Exponent®

Final Contaminated Media Management Plan

USPS Portland P&DC
715 Northwest Hoyt Street
Portland, Oregon 97208

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715 Northwest Hoyt Street
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Prepared for

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Table 1. Environmental matrix—USPS Portland P&DC site

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Acronyms and Abbreviations

BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	Code of Federal Regulations
CMMP	Contaminated Media Management Plan
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
mg/L	milligrams per liter
OAR	Oregon Administrative Rules
OSHA	Occupational Safety and Health Administration
P&DC	Processing and Distribution Center
PAH	polycyclic aromatic hydrocarbon
PPE	personal protective equipment
ppm	parts per million
RBC	risk-based concentration
ROD	Record of Decision, DEQ
TPH	total petroleum hydrocarbons
the Site	U.S. Postal Service Processing and Distribution Center, Portland, Oregon
USPS	U.S. Postal Service
UST	underground storage tank
VMF	vehicle maintenance facility

1 Introduction

This Contaminated Media Management Plan (CMMP) has been prepared for the U.S. Postal Service (USPS) Portland Processing and Distribution Center (P&DC) (the Site) in Portland, Oregon. This CMMP is prepared as a part of the remedial action in Section 8.0 of the Record of Decision (ROD) issued by the Oregon Department of Environmental Quality (DEQ) for continued use of the Site as a P&DC (the ROD is included as Appendix A). The purpose of this CMMP is to provide general guidance for managing contaminants in soil and groundwater on the Site in a manner that is protective of human health and the environment. The CMMP will be used by USPS, contractors, and subcontractors performing activities with the potential to encounter contaminants in the subsurface.

This CMMP includes:

- Description of the nature and extent of subsurface environmental impacts
- Procedures to notify workers of potential environmental hazards
- Procedures for handling contaminated media
- Description of engineering controls to prevent unacceptable exposure to subsurface contaminants, including inspection and maintenance of the existing cover (including paving and buildings).

This CMMP is intended to be a stand-alone document and should be updated as necessary by USPS based on Site conditions and to support Site projects and other activities.

2 Site Description

The Site is located at 715 Northwest Hoyt Street in Portland, Oregon (Figure 1). The property was formerly used by a prior owner as a rail yard with associated warehousing and a small Pintsch gas plant. The Portland P&DC processes all outgoing mail for the State of Oregon and is composed of a 398,000-ft^2 processing and distribution center and main post office, a 10,025-ft^2 vehicle maintenance facility (VMF), a 157,400-ft^2 multi-story parking structure, exterior parking areas, and exterior maneuvering areas (Figure 2). The Site is entirely covered with either structures or paving except for a few landscaped areas as described in Section 9.0.

Historic operations that occurred prior to USPS operations on the Site have resulted in impacts to soil and groundwater in areas of the Site. Metals and petroleum-related chemicals from these historic operations have been detected in soil and/or groundwater at various locations on the Site. Petroleum impacts to soil have also been detected in the VMF area. Detailed investigations have determined that continued operations by USPS can occur at the Site without risk to human health and the environment. However, any activities that would remove the paving or a structure and disturb the soil and/or groundwater must be carried out while observing precautions and following certain procedures. This CMMP has been prepared to assist USPS and its contractors in determining the precautions and procedures that will be considered and followed as applicable during activities which will disturb soil and/or groundwater beneath the Site. General procedures for inspecting and maintaining the Site cover are also presented.

For more detailed information regarding specific chemical contaminants at the Site and where they are located, please refer to Appendix A, *Selected Remedial Action, Record of Decision for the USPS-P&DC Site, Portland Oregon*, prepared by DEQ on July 14, 2010. This document includes an Administrative Record Index with environmental reports that have been prepared describing subsurface conditions on and in the vicinity of the property, including the remedial investigation report for the Portland P&DC dated April 21, 2006. These reports can be provided to those conducting subsurface work at the Site, as needed or upon request.

3 Historic Site Use

Starting in the late 1800s the property was used as a rail yard with associated warehousing facilities and a small Pintsch gas plant, where compressed gas was manufactured to light rail cars. The eastern and western halves (roughly) of the P&DC have a somewhat different history which results in distinctly different environmental impacts in the two parcels. A general description of historic Site usage follows.

3.1 Western Half of the Site

This portion of the property was used as a rail yard. Much of the area, except the far northern portion, contained multiple rail lines. Three areas can be distinguished geographically by former usage (see Figure 2).

- **Former Coach Cleaning Area and Electrical Utility Vault Area**

  These two areas, which constitute most of the western parcel, were used for staging, cleaning, provisioning, and maintenance of rail cars. Multiple rail lines were operated in these areas.

- **Former Pintsch Gas Plant Area**

  The Pintsch gas plant operated in the northern 200 ft of the west parcel from approximately 1893 until the early 1930s. This plant produced compressed gas from oil for lighting railcars prior to the advent of electric lighting. The southern part of this area contained a small turntable which serviced the former coach cleaning area to the south.

3.2 Eastern Half of the Site

Most of the eastern half of the Site was used as rail yard warehousing. At one time, two long, narrow warehouses with rail lines in between them were present in this area. Historical records discussed in "Review of Eastern Half of USPS Property" dated July 2002 indicate that the warehouses (e.g., freight depots) were operated on the eastern half of the Site from the early 1890s to the late 1950s. No other rail activity is apparent on the eastern parcel prior to construction of the P&DC. The existing VMF occupies the northern part of this parcel.

4 Nature of Contamination

The nature of contamination at the Site is described below and was determined during a remedial investigation completed in 2006 and a few previous investigations. A human health risk assessment was completed in 2006 as part of the remedial investigation to evaluate potential risks to human health from exposure to contaminants in soil and groundwater at the Site. The following receptors were evaluated:

- Potential current and hypothetical future excavation workers who may come into contact with impacted soil, and shallow groundwater that may enter an excavation at the Site
- Hypothetical future construction worker exposure to soil, and shallow groundwater that may enter an excavation during large-scale Site renovation
- Hypothetical future occupational workers who may come into contact with impacted soil in the absence of existing paving during large-scale Site renovation.

In 2008, a human health risk assessment was completed for hypothetical urban residents in the event that the Site were first sold and then redeveloped for urban residential use. In 2009, human health risks were re-evaluated following DEQ's 2008 reclassification and decrease of the risk-based concentrations (RBCs) for naphthalene, ethylbenzene, and 1,1-dichloroethane. This evaluation included assessments of vapor intrusion and volatilization to outdoor air.

Potential risks to these receptors were calculated as part of each risk assessment and compared to DEQ's acceptable risk levels. The general quality of soil and groundwater and exceedances of DEQ's acceptable risk levels are described for each area in the sections below. All receptors are discussed except urban residents because urban residents would only be present if the Site were first sold and then redeveloped.

4.1 Soils Beneath the Western Half of the Site

- **Former Coach Cleaning Area**

  Soils in this area contain metals and low concentrations of aged petroleum hydrocarbons, including polycyclic aromatic hydrocarbons (PAHs) (a component of petroleum hydrocarbons), that were released along the historic railroad tracks sometime before coach cleaning activities ceased more than 70 years ago. Total petroleum hydrocarbons (TPH) range from non-detectable to about 600 parts per million (ppm) and are generally confined to the upper 3 ft of soil. One location (see Figure 2, Boring CC-3 completed in 2004) contained low levels of petroleum hydrocarbons to a depth of 7 ft. Elevated concentrations of four metals, primarily lead and

arsenic, were detected in soils in this area. Lead was detected in soils at concentrations ranging from approximately 70 to 3,100 ppm. Arsenic was detected in soils at concentrations ranging from approximately 11 to 50 ppm. The higher concentrations of metals are located in the general area of Borings CC-6, CC-9, and CC-10 (Figure 2). Concentrations of the following contaminant exceed DEQ's acceptable risk level for occupational worker and construction worker exposure in the former coach cleaning area:

– Arsenic

There are no exceedances of DEQ's acceptable risk level for excavation workers. The ROD determines that compliance with this CMMP and the existing cover at the Site prevent occupational worker and construction worker exposure to an unacceptable risk for the arsenic present in the soil in the former coach cleaning area.

- **Electrical Utility Vault Area**

A portion of the former coach cleaning area is now referred to as the electrical utility vault area because this area is the location of the P&DC's electrical distribution system. Most of this area is on the western parcel. The shallow soils (less than 10 ft) contain petroleum hydrocarbons similar to the former coach cleaning area except in higher concentrations (up to approximately 30,000 ppm). In some areas of the electrical utility vault area, concentrations can be above 5,000 ppm, and black staining and petroleum odors are present. Elevated PAHs, a component of petroleum hydrocarbons, were detected in these areas. Metals concentrations are relatively low. As an example, although arsenic exceeds DEQ's acceptable risk level as discussed below, arsenic was detected at concentrations ranging from 1 to 15 ppm, with an average detected concentration equal to the presumed background level of 7 ppm.

Concentrations of the following contaminants exceed DEQ's acceptable risk level for occupational worker and/or construction worker exposure in the electrical utility vault area:

– Arsenic

– Benzo[a]pyrene

– Benz[a]anthracene

– Benzo[b]fluoranthene

– Dibenz[a,h]anthracene

– Indeno[1,2,3-cd]pyrene

– Naphthalene

There are no exceedances of DEQ's acceptable risk level for excavation workers. The ROD determines that compliance with this CMMP and the existing cover at the Site prevent occupational worker and/or construction worker exposure to an unacceptable risk for the arsenic, benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene, and naphthalene present in the soil in the electrical utility vault area.

Also, naphthalene in soil exceeds the DEQ risk-based concentration (RBC) for volatilization to outdoor air for occupational workers based on DEQ's 2008 reclassification of this constituent. The ROD determines that compliance with this CMMP and the existing cover is protective of occupational workers for this potential volatilization given limited Site use in this area. Potential volatilization of naphthalene to outdoor air should be considered for projects conducted in this area or if Site use in this area by occupational workers significantly increases.

- **Former Pintsch Gas Plant Area**

An area in the vicinity of Boring PP-1 (see Figure 2) contains soils with the highest levels of petroleum hydrocarbons. The highest concentrations of petroleum hydrocarbons (over 30,000 ppm) are below 10 ft, but high concentrations (more than 25,000 ppm) can also occur in soils shallower than 10 ft. Heavy, black staining and/or small, viscous black globules are present in the soil below a depth of approximately 10 ft.

Concentrations of the following contaminants exceed DEQ's acceptable risk level for excavation worker and/or occupational worker and/or construction worker exposure in the former Pintsch gas plant area:

– Arsenic

– Benzo[a]pyrene

– Benz[a]anthracene

– Benzo[b]fluoranthene

– Benzo[k]fluoranthene

– Dibenz[a,h]anthracene

– Indeno[1,2,3-cd]pyrene

– Naphthalene

The ROD determines that compliance with this CMMP and the existing cover at the Site prevent occupational worker, construction worker, and/or excavation worker exposure to an unacceptable risk for the arsenic, benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-cd]pyrene, and naphthalene present in the soil in the former Pintsch gas plant area.

Also, naphthalene in soil exceeds the DEQ RBC for volatilization to outdoor air for occupational workers based on DEQ's 2008 reclassification of this constituent. The ROD determines that compliance with this CMMP and the existing cover is protective of occupational workers for this potential volatilization given limited Site use in this area. Potential volatilization of naphthalene to outdoor air should be considered for projects conducted in this area or if Site use in this area by occupational workers significantly increases. This CMMP for existing Site use does not include a discussion of vapor intrusion for the former Pintsch gas plant area because buildings are not present in the area of impacts.

4.2 Soils Beneath the Eastern Half of the Site

- **Vehicle Maintenance Facility Area**

  Six underground storage tanks (USTs) used by USPS to store diesel, gasoline, waste oil, and heating oil were decommissioned by removal in 1992 and 1993. Five of the USTs were located at the VMF, and one UST was located on the south side of the Portland P&DC complex (Figure 2). Most of the contaminated soils were excavated except where the concentrations of hydrocarbons were low or where existing structures (e.g., the VMF building and pump island) precluded soil removal. Outside and beneath the VMF, including areas in the vicinity of the pump island, soils with low concentrations of petroleum hydrocarbons could be encountered to a depth of approximately 10 ft. Soils in this area could have TPH concentrations up to about 71,000 ppm. There are no known exceedances of DEQ's acceptable risk levels in this area. Soil was not tested for metals in the VMF area.

- **Northeast Corner Area**

  A small area in the northeastern corner of the Site contains soils with a total hydrocarbon concentration up to approximately 25,000 ppm (see Figure 2) with some PAHs. A few metals were also detected including arsenic up to approximately 17 ppm. The source for this localized petroleum impact is unknown. The concentration of the following contaminant exceeds DEQ's acceptable risk level for occupational worker exposure in the northeast corner area:

– Arsenic

The ROD determines that compliance with this CMMP and the existing cover at the Site prevents occupational worker exposure to an unacceptable risk for the arsenic present in the soil in the northeast corner area. There are no risk level exceedances in this area for excavation worker or construction worker exposure.

4.3 Other Areas of the Site

The remainder of the Site is shown as the P&DC building and parking area (parking structure) on Figure 2. Because the Portland P&DC Site was once used as a rail yard some petroleum hydrocarbons, and possibly metals (primarily lead and arsenic), could be encountered anywhere on the Site. However, the likelihood of encountering high concentrations that exceed DEQ's acceptable risk levels on these other areas of the Site (outside the areas discussed in Sections 4.1 and 4.2) is prevented by the Site cover for an occupational worker, and low for an excavation worker (the only current receptor with the potential to be exposed to excavated soil for existing Site use).

As described above, elevated arsenic above the presumed natural background level of 7 ppm has been detected in soil in the former coach cleaning area, electrical utility vault area, and in the former Pintsch gas plant area. Soil present in other areas of the Site has not been tested for arsenic, so, as requested by DEQ, such soil will be considered to contain elevated arsenic in lieu of data indicating otherwise. However, occupational worker exposure to arsenic and other contaminants in soil by direct contact is prevented by the cover, which will be maintained as provided in the remedial action. The E&ES will provide that USPS notify DEQ if there is to be a change in Site use in the future, to provide for continued protection of occupational workers. The E&ES will also require USPS to notify DEQ if there is to be any removal of the cover with the potential to encounter impacted soil and/or groundwater to provide for the safety of excavation workers and occupational workers.

4.4 Groundwater

The groundwater beneath the Site has not been significantly impacted except in the area of the former Pintsch gas plant. In this area dissolved hydrocarbons are present in the shallow groundwater. This shallow groundwater is generally encountered between 9 and 11 ft below the ground surface and is not used for any purpose. Total dissolved hydrocarbons in the shallow groundwater in this area are present in concentrations up to approximately 20 milligrams per liter (mg/L). The impacted area is within the former Pintsch gas plant area designated on Figure 2. Significant groundwater contamination has not been identified in other areas of the P&DC Site.

