if during the time that the well was open contamination was able to migrate to the deeper basalt aquifer (Parametrix 1995).

2.3.3 Stormwater Drainage

Stormwater at the WSP flows into one of two drainage basins, one to the north and one to the south (Figure 5). These basins drain to respective natural drainage channels to the north and south of the facility. Engineering controls on the WSP site, such as drains, corrugated metal pipes, man-made ponds, and culverts, direct stormwater into either the north or south drainage channel (HWA 1998). According to Figure 5, the majority of the stormwater is diverted into the south drainage channel (Parametrix 1995).

The northern drainage basin, shown as basin No. 4 in Figure 5, collects agricultural runoff from the fields to the north and east, as well as runoff from a small area of the prison complex, including the Intensive Management Unit. This basin is approximately 120 acres and directs stormwater to the east-west-trending channel that runs through the culvert underneath the WSP Landfill. This channel is dry most of the year.

Two ponds were constructed in the drainage channel northwest of the WSP Landfill in the 1940s and still exist on site. They were designed to supply water for irrigation, but are no longer used for that. Four catch basins that were installed for construction of the parking lot seen in Figure 2 are also present in the drainage channel, east of the WSP Landfill. These catch basins reportedly collect stormwater from surrounding areas and discharge it to the culvert that runs beneath the eastern portion of the WSP Landfill, eventually draining to one of the constructed ponds (HWA 1999). Further details about the flow of the drainage channel can be seen in Figures 3 and 6.

During a recent site visit on April 8, 2009 the outlet of the culvert was not visible on the west side of the landfill. It is possible that the original culvert outlet was buried as the landfill expanded or from erosion of the fill material. The condition of the culvert under the WSP Landfill could not be determined from a visual inspection of the area (Ecology 2009a).

2.3.4 Climate

With an average precipitation of up to 18 inches, the Walla Walla area is considered arid. August through November are the driest months (Ecology 1999).

2.4 Environmental Site Regulation and Compliance History

The WSP has a long-standing compliance history with the Department of Ecology. According to Ecology records, compliance problems at the facility were first reported in March 1990 immediately after the WSP was declared a large quantity generator. At this time, WSP was penalized for improper waste management, shipping, labeling, and handling. In November 1994, WSP was again cited for numerous large quantity generator violations. During a 2001 hazardous waste inspection, several more hazardous waste violations were found.

The most recent hazardous waste administrative order was issued in 2002 by Ecology to WSP. In this order, WSP was penalized $54,000, which was reduced to $43,200 because of implementation of an employee hazardous waste training program and creation of an on-site environmental compliance position. WSP completed a contingency plan in 2004 and a facility inspection plan in 2005 to further facilitate regulatory compliance.

The waste generator status of WSP, which is based on the amount of dangerous waste generated each month, has gone from large to medium to small quantity generator basis in the last 10 years. From 2000 to 2004, WSP was a large quantity generator. WSP was a medium quantity generator from 2004 until 2005, and since then has been a small quantity generator. Several hazardous waste inspections have been conducted over the last 20 years to confirm that WSP was filing the correct generator status and complying with hazardous waste regulations. Summaries of these inspections are given below (Ecology 2009b).

On August 1, 1990, a hazardous waste inspection was conducted at WSP. During this inspection, several compliance problems were observed, including improper waste discharges; accumulation past time limit; and failure to designate wastes, label hazardous waste containers, file a manifest exception report, conduct facility inspections, have a contingency report, or have a training plan (Ecology 1994).

Another hazardous waste inspection was conducted on November 8, 1994, when further violations were observed, including failure to designate waste according to required procedures, send dangerous waste to a permitted facility, provide required notice of a spill or discharge to Ecology, adequately label containers, provide a personnel training program, develop a schedule for maintenance and inspection of all monitoring equipment, prepare a contingency plan, or conduct weekly inspections of dangerous waste accumulation areas and containers. Documented waste materials included antifreeze, perchlorethylene sludge, lacquer thinner, still bottoms, spent methylene chloride, photochemicals, and petroleum naphtha solvent (Ecology 1999).

Additional environmental incidents were a report of a leaky underground storage tank (LUST) and alleged dumping of chemicals into the powerhouse stormwater drain and into the WSP Landfill. The LUST, reported to Ecology in April 1996, was a 500-gallon diesel tank with a hole in the end. DOC reported to Ecology that the UST had been removed and 30 to 35 tons of petroleum-contaminated soil excavated for disposal at the Sudbury Landfill.

2.5 WSP Landfill History

The WSP Landfill served as the principal disposal site for DOC construction and demolition debris, ash from the penitentiary boiler, and yard and farm waste from the former state farm from the early 1970s until 1987 (HWA 1998). According to DOC the facility was constructed in conformance to the regulations in effect at the time (WAC 173-301). When it was created in the early 1970s a culvert was installed in the natural swale of an east-west-trending intermittent drainage channel to allow drainage to continue to flow under the landfill. The construction details and materials used for the culvert are unknown. Portions of the drainage channel were filled with construction/ demolition debris, yard and farm waste, and boiler ash. The fill covers approximately 7 acres. Portions of the fill on either side of an unpaved road are referred to as the east cell and the west cell (HWA 1998).

The west cell is 4.3 acres and is bordered on the south by a gravel road and a corn field, on the west by an alfalfa field, on the north by the two manufactured ponds, and on the east by the north-south access road and the east cell. At closure both cells were reportedly capped with a one-foot thick cover of native soils (probably silts of the Palouse formation). Subsequently, the West cell was used as a pasture and manure composting area. Construction debris was reportedly exposed at ground surface, apparently as a result of agricultural tilling (Ecology 2000).

The east cell is 3.4 acres, and is bordered on the north by an alfalfa field, on the east by the drainage channel that receives stormwater from the north parking lot and IMU, and on the south and on the west by a gravel road. For some time after the landfill closure, the east cell served as a fenced pasture for cattle. Structures formerly on this cell include a large feeding trough on the southwest side of the cell, a watering trough in the southeast corner, and two open sheds on the north-central portion. Brick, concrete, rebar debris, cow manure, and hay were scattered across the cell at the ground surface. It is unknown whether the east cell is still used as a pasture or whether any of the structures mentioned remain in place (HWA 1998). The East cell soil cap, though apparently undisturbed, was subsequently covered with nine to twelve inches of boiler ash (Figure 2) (Ecology 2000).