Concentrations of the following contaminants exceed DEQ's acceptable risk level in the former Pintsch gas plant area for construction/excavation worker exposure to groundwater in an excavation:

– Benzo[a]pyrene

– Naphthalene

The ROD determines that compliance with this CMMP and the existing cover at the Site prevent construction/excavation worker exposure to an unacceptable risk for the benzo[a]pyrene and naphthalene present in the groundwater in the former Pintsch gas plant area.

5 Site Contaminants

Site investigations show that petroleum-related constituents are elevated in soil and groundwater in some areas of the Site and metals are elevated in soil in some areas of the Site.

A project-specific health and safety plan (HASP) should include the Site contaminants summarized below.

5.1 Soil

- Metals
  - Arsenic
  - Lead
  - Iron
  - Chromium.
- TPH (diesel and heavy oil) including:
  - BTEX (benzene, toluene, ethylbenzene, and xylenes)
  - PAHs
    - Naphthalene
    - 2-Methylnaphthalene
    - Benz[a]anthracene
    - Benzo[a]pyrene
    - Benzo[b]fluoranthene
    - Benzo[k]fluoranthene
    - Chrysene
    - Dibenz[a,h]anthracene
    - Indeno[1,2,3-cd]pyrene.

5.2 Groundwater

- TPH (diesel and heavy oil) including:
  - BTEX
  - PAHs
    - Naphthalene
    - 2-Methylnaphthalene
    - Benz[a]anthracene
    - Benzo[a]pyrene
    - Benzo[b]fluoranthene
    - Benzo[k]fluoranthene
    - Chrysene
    - Dibenz[a,h]anthracene
    - Indeno[1,2,3-cd]pyrene.

5.3 Summary

Of the constituents listed in Sections 5.1 and 5.2, only benzo[a]pyrene in soil and benzo[a]pyrene and naphthalene in groundwater exceed DEQ's risk levels for current Site use (excavation workers) in the former Pintsch gas plant area only. In addition, naphthalene in soil exceeds the DEQ risk level for volatilization to outdoor air for occupational workers in the electrical utility vault area and the former Pintsch gas plant area. Although the remaining contaminants are present below DEQ risk levels for current Site use in soil and/or groundwater at the Site, these contaminants should be included in health and safety planning.

As discussed above, elevated arsenic above the presumed natural background level of 7 ppm has been detected in soil in the former coach cleaning area, electrical utility vault area, and in the former Pintsch gas plant area. Soil present in other areas of the Site has not been tested for arsenic, so, as requested by DEQ, such soil will be considered to contain elevated arsenic in lieu of data indicating otherwise. However, occupational worker exposure to arsenic and other contaminants in soil by direct contact is prevented by the cover, which will be maintained as provided in the remedial action. The E&ES will provide that USPS notify DEQ if there is to be a change in Site use in the future to provide for continued protection of occupational workers. The E&ES will also require that USPS notify DEQ if there is to be any removal of the cover with the potential to encounter impacted soil and/or groundwater to provide for the safety of excavation workers and occupational workers.

6 Health and Safety

The USPS has developed the following requirements and recommendations to provide for the health and safety of workers, USPS employees and the public during subsurface work with the potential to encounter impacted soil and/or groundwater. USPS will provide this CMMP to its personnel, contractors, and subcontractors performing activities with the potential to encounter contaminants in the subsurface. As part of the project planning process, a project-specific HASP will be developed. In addition, personnel working in the zone where hazardous operations are conducted will be properly trained and will have the required experience in working at hazardous sites. All workers who are expected to come into contact with impacted soil and/or groundwater will be informed of the environmental condition of the Site by the USPS, including, as needed or upon request, available environmental reports and other data.

6.1 Project-Specific Health and Safety Plans

USPS will require preparation of a project-specific HASP prior to work. USPS will review the HASP to ensure that the HASP includes the required elements, however, each contractor is responsible for the safety of its workers and each contractor may prepare its own HASP. All HASPs will be prepared in accordance with:

- Contractor's health and safety policies and procedures
- USPS health and safety policies and procedures
- Occupational Safety and Health Administration's (OSHA's) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation, 29 Code of Federal Regulations (CFR) 1910.120
- Oregon Administrative Rules (OAR), Chapter 437, Division 2 (as applicable)
- Applicable local, state, and federal requirements.

All personnel working on or in the area of hazardous operations must read and be familiar with the HASP prior to work, and must certify in writing that they have read and understand the HASP prior to commencement of hazardous operations.

The HASP must be appropriate for the planned work. The following elements are recommended for inclusion in a project-specific HASP:

- Site background and description.
- Specific health and safety information and training requirements for the project.
- List of project tasks and scope of work.

- Management of contractors and contractor health and safety.
- Requirement that a change in scope of the project, introduction of new hazards, or a change in existing hazards will require a revision of the HASP and proper review/approvals of the revised HASP.
- Project team organization that ensures health and safety for the project, including the identification of project and/or task manager(s), USPS and subcontractor health and safety contacts, and Site safety officer/manager.

  Assignment of the following responsibilities to team members:

  – Review and ensure project compliance with HASP

  – Ensure work is performed in a safe manner

  – Ensure the HASP is available and reviewed by all Site personnel, including contractors

  – Ensure required project-specific training is completed (e.g., tailgate meetings) as required for workers in and outside the work zone

  – Ensure Site visitors (all personnel who visit the work area and are not part of the project being implemented, such as a P&DC employee) are informed of the hazards related to the work, document visitors during the project, and document visitor's acknowledgement that they have been informed of the hazards (e.g., Site visitors log)

  – Authority to stop activities when necessary to protect workers, the public, and/or the environment

  – Coordination of activities during emergency situations

  – Dissemination and maintenance of all necessary permits and safety information to other Site personnel

  – Communication with the project/task manager, USPS and subcontractor health and safety contacts, and others as necessary on health and safety issues

  – Report all injuries, illnesses, and accidents to the project/task manager, USPS and subcontractor health and safety contacts, and others as appropriate

  – Ensure required safety equipment is maintained and used at the Site (e.g., personal protective equipment [PPE]).

- Hazard identification, communication, and control procedures including:
  - Chemical hazards

    Contaminants and chemical properties, including potential routes of entry, exposure symptoms, and regulatory thresholds for exposure.
  - Physical hazards

    Equipment, slip/trip/fall, material handling, noise, traffic management, underground utilities, electrical hazards, biological hazards, and other physical hazards as appropriate.
- Requirements for informing workers of hazards they may encounter during their daily tasks. This information should be given through at least daily tailgate safety meetings at the beginning of each work day or when new workers enter the work area or hazards change. Meetings should be documented (e.g., tailgate safety meeting form).
- Requirements for handling hazardous materials, including preparation for proper management and disposal of impacted soils and/or groundwater (see Section 7).
- Identification of construction measures to reduce exposure as appropriate, such as:
  - Dust suppression/control
  - Minimizing soil excavations
  - Equipment decontamination
  - Implementing stormwater pollution prevention protocols
  - Collection and management of dewatering liquids from below-grade excavations
  - Preventing vertical transport of chemicals during subsurface work.
- Identification of the required level of protection and the recommended PPE for each task appropriate for Site hazards, and provisions to move to a higher level of protection, if needed.

  The contractor is responsible for identifying and ensuring that the proper level of PPE is used for each task. At a minimum, OSHA Level D equipment and clothing should be required. Each level of protection should also include personal exposure monitoring and respiratory protection requirements, if needed.
- Identification of required medical screening and training.

- Discussion of Site access and control, including maintaining and, if needed, supplementing access restrictions. Currently, access is restricted to the Site by a chain link fence and a programmed lock that allows entrance only by security badge (except for the public mail area of the main post office building).
- Identification of work zones and procedures, including decontamination zones and procedures.
- Emergency action plan, including an emergency contact list and a map/route to the nearest hospital.
- Accident and injury review.

An "Environmental matrix" shown on Table 1 provides a summary of general precautions and procedures. This CMMP and matrix should be used as general guidance only. A thorough determination of precautions and procedures will depend on the nature of work and should be documented in a project-specific HASP as described above.

Prior to work, USPS personnel or contractors must obtain USPS approval of the project-specific HASP. However, contractors are responsible for the health and safety of their employees. The current USPS HASP reviewer/approver is Ann Yarnell (ann.m.yarnell@usps.gov) as discussed in Section 8. USPS personnel and/or the contractor will provide copies of the final USPS approved HASP to the USPS contacts identified in Section 8 prior to beginning work. This CMMP does not constitute a project-specific HASP.

6.2 Health and Safety Training

All personnel in the work zone must have proper health and safety training and experience to conduct the planned work, including all required medical monitoring. These personnel must be certified to work at sites where hazardous substances are present. As noted above, health and safety training requirements must be outlined in the project-specific HASP.

7 Contaminated Media Handling

Contaminated groundwater and soil may be encountered during subsurface activities. The project-specific HASP will include provisions for handling contaminated media, if encountered.

7.1 Groundwater

Groundwater under the property is not used as a drinking water source. Workers may encounter impacted groundwater in an excavation in the former Pintsch gas plant area. However, groundwater encountered in any area of the Site will be observed for impact by inspecting for sheens and odors. If groundwater is encountered in an excavation in the former Pintsch gas plant area or if impacted groundwater is encountered in any other area of the Site, and workers are required to conduct activities within the excavation, the excavation will be dewatered as appropriate to allow work and to minimize potential exposure. Collected water will either be discharged to a sewer with proper approvals and permits that may include characterization and treatment prior to discharge, or the collected water will be contained and characterized for proper offsite recycling or disposal. DEQ notification will not be necessary outside the Pintsch gas plant area if groundwater is encountered and no field evidence of impact is observed (no sheens or odors). DEQ notification is discussed in Section 8.1.

7.2 Soil

The Site is covered with asphalt, concrete, and structures which act as a cover/barrier for impacted soil. Subsurface activities that remove this cover and the underlying base course have the potential to encounter impacted soil in all areas not covered by buildings. Soil excavated above the water table in any area of the Site may be reused onsite with no analyses to refill the same excavation. Any other onsite reuse, such as placement outside the original excavation, will require DEQ approval. Soil must be tested for the following parameters to evaluate reuse onsite to refill excavations at or below the water table, or to evaluate possible reuse on the Site for other than refilling any excavations:

- Arsenic, lead, and chromium by U.S. Environmental Protection Agency (EPA) Method 6000/7000 or equivalent
- TPH by Northwest Method NWTPH-Dx (diesel and heavier oil) or equivalent
- PAHs by EPA Method 8270 or equivalent.

If soil is to be managed offsite (e.g., recycling or disposal), USPS must coordinate with the offsite facility to determine if any characterization (testing) is needed. All sampling and analysis must also be conducted in accordance with pertinent DEQ and EPA requirements and

guidelines (e.g., sample collection and preservation, chain of custody, sample analysis by an accredited laboratory, etc.). USPS will provide notice to DEQ regarding any soil excavation activities. DEQ notification is discussed in Section 8.1.

8 Required Notifications

USPS must be notified prior to disturbing the Site cover and for HASP approval as described in the following sections.

8.1 Disturbance of Site Cover

Anytime a project or activity on the P&DC Site requires disturbance of the Site cover anywhere on the property, the local USPS Maintenance Manager and the USPS Architect/Engineer managing environmental issues for the Portland P&DC Site must be contacted ***prior to starting work***. It is recommended that these contacts be made during the project or activity planning stage to minimize delays that may be caused by environmental issues.

The current USPS contacts for notifications are:

Maintenance Manager
David L. Long
USPS Portland P&DC
P.O. Box 4009
Portland, Oregon 97208-4009
(503) 294-2365
email: david.l.long@usps.gov

USPS Architect/Engineer
Hugh Roche
USPS Western Area Facilities Service Office
160 Inverness Drive West, Suite 400
Englewood, Colorado 80112-5005
(303) 220-6524
email: hugh.c.roche@usps.gov

One of the USPS contacts noted above will review the scope of work, determine whether DEQ notification is necessary, and if so, complete a notification to DEQ's Northwest Region Cleanup Section prior to subsurface field work. DEQ will be notified if subsurface work with the potential to encounter impacted soil and/or groundwater is planned in areas as described above.

The current DEQ contact for notification is:

DEQ Project Manager
Dan Hafley
Northwest Cleanup Section
State of Oregon
Department of Environmental Quality
2020 SW Fourth Avenue
Portland, Oregon 97201
(503) 229-5417
email: hafley.dan@deq.state.or.us

Contacts in this section may be changed by USPS.

8.2 HASP Approval

As described in Section 6, USPS personnel and/or contractors will prepare a project-specific HASP and obtain USPS approval of the HASP prior to commencement of any work.

The current USPS contact for HASP review/approval is:

USPS HASP Reviewer/Approver
Ann Yarnell
Facilities Environmental Specialist
6013 Benjamin Road, Suite 201
Tampa, Florida 33634-5193
(813) 889-4317
email: ann.m.yarnell@usps.gov

This contact may be changed by USPS.

9 Inspecting and Maintaining Site Cover

Maintenance of the Site cover is necessary to limit human exposure to impacted media, except by properly protected and qualified workers. The Site cover consists of paving over part of the property and structures (buildings) over the remainder of the property with minor landscaped areas. USPS will inspect the structure floors only if damage is suspected due to a major event (e.g., an earthquake).

Construction information for the P&DC building, the VMF building, the truck scale, and the drive aisles and parking lots were provided by USPS and are summarized here. The P&DC building floor was constructed with reinforced structural concrete approximately 6 inches thick with tiles covering most of the floor. There are some tunnels under the first floor that were also built with approximately 8 to 20-inch thick concrete walls and approximately 8-inch thick concrete floors. The VMF was constructed slab on grade with a concrete thickness of approximately 6 inches. A truck scale pit is located outside the northwest corner of the P&DC building and was constructed with an approximate 10-inch thick concrete floor and 12-inch thick concrete walls. Paving thicknesses of 3.5 to 5 inches were measured in the drive aisles and parking lots during a geophysical survey and coring project conducted in August 2010. Minor landscaped areas are composed of trees, shrubs and cover (e.g., soil and/or bark). The buildings, paved areas and landscaped areas are shown on Figure 2.