No landfill controls such as liners, leachate collection systems, or stormwater management equipment exist at the landfill because at the time the landfill was closed in 1987, these prevention measures were not required. However, the WSP Landfill was closed in accordance with regulations applicable at that time (HWA 1998).

In December 1991, Ecology received an anonymous complaint alleging that hazardous substances had been disposed of in the closed WSP Landfill. Materials allegedly dumped were hazardous chemicals, solvents, paints, thinners, and medical wastes. Ecology placed the WSP Landfill on the Confirmed and Suspected Contaminated Sites List in May 1992 after conducting an initial site investigation of the WSP Landfill on March 11, 1992 (Parametrix 1995).

From 1991 through 1998 groundwater monitoring data from samples collected downgradient of the WSP and at the WSP Landfill have indicated that concentration levels for VOCs in the shallow alluvial aquifer sometimes exceeded MTCA Method A standards and more often exceeded the more stringent Washington State Maximum Contaminant Levels (MCLs) for drinking water. Levels of nitrate-nitrogen and Total Dissolved Solids (TDSs) sometimes exceeded MCLs for drinking water. VOCs detected within the groundwater include trichlorofluoromethane, PCE, TCE, and chloroform. Toluene has been confirmed as a contaminant in surface water at the WSP Landfill (HWA 1998). Groundwater and surface water sampling results are summarized in the following table:

Table 2-1 Summary of Detections in Groundwater & Surface Water						
Well	**Location**	**Sampling Date**	**TCE (µg/L)**	**PCE (µg/L)**	**Toluene (µg/L)**	**Chloroform (µg/L)**
Sudbury Road Landfill Monitoring Wells						
MW-2	Between cells of SRL	6/15/1993		0.6		
		8/31/1993		0.7		
MW-3	West side of SRL	12/30/1998				0.5
MW-5	NE of SRL and west of WSP Landfill	3/30/1993		**5.3**		
		4/13/1993	2.6	**7.1**		
		6/14/1993	4	**6.5**		
		8/31/1993	3.7	**5.5**		
		3/25/1998	2	3		
		9/21/1998	3	3		
		12/30/1998	2.7	2.3		0.7
MW-7	W of WSP on Property Line	7/14/1998	ND	1.26	ND	ND
MW-8	Between SRL and WSP	8/31/1993		0.6		
MW-9	West of WSP Landfill on WSP Property Line	3/30/1993	ND	3.6		
		4/13/1993	2.6	4.1		
		6/14/1993	1.7	2.3		
		6/14/1993	1.7	2.3		
		8/31/1993	2.3	3.1		
		12/7/1993	2.3	3.4		
		8/30/1994	1.9	2.7		
		9/28/1994	1.8	2.7		
		11/8/1994	1.8	2.6		
		12/16/1994	1.77	2.42		
		2/18/1998	2.48	1.84	ND	1.05
		7/14/1998	3.23	1.61	ND	ND
MW-10	SW of WSP on WSP Property Line	2/18/1998	ND	ND	ND	2.04
		7/14/1998	ND	ND	ND	1.49
MW-11	South Side of SRL	12/30/1998	0.7			1.2
WSP Monitoring Wells						
MW-1	North side of WSP Landfill	2/18/1998	1.73 (dup)	ND	ND	ND
		7/14/1998	1.92	ND	ND	ND
MW-2	900 ft west of WSP Landfill	2/18/1998	**5.72**	ND	ND	ND
		7/14/1998	**6.45**	ND	ND	1.0 (dup)
MW-3	SW corner of WSP Landfill	2/18/1998	**5.06**	ND	ND	1.07
		7/14/1998	**6.06**	ND	ND	ND
MW-4	Between WSP Landfill & IMU	2/18/1998	**6.14**	ND	ND	2.87
		7/14/1998	**6.56**	ND	ND	1.67
WSP Surface Water Samples						
S-1	East side of east cell	2/18/1998	ND	ND	2.36	ND
S-2	NE side of west cell	2/18/1998	ND	ND	5.31	1.86
S-3	NW side of west cell	2/18/1998	ND	ND	23	ND
MTCA Method A Standard for groundwater			**5**	**5**	**1,000**	
WA State Maximum Contaminant Levels (MCLs)			**3**	**0.8**	**1,000**	**7**

Blank = The sample was not analyzed for the contaminant, or the contaminant was not detected (unclear from source).
dup = The concentration was detected only in a duplicate of the same sample location.
ND = The contaminant was not detected at the detection limit for the analysis.
Bold = Exceeds current MTCA Method A Cleanup Level. Shaded = Exceeds more stringent MCL for water quality.

3 Evaluation of Existing Data and Identification of Data Gaps

3.1 Previous Investigations and Existing Data

3.1.1 1984 PCB Appraisal

In August 1984, the General Electric Company (GE) Apparatus and Engineering Services conducted a site-wide polychlorinated biphenyl (PCB) transformer inspection and prepared a PCB Regulatory Compliance Report for the WSP (GE 1984). Of the 92 existing oil-filled transformers, 90 were inspected, as well as oil circuit breakers and oil-filled disconnects. The results of this inspection indicated that two transformers had "running leaks," and action was taken to provide containment. No confirmation exists on how much oil actually leaked, what the leak effected, or if the oil was actually PCB oil. The data plates on the transformers only listed insulating oil. As a precaution WSP decided to label the contents as PCB oil without testing (EH 2009). The locations of these two transformers, while in operation or while stored for disposal, are unknown. Some equipment known to contain PCBs was temporarily stored in a building east of the Big Yard between Buildings E50 and G50 (Figure 7) (DOC 2009b). Apparently this building no longer exists and its exact former location is unknown.

3.1.2 1992 Initial Investigation

In March 1992, Ecology conducted an Initial Investigation at the Washington State Penitentiary due to anonymous complaints of chemical dumping in the WSP landfill. During the investigation, no contamination was visibly apparent. The migration pathway of concern noted was groundwater. The investigation noted that a 10" well in the east part of the landfill was not abandoned properly. The investigation also noted that livestock carcasses had been disposed of near the northeast edge of the pond with numerous animal bones littered around the site (Ecology 1992).

As part of the Initial Investigation, multiple letters were sent to former employees of WSP, the County Health department, and the contractor used during the closure of the WSP Landfill in order to gather further information. All respondents of this letter claimed to have no knowledge of any inappropriate dumping at the WSP Landfill (Ecology 1992). Because no evidence was found to support these claims, the Initial Investigation determined that the site needed to be carried forward in the MTCA process.

3.1.3 1995 Site Hazard Assessment

Based upon the findings of the Initial Investigation, a Site Hazard Assessment was conducted by SAIC in April 1995 in order to gather information on past and present waste management activities and other site specific environmental data. This assessment was conducted in order to score the site following the Washington Ranking Method (WARM) Scoring Manual guidelines. Sites are ranked on a scale of one to five, with one representing the highest level of concern, and five the lowest, relative to all other assessed/ranked sites in the state. The overall ranking given to the WSP Landfill after the field site hazard assessment was "3" (Ecology 1995).

No field measurements were collected at this time. Suspected hazardous substances listed at this time were PCE and TCE. The quantities of these hazardous substances were listed as unknown. The routes in which these hazardous substances were available were listed as air and groundwater. No details about the source of these hazardous substances were discussed; however, it was noted that TCE and PCE were found in the two wells downgradient of the WSP Landfill and upgradient of the Sudbury Landfill. The site hazard checklist noted that the WSP Landfill cover was not maintained and did not have run-on/runoff control or cover. The checklist also noted that the landfill was unlined and that liquid wastes may have been disposed of at the WSP Landfill (Ecology 1995).

3.1.4 1995 Site Assessment

Parametrix, Inc. performed a Site Assessment evaluation of the closed WSP Landfill in June 1995. The purpose of the evaluation was to compile data on the landfill history and site conditions and evaluate the types of disposed materials, the contaminant migration potential, and the landfill condition (Parametrix 1995). The assessment concluded that the WSP Landfill did not present an imminent threat to human health or the environment that required immediate remedial actions. However, the assessment also concluded that there was insufficient information to confirm or to rule out the possibility that contaminants might be buried in the WSP Landfill (Parametrix 1995).

During the record search performed for the 1995 Site Assessment, it was discovered that in 1956 an irrigation well (No. 4; no longer used) had been drilled near the current location of the WSP Landfill. The well log for this well shows an upper well casing 24inches in diameter extending from the surface to a depth of 525 feet, at which point no further casing was used and the well was finished as an open hole in basalt to a depth of 1,004 feet. An inspection report by Ecology from 1992 noted that the well was not properly abandoned, and that a copy of the Ecology water well closure regulations would be sent to the WSP officials. The well was eventually closed, sealed, and capped by WSP. Although it cannot be confirmed, it is assumed that well No. 4 was properly constructed and maintained while in use. However due to the fact that it was not properly decommissioned as reported in the Initial Investigation, it is possible that the alleged contamination may have reached the lower aquifer through the preferential pathway of the open well. According to DOC the available records for drinking water wells in the vicinity of the WSP landfill are unreliable. Therefore, it is difficult to assess the risk of potential contaminant migration to the lower aquifer.

3.1.5 1996 UST Removal

Beginning in August 1995, DOC performed Underground Storage Tank (UST) removal activities at the WSP. Over a period of 8 months six 500-gallon USTs and one 1,000-gallon UST containing diesel were decommissioned. All seven USTs were used to supply diesel for several emergency generators on site. Tank removal operations were followed by post-excavation soil sampling to evaluate whether any soil contamination existed. Soil samples were typically collected from the walls and bottom of each excavation pit. In all but one location the four wall samples were composited at the lab into two samples for analysis (either north and east, or south and west). Typically, three stockpile samples from the soil removed at each pit location were collected and composited as one sample for analysis. Samples were analyzed for Total Petroleum Hydrocarbons (TPH) as Diesel (TPH-D) by WTPH-D (DOC 1996).

Upon removal, all seven tanks and associated piping were described as having no visible holes, abrasions or corrosion. No visible signs of contamination nor any odors were observed at any of the seven tank pit locations. The report states that a field instrument was not used at any of the excavations to determine whether hydrocarbon contamination was present or further excavation and sampling were necessary (DOC 1996). Contrary to the report, there is anecdotal evidence that a field device may have been used (DOC 2009c).

The laboratory results from collected soil samples indicated there were many cases where confirmation samples had non-detect results, but there were multiple detections of TPH-D in the sidewalls, bottoms, and stockpiles (see Table 3-1). At tank #11 (T_{11} in Figure 7) a south sidewall sample could not be collected due to interference with a building foundation. Although the two sidewall samples analyzed had non-detect results, the bottom and stockpile samples had TPH-D detections of 640 ppm and 280 ppm respectively, which exceeded MTCA Method A cleanup level in effect at the time. The report states that an additional vertical excavation was conducted to a depth of 9.5 feet, and that a soil sample was drawn with non-detect results. This sample was analyzed with a different method-WTPH-418.1 for Heavy Oils (DOC 1996). However, it is unclear if any contaminated soil remains under the adjacent building foundation. There is also an additional UST location near the former motor pool (T* in Figure 7). The report did not address this location.

Table 3-1 TPH-D Detections in Soil from WSP UST Excavations

1	MSC-1 SP	3 stockpile samples composited*	n/a	**210**	Staff Parking
4	MSC-2 SP	3 stockpile samples composited*	n/a	96	Behind MSC Industrial Building
8	WSP-4 NE	N & E sidewalls composited*	5.5	32	Unit 1
8	WSP-4 SW	S & W sidewalls composited*	5.5	28	Unit 1
8	WSP-4 SP	3 stockpile samples composited*	n/a	47	Unit 1
9	WSP-2 SP	3 stockpile samples composited*	n/a	59	Unit 5
11	IMU-1 B	discrete grab – bottom of excavation	8.0	**640**	IMU-inside fence
11	IMU-1 SP	3 stockpile samples composited*	n/a	**280**	IMU-inside fence
Former MTCA Method A Cleanup Levels for Soil				*200*	
Current MTCA Method A Cleanup Levels for Soil				*2,000*	

Source: DOC 1996
Notes: Bolded entries include exceedances of the MTCA Method A Cleanup Level Standards in effect in 1996.
* Samples were composited by the laboratory.
** Locations are listed as found in the reference.