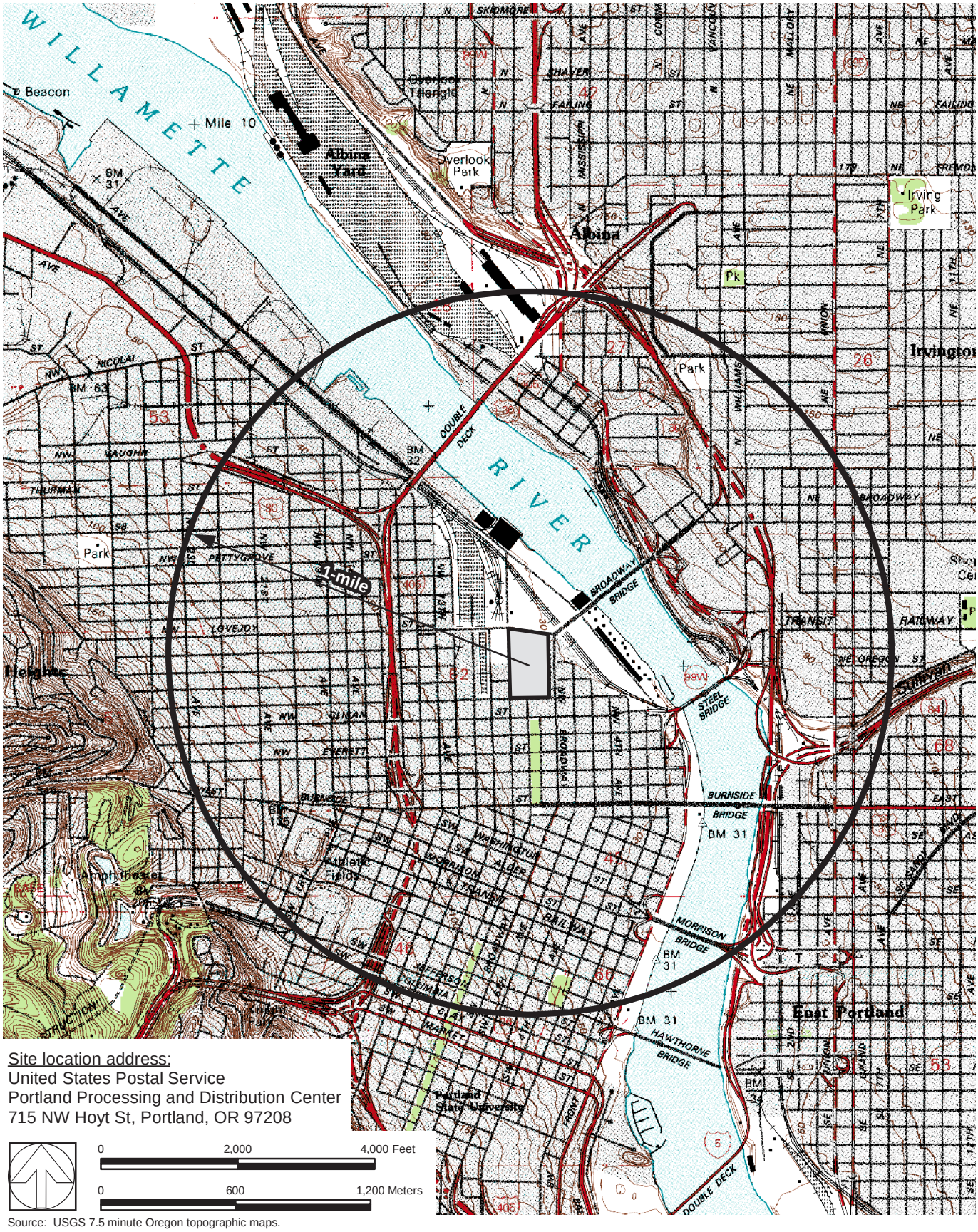
USPS will properly maintain the paving through an inspection and maintenance program. Recently, USPS identified the need for paving improvements in several areas of the Site, and the majority of this work is planned to be completed in 2011. Photographs will be taken during the paving work to document construction and repairs. A visual cover inspection will be completed following these improvements and will be documented on the inspection form provided in Appendix B, with key photographs taken during the improvement project.

As provided in the ROD, the Site cover will be maintained and visually inspected on an annual basis using the inspection form as provided in Appendix B. Photographs will be taken during each annual inspection. During the five-year review, DEQ may determine that less frequent inspections are appropriate.

If the Site cover is disturbed for any reason, it will be restored as deemed appropriate to support USPS operations and to prevent human exposure to potentially impacted media. Cover repair must be completed within 30 days of removing the cover or within an alternate timeframe approved by DEQ. At a minimum, new paving material will be composed of 2 in. of rigid or flexible pavement and will conform to USPS standard design criteria. If the base course below the paving is removed, the thickness of new base course material may match the existing thickness. Repair in landscaped areas will be composed of a demarcation layer and 12 inches of clean soil or rock, if feasible. The scope of actual repair activities in landscaped areas may be modified at the discretion of USPS to ensure the protection of landscaping (e.g., trees).

USPS will provide information related to cover removal and repair to DEQ within 60 days of project completion or within an alternate timeframe approved by DEQ. USPS may provide this information by phone, electronic mail, memorandum, or report.

Figures



Site location address:
United States Postal Service
Portland Processing and Distribution Center
715 NW Hoyt St, Portland, OR 97208

Source: USGS 7.5 minute Oregon topographic maps.

Figure 1. Site location

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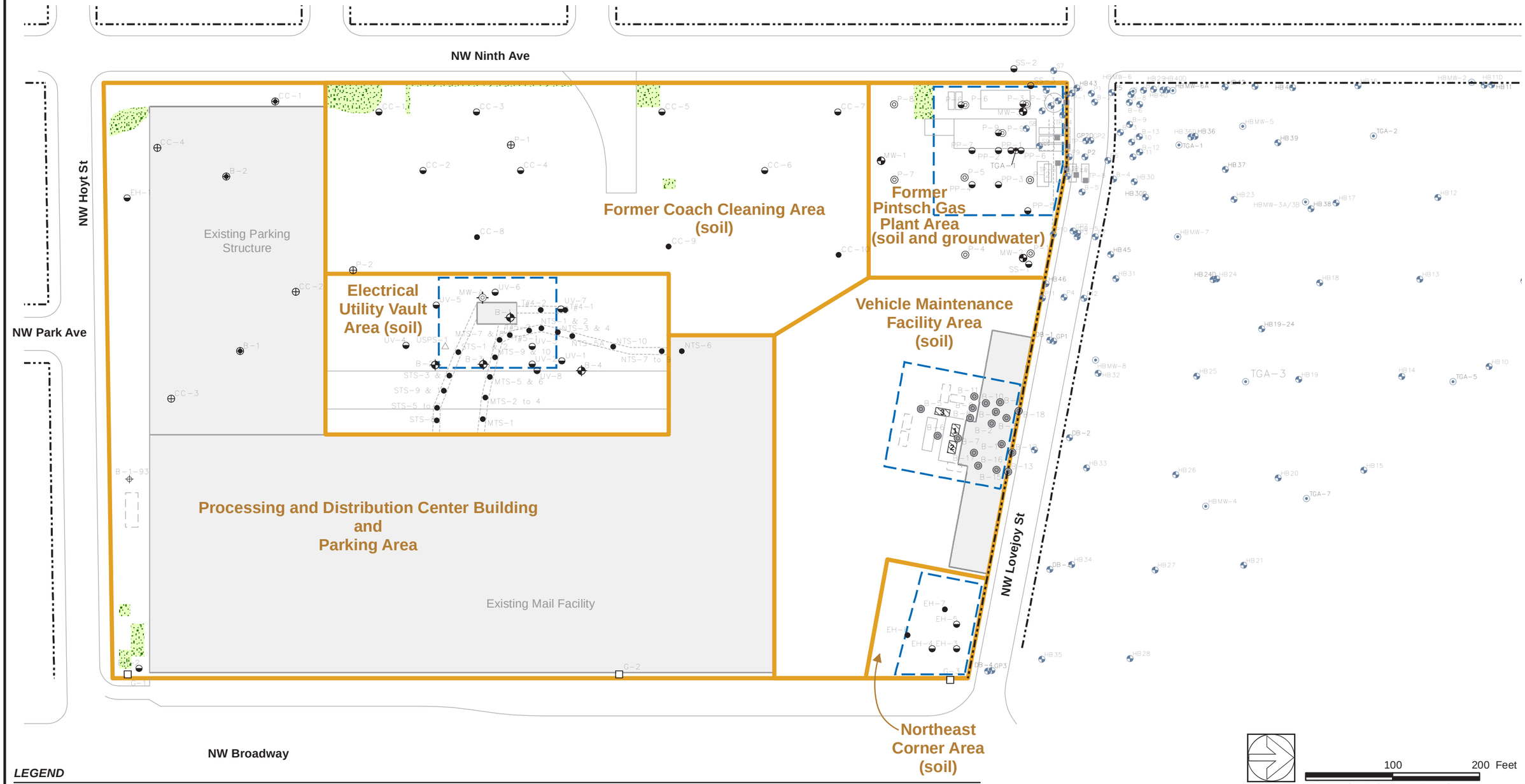

LEGEND

- Trench soil sample collected by GeoEngineers in 1997
- Boring completed by GeoEngineers in 1996
- Shallow monitoring well completed by GeoEngineers in 1996
- Shallow monitoring well completed by Alisto in 2000
- Boring completed by Alisto in 2000
- Monitoring well completed by Dames & Moore in 1993
- Hand auger boring completed by Dames & Moore in 1993
- Boring completed by Cornforth Consultants in 1986
- Boring completed by Geotechnical Resources in 1987
- Boring completed by ARCADIS in 2004
- TGA well completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Trench sample by Dames & Moore in 1997
- Test pit completed by Dames & Moore in 1993
- Building
- Area where significant concentrations of hydrocarbons can be expected
- Removed underground storage tank
- Landscaped areas

Source: Adapted from ARCADIS (2006) final remedial investigation

Note: Sampling locations and site features are approximate. All areas are paved unless otherwise noted (i.e. buildings, landscape areas, etc).

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Figure 2. Environmental precaution areas

Table

Table 1. Environmental matrix—USPS Portland P&DC site

	Western Half of Site				Eastern Half of Site		
	Former Coach Cleaning Area	Electrical Utility Vault Area	Former Pintsch Gas Plant Area	Parking Structure Area	P&DC Building Area	VMF Area	Northeast Corner Area
Contact USPS Portland P&DC Maintenance Manager and USPS Architect/Engineer managing Portland P&DC environmental issues before starting work that will disturb the paving (cap)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obtain USPS approval of project-specific HASP prior to starting work that will disturb the paving (cap)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Anticipated contaminants	Petroleum and Metals	Petroleum and Metals	Petroleum and Metals	Possible Petroleum and Possible Metals[c]	Possible Petroleum and Possible Metals[c]	Petroleum and Possible Metals[c]	Petroleum and Metals
Anticipated contaminant concentration	Medium	Very High	Very High	Very Low	Very Low	Medium	Low
Depth of concern[a]	Less than 10 ft	Less than 10 ft	Less than 16 ft	Less than 10 ft	Less than 10 ft	Less than 10 ft	Less than 10 ft
Minimum personal protective equipment[b]	Modified Level D	Modified Level D	Modified Level D	Modified Level D	Modified Level D	Modified Level D	Modified Level D
Anticipate characterization for reuse other than refilling the same excavation above the water table, or offsite recycling or disposal of soil?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Anticipate impacted groundwater and discharge of groundwater to sewer, or offsite recycling or disposal of groundwater?	No[d]	No[d]	Yes	No[d]	No[d]	No[d]	No[d]
Anticipate air monitoring during subsurface work?	No	Yes	Yes	No	No	Yes	Yes
Prevent exposure to non-excavation/ construction workers (e.g., occupational workers)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[a] Does not include exposure below a depth of 16 ft because construction/excavation work below this depth is not anticipated. In some areas of the Site, contaminants have been detected below 16 ft (e.g., former Pintsch gas plant area).

[b] Modified Level D includes nitrile gloves to reduce exposure.

[c] Metals in soil do not exceed DEQ's acceptable risk levels for excavation worker exposure. For the existing site use, occupationial worker exposure to metals in soil by direct contact is prevented by the cap, which will be maintained as required by the remedial action selected by DEQ.

[d] Although groundwater impacts have not been observed outside the former Pintsch gas plant area, groundwater encountered in all areas of the Site will be field screened for sheens and odors. If impacts are observed, groundwater will be managed accordingly.

Appendix A

Selected Remedial Action, Record of Decision for the USPS-P&DC Site, Portland, Oregon (DEQ, July 14, 2010)

SELECTED REMEDIAL ACTION
RECORD OF DECISION
FOR THE
USPS-P&DC SITE
PORTLAND, OREGON

1.0 INTRODUCTION AND PURPOSE

This document presents the Oregon Department of Environmental Quality (DEQ) selected remedial action for the United States Postal Service – Processing and Distribution Center (USPS P&DC) site located in Portland, Oregon. The remedial action was chosen in accordance with Oregon Revised Statute (ORS) 465.200 et. seq. and is based on the administrative record for this site. This Record of Decision (ROD) summarizes the more detailed information presented in the soil and groundwater remedial investigation reports prepared for the site, and other documents in the administrative record. The ROD is based on the site Staff Report dated April 30, 2010.

An Intergovernmental Agreement for Remedial Investigation/Feasibility Study and Scope of Work (IGA/SOW, No. LQVC-NWR-03-06) was signed by property owner USPS and the DEQ on May 21, 2003 and guided much of site investigation, risk assessment, and remedy evaluation work. Prior site investigation work was performed under a letter agreement signed by USPS and dated November 15, 1999. The USPS P&DC site is listed in DEQ's Environmental Cleanup and Site Information (ECSI) database as #2183.

2.0 SUMMARY OF SELECTED REMEDIAL ACTION

The USPS prepared a Final Land Use Evaluation on March 26, 2003 that identified use of the site as a processing and distribution center as the current and reasonably likely future use. DEQ approved the Evaluation on September 8, 2003. Recently, the Portland Development Commission (PDC) requested that the USPS negotiate a sale of the site to PDC for redevelopment. Because those negotiations are ongoing, DEQ requested that USPS address a hypothetical future site use scenario of mixed commercial and urban residential in the final site feasibility study.

To address these two scenarios, separate remedial actions are have been selected for the USPS facility as follows: 1) an Existing Site Use scenario under which the site would continue to be used by the USPS as its main Oregon processing and distribution center, with access restricted and a protective site cover maintained; and 2) a Hypothetical Future Site Use scenario under which the site would be sold and redeveloped with mixed commercial and urban residential use likely.

Under the Existing Site Use scenario, only occupational or excavation worker exposure is possible, as contaminated media would be covered by existing USPS buildings and paving. According to USPS, the buildings and paving are integral to continued operation of the postal facility. Under the Hypothetical Future Site Use scenario, exposure to urban residents, occupational workers, construction workers, and excavation workers would be possible. Selected remedial actions for the site for both scenarios are outlined below.

<u>Remedial Action For Soil – Existing Site Use</u>

Institutional and engineering controls:

- Maintenance of the existing site cover (paving and buildings over the entire site) as a cap.
- Prevention of unacceptable occupational worker exposure by maintaining existing limited use in the portions of the Former Pintsch Gas Plant (Pintsch Plant) and Electrical Utility Vault (Electrical Vault) areas.
- Use of engineering and institutional controls (personal protective equipment as necessary and USPS ongoing limitations on property access) to prevent unacceptable exposure of excavation workers to contaminated soils.
- Recording of an Easement and Equitable Servitude (E&ES) with the property deed summarizing information on site contamination, worker notification and protection requirements, cap inspection and maintenance requirements, and acknowledging the requirements set forth in a Contaminated Media Management Plan (CMMP).

Remedial Action For Groundwater – Existing Site Use

Institutional and engineering controls:

- Use of engineering controls to prevent unacceptable exposure of excavation workers to contaminated groundwater in the former Pintsch Plant area.
- Recording of an E&ES with the property deed prohibiting use of groundwater for drinking or any other purposes where human contact might occur.