3.1.6 1998 Preliminary Hydrogeologic Evaluation for WSP Landfill

In 1998, HWA Geosciences Inc. (HWA) was contracted by DOC to perform a preliminary hydrogeologic evaluation of the closed landfill at the WSP. This evaluation was designed to provide a preliminary understanding of the hydrogeologic characteristics of the area and to evaluate surface water and groundwater quality in the area of the WSP Landfill. In addition, the investigation was designed to evaluate the presence of landfill soil gas at the WSP Landfill. The HWA investigation consisted of two phases. The first phase was conducted during February 1998, and the second was completed in July 1998.

During the first phase, HWA installed four monitoring wells at the WSP Landfill, and subsequently collected groundwater samples for laboratory analysis. HWA also sampled two existing Sudbury Landfill monitoring wells (MW-9 and MW-10, Figure 1), and collected stormwater samples from an intermittent drainage near the WSP Landfill.

During the second phase, HWA collected additional groundwater samples from the four WSP Landfill monitoring wells and three Sudbury Landfill monitoring wells (MW-7, MW-9 and MW-10). No stormwater samples were collected during the second phase because none was observed in the intermittent drainage. A soil gas survey was completed in the area of the WSP Landfill.

Groundwater elevations were also determined during the wet and dry seasons. Depth to groundwater and groundwater elevations are given in Table 3-2.

Table 3-2 Depth to Groundwater and Groundwater Elevation for WSP Landfill Monitoring Wells

MW-1	898.90	57.97	840.93	61.79	837.11
MW-2	878.72	40.84	837.88	43.85	834.87
MW-3	909.61	69.10	840.51	73	836.61
MW-4	915.43	72.81	842.62	77.36	838.07
MW-7	No data	No data	No data	42.28	No data
MW-9	873.78	59.97	813.81	No data	No data
MW-10	858.66	22.73	835.93	25.3	833.36

Water quality Standards for Ground Waters of the State of Washington (WAC 173-200) and MTCA Method A Cleanup Standards were used for evaluation of the analytical results of all groundwater samples where applicable. Exceedances based on these criteria observed during both phases included Total Dissolved Solids, iron, manganese, nitrate-nitrogen, TCE, and PCE. Toluene was detected in the three stormwater samples collected but at concentration levels below the MCL (see Table 2-1).

Results of the soil gas survey indicated combustible gas in the east and west WSP Landfill cells. The combustible gas might originate from hay and cow manure near the surface.

The data collected during this investigation did not identify the source of the groundwater VOC contamination at the WSP Landfill or at the Sudbury Landfill monitoring wells. The report recommended quarterly groundwater monitoring of existing wells and installing three new wells to further determine the source of the contamination. There was no documentation available for review that stated any follow up investigation has occurred.

3.1.7 1999 Sudbury Landfill Site Contaminant Source Identification/Assessment Report

In 1999, Ecology completed a Contaminant Source Identification/Assessment (CSI/A) study for potential sources of VOCs detected in the upgradient groundwater monitoring wells at Sudbury Landfill. The Sudbury Landfill is immediately west of the WSP. The CSI/A was conducted under a Site Assessment Cooperative Agreement between Ecology and the Environmental Protection Agency (EPA).

The CSI/A study included a review of public and governmental documents, research on the contaminant's use and properties, interviews of officials and residents, and a field reconnaissance (Ecology 1999).

Sudbury Landfill groundwater monitoring data for 1991 through 1998 indicated that groundwater quality in the shallow aquifer was being impacted by upgradient sources. In some samples Nitrate, TDS, and VOCs exceeded Washington State Water Quality Standards. VOCs detected in the Sudbury Landfill's upgradient monitoring wells include PCE, TCE, trichlorofluoromethane, and chloroform (Ecology 1999). Because contaminant concentrations are generally higher in the upgradient wells and lower in the downgradient wells, the Sudbury Landfill is not the suspected source of the VOC contamination (Ecology 2000).

Recommendations made at the conclusion of this study included the execution of a Preliminary Assessment (PA) that focused on the WSP Landfill while also evaluating past and present prison institutional operations.

3.1.8 2000 Preliminary Assessment Washington State Penitentiary Narrative Report

In 2000, Ecology released a PA report. The purpose of the PA was to assess the immediate or potential threat to human health and the environment in the area of WSP and to collect information to support a decision on further action under CERCLA. PA activities consisted of research and file review. Conclusions based on the PA included the following:

- The shallow sedimentary aquifer has been impacted by VOCs and the WSP Landfill has been assessed as a high potential source of the contamination.
- There is no information that indicates that Mill Creek or the Walla Walla River has been impacted by either runoff or shallow groundwater from the WSP property. However, because the streams ultimately receive water from the penitentiary site, there is a possible threat to human health and the environment.
- Because of the nature of the suspected contamination, there are opportunities for soil exposure and air hazards; however, the threat is judged to be low.

3.2 Contaminants of Concern

In the past investigations noted above various contaminants and water quality parameters have been investigated. Due to exceedances of regulatory limits (either MTCA Method A or more stringent MCLs) and persistent detections chlorinated solvents and related degradation products are the primary contaminants of concern (COCs) for this investigation. Other VOCs are considered to be COCs because of multiple detections at some period in time, including trichlorofluoromethane, chloroform, and toluene. Although sampling activity may not be planned solely to identify these additional VOCs, the VOC analysis of samples will include them.

Several Metals are a COC due to detections and some exceedances in past groundwater samples, as well as information about past operations that pose a risk of releasing heavy metal contaminants into the environment.

In certain AOCs semi-volatile organic compounds (SVOCs) are COCs based on the past usage, storage and disposal of solvents, de-greasers and other potential source materials. These AOCs include the former motor pool, former auto body shop and furniture refinishing facility, the former hazardous waste accumulation area, and the sign shop.

Due to operational history and available information petroleum hydrocarbons (primarily TPH-D) are a COC for specific AOCs. These areas involve the locations of two former USTs, the auto body shop and the former Motor Pool. Further information is discussed below.

Due to the limited areas of coal storage PAHs are a COC specifically related to the past storage and burning of coal as fuel. Further field inspection will help to determine the possibility of this contaminant reaching soil and eventually groundwater.

The location(s) of potential sources of PCBs are unknown at this time; however, due to reported leaks from equipment potentially containing PCB oil, PCBs are a COC. Analysis of PCBs will be limited to the identification of potential source locations.

Some investigations identified exceedances of water quality parameters such as TDS and nitrates. However, because they will not be the target of any proposed cleanup action, water quality parameters are not considered COCs, but are of interest to expand the understanding of groundwater dynamics.

Section 1.4 of the Sampling and Analysis Plan (SAP, Appendix A) provides more detail in defining COCs, including which are confirmed and which are suspected.

3.3 Areas of Concern & Summary of Findings

Based on the preliminary site conceptual model and evaluation of existing data, AOCs and potential AOCs for the site have been chosen and are described below. An AOC is defined as having the following characteristics:

- Containing one or more contaminants, confirmed by either laboratory analysis OR documented observations of a release; AND
- Presenting a reasonable concern that contaminants have affected soil or groundwater and may present a risk of contaminant migration or exposure to human health or the environment.

These classifications may change based on the results of the RI/FS.

A potential AOC is defined as an area with the following characteristics:

- Information from the site history indicates that a hazardous material was used or stored in the area; AND
- There is a reasonable concern that a spill or release may have occurred.

Table 3-3 Washington State Penitentiary Areas of Concern and Contaminants of Concern

1. WSP Landfill (AOC)	TCE and chloroform in groundwater. Toluene, arsenic, copper, lead, and manganese in surface water.	Contaminants have been detected in proximate groundwater and surface water. Hazardous materials have allegedly been dumped here.
2. Former dry cleaning services (AOC)	No sampling has been conducted in this area. Suspected VOCs include TCE and its degradation products	The first laundry/dry cleaning facility was built in 1930. Dry cleaning activities continued until 1974 when they were moved to C30. Dry cleaning continued until the early 1990s (Ecology 2009a). PCE sludge was stored on site at both locations in 15-gallon drums just outside the laundry buildings (Ecology 1994). No sampling has been conducted at either location, but during demolition of the initial laundry location, the DOC crew noticed strong chemical odors, and hazardous materials may have been disposed of down the storm drain (Ecology 2009a).
3. Former motor pool (potential AOC)	No sampling has been conducted here. Suspected COCs include VOCs, SVOCs, metals, and TPH.	This area is a potential AOC because it used many solvents, degreasers, and petroleum products. The possibility that spills and leaks occurred in this area is high.
4. Former UST areas (potential AOC)	Sampling has been conducted in the former UST areas. All results were under current MTCA Method A cleanup levels. All tanks reportedly contained diesel fuel.	Additional information obtained by DOC in September 2009, and further data evaluation by Ecology, resulted in the conclusion that sufficient soil sampling was done during removal of the former USTs and that additional soil sampling will not be required. However, testing of groundwater in future monitoring wells drilled at WSP will include petroleum hydrocarbons.

Table 3-3 Washington State Penitentiary Areas of Concern and Contaminants of Concern

5. Former auto body shop and furniture refurbishing facility (potential AOC)	No sampling has been conducted here. Suspected COCs include VOCs, SVOCs, metals, and TPH.	This area has been used for both autobody work and furniture refurbishing. There has been extensive solvent use in the furniture refurbishing shop as well as the use of multiple petroleum products, degreasers, and other materials in the autobody shop. There is a high possibility of spills and leaks.
6. Former hazardous waste accumulation area (potential AOC)	No sampling has been conducted here. Suspected COCs include VOCs, SVOCs, metals, and TPH.	Because there were multiple WAC violations, and because this storage area dates back to pre-RCRA, this is a potential AOC.
7. Steam plant boiler ash (potential AOC)	No sampling has been conducted in this area. PAHs and PCBs are suspected.	On the basis of additional clarification provided by DOC in September 2009 regarding historical power use, steam generation, and associated electrical components at the site, Ecology eliminated PCBs as SCOCs for AOC No. 7. Regarding the boiler ash issue, the greatest potential for exposure to ash is in unpaved areas of WSP where ash may have been used as fill (such as the "yards" associated with the BAR units and the western edge of the WSP facility).
8. Sign shop (potential AOC)	No sampling has been conducted here. Suspected COCs include VOCs and SVOCs.	This area has a long history of solvent use during sign manufacturing. There is a risk that spills and leaks of solvents occurred.
9. Metal Plant #1 (potential AOC)	No sampling has been conducted in this area. Suspected COCs include VOCs	This area is used for manufacturing license plates and also has a long history of solvent use. Because of the threat of spills and leaks over the years, this area is a potential AOC.

Table 3-3 Washington State Penitentiary Areas of Concern and Contaminants of Concern

10. PCB storage area (location of two leaking transformers unknown) (potential AOC)	No sampling has been conducted in this area. PCBs are suspected.	Additional information obtained by DOC in September 2009 documented the location of the former cement block building where transformers were stored, which had a concrete floor and was demolished in the mid 1990s. The area of this former building was subsequently graded and is now an open grass-covered area. A facility wide changeout and cleanup of PCB-containing transformers was completed at WSP in 1986. Any potential leakage of older transformers in the former storage building would have been contained within the building. After considering this information, Ecology concluded that AOC 10 would be eliminated from further investigation.

3.4 Data Gaps

3.4.1 Extent of Landfill

A review of historical aerial photographs shows the lateral extent of the landfill expanding throughout landfill operations from the start of the 1970s until its formal closing in 1987. However, it is unclear whether wastes were disposed of throughout the entire capped area. The construction details and vertical extents of the landfill are also unknown. Although the culvert pipe material is unknown, its deterioration over time may have created a pathway for precipitation that infiltrates the landfill.

3.4.2 Landfill Content

The contents of the WSP Landfill are unknown except for descriptions provided of the construction debris deposited from the 1970s until 1987. It is not known whether there are any drums or hazardous materials present in the landfill.

3.4.3 Soil Contamination

There is a lack of soil data to fully characterize confirmed COCs and to confirm or rule out suspected COCs. The extent of any soil contamination at the former dry cleaning facility is unknown. Other AOCs where no sampling has been conducted and suspected contaminants may have reached soil need to be further investigated. Therefore, soil sampling and/or a soil gas survey will be needed in various AOCs. Depending on initial findings, this may require further investigation work beyond the initial scope.

3.4.4 Groundwater Characteristics & Contamination

Some hydrogeological data has been collected in the vicinity; however, the data is insufficient to fully understand the characteristics of the shallow aquifer. A better understanding of the dynamics of the aquifer will help guide decisions for any future investigations as well as remedial options.