Remedial Action For Soil – Hypothetical Future Site Use

Hot spot removal and institutional and engineering controls:

- Maintenance of the existing site cover (paving and buildings) until redevelopment occurs, and temporary capping and access restrictions if cover is compromised or removed.
- Concurrent with redevelopment, capping of areas of where soil exceeds acceptable risk levels with a demarcation layer and a minimum of two feet of clean fill (landscape areas) or hardscape (buildings and paved areas). Cap specifications for paved/building areas to be determined in a remedial design document and subject to DEQ approval.
- Excavation of soil exceeding hot spot concentrations (>100x relevant risk-based concentration or RBC for individual carcinogenic contaminants) in the Electrical Utility Vault and Pintsch Plant areas, and off-site disposal of excavated soil at a Subtitle D landfill or other DEQ-approved facility. This action will require confirmatory sampling to ensure that all hot spot soils are removed.
- Installation of a vapor mitigation system in the Pintsch Plant and Electrical Vault areas to prevent exposure to soil contamination via vapor migration, or additional investigation to demonstrate that a vapor mitigation system is not needed.
- Removal of two pockets of petroleum contamination beneath existing site buildings, as described in DEQ's June 13, 1997 approval letter for decommissioning of site underground storage tanks (USTs); or completion of a risk analysis confirming that residual contamination does not pose a risk under the appropriate site use scenarios.
- Implementation of engineering controls, as necessary following hot spot removal and any other soil removal related to site development, to prevent unacceptable exposure to contaminated soils by excavation workers. Controls are to be outlined in a new CMMP, including protocols for worker notification and requirements for personal protective equipment (PPE), dust suppression, soil management protocols, site access restrictions, etc.

- Recording of a revised E&ES with the property deed (unless the E&ES recorded by USPS is determined to be adequate), outlining site hazards, cap inspection and maintenance requirements, and acknowledging the requirements set forth in the CMMP.

Remedial Action For Groundwater – Hypothetical Future Site Use

Institutional and engineering controls:

- Installation of a vapor mitigation system in the Pintsch Plant area to prevent urban residential exposure to groundwater contamination via vapor migration. If some or all of impacted groundwater is removed as part of site development, or site use under redevelopment does not include residents as expected, residual risk analysis will be necessary to confirm that vapor risk has been addressed and mitigation is not necessary.
- Implementation of engineering controls, as necessary, to prevent unacceptable exposure to contaminated groundwater in an excavation in the former Pintsch Plant area. Controls are to be outlined in a CMMP, and include protocols for worker notification and requirements for PPE, groundwater management protocols, site access restrictions, etc.
- Recording of an E&ES with the property deed prohibiting use of groundwater for drinking or any other purposes where human contact might occur, if such an E&ES has not been recorded previously.

A more detailed description of selected actions for the USPS site can be found in Section 8: DEQ Selected Remedial Action.

3.0 SITE DESCRIPTION

The USPS site is located at 715 NW Hoyt Street in Portland (see Attachment 1 for location). The approximately 13-acre site is located in a zone of mixed commercial and urban residential development at the north end of downtown Portland. The site is bounded by NW Broadway on the east, NW Hoyt Street on the south, NW Ninth Avenue on the west, and NW Lovejoy Street (aka the Lovejoy Ramp) on the north.

The USPS site processes all outgoing mail for the State of Oregon, and is comprised of the 398,000-square foot P&DC and Main Post Office building, a 10,025-square foot Vehicle Maintenance Facility (VMF), a 157,400-square foot multi-story parking structure, and exterior parking and maneuvering areas for postal vehicles. The site is covered with either structures or paving, with the exception of a few small landscaped areas along the south property boundary adjacent to NW Hoyt Street and NW 9th Avenue. Public access is restricted to all portions of the site except the Main Post Office, situated at the south end of the site along NW Hoyt Street. The site is generally flat, and runoff is either to catch basins located within the site proper, or those located on adjacent paved streets. Runoff from the site and surrounding area discharges to the Willamette River via subsurface storm drains, primarily via drain lines located beneath NW Ninth Avenue and NW Tenth Avenue, which connect to the so-called Tanner Creek Sewer outfall and discharge to the Willamette River north of the Broadway Bridge near the Centennial Mills property.

The site is zoned EXd (Central Employment), as is property to the immediate north and west. Property to the immediate east and south is zoned CXd (Commercial). Both allow some residential development. The nearest surface water body is the Willamette River, located at its closest approximately 700 feet to the northeast.

Roughly the eastern half of the site was owned by Northern Pacific Terminal Company (NPTC, later becoming Portland Terminal Railroad Company or PTRR) from 1882 to 1959, while the same entity owned the western portion of the site from 1882 to 1974. NPTC/PTRR used the entire site for railyard operations. Rail operations included numerous track lines and a railroad turntable. Rail car repair and cleaning were performed along the west side of the site in the 1890s and early 1900s (Coach Cleaning Area), while freight depots operated in the eastern portion of the site from the 1890s to later 1950s. A Pintsch Gas Plant operated in the northwest site corner from approximately 1893 to the 1930s, producing compressed gas from naphtha-grade oil for the lighting of railroad cars. Process equipment including an above-ground gas holder, high-pressure tanks, a tar well, and oil tanks were present at the Pintsch operation. No definitive information has been found regarding operations and waste disposal practices at the plant; however investigation efforts suggest that most impacted material associated with gas plant activity came to be located on neighboring property to the north that was initially below the grade of the gas plant (Lovejoy Ramp area and adjoining Station Place/Horse Barn site, ECSI# 2407). It appears also that a portion of the operation extended beyond the current USPS property and into NW Lovejoy Street (Lovejoy Ramp, owned by the City of Portland).

USPS purchased the eastern half of the site in 1959, and subsequently sold it in 1960. They then leased and began operation of the P&DC on the eastern portion of the site in 1962. In 1974 USPS purchased the eastern and western halves of the site, forming the site as it is configured today. The P&DC/Main Post Office Building and VMF buildings were constructed in 1962, and the parking structure in 1987. The P&DC property is currently used for the processing and distribution of mail, the Main Post Office for public services, the VMF building for repair and maintenance of USPS vehicles, and the parking structure for employee parking. Attachment 2 shows selected current and historical site features.

Shallow soil at the site consists primarily of fill, having a variable grain size and in some cases containing man-made materials including brick, wood, and slag. Willamette River dredge sand is also present in some areas. The fill material is in turn underlain by alluvial/fluvial deposits of Pleistocene to Recent age. The deposits represent a combination of flood deposits of the Willamette River, and fine-grained sediments associated with the Ice-Age Bretz floods. These are underlain, in turn, by unconsolidated gravels of the Pliocene-age Troutdale Formation. In the northwest site corner, Troutdale gravels were encountered at a depth of approximately 80' below ground surface (bgs). These gravels are underlain at depth (unknown) by Miocene-age flood basalts of the Columbia River Basalts Group.

Groundwater is typically present at a depth of approximately 10 to 20' bgs across the site. Shallowest groundwater (unconfined water table aquifer) in the westernmost-portion of the site flows to the west, apparently influenced by utilities located beneath NW 9th Avenue. Shallow flow in the eastern portion of the site and in deeper Alluvial Deposits is surmised to be north-northeast towards the Willamette River (a regional discharge boundary). Groundwater flow in the underlying Troutdale Gravel Aquifer (TGA), present within unconsolidated gravels of the upper Troutdale Formation, is northeast (towards the Willamette River) based on information from the adjacent Station Place/Horse Barn site. There is no current or reasonably likely future use of the shallow (Alluvial) aquifer at the site beyond recharge of the nearby Willamette River. In the past, deeper TGA groundwater was used in the site vicinity for industrial and irrigation purposes. The only known current use of the TGA within approximately 1 mile of the site is City of Portland irrigation well at Waterfront Park, well outside of any site influence. Water for resident and business use in the area is supplied by the City of Portland from a distant surface water source (Bull Run Reservoir).

Regarding current and future site land use, USPS submitted a Final Land Use Evaluation that stated that it intended to continue operating the P&DC at the subject site. Recently PDC requested that USPS negotiate a sale of the site to PDC for redevelopment. For this reason, the Focused Feasibility Study

(FFS) also considered a hypothetical future urban residential use. In the event that the site is redeveloped in the future, the use would likely change to mixed commercial and urban residential. There has been extensive redevelopment around the site in the last 10 years, nearly all being mixed commercial and urban residential.

4.0 SITE INVESTIGATION

A number of phases of investigation and cleanup have been performed at the site, within the adjacent Lovejoy Street right-of-way, and at neighboring properties to the north (Station Place Redevelopment aka the Horse Barn, ECSI# 2407)), northwest (Hoyt Street Railyards, ECSI# 1080), and Pearl Block (ECSI# 4960) properties. Investigation at the USPS site has largely focused on the following areas associated with contamination from historical (railroad) site use: Former Pintsch Gas Plant, Former Coach Cleaning, Electrical Utility Vault, and storm sewers. USPS has also conducted underground storage tank (UST) investigations related to its operations at the site. Note that earlier investigation work completed under DEQ UST and Voluntary Programs is presented in subpart A of this section, work performed independent of DEQ in subpart B, and work performed under the Intergovernmental Agreement with DEQ in subpart C. A figure showing most soil and groundwater sampling locations at and around the site is presented in Attachment 3. References for individual investigations are presented in Appendix A.

A. INVESTIGATION UNDER DEQ UST AND VOLUNTARY PROGRAMS

Vehicle Maintenance Facility and South Side of Main P&DC Building. Six USTs used by the USPS to store diesel, gasoline, waste oil, and heating oil were decommissioned by removal in 1992 and 1993. Five USTs were located at the USPS VMF, and one was located on the south side of the Portland P&DC complex. Contamination was detected in both areas, and soil remediation completed. DEQ's Northwest Region UST program issued a no further action determination for the UST decommissioning activities on June 13, 1997, but noted that some pockets of elevated petroleum contamination were left in both areas because of inaccessibility. A copy of the NFA letter is included as Attachment 4. Elements of these UST activities are discussed below.

1993 UST Decommissioning Report Review & Soil Investigation. This report, prepared by Dames & Moore, presents the results of soil boring and test pit work that was done at the USPS VMF in the course of decommissioning USTs, including a 300 gallon waste oil UST, 1,000 and two (2) 5,000 gallon diesel USTs, and a 10,000-gallon gasoline UST. Hand auger borings (B1 through B18, and EX-1) were advanced to a maximum of 4 feet below ground surface (bgs), with one to two samples from each analyzed by either total petroleum hydrocarbons (TPH). Three deeper test pits were installed south of the VMF building, with selected samples similarly analyzed. In the hand auger samples, TPH was detected at a number of locations to a maximum of 71,000 mg/kg (diesel/bunker). Deeper test pit samples were generally non-detect.

1994 UST Decommissioning & Soil Investigation Report. A 25,000-gallon Bunker "C" fuel tank located immediately south of the existing mail facility was decommissioned in 1993. In the course of removal, contamination was observed in the area of the product line, which had been hit during shoring activities. No impacts were observed in the UST excavation. Numerous soil samples were collected during decommissioning. Results from investigation and confirmatory sampling are documented in "Geotechnical Investigation, 25,000 Gallon UST Removal" (June 8, 1993) and "UST Decommissioning & Soil Investigation Report" (February 10, 1994) prepared by Dames & Moore. Impacted soil was removed from this location, and transported off-site for disposal. A pocket of residual contamination (to 770 mg/kg diesel) was left in place next to the adjacent building foundation as noted in DEQ's

June 13, 1997 NFA letter for the tank removal. A monitoring well was installed in 1993 by Dames & Moore near the southeast garage corner associated with the UST decommissioning at this location. Groundwater was analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX); none were detected.

2001 Preliminary Assessment Report. Alisto Engineering Group completed a Preliminary Site Assessment for the USPS site dated March 8, 2001. Work included the advancement of borings to a maximum of 32 feet bgs at nine locations in the northwest site corner (Pintsch Plant Area), and the collection of deeper soil samples (8 to 32 feet bgs) and shallow groundwater samples from the same areas. Soil samples were analyzed for TPH, BTEX, polynuclear aromatic hydrocarbons (PAHs), and metals, and grab groundwater samples collected from the boreholes were analyzed for TPH and BTEX. Three monitoring wells (MW-1 to -3) were subsequently installed and sampled in August 2000. Sample results are discussed below in subpart C.

B. INDEPENDENT INVESTIGATIONS REPORTED TO DEQ

1987 Parking Garage Geotechnical Investigation. Geotechnical borings (B-1 and B-2 and CC-1 to -4) were completed in 1986 and 1987 in association with construction of the Parking Garage. It appears from DEQ records that the 1986 work was completed by Cornforth Consultants and that in 1987 by Geotechnical Resources. Borings were advanced to 45 feet bgs; no visual evidence of contamination was noted.

1993 Geotechnical Investigation. In association with decommissioning of the 25,000 gallon Bunker "C" UST located south of the mail facility, a soil and groundwater sample were collected near the tank. No petroleum hydrocarbons were detected.

1996/1997 Limited Subsurface Environmental Assessment, Proposed Utility Construction. As a prelude to utility construction west of the mail handling building, shallow soil samples were collected from three of four soil borings (B-1 through -4) and a groundwater sample (from well MW-A) was collected in late 1996. Soil samples were analyzed for TPH, PAHs, and total metals, and the groundwater sample for TPH, PAHs, and BTEX. The well was resampled in November 1997. There were no detections in groundwater beyond that of fluoranthene (< 1 ug/L) in the 1996 groundwater sample. Dissolved lead was detected at 1.5 µg/L in the 1997 groundwater sample.

1997 Work Plan, Excavation Monitoring and Oversight. Additional data from the utility trench was included in GeoEngineers' "Work Plan, Excavation Monitoring and Oversight" (May 16, 1997). A composite sample collected from stockpiled soil (SS-1/SS-2) contained TPH-D and TPH–O to 5,170 and 3,880 mg/kg respectively, and individual PAH concentrations up to 292 mg/kg. A soil sample collected following excavation (TS-1) had reduced levels of contaminants. Soil Sample USPS-1 had elevated levels of contaminants.

1997 Report of Excavation Observation and Monitoring. GeoEngineers' report contained confirmatory sampling data from the five shallow utility trenches that were dug to facilitate utility construction. Samples were designated STS-, MTS-, NTS-, T#4-, and T#5- representing the south, middle, north, and fourth and fifth trenches. Confirmatory samples were collected from depths varying from 1.5 to 13 feet bgs, and analyzed for TPH, metals, VOCs, and PAHs. Elevated TPH, metals (arsenic and lead), and PAHs were detected. At location USPS-T#5-2 (3.5 feet bgs), TPH-D and TPH-HO were detected to 175,000 and 128,000 mg/kg respectively, and representative PAHs, benzo(a)pyrene and naphthalene, detected to 73.1 and 246 mg/kg, respectively.

2000/2001 Natural Gas Line. Soil sampling was completed in 2000 and 2001 in conjunction with rerouting of a natural gas line situated along the east side of the site and in NW Broadway Street. TPH, PAHs, and metals were detected.

C. INVESTIGATION UNDER DEQ

Pintsch Gas Plant. Investigation of the Pintsch gas plant formerly located in the northwest site corner was initiated in 2000. Initial work focused on soil sampling and VOCs, PAHs, and TPH were detected. Three shallow groundwater wells (MW-1 to -3) were subsequently installed and monitored between 2000 and 2003. Contaminants detected in soil and groundwater – primarily TPH, VOCs, and PAHs - were consistent with those detected beneath the adjoining Lovejoy Ramp (north), and the Union Station-Horse Barn site to the north, and are likely attributable to Pintsch Plant operations and other historic railyard activities in the area and contaminated fill. Impacts to groundwater are primarily located in the vicinity of MW-3. Research of historical records subsequently revealed that plant operations extended across the USPS property line and onto what is now Lovejoy Ramp (formerly NW Lovejoy Street) and owned by the City of Portland. The layout of the former gas plant is shown in Attachment 2. Soil contamination related to past practices at the site, including historical railyard activities and placement of contaminated fill, were identified during the RI. Although impacts in the former Pintsch Gas Plant area are likely attributable to these sources, the most significant source appears to be operation of the gas plant.

TPH and VOCs were not detected in MW-1 and -2, located south (upgradient) and east (side-gradient) of the gas plant footprint. PAHs were detected in both wells at concentrations of less than 1 ug/L. At MW-3, located within the footprint of the plant, maximum detections of TPH-diesel (TPH-D), TPH - heavy oil (TPH-HO), naphthalene, and benzene were 13,000 ug/L, 3,920 ug/L, 3,900 ug/L, and 1,020 ug/L respectively. Similar detections were observed on the adjacent Union Station-Horse Barn site. Monitoring of MW-1 and -2 was discontinued in 2003 based on a lack of significant detections, and for MW-3 in 2005 when DEQ determined that an adequate data set had been generated.

In 2004, twelve borings (P-3, -6, and -9; PP-1 through -7, and SS-2 and -3) were advanced in the gas plant. Samples were collected at depths ranging from 3 to 90 feet bgs. Most borings were advanced for collection of shallow soil samples to assess near-surface impacts in the Pintsch plant area to augment the deeper investigation completed in 2001. Boring PP-6 was advanced to the top of the TGA to determine the depth (elevation) of the TGA on the USPS site. Borings SS-2 and -3 were advanced to 32' bgs to evaluate conditions in the vicinity of the former (abandoned) Tanner Creek sewer line located to the immediate west below NW 9th Avenue. Analysis included BTEX, VOCs, PAHs, and TPH.

TPH and PAHs, in particular, were commonly detected, with the highest concentrations being in deeper unsaturated soil and extending into the top of the water table (7 to 16 feet bgs). The presence of elevated contamination at depth was surmised to be from filling of the site subsequent to gas plant and railroad activities.

At the presumed location of the former gas plant "tar well', a boring was advanced to the top of the TGA at approximately 90' bgs, and samples collected from multiple intervals for analysis. Impacts with characteristics typical of Pintsch Plant operations and other historic railyard activities were observed in soil and groundwater, but attenuated with depth, and free product was not seen in the TGA as it was at the adjoining Station Place (Horse Barn) site to the north. A monitoring well (TGA-1) was subsequently installed near this location, and groundwater samples collected from December 2004 through September 2005. TPH, benzene, and naphthalene were detected to a maximum 0.78 mg/L, 1.72 ug/L, and 2.27 ug/L respectively. Based on a lack of significant impacts, USPS requested and received DEQ approval to discontinue sampling of this TGA well.

Storm Sewer. Investigation at the Union Station-Horse Barn site, and within NW Lovejoy Street during construction of the new ramp in 2003, has identified TPH, VOC, and PAH contamination in soil and shallow groundwater along the eastern margin of NW 9th Avenue. The likely source is the historical discharge of gas plant waste onto these properties. Subsequent video survey of the sewer and sampling of stormwater within the 27-inch sewer beneath NW Lovejoy in the mid-2000s identified contaminants associated with gas plant waste (benzene, naphthalene, and other PAHs) within the sewer, but at sufficiently low levels that they did not exceed risk-based screening values at sample collection points (manholes) downstream of the Union Station-Horse Barn site. Ambient water quality samples were collected during both low high water conditions.

To evaluate conditions in the northwestern area of the Site and in the vicinity of the former (abandoned) Tanner Creek sewer line, two borings (SS-2 and -3) were advanced as close to the sewer line as possible at DEQ's request during the RI in 2004. Soil samples were collected from depths between 16 and 32 feet bgs and analyzed for BTEX, VOCs, PAHs, TPH, and metals. TPH (to 1,380 mg/kg), PAHs, and VOCs (excluding benzene and others) were detected, indicating that gas plant contamination extends off of the site and beneath NW Lovejoy. Groundwater adjacent to the sewer was similarly impacted.

During construction on the new Lovejoy Ramp in the early 2000s, an unknown petroleum product was observed by DEQ seeping from shallow soil in an excavation sidewall. DEQ recalls that the seepage was observed near the northwest corner of the VMF. In contrast, the City of Portland indicated that seeps were observed near the northwest corner of the Site and not near the VMF (City of Portland 2004 as cited in ARCADIS, 2006). The City noted that the seep was encountered during installation of a light pole adjacent to the Horse Barn property on the north side of vacated NW Lovejoy Street. According to DEQ staff, the area of seepage was subsequently covered and the source of the contamination not identified.

Electrical Utility Vault. Subsurface petroleum contamination was encountered in 1996 during geotechnical drilling activities associated with an electrical utility vault expansion west of the P&DC facility. Near surface soil was visually impacted, and contaminated with total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and lead. Impacted soil was excavated and transported off-site for disposal at the Hillsboro Subtitle D landfill. A monitoring well (MW-A) was installed in the impacted area in 1996 by GeoEngineers and samples were collected during low and high water conditions, and later in October 2004. Significant groundwater impacts were not observed.

During subsequent RI investigation completed by ARCADIS (for USPS) in 2004, additional borings (UV-1 through UV-8) were advanced, generally to15 feet bgs, to further delineation of the impacted area. One boring (UV-8) was advanced to 30 feet bgs and a temporary shallow groundwater monitoring point was constructed. Soil and groundwater samples from the boring and wells (UV-8 and MW-A) were analyzed for BTEX (benzene, toluene, ethylbenzene, and xylenes), PAHs, and TPH. Elevated contaminants included PAHs were detected in soil. Two PAHs were detected in groundwater in the UV-8 boring; none were detected in well MW-A.

Coach Cleaning Area. According to Sanborn Fire Insurance Maps and other sources, the cleaning of railroad passenger (coach) cars was performed in the west-central portion of the site. To evaluate conditions in this area, seven borings (CC-1 to -7) were advanced to 15 feet bgs in this area in 2004, and two samples (surface and subsurface) at each location were collected and analyzed for VOCs, TPH, PAHs, and metals. Organic contaminants were generally low or absent, and arsenic and lead notably elevated. Detected arsenic ranged from 22 to 48 mg/kg, and lead from 244 to 1,080 mg/kg. In 2006, three additional borings (CC-8 to -10) were advanced in the area. Elevated lead and arsenic were detected to 3,020 and 50.9 mg/kg, respectively.

Parking Garage. As part of the RI, shallow and deeper soil samples were collected from immediately south of the garage (location EH-1) in 2004 and analyzed for TPH, VOCs and PAHs. Metals were not analyzed. Low levels of a few PAHs were detected.

Northeast Corner. As part of the RI, sampling was completed in the northeast corner area by ARCADIS in 2004. Soil samples were collected (surface and at depth) at three locations (EH-3 through -5), with notable detections of TPH at EH-3. Metals were not analyzed. Soil samples were collected at two additional locations (EH-6 and -7). TPH was detected at 2,000 mg/kg at one location (EH-6), and arsenic at both (to 17.2 mg/kg).

5.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination associated with activities at the USPS site are summarized in the April 2006 Remedial Investigation Report. A brief summary of site sampling results for impacted media (soil, groundwater) and off-site surface water results are presented below. Soil contamination related to past practices at the site, including historical railyard activities and placement of contaminated fill, were identified during the RI. In the northwest site corner where the Pintsch Gas Plant formerly operated, additional impacts to both soil and groundwater are observed, including elevated VOCs and PAHs. Contamination in this area appears to be primarily related to the gas plant, and extends off-site to the north, northeast, and west below NW9th Avenue and NW Lovejoy, and onto/below adjoining properties.

A. Soil Contamination.

On-Site. Metals, TPH, and PAHs have been detected at elevated concentrations in a number of site areas. Outside of the northwest site corner (Pintsch Plant area), contamination is present primarily in shallow soil (less than 5 feet bgs), and appears to be associated primarily with historical use of the site as a railyard and/or contaminated fill. Arsenic detections commonly exceed DEQ's default background concentration of 7 mg/kg, with a maximum of 50.9 mg/kg detected in the northern portion of the site. Lead is likewise elevated above background in a number of site areas with the maximum detected concentration of 3,020 mg/kg in the Coach Cleaning area, but typically below DEQ's residential RBC of 400 mg/kg in other areas of the site. PAHs are notably elevated in the Electrical Vault and Pintsch Plant areas. Impacts in the former are shallow, but in the latter extend below the top of the water table. The notable risk-driver is PAHs, in particular benzo(a)pyrene. VOCs have generally not been detected in site soil. TPH related to former USTs has been detected below both the VMF building, and near the southern site boundary.

Off-Site. Soil contamination in the Pintsch Plant area extends off-site to the north and west. Off-site contamination to the north (impacting both the Lovejoy Ramp and the Station Place properties) is significant, and appears to be associated with disposal of gas plant waste onto these properties during gas plant operation. Characterization and limited removal of soil contamination has occurred on this property under DEQ direction, and the Station Place and Lovejoy Ramp area are capped to prevent human exposure to residual contamination. As part of the Station Place soil remedy, a large volume of hot spot soil containing contamination with characteristics assumed to be typical of gas plant waste was removed. Soil contamination is also present to the west and northwest on the former Prendergast and Hoyt Street Railyards properties. Both sites are capped with mixed urban residential/commercial development.

B. Groundwater Contamination.

On-Site. Groundwater contamination at the USPS site is confined mainly to the Pintsch Plant and related to gas plant releases. At MW-3, detected groundwater contaminants include VOCs and PAHs. In shallow well MW-3 where the greatest impacts were found, diesel and heavy oil were detected to 13,000 and 3,920 ug/L, respectively. Naphthalene and benzo(a)pyrene were detected to 3,900 and 27.5 ug/L, respectively. Benzene and other organic compounds were also detected.

In the Electrical Vault area, low level PAHs (<1 ug/L) were detected in limited groundwater investigation work. Given the apparent absence of deeper soil impacts, groundwater sampling was not performed in the Former Coach Cleaning Area, Parking Garage Area, or the eastern portion of the property (including below the main processing building). An exception is groundwater sampling completed during the heating oil UST decommissioning in 1993 ("B-1-93"),. Groundwater beneath the VMF building was not encountered during UST decommissioning as noted in DEQ's NFA issued on June 13, 1997.

Off-Site. Contamination related to the former Pintsch manufactured gas plant has been detected in groundwater on properties located north (Lovejoy Ramp and Station Place, ECSI# 2407), northwest (Hoyt Street Railyards, ECSI# 1080), and west (Pearl Block, ECSI# 4960) of the northwest site corner, as well as in/around sewers in the NW Ninth Avenue/NW Lovejoy Street intersection. Attachment 5 shows the general location of groundwater impacts extending from the Pintsch area . The presumed source of the contamination is spillage or improper disposal of gas plant waste. Some portions of the impacted area include degraded free product containing high concentrations of benzene and naphthalene. Pintsch-related groundwater contamination has been characterized to DEQ satisfaction at the Lovejoy Ramp, Station Place, and Hoyt Street Railyard properties, and residual contamination addressed through engineering and institutional controls. At the Pearl Block (aka Prendergast) property, approximately 6,000 cubic yards of contaminated soil were removed prior to site development. A residential high-rise was subsequently developed on the site and a Conditional NFA issued by DEQ in 2008. The extent of Pintsch-related contamination beneath NW 9th and Lovejoy avenues has not been determined.

During investigation work at Station Place, groundwater contamination was observed around an active 27" storm drain, and within and around a 72" brick-lined sewer (the abandoned Tanner Creek Sewer), located beneath NW 9th Avenue, most notably between NW Lovejoy and NW Marshall Street. The apparent source of the contamination is the Pintsch gas plant. During Station Place investigation work, it was determined through sampling that infiltration of contamination into the 27" sewer is currently limited, and that contamination in the distal portion of the sewer (closest to the Willamette River where it discharges to the active Tanner Creek Sewer) does not exceed relevant risk-based screening values for protection of the river. Contamination including free product remains in and around the abandoned Tanner Creek Sewer, most notably between NW Lovejoy and NW Marshall. Contamination has also been detected further down-pipe in the sewer below the Centennial Mill property (adjacent to the Willamette River). The Pintsch gas plant is a possible source of this contamination.

As noted above in Section 4.0, deeper soil and shallow groundwater contamination were detected in and west of the Pintsch Gas Plant Area, and in the vicinity of a 24" storm gravity main located beneath NW 9th Avenue. After passing immediately west of the northwest site corner, the drain turns west below NW Lovejoy Street before connecting to the current Tanner Creek Sewer at the NW 10th Avenue and NW Lovejoy Street intersection. The Tanner Creek Sewer runs in a northerly direction approximately 1,600 feet before discharging to the Willamette River.

Shallow groundwater at location SS-2 adjacent to the sewer contained the following: naphthalene at 24.5 ug/L, benzo(a)pyrene at 7.52 ug/L, and BTEX compounds at 3.96 ug/L, 1.58 ug/L, 1.27 ug/L, and 1.39

ug/L respectively. The benzo(a)pyrene detection exceeds EPA's drinking water MCL and tapwater PRG, JSCS fish consumption screening values (Table 3-1), and the Tier II SCV for ecological receptors. A sewer water sample collected by ARCADIS (2004) from the 24" line within the NW 9th and Lovejoy intersection, down-pipe of one connection to the USPS site (draining a portion of the USPS Site), contained the following: diesel (0.0922 mg/L), naphthalene (3.25 ug/L), pyrene (0.837 ug/L), benzene (47.9 ug/L), ethylbenzene (14.7 ug/L), and xylenes (6.48 ug/L).

Finally, high- and low-water sewer water sampling was completed within the Tanner Creek sewer in 2002 to evaluate releases related to the nearby Hoyt Street Railyards (#1080) site. Sampling locations and results are presented in Attachment 6, and are more fully discussed in RETEC's *Tanner Creek Sewer Investigation and Evaluation, Former Hoyt Street Railyard* (February 2004). At the Tanner Creek Sewer sampling location closest to the USPS site, RASS-4, contaminants including naphthalene (4.25 ug/L) and benzene (4.05 ug/L) were detected during high-flow conditions (12/31/02). These same contaminants were either not detected, or detected at very low concentrations at the sewer outfall (RASS-1) at the river.