It is clear that the shallow gravel aquifer has had levels of VOCs. However, neither the extents nor the source(s) of contamination have been identified, and the most recent data is more than 10 years old. Some areas of concern may be sources of VOCs as well as other suspected COCs (e.g., TPH and metals). Other upgradient facilities may also be potential sources (Ecology 1999). There has been mention of contamination of trichlorofluoromethane, but no data was available to assess the extent of contamination or the potential source or sources.

It is also unknown whether the deeper basalt aquifer has been affected. It is not known whether any contamination infiltrated the basalt aquifer through any water wells that were improperly constructed, maintained, or closed. Such wells may present potential pathways for the migration of contaminated groundwater from the shallow aquifer into the deeper aquifer.

3.4.5 Stormwater Drainage

An updated stormwater drainage map is needed to determine current on-site storm water drainage. According to figure 3, provided from the 1995 Site Assessment, it appears that the majority of storm water on-site is diverted south into the southern discharge pond/ wetland area. Current storm water flow may have changed since 1995. It is likely that much of the stormwater now goes to a combined sewer system. However, a more complete and accurate understanding of the site's stormwater pathways will provide a better indication of potential contaminant pathways.

3.5 Preliminary Conceptual Site Model

The preliminary Conceptual Site Model (CSM) gives a general picture of the site contamination based on current knowledge. According to WAC 173-340, the preliminary CSM "identifies potential or suspected sources of hazardous substances, types and concentrations of hazardous substances, potentially contaminated media, and actual and potential exposure pathways and receptors" and assists in decision-making.

For the WSP, the preliminary CSM is based on the flow of precipitation, stormwater, groundwater and surface water (Figure 8) along with identification of AOCs and potential AOCs as described above and as shown in Figure 7. The AOCs and potential AOCs are identified as independent areas, but each has the potential to contribute contamination that may migrate off site via groundwater and/or stormwater pathways. The preliminary CSM is illustrated in Figures 7 and 8.

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4 Statement of Work

4.1 Introduction

The purpose of the RI/FS is to evaluate whether any hazardous materials have been disposed of in the closed WSP Landfill or whether any historical operations or disposal practices have contributed to known or unknown off-site contamination. VOC concentrations have been discovered in downgradient groundwater monitoring wells. It is also necessary to determine the hydrogeologic characteristics of the study area.

4.2 Develop Conceptual Site Model

A preliminary CSM was developed for the site based on the results of historical research (Section 3.4). The CSM portrays contaminant sources and possible transport pathways. All information portrayed in the CSM is speculative and will be evaluated during completion of the RI/FS.

The CSM will be further developed based on the results of this RI/FS, conceptually portraying new contaminant sources and possible transport pathways.

4.3 Identify Applicable Cleanup Levels

In Washington, relevant and appropriate requirements for site remediation are set forth in the MTCA Cleanup Regulation, WAC 173-340. Criteria for selection of cleanup alternatives, including the preference for cleanup technologies, are presented in WAC 173-340-360. Since the soil contamination at this site is limited to VOCs, TPH, SVOCs, PAHs, and metals, the following cleanup standards will be applied in WAC 173-340-720 for unrestricted land use: Table 1, Method A cleanup levels – Ground Water, and 173-340-740; and Table 2, Method A cleanup levels – Soil. If evidence suggests that additional or different cleanup standards should be applied, this new information will be compiled to support the revised cleanup levels.

4.4 Conduct Further Research to Resolve Known Data Gaps

For some of the data gaps noted in Section 3.3 additional information may exist that was not available at the time of this report. Ecology and DOC will be consulted to identify further sources of information that may help make investigation activities more cost

efficient and effective in collecting data. Such research can include, but is not limited to, follow-up interviews, additional reports, facility information, site walks, and contacts with local agencies and private parties.

4.5 Ecological Evaluation

The actual Terrestrial Ecological Evaluation (TEE) under MTCA will not be performed until a later stage of the project. The information gathered under this Ecological Evaluation will be used to determine whether there are potential impacts to ecological receptors, and will provide the necessary information needed to complete the TEE.

Data will be collected on the types of vegetation present on the property, both proximal to the secure perimeter and in areas that are less impacted by human activity. In addition, an analysis of the presence or absence of threatened and/or endangered species will be completed. Concentrations of contaminants in soil in and around the WSP Landfill will also be used to complete the TEE.

4.6 Identify ARARs

Site-specific applicable or relevant and appropriate requirements (ARARs) that are related to the remediation of the WSP site will be identified as part of the RI. The intent is to identify potential ARARs to be used to evaluate remedial alternatives. Applicable laws are defined as those requirements that are legally applicable as well as those that Ecology determines to be both relevant and appropriate.

To be defined as "legally applicable," a requirement must be propagated under state or federal law and specifically address a hazardous substance, cleanup action location, or other circumstance at the site. "Relevant and Appropriate" requirements are limited to those requirements propagated under state and federal laws that while not legally applicable, are determined by Ecology to address circumstances sufficiently similar to those encountered at the site.

4.7 Identify Present and Proposed Land Uses

Land use to the north of the prison complex is dry land wheat farming. Activities in the commercial/industrial area to the south and southeast of the WSP include food and agricultural product processing; automotive and truck repair and service; metal working, including fabrication, casting, and chrome plating; and petroleum product storage and sales (Ecology 2000).

Most industrial and residential buildings in the area are connected to the municipal sanitary sewer system and water services. Land use in the area will be confirmed during WSP site visits, and an inventory of drinking water wells, irrigation wells, and resource protection wells recorded with Ecology within a 0.5-mile radius of the property will be compiled.

4.8 Identify and Confirm Suspected Sources and Contaminants of Concern

The potential AOCs and suspected contaminants of concern identified in this Work Plan and described in the attached Sampling and Analysis Plan (SAP) will be either confirmed or ruled out during the RI. A phased sampling approach and procedures designed to provide high quality data in an efficient manner will be applied during the RI. Sampling locations will be based on a combination of current site conditions and historical information. Field screening and visual and olfactory observations will also be used to assist in choosing sampling locations.

4.9 Execute SAP

This section describes the general technical approach for the RI. The details of the technical approach, including sampling methods and procedures, are described in the Sampling and Analysis Plan (Appendix A). The RI fieldwork will consist of the groundwater investigation and the AOC investigation.