6.0 RISK ASSESSMENT

A draft human health risk assessment identifying baseline risk associated with soil and groundwater contamination at the USPS site was submitted in June 2005 as part of the Remedial Investigation Report (the Risk Assessment representing Appendix A of the RI Report). A Final Risk Assessment report was submitted in April 2006 addressing DEQ comments on the draft Risk Assessment, and subsequently approved by DEQ. In these assessments, soil and groundwater sampling results were compared to screening values under two scenarios: the Existing Site Use scenario (current and reasonably likely future use based on continued USPS use), and a Hypothetical Future Site Use scenario where the site would be sold and redeveloped to include urban residential and commercial (aka occupational) use.
The results of the 2006 risk assessment are presented in section 6.A below.

In 2008, supplementary RA work was completed as part of the site FFS, specifically addressing the potential for future urban residual use under the Hypothetical Future Site Use scenario. (DEQ required evaluation of urban resident risk as an amendment to the 2008 Focused Feasibility Study or FFS, based on the initiation of property sale discussions between USPS and the Portland Development Commission.) The results of the separate risk analysis for urban residents are presented in section 6.B.

A 2009 risk analysis was completed (by ARCADIS for USPS) at the request of DEQ, assessing the ramifications of EPA's 2008 reclassification of three site contaminants as carcinogens. The screening was performed after the FFS was completed, and is discussed in Section 6.C.

A. 2006 Risk Assessment

Human Health.
Under the Existing Site Use Scenario, both commercial and excavation workers were evaluated as potential receptors, however only excavation (aka utility) worker exposure was considered viable. This was based on USPS determination that as long as the site remains in federal ownership, site access will be restricted and pavement and buildings will remain intact, making occupational or construction worker unlikely. Under the Hypothetical Future Site Use Scenario, excavation workers, construction workers, and occupational worker exposure was deemed possible and evaluated.

For both the Existing and Future Use scenarios, Constituents of Interest (COIs) were based on soil and groundwater data sets. Detected COIs were subsequently screened to determine a list of COPCs that were included in the baseline RA calculations. COIs were screened based on the frequency of detection, background concentrations, and contaminant concentration to determine COPCs as described in DEQ's *Guidance for Conduct of Deterministic Human Health Risk Assessments* (2000). Soil COIs were screened against USEPA Region IX Preliminary Remediation Goals (PRGs) and groundwater COIs were screened against PRGs for residential tap water. Site-specific RBCs were calculated for selected impacted areas using the DEQ guidance *Calculating RBCs for Total Petroleum Hydrocarbons* (December 2003) and VPH/EPH data from the site.

Selected COPCs are presented in Attachment 7 for the following subareas of the site: Coach Cleaning Area (CC), Northeast Area (NE), Pintsch Plan Area (PP), and Utility Vault Area (UV). After screening, select VOCs, PAHs, petroleum hydrocarbons, and metals were carried forward in the risk assessment.

A toxicity assessment was subsequently completed under both scenarios for identified COPCs considering both carcinogenic and non-carcinogenic effects, with toxicity values obtained primarily from USEPA's Integrated Risk Information System (IRIS, EPA 2005a). Carcinogenic effects of high molecular weight PAHs were assessed using USEPA's Toxicity Equivalency Factor (TEF) methodology. The non-carcinogenic hazard associated with TPH in soil and groundwater at the site was evaluated using the Oregon DEQ RBC methodology. The USEPA Adult Lead Model (USEPA 1999a and 2003) was used for estimation of blood lead levels of current and future receptors. A summary of calculated risks for excavation, construction, and occupational workers is also included in Attachment 7.

Tables in the final Risk Assessment summarize the total Excess Lifetime Cancer Risk (ELCR), total Hazard Index (HI, for non-carcinogens), and total alternate HI for the relevant receptors utilizing both Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) calculations. Calculated values were compared to DEQ's risk criteria of 1 x 10-6 (1E-06) for individual carcinogens or 1 x 10-5 (1E-05) for summed carcinogenic risk, and a non-carcinogen HI of 1. A summary discussion of risk results for both the Existing Site Use and Hypothetical Future Use scenarios follows.

Excavation Worker. Excavation worker exposure to site soil and groundwater was considered under both the Existing Site Use and Hypothetical Future Use scenarios. Calculated ELCR values for excavation worker exposure to surface soil, subsurface soil, and shallow groundwater (0 to 16' bgs) ranged from 3E-08 to 4E-06 for individual site areas, with only the Pintsch Plant Area exceeding on an individual basis. No HI values in excess of 1 were observed. Site contamination (soil and groundwater in an excavation) therefore poses a risk to excavation workers only in the Pintsch Gas Plant Area under Existing Site Use and Hypothetical Future Site Use scenarios.

Construction Worker. Construction worker exposure to site soil and groundwater was considered under the Hypothetical Future Use scenario, and as with excavation worker assumed exposure to contaminated media in the 0 to 16' bgs range. No HI values exceeded DEQ's benchmark of 1 using DEQ's TPH methodology. Under each scenario, soil in the Pintsch Gas Plant Area exceeded the DEQ ELCR thresholds on a total and individual constituent basis. Groundwater in the Pintsch Plant Area exceeded the DEQ ELCR threshold on an individual constituent basis only. Specifically, the acceptable ELCR limit was exceeded for individual chemicals in soil in the Former Coach Cleaning Area (arsenic) and the Utility Vault Area (benzo[a]pyrene and dibenz[a,h]anthracene). In the Pintsch Gas Plant area, five PAHs with a cumulative ELCR of 1E-04 exceeded benchmarks. Benzo(a)pyrene exceeded the construction worker RBC of 0.002 mg/L in this area.

Occupational Worker. Occupational worker risk was evaluated under the Hypothetical Future Use scenario using two soil data sets: surface soil representing 0 to 3 feet bgs, and surface and subsurface soil representing soil in the 0 to 16 feet bgs zone. For surface soil, cumulative carcinogenic risk ranged from 3E-5 in the Coach Cleaning Area, to 5E-4 in the Pintsch Plant Area. HI did not exceed 1 in any of these areas. For combined surface and subsurface soil, ELCR values exceeded DEQ thresholds in the Northeast Area (5E-06 for benzo[a]pyrene), the Coach Cleaning Area (cumulative 3E-05), Utility Vault Area (cumulative 8E-05), and Pintsch Plant Area (cumulative 9E-04).

For Existing Site Use, the risk driver for soil and groundwater presented in the 2006 risk assessment is benzo(a)pyrene. For Hypothetical Future Use, the risk drivers for soil are primarily arsenic, detected at concentrations above DEQ's default background concentration of 7 mg/kg over much of the site, and PAHs, in particular benzo(a)pyrene. Benzo(a)pyrene is the risk driver for groundwater under the Hypothetical Future Use scenario.

Ecological. A Level 1 ecological scoping was conducted in accordance with DEQ guidance. No ecological receptors or complete exposure pathways were identified in the vicinity of the Site. No further ecological risk assessment work was completed.. DEQ approved this determination based on the following:

- Existing Use. With the exception of a few small areas where landscaping plants have been placed in imported soil, the site is currently capped by buildings or paving and contaminated soil is not exposed;
- Hypothetical Future Use. Redevelopment will require capping of the site, eliminating the potential for ecological exposure;
- Groundwater contamination at the site is localized and unlikely to migrate to surface water bodies, the nearest of which is the Willamette River.

Two additional items addressed in the 2006 RA were contamination hot spots, and the potential for site-related contamination to impact the Willamette River via preferential migrations along area sewers. Each is discussed below.

Contamination Hot Spots. The 2006 RA included a screening for potential contamination hot spots as outlined in *DEQ's Guidance For Identification of Hot Spots* (April 1998). Soil hot spot screening was based on whether "highly concentrated" contamination was present, as the "highly mobile", or "not reliably containable" criteria were determined not applicable based on site data. Hot spot screening for groundwater was based on whether a beneficial use was impacted. Groundwater hot spots were not identified because the RI evaluation showed that Site groundwater conditions do not result in a significant adverse effect on the beneficial use of shallow or TGA groundwater (discharge to the Willamette River). Highly concentrated soil hot spots were identified at the site as discussed below. For human health, hot spot concentrations correspond to 100 times the acceptable risk level for individual carcinogens, and 10 times the acceptable risk level for individual non-carcinogens. No hot spots were identified for Existing Site Use. Hot spot exceedances were identified for the Hypothetical Future Site Use scenario as follows:

Excavation Worker.

- No exceedances.

Construction Worker.

- Benzo(a) pyrene in the Pintsch Plant Area for surface soil, and combined surface and subsurface soil.

Occupational Worker.

- Benzo(a)pyrene, benzo(a)anthracene, and dibenz(a,h)anthracene in the Pintsch Plant Area for surface soil.

- Benzo(a)pyrene in the Utility Vault Area for surface soil.

Tables and Figures illustrating highly concentrated hot spots for construction, and occupational workers are presented in Attachment 8.

Potential for Impacts to the Willamette River. As previously mentioned, gas plant-related soil and groundwater contamination in the northwest site corner extends beneath NW 9th Avenue near NW Lovejoy. Two storm sewers are located in this area: a 27-inch vitrified sewer pipe (VSP) running beneath NW 9th from NW Lovejoy to its intersection with the Tanner Creek Sewer at NW Naito, and a 24-inch VSP line that runs west of the NW 9th/Lovejoy intersection and discharges to the Tanner Creek Sewer at NW 10th and Lovejoy. Both sewers are potential conduits for migration of site-related contaminants to the river. The 27-inch sewer originates on the USPS property, while the 24-inch line extends well south (up-pipe) of the property.

In reviewing the 2006 RA, DEQ determined that additional off-site investigation was not necessary based on the following two reasons:

- Site-related contaminants (benzene, naphthalene, and carcinogenic PAHs) have generally not been detected in stormwater samples collected in the downstream end of the Tanner Creek Sewer at concentrations exceeding human or ecological health outlined in DEQ's Portland Harbor Joint Source Control Strategy (Table 3-1), which were evaluated by DEQ for comparison purposes.
- Extensive contamination is present beneath the NW 9th and Lovejoy intersection, including within and around a 72-inch brick-lined sewer following the general path of the 24" line. Most contamination appears to be associated with the former Pintsch gas plant, although contribution from other sources has not been ruled out. Contamination beneath the streets will be assigned a separate number in DEQ's Environmental Cleanup and Site Investigation database (Abandoned Tanner Creek Sewer, ECSI# 5328), and assigned for further action. DEQ is confident that contamination is related to historical activities/releases and will pursue additional investigation, as necessary, accordingly.

B. 2008 Risk Assessment Addendum – Urban Resident Exposure Assessment

At the request of DEQ, the 2008 FFS included an evaluation of the risk associated with urban resident exposure to site soil under the Hypothetical Future Site Use (redevelopment) scenario. Urban residential exposure to soil and groundwater via vapor intrusion and volatilization (using the most conservative pathway for each constituent) was also evaluated. Soil COIs were screened against USEPA Region VI Human Health Medium-Specific screening levels, and groundwater COIs were screened against PRGs for residential tap water. The USEPA Adult Lead Model (USEPA 1999a and 2003) and the IEUBK Childhood Lead Model were used for estimation of blood lead levels of adult and child receptors.

For a hypothetical future urban resident, unacceptable cumulative excess lifetime cancer risk was identified for the following site areas: Former Coach Cleaning Area, Northeastern Area, Electrical Vault Area, and Former Pintsch Gas Plant Area, with ELCR values ranging from 2E-05 to 4E-03. In addition, the individual ELCR limit was exceeded for benzo[a]pyrene in the Southern Area. Non-cancer HI values were less than the DEQ regulatory standard of 1 with the exception of the Pintsch Plant area where a HI of 2 was observed for this receptor. As with other exposure pathways, risk was primarily associated with carcinogenic PAHs [most notably benzo(a)pyrene] and arsenic. Hot spot exceedances for RME age-averaged hypothetical urban residents were as follows:

- Pintsch Plant area surface soil for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene; and
- Electrical Vault surface soil for benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and dibenz(a,h)anthracene.

Urban resident COPC screening results, a summary of calculated risks, and soil hot spot locations are presented in Attachment 9. Figures showing exceedance area for soil under the Hypothetical Future Site Use scenario are numerous (as most site areas exceed for one or more future use receptors) and are presented in the 2008 Focused Feasibility Study.

C. Post-FFS Risk Evaluation

At the request of DEQ, USPS submitted an August 2009 *Technical Memorandum, Reclassified Compounds* dated August 21, 2009 evaluating potential changes to the RA based on EPA's 2008 reclassification of selected site contaminants as carcinogens. discussed changes to the site "risk profile" based on the new DEQ RBCs. No significant changes were observed for 1,1-DCA and ethylbenzene. Revised RBC for naphthalene results in the following changes:

- Under the Existing Site Use scenario, soil exceeded occupational RBCs for volatilization to outdoor air in two localized portions of the Pintsch and Electrical Utility Vault areas.
- Under the Hypothetical Future Site Use scenario, vadose zone soil (surface to below 3' bgs) and localized groundwater in the Pintsch and Utility Vault areas was determined to pose a risk based on the vapor intrusion and volatilization pathways.
- Under both the current and hypothetical scenarios, the EPC for naphthalene exceeds its corresponding (carcinogen) RBC for excavation worker exposure to groundwater in an excavation in the Pintsch Plant area. Under the Hypothetical Future Use Scenario, naphthalene exceeds its corresponding RBC for construction workers.
- The naphthalene concentrations at location P2 S-2 and PP-1 exceed the (carcinogen) urban residential RBC for vapor intrusion to indoor air in the Pintsch Plant area.

DEQ has concluded the following regarding this new risk information, the results of which have been considered in identifying the selected remediation action for the site outlined below:

- Under the Existing Site Use scenario, minor exceedances of screening values exceedance areas in the Pintsch and Electrical Vault areas, under the Existing Site Use scenario do not warrant remedial action by the USPS. The areas are small, in portions of the site where human access is limited (parking or truck through-transit areas), and soil is capped with asphalt or concrete. The risk is therefore not considered sufficient to warrant remedial action by USPS provided the areas remain capped and site use does not change. Soil contamination will need to be addressed if site redevelopment occurs as outlined in the selected remedy discussion.
- Under Future Site Use, deeper soil and groundwater in the Pintsch area, and soil in the Electrical Vault area, pose a risk to residential receptors via vapor migration. Vapor mitigation will be required in these areas to address residual risk unless soil is removed or confirmatory sampling of contaminated media as part of site development demonstrates that vapor mitigation is not necessary. Additional sampling will be necessary in the Pintsch area to better delineate the area of soil and groundwater risk exceedance.
- Excess risk to excavation and construction workers (considering naphthalene and ethylbenzene as carcinogens) does not rise to the level of a hot spot, and can be addressed through engineering and institutional controls.

7.0 FEASIBILTY STUDY/EVALUATION OF REMEDIAL ALTERNATIVES

A ***Final Focused Feasibility Study Report*** (FFS) was completed by ARCADIS in 2008 and approved by DEQ. The document was prepared in accordance with a FFS Work Plan dated June 4, 2007. The FFS evaluated site risk and accompanying remedial actions under two separate scenarios: a) Existing Site Use (continuing site ownership, occupancy, and use by the USPS); and b) Hypothetical Future Site Use (sale of the property for redevelopment including commercial and urban residential use). Under Existing Site Use, remedial actions were considered to address excess risk to excavation workers, based on USPS ongoing insistence that commercial worker exposure was not possible during their occupancy. It is implicit in this that ongoing maintenance of site paving and buildings is necessary to prevent commercial worker exposure. Under Hypothetical Future Site Use, remedies were evaluated to address urban resident, commercial worker, excavation worker, and construction worker excess risk.

For both the existing and redevelopment use scenarios, a discussion of remedial action objectives (RAOs) was followed by an identification of areas or volumes of media requiring remediation action, and focused identification and screening of remedial alternatives, and recommended remedial alternatives. A qualitative evaluation of residual risk was also completed.
The evaluation of remedial action alternatives includes the following three criteria:

- The protectiveness of the alternative based on the standards of OAR 340-122-0040;
- The feasibility of the alternative based on the balancing factors set forth in OAR 340-122-0090(3);
- Remediation of hot spots of contamination to the extent feasible based on the criteria set forth in OAR 340-122-0090(4).

A. Existing Site Use

Remedial Action Objectives
RAOs under Existing Site Use are to reduce or eliminate excavation worker exposure to contaminated soil in the Pintsch Plant area, and to groundwater in the vicinity of MW-3, where individual carcinogenic risk exceeds 1 x 10-6. This can be accomplished through treatment and/or removal of contaminated media in this area, or by implementing measures to make excavation workers aware of contamination in this area, and the use of personal protective equipment to prevent unacceptable exposure (engineering and institutional controls). Both were evaluated in the FFS.

Screening and Discussion of Remedial Alternatives
Remedial alternatives for soil were:

- No Action (USPS-S1); and
- Institutional and Engineering Controls (USPS-S2).

Remedial alternatives for groundwater were:

- No Action (USPS-GW1); and
- Institutional and Engineering Controls (USPS-GW2).

Engineering controls identified for the site included inspection and maintenance of the protective cover present at the site consisting of a parking garage, the main USPS building, and parking, maneuvering, and driveway areas. Institutional controls would include execution and recording of an Easement and Equitable Servitude (E&ES) with the property deed, and adherence to the existing CMMP.
Protectiveness would be achieved through maintenance of the cover, USPS 24-hour security restricting

site access, and the use of dust suppression and personal protective equipment by any excavation workers in impacted areas to minimize exposure to site contaminants.

Analysis of Remedial Action Alternatives

Soil. No Action (USPS-S1) was determined to be inadequate in protecting excavation workers, and was not reliable given its lack of protectiveness. On the positive side, no implementation was necessary, and there was no implementation risk or cost. Institutional and Engineering Controls (USPS-S2) were determined in the FFS to be effective, with protectiveness achieved through maintenance of the site cover, adherence to the site CMMP, and the use of personal protective equipment (PPE) by any excavation workers in the impacted areas. Long-term reliability would be achieved through maintenance of the site cover, USPS security, and the E&ES. The remedy was determined to be easily implementable, with no implementation risk and negligible cost (less than $1,000 per year).

Groundwater. According to the FFS, USPS has complete control over groundwater exposure, limiting or eliminating the potential for excavation worker exposure to contaminated groundwater in the Pintsch Plant area. They further noted that site groundwater is not currently used for drinking purposes. The No Action (USPS-GW1) remedy was deemed protective and reliable. The No Action remedy does not require implementation, and has no implementation risk and cost.

Institutional and Engineering Controls (USPS-GW2) was determined in the FFS to be protective/effective in preventing exposure to groundwater through USPS control of the site, use of personal protective equipment, implementation of the existing CMMP, and adherence to a site E&ES.
The E&ES would include a prohibition on groundwater use at the site. This remedy was determined to be reliable, easily implementable, and has no substantive cost.

Recommended Remedial Alternatives

Based on their analysis, including a semi-quantitative evaluation based on ranking the balancing factors and scoring each alternative, the following were recommended in the FFS:

Soil: Institutional and Engineering Controls (USPS-S2) consisting of maintenance of the existing site cover, adherence to the CMMP, and execution and recording of an E&ES.
Groundwater: Institutional and Engineering Controls (USPS-GW2) consisting of adherence to the CMMP and execution and recording of an E&ES. The E&ES would include a prohibition on use of groundwater beneath the site.

B. Hypothetical Future Site Use

Remedial Action Objectives

Soil. RAOs for soil under Hypothetical Future Site Use are to reduce human exposure to contaminant concentrations – to less than 1E-6 for individual carcinogen, less than 1E-5 for multiple carcinogens, and a HI of less than 1 for non-carcinogens - as outlined below. Relevant RAOs/RBCs for individual media, receptors, and compounds from the FFS are presented in Attachment 10, along with tables showing areas/volumes of media requiring remedial action. RAOs apply to most portions of the site where regulatory thresholds were exceeded for carcinogens, and include excavation, construction, and occupational workers as well as urban residents. The non-carcinogen threshold was also exceeded in the Former Pintsch Gas Plant Area for urban residents. Risk level exceedances for two additional pathways were identified for the Hypothetical Future Use scenario in ARCADIS' *Technical Memorandum, Reclassified Compounds* dated August 21, 2009. Exceedances of the DEQ default soil RBCs for urban residents and occupational workers were identified for vapor intrusion and/or volatilization in the Utility Vault and Pintsch Plant areas.

RAOs were also established for highly-concentrated contamination hot spots observed in both the Pintsch Plant area and Electrical Vault area, with carcinogenic PAHs being the contaminants of concern. Hot spots were identified with respect to construction workers, occupational workers, and urban residents.
Groundwater. RAOs for groundwater under this scenario are to reduce excavation and construction worker exposure to groundwater exceeding the regulatory criteria, more specifically the RBC of 0.002 mg/l for benzo(a)pyrene exceeded in the Pintsch Plant Area. As groundwater hot spots have not been identified, hot spot RAOs were not developed.

Areas/volumes of soil and groundwater media requiring remedial action assessment were developed for each sub area of the site (Former Coach Cleaning area, Electrical Vault area, etc.). Volume estimates for hot spot soil were similarly developed and are presented in the FFS.

Screening of Remedial Alternatives

As with the Existing Site Use scenario, a detailed preliminary screening of remedial alternatives was not performed. Rather, the preliminary screening was completed and described in the FFS using USPS data, and data/evaluations completed for the adjacent sites. For example, contamination at the adjacent Horse Barn site is similar to impacts on the USPS Site, consisting of waste from the Pintsch Gas Plant and contamination from long-time rail use. ARCADIS noted that similar to the Horse Barn site, the most likely active treatment technologies could be eliminated on the basis of cost, implementability, and/or effectiveness concerns. Remedial actions carried forward for USPS included the following:

Soil

- No Action (Future S1);
- Engineering and Institutional Controls (Future S2);
- Removal of construction worker, occupational worker, and urban resident hot spots; institutional and engineering controls for remaining soil with excess risk (Future S3); and
- Removal of all soil exceeding risk levels for excavation, construction, and occupational workers and urban residents (Future S4).

Groundwater

- No Action (Future GW1); and
- Institutional and Engineering Controls (Future GW2).

A groundwater treatment technology was not evaluated in the FFS because the acceptable risk level for excavation and construction workers was only exceeded in a small portion of the site (Pintsch Plant Area).

Description of Remedial Alternatives

Soil. Under the No Action (Future S1) alternative, no action would be taken to address excess risk at the site. Under Institutional and Engineering Controls (Future S2), an E&ES would be recorded with the site requiring inspection and maintenance of the site cap. If the current USPS cap was removed to facilitate redevelopment, the site would need to be re-capped in conjunction with redevelopment work. The CMMP would also note the necessity of personal protective equipment for subsurface workers, dust suppression during work, etc. A future property owner would also be required to update the current USPS CMMP.

Remedial alternative Future S3 (Removal of Hypothetical Highly Concentrated Hot Spots for Construction Workers, Occupational Workers, and Urban Residents, and Institutional Controls to Prevent Exposure for Soil Hypothetically Exceeding Acceptable Risk Levels) would entail the removal of all site soil that exceeds hot spot levels for the exposure depths defined and evaluated in the final FFS for

construction and occupational workers as well as urban residents. Hot spot soil in the 0 to 3' bgs zone would be removed from the Electrical Vault and Pintsch Plant areas for urban residents and occupational workers. Regarding construction worker exposure to deeper soil, a highly-concentrated hot spot was only identified in the PP-1/PP-6 area to a depth of approximately 10 feet. An estimated 800 cubic yards of soil would be removed. It should be noted that deeper soil in the Pintsch Plant area exceeds hot spot values for occupational or urban residential exposure, precluding relocation of the soil to within 3 feet of ground surface (where it would become a hot spot with a corresponding DEQ preference for treatment or removal).

For remedial alternative Future S4 (Removal of Soil Hypothetically Exceeding DEQ Acceptable Risk Levels for Excavation Workers, Construction Workers, Occupational Workers and Urban Residents), all soil exceeding acceptable risk levels would be removed, to a maximum of 10 feet bgs. Under this alternative, approximately 23,500 cubic yards of contaminated soil would be excavated and transported off-site for disposal at the Hillsboro, Oregon Subtitle D landfill. Soil hot spots would be addressed as part of the wholesale contaminated soil removal. No engineering or institutional controls would be necessary under this remedy.

Groundwater. No Action (Future GW1) does not include monitoring, remediation, nor institutional controls. Institutional and Engineering Controls to Prevent Exposure (Future GW2) would rely on a combination of an E&ES restricting groundwater use and an updated CMMP to prevent construction or excavation worker exposure to contaminated shallow groundwater in the Pintsch Plant Area. The risk exceedance area is estimated by ARCADIS to be approximately 17,000 square feet in size.

Analysis of Remedial Action Alternatives

Soil. No Action (Future S1) would not provide exposure protection for excavation, construction, or occupational workers, nor for urban residents. The alternative therefore does not achieve RAOs. It is not reliable, either short or long-term (from the standpoint of effectiveness). No implementation is necessary, and it has no cost. It would not address DEQ's preference for treatment or removal of hot spots.

To achieve protectiveness, the Institutional and Engineering Controls (Future S2) alternative would require maintaining the existing USPS cap until redevelopment occurred, at which time a new cap acceptable to DEQ could be installed at the site or an interim risk evaluation for an alternative remedy to ensure the continued protection of human health. While protective/effective, it would not address contamination hot spots. Long-term reliability would be achieved provided that the site cap was installed correctly and maintained; protection of excavation and construction workers would have to be achieved through site worker notification, use of PPE, dust suppression, etc. Site capping without excavation would be easy to implement, with limited implementation risk (mainly from soil exposure during existing cap removal and installation of a new cap). ARCADIS estimated the cost of this alternative as less than $1,000 per year – the cost of annual cap inspections.

Alternative Future S3, which consists of both hot spot removal and institutional and engineering controls, is expected to be largely effective in limiting human receptor exposure to soil exceeding both RBCs and hot spot values, if properly implemented. As with alternative Future S2, engineering and institutional controls would include maintenance of a cap as part of site development. Related cap inspection and maintenance, recording an E&ES, etc. would be necessary. Implementation would be relatively easy, with the possible exception of hot spot soil removal in the Electrical Utility Vault Area where underground transmission lines are present and extend into the P&DC building. This would not be an issue if the P&DC building were demolished and the vault decommissioned prior to hot spot excavation. The primary implementation risk would be to construction workers, but could be minimized by implementing working safety measures. With soil excavation, there is also potential for off-site exposure

from windblown dust, releases from trucks transporting hot spot soil to the landfill, and track-off. All could be managed through a CMMP and controls outlined in a Remedial Action Plan (RAP). The long term reliability of this alternative is expected to be good. The estimated cost for Future-S3 is $340,000. Confirmatory sampling would be required by DEQ in both hot spot excavation areas which could, potentially, result in increased hot spot areas and corresponding costs. Note that the cost does not include construction of a new cap/cover at the site as part of site redevelopment for the reasons discussed above.

Alternative Future S4 entailing removal of all contaminated soil at the site exceeding acceptable risk levels for exposure depths defined and evaluated in the final FFS, would be both protective and effective from both a short and long-term standpoint. Removal of an estimated 23,500 cubic yards of soil from the site would provide some challenge from a logistical standpoint, and would carry a significant implementation risk from the standpoint of on-site worker safety. Risk to on-site workers would include that associated with heavy equipment work, working around/in excavations, and exposure to site soil contaminants. Off-site risk would come from potential release of contaminated soil from trucks, track-off related to vehicular traffic, and contaminant migration by runoff or as dust. This concern is fairly acute given the immediate proximity of high-density urban residential development. Long-term reliability is expected to be good. ARCADIS estimated the cost of this work at $6,500,000, and concluded that the costs would be disproportionate to the benefits created through risk reduction.

Groundwater
The No Action alternative for groundwater (Future GW1) would not be protective of excavation or construction workers that might encounter groundwater. It, therefore, does not achieve RAOs. Accordingly, it would have neither short nor long-term reliability. There is neither implementation risk nor cost associated with this alternative.

Institutional and engineering controls outlined in alternative Future GW2 would be protective in limiting excavation or construction worker exposure to groundwater contamination in the Pintsch Plant area. The controls would similarly be reliable if memorialized in an E&ES and the document followed. The alternative is easy to implement, and there is no implementation risk. As no substantive cost is associated with this remedy, the cost is considered reasonable.

<u>Recommended Remedial Alternatives</u>
Based on the analysis, including a semi-quantitative evaluation based on ranking the balancing factors and scoring each alternative, the following were recommended in the FFS under the Hypothetical Future Use scenario:

Soil (Future S3)
The recommend remedial for soil includes:

- Removal of highly-concentrated hot spots for construction and occupational workers, and urban residents;
- Maintenance of the existing site cover, or a new site cover installed to support hypothetical future use;
- Adherence to the CMMP; and
- Execution and recording of an E&ES.

The FFS further recommended installation of a vapor barrier in the Pintsch Plant area as part of redevelopment construction. The recommendation was based on a small vadose zone data set in this area (with a detection of naphthalene to 1,500 mg/kg), and the presence of sheens and tar-like material near/at the water table. As an alternative to a vapor barrier, additional sampling could be performed to show that

a vapor barrier might not be necessary. Since this time, DEQ has published guidance revising RBCs for naphthalene, ethylbenzene, and 1,1-dichloroethane based on a reclassification of these constituents as carcinogens. Lower RBCs have been developed for several pathways including direct contact, vapor intrusion and volatilization. The effect of DEQ's reclassification for the Site was evaluated in ARCADIS' *Technical Memorandum, Reclassified Compounds* dated August 21, 2009. Exceedances of the DEQ default soil RBCs for urban residents and occupational workers were identified for vapor intrusion and/or volatilization in the Utility Vault and Pintsch Plant areas. These results support a vapor barrier or additional investigation to show that a vapor barrier is not is necessary.