4.9.1 Groundwater Investigation

The purpose of the Groundwater Investigation is to further develop the conceptual model of the site and of sub-surface conditions of the WSP Landfill and other AOCs. The Groundwater Investigation is described in detail in the SAP and QAPP (Appendices A and B to this Work Plan, respectively) and will consist of the following activities:

- Drilling boreholes for installation of new monitoring wells.
- Collecting soil samplings from the borings for chemical analysis.
- Constructing and developing the monitoring wells.
- Assessment of local water wells as potential sampling locations.
- Completing the first quarterly RI groundwater monitoring event by sampling new monitoring wells, selected pre-existing monitoring wells, and local water wells (if sufficiently documented).

4.9.2 AOC Investigation

The preliminary scope of the AOC Investigation was developed from the AOC delineation process and will include a geophysical investigation (WSP Landfill), installation and sampling of gas probes (WSP Landfill), surficial and shallow subsurface soil sampling, test pits, and soil gas surveys. Sampling details of the AOC Investigation may change if site conditions (including direct-push soil probes) warrant a different approach. Depending on access and availability, there may also be sediment sampling of the suspected bodies of water. Additional information on the AOC Investigation, including sampling techniques and analytical methods, is presented in the SAP and the QAPP (Appendices A and B, respectively).

4.9.3 Additional Investigation Measures

Some additional investigations may be necessary that go beyond the scope outlined in this Work Plan. These interim action activities will be implemented under an additional scope of work at a later time decided by DOC and Ecology.

4.9.3.1 Buried Drum Interim Action

If buried drums (or other suspect containers) are identified during the AOC Investigation work, an interim buried container investigation work plan will be developed. The purpose of the buried container investigation is to determine the type and contents of the buried container(s) identified through geophysical means. Such an investigation requires higher levels of Health & Safety protection than what is necessary for this Work Plan. Removal of the buried containers may be considered part of the investigation depending on the data collected.

4.9.3.2 Landfill Soil and Waste Characterization

Further characterization of the WSP Landfill will be conducted via the excavation and sampling of test pits in potential hot spots within the landfill.

4.10 Fulfill QAPP

All planning, implementation, and assessment procedures for quality assurance and quality control (QA/QC) presented in the Quality Assurance Project Plan (Appendix B) will be followed and implemented during the RI.

4.11 Complete a Site-Specific Risk Assessment

The results of the Groundwater and AOC Investigations will support preparation of a risk assessment that identifies contaminant migration pathways and potential exposure scenarios to plants, animals, and humans. This risk assessment will be based upon the toxicological and fate/transport properties of the CCOCs revealed from the RI field investigation, soil and groundwater conditions beneath the WSP site, and types and locations of potential receptors. The TEE will be a component of the risk assessment. Findings of the risk assessment will determine which CCOCs and their respective exposure pathways will be addressed in the FS.

4.12 Conduct a Feasibility Study

The objective of the FS will be to evaluate appropriate remediation alternatives and select the preferred remedial alternative. The FS will be performed in accordance with the requirements of the Agreed Order and MTCA regulations, specifically WAC 173-340-350 (8).

4.13 RI/FS Report

The documentation, results, and findings of the RI and FS will be presented in a Draft RI/FS Report to Ecology. Pursuant to discussion of comments between Ecology and DOC, a Final Draft RI/FS Report will be prepared for public review during the public comment period. After Ecology has prepared a responsiveness summary to public comments, Ecology and DOC will discuss revisions to the Final Draft RI/FS Report, after which the report will be completed.

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5 Submittal Requirements

As part of the execution of this Work Plan the following documentation will be submitted. However, additional documentation may be necessary if further investigation is conducted to close the existing data gaps:

- Health & Safety Plan – A site-specific health and safety plan that will address all of the activity hazards likely to be encountered while executing the SOW.
- Mobilization Plan – A site-specific mobilization plan that will address logistics, required utilities, security, and interface issues with other involved parties.
- Worker Identification & Background – As directed by DOC, security information for all personnel who plan to conduct work at the WSP facility will be submitted. The DOC will perform the background checks necessary to give clearance for each individual.
- Remedial Investigation/Feasibility Study Draft & Final – A draft and final RI/FS report will be submitted to the extent supported by the investigative activities outlined herein. A Feasibility Study may not be practical for this submission if further data is necessary. If this is the case, the RI report will identify further data gaps and recommendations for closing them.

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6 Project Schedule

The preliminary schedule for the RI/FS at WSP is provided in Appendix E to this Work Plan. This schedule will be updated as the project progresses and will be included in the required progress reports to Ecology.

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Figures

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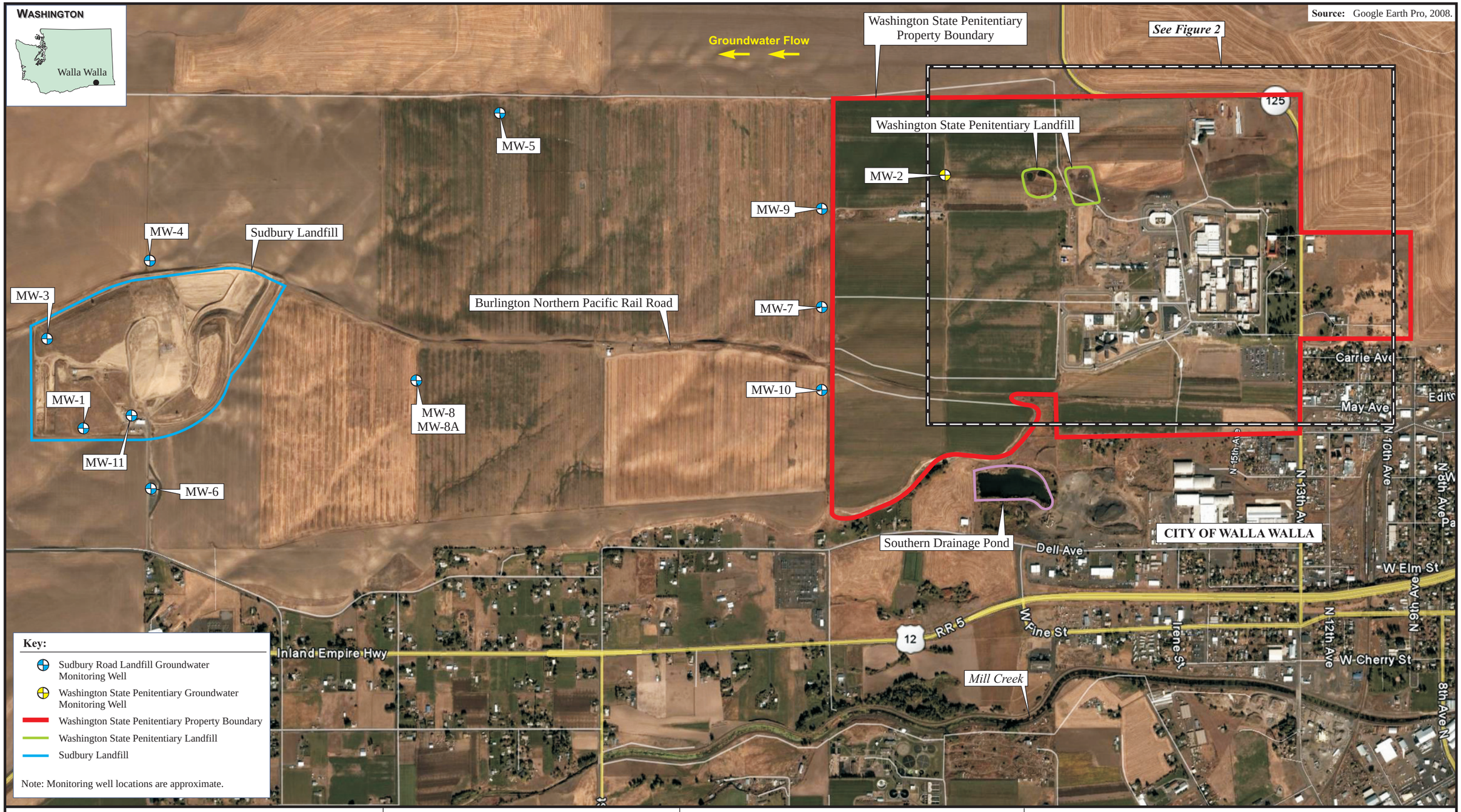

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N

0 1072 2144
Approximate Scale in Feet

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Figure 1
SITE LOCATION MAP

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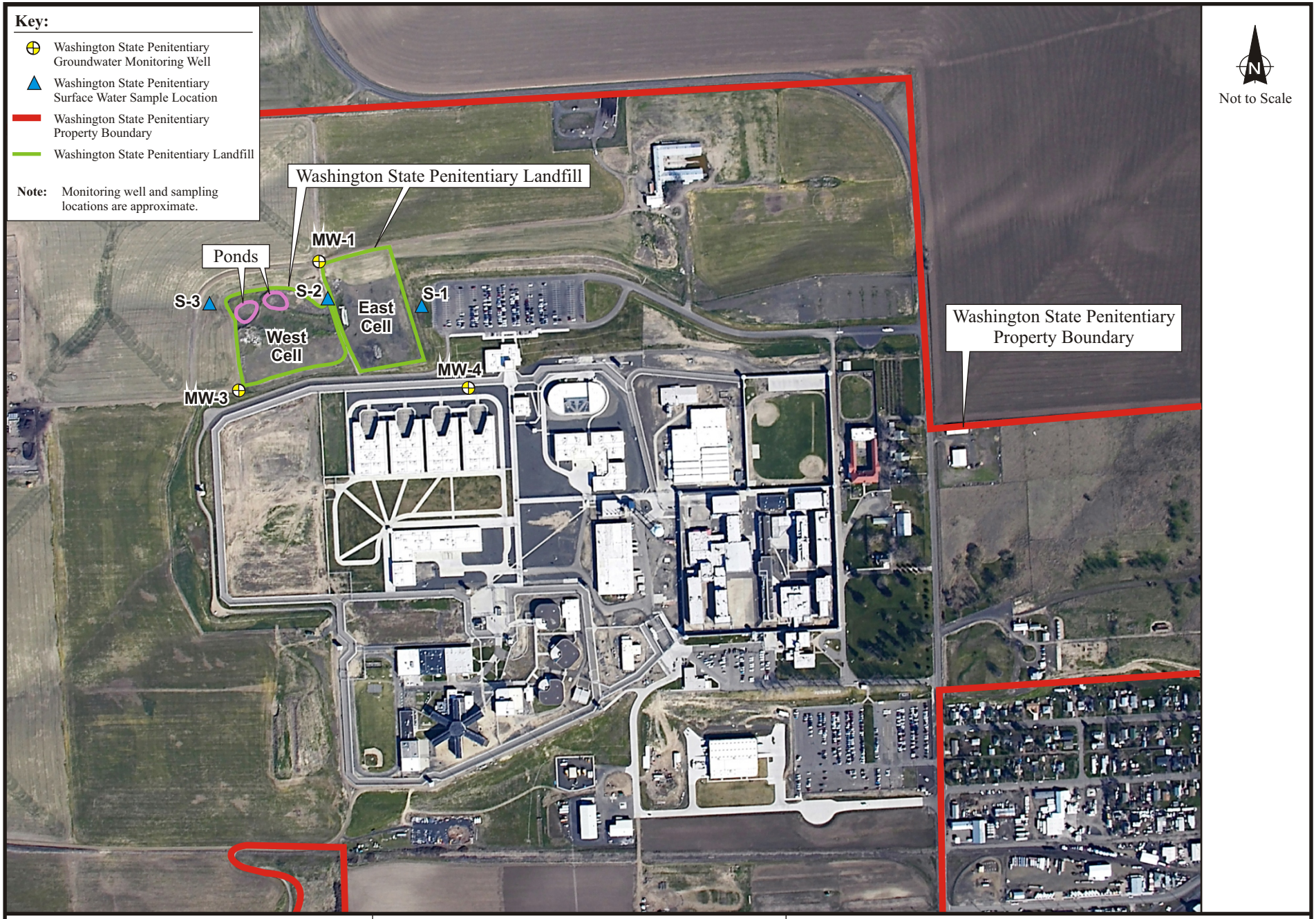

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Figure 2
FACILITY SITE PLAN

Source: Professional Ag Services, 2008.

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