For soil, alternative Future S3 was chosen because hot spot removal and maintenance of the existing site cap, and/or maintenance of a new cap constructed for a future use, addresses excess risk to receptors at the site in the most cost-effective and safe manner. Future S1 and S2 were removed from consideration because they did not address DEQ's preference for treatment or removal of hot spots, and removal of all contaminated site soil under alternative Future S4 was considered cost prohibitive with unnecessary additional implementation risk. The removal of all identified hot spots and disposition by off-site disposal at a solid waste landfill identified in Future S3, meets Oregon Rule and Statute requirements regarding treatment or removal of hot spots to the extent such measures are feasible (see ORS 465.315 and OAR 340-122).

Alternative Future S3 manages construction and excavation worker risk through institutional and engineering controls, including an updated CMMP and requirements for use of personal protective equipment. This is protective, and more cost-effective (and with less implementation risk) than alternative Future S4. Alternative Future S1 (No Action) does not adequately address risk for any of the receptors and is therefore not protective, while alternative Future S2 (Institutional and Engineering Controls) is the same as Future S3 with respect to worker exposure.

Groundwater (Future GW2)
The recommended remedial action for groundwater includes:

- Engineering and institutional controls.

For groundwater, alternative Future GW1 was not selected by ARCADIS because it does not eliminate potential excavation or construction worker exposure to contaminated groundwater in the Pintsch Plant area, and therefore does not meet RAOs. Future GW2 would address potential exposure through engineering or institutional controls (PPE, CMMP, and E&ES) and was deemed protective. Tables illustrating ARCADIS' remedial alternative screening and order-of-magnitude cost analysis are presented in Attachment 11.

8.0 DEQ SELECTED REMEDIAL ACTION

DEQ's selected remedial actions for site soil and groundwater at the USPS site are modified versions of the alternatives recommended in the 2008 FFS. The remedial actions also incorporate an October 2009 evaluation of naphthalene, ethylbenzene, and 1,1-dichloroethane (1,1-DCA) detections in site media as carcinogens.

Remedial Action For Soil – Existing Site Use

Institutional and engineering controls:

- Maintenance of the existing site cover (paving and buildings over the entire site) as a cap.

- Prevention of unacceptable occupational worker exposure by maintaining existing limited use in the portions of the Pintsch Plant and Electrical Vault areas where naphthalene concentrations exceed RBCs for volatilization to outdoor air. Both areas are currently used for vehicle parking or pass-through, with very limited USPS worker use. If use of these areas changes, supplemental sampling or remedial action may be required by DEQ. Management will be considered an institutional control.
- Implementation of controls to prevent unacceptable exposure of facility or outside excavation workers to contaminated soils (site-wide). Controls are to be outlined in a CMMP and include protocols for worker notification, and requirements for PPE, dust suppression, proper soil management, site access restrictions, etc. to minimize or prevent exposure.
- Recording of an E&ES with the property deed identifying site contamination, worker notification requirements, cap inspection and maintenance requirements, and acknowledging the requirements set forth in the CMMP.

Remedial Action For Groundwater – Existing Site Use

Institutional and engineering controls:

- Implementation of engineering controls to prevent unacceptable exposure of excavation workers to contaminated groundwater in the former Pintsch Plant area (see Attachment 12 for location). Controls are to be outlined in a CMMP and include protocols for worker notification, requirements for PPE, groundwater management, site access restrictions, etc.
- Recording of an E&ES with the property deed prohibiting use of groundwater for drinking or any other purposes where human contact might occur.

Remedial Action For Soil – Hypothetical Future Site Use

Hot spot removal and institutional and engineering controls:

- Maintenance of the existing site cover (paving and buildings) during the period of time between USPS occupancy and site redevelopment. If paving or building are removed to facilitate USPS departure, all uncovered soil must be capped with demarcation material and a minimum of 4 inches of clean gravel unless otherwise specified by DEQ. Physical access to the site must be restricted. DEQ may require additional safeguards to ensure the continued protection of human health. PPE and other engineering controls will be utilized, as necessary, to prevent unacceptable excavation and construction worker exposure.
- As part of site redevelopment, cap areas of the site exceeding acceptable risk levels with a demarcation layer and two feet of clean fill (landscape areas) or hardscape (buildings and paved areas) Cap specifications for paved/building areas will be determined in a remedial design document and are subject to DEQ final approval.
- Excavation of soil exceeding hot spot concentrations (>100x relevant RBC for individual carcinogenic contaminants), and off-site disposal of excavated soil at a Subtitle D landfill or other DEQ-approved facility. This action will require confirmatory sampling to ensure that all hot spot soils are removed.
- Installation of a vapor mitigation system in the Pintsch Plant and Electrical Vault areas to prevent urban residential and occupational worker exposure to soil contamination via

vapor migration, or additional investigation to demonstrate that a vapor mitigation system is not needed.. If some or all of the soil with excess risk is removed as part of site development, a residual risk analysis will be necessary to confirm that vapor risk has been addressed to DEQ satisfaction.

- Removal of two pockets of petroleum contamination beneath existing site buildings, as described in DEQ's June 13, 1997 approval letter for decommissioning of site (USTs); or completion of a risk analysis confirming that residual contamination does not pose a risk under the appropriate site use scenario. One pocket is located next to the south side of the Main Post Office building and the other pocket is located next to and underneath the south side of the VMF building/pump island.
- Implementation of engineering controls, as necessary and following hot spot removal and any other soil removal related to site development, to prevent unacceptable exposure to contaminated soils by excavation workers in the Pintsch Plant area and construction workers site USTs. Measures to prevent unacceptable exposure would apply to both during and following site redevelopment. Controls would be outlined in a CMMP, and would include protocols for worker notification and requirements for PPE, dust suppression, soil management, site access restrictions, etc.
- Recording of a revised E&ES with the property deed outlining site hazards, cap inspection and maintenance requirements, and acknowledging the requirements set forth in the CMMP as necessary.

Remedial Action For Groundwater – Hypothetical Future Site Use

Institutional and engineering controls:

- Installation of a vapor mitigation system in the Pintsch Plant area, as deemed necessary through additional sampling, to prevent urban residential exposure to groundwater contamination via vapor migration. If some or all of contaminated groundwater is removed as part of site development, or site use under redevelopment does not include residents as expected, residual risk analysis will be necessary to confirm that vapor risk has been addressed and mitigation is not necessary.
- Implementation of engineering controls, as necessary, to prevent unacceptable exposure of construction and excavation workers to contaminated groundwater in an excavation in the former Pintsch Plant area. Controls are to be in a CMMP, and include protocols for worker notification and requirements for PPE, groundwater management, site access restrictions, etc. Measures to prevent unacceptable exposure are to apply both during and following site redevelopment.
- Recording of an E&ES with the property deed prohibiting use of groundwater for drinking or any other purposes where human contact might occur, if such an E&ES has not been recorded previously.

The following conditions are noted with respect to the Hypothetical Future Use remedies:

- The selected remedial actions for this scenario assume that under redevelopment, site use will include an urban residential element, as is the case with nearly all new development in the area. If redevelopment of the site does not include a residential component, re-evaluation of conclusions regarding hot spots, areas of excess risk requiring remedial action, etc. will necessarily need to be revisited. Similarly, as described in the selected remedial actions above,

removal of significant soil and/or groundwater contamination under site development (beyond the required hot spot removal) may reduce or eliminate the amount of contamination requiring remedial action in selected site areas, and thus modify the selected remedy. This is acceptable within the selected remedy provided that necessary risk analysis is completed to DEQ satisfaction.

- It is DEQ's expectation that railroad-related shallow soil contamination extends beneath site buildings and other paved areas where sampling has not been performed. Capping will be required in these areas unless DEQ-approved sampling is performed to confirm an absence of significant contamination.
- Given the nature of site contamination (generally surficial in nature and related to site-wide railroad activity), groundwater investigation at the site has been limited to the areas where deeper soil or groundwater impacts were either observed or inferred (Pintsch MGP and Electrical Utility Vault areas, and the UST near the south property boundary). If significant contamination is encountered during site redevelopment in areas where analytical data is limited or absent, characterization sampling will be required by DEQ. If contamination is present at depth, DEQ may require groundwater sampling. Note that unexpected contamination applies both to contamination associated with past railroad and gas plant operations, and to contamination associated with USPS operations not specifically addressed in the site remedial investigation.
- Following or in lieu of UST pocket-in-place removal, DEQ will require confirmatory sampling to verify that the nature and extent of this contamination have been defined, residual contamination does not pose an unacceptable risk, and that contamination does not extend to the water table. Groundwater sampling may be required by DEQ if deeper soil impacts are found.
- As discussed in Section 6.0, DEQ will not require additional site characterization or remediation of contamination located off-site beneath the adjacent NW 9th Avenue and NW Lovejoy intersection, and extending to the north below NW 9th Avenue within and around the Abandoned Tanner Creek Sewer. The primary source of the contamination appears to be historical releases from the Pintsch MGP formerly located in the northwest site corner. Investigation and cleanup, as necessary, will be pursued through the historical site owner. As part of site development, however, DEQ will require that any on-site utility connections to the abandoned Tanner Creek Sewer be located and abandoned. *Operating* site utility connections that may pose a preferential migration pathway for off-site migration of site contaminants will likewise need to be addressed. Any unexpected contamination (beyond that identified under the site RI and RA) found during this effort will need to be addressed to DEQ's satisfaction.
- At the discretion of DEQ and with prior approval, reuse of non-hot spot contaminated soil below the site cap will be considered.

The remedial actions described above are protective of public health, safety, and welfare and of the environment and specified in OAR 340-122-0090. They are based on the balancing of remedy selection factors as specified in section (3) of this rule, and satisfy the requirements for hot spots of contamination as specified in section (4) of this rule. A discussion of the selected remedies with respect to protectiveness and the balancing factors follows.

Existing Site Use

Protectiveness. Occupational worker exposure to contaminated soil is not expected given the USPS commitment to maintenance of the existing site cap. As discussed in Section 8.0, risk level exceedance areas for volatilization from soil to outdoor air have been identified for occupational workers in the Electrical Utility Vault and Pintsch Gas Plant areas. However, this risk is mitigated based on the existing cover and limited use of these areas. Protection of excavation

workers is achieved through implementation of engineering and institutional controls to limit or prevent exposure to contaminated soil and groundwater. A formal restriction will be placed on groundwater use to prevent potable use although this is not expected.

Effectiveness. The magnitude of risk from impacted soil and groundwater will be reduced primarily though requirements for PPE for excavation workers, rather than a reduction in contaminant volume, toxicity, mobility etc. Continued access restrictions will ensure that unauthorized access to the site does not occur. The engineering and institutional controls, if properly implemented, are expected to be adequate from an effectiveness standpoint. Remedial action objectives are achieved as excavation workers operate under a CMMP, which will be updated as necessary.

Long-Term Reliability. Engineering and institutional controls are expected to be a reliable method for limiting/preventing occupational worker exposure to volatiles. Engineering and institutional controls are also expected to be a reliable method for limiting/preventing excavation worker contact with contaminated soil and groundwater, acknowledging that there is some uncertainty as protectiveness relies on USPS adherence to the E&ES. As a governmental agency operating in a high-profile location, this uncertainty would appear to be low. As part of the E&ES, DEQ will periodically inspect the site to confirm controls are maintained.

Implementability. Updating, developing, and recording of an E&ES are easily implementable. Follow-through will be required on the part of USPS to ensure that engineering and institutional controls outlined in these documents are implemented.

Implementation Risk. The selected remedy is not expected to have any impact on the surrounding community, nor is there an impact to workers during remedy implementation given that no soil or groundwater treatment or removal is necessary.

Reasonableness of Cost. Total costs of less $1,000 per year identified by ARCADIS are associated with yearly cap inspection and submission of cap inspection reports. The cost does not include updating the CMMP and negotiation and recording of an E&ES. Ongoing cap maintenance is considered an operational cost for the USPS. Costs associated with implementation of engineering and institutional controls to manage groundwater exposure were considered by ARCADIS to be negligible.

Cap elements will consist of existing concrete and asphalt paving, and USPS buildings that cover the remainder of the site. As part of the Remedial Action Plan, DEQ will require an inspection of the entire site to confirm that paving and buildings are intact and that the cover is of sufficient thickness to be protective. A deed restriction to be recorded with the property deed will identify the nature of site soil and groundwater contamination, outline cap maintenance and worker notification/protection requirements and other requirements of the CMMP, and identify prohibitions on groundwater use.

Hypothetical Future Site Use

Protectiveness. Protectiveness is achieved through a combination of soil (hot spot) removal and capping to prevent occupational or urban residential exposure, and engineering and institutional controls to limit or prevent exposure to site contamination (soil and groundwater) prior to, during, and after site redevelopment.

Effectiveness. The volume and overall toxicity of contamination will be reduced through removal of contamination hot spots, and residual contamination (pocket-in-place) in UST areas. Most effectiveness will be achieved through management, namely site-wide engineering and institutional controls (e.g., capping). These controls are expected by DEQ to be adequate to manage the risk associated with exposure to impacted soil and groundwater remaining at the site. Remedial action objectives will be achieved through remedy implementation.

Long-Term Reliability. The reliability of hot spot soil removal is excellent from a site exposure standpoint given that this soil will no longer be available for exposure. Given that the soil is to be disposed of at a Subtitle D landfill, long-term reliability is also considered to be good. The reliability of engineering and institutional controls in limiting or preventing human exposure to residual soil and groundwater contamination at the site is considered adequate, in particular because of the location of the site in an area of intense commercial and urban redevelopment. Redevelopment, if performed, is expected to result in a combination of structures or paving over the entire site (excluding landscaped areas). There is a limited potential for excavation worker "incursions" below the cap once developed, and work on other sites has shown newly-built structures and paving to be a reliable cap.

Implementability. Soil excavation can be easily accomplished during site redevelopment, as construction would necessarily include excavation of soil for foundation work and subsurface utility installation. Site capping could likewise be easily accomplished. Creation of a CMMP and recording of an E&ES are easily implementable.

Implementation Risk. There is a potential exposure risk for both on-site workers and off-site occupational workers/residents associated with hot spot removal. Risks will be addressed through the CMMP and general requirements of the RAP. On-site risk will be addressed primarily through personal protective equipment and dust suppression, and off-site by dust-suppression and use of covered trucks for off-site disposal of excavated soil. Soil pile management will be important to minimize exposure. All of these are expected to be effective if properly implemented. The time expected for remedial action *completion* is unknown, in part because redevelopment may be phased. If this were to occur, DEQ would require either management of the existing (USPS) cap to the extent it remains, or installation of a temporary cap where contaminated soil has been exposed.

Reasonableness of Cost. The cost for hot spot soil removal was estimated by ARCADIS to be $340,000, associated with excavation and off-site disposal. This cost is considered reasonable, particularly in comparison to the cost for removal of all contaminated soil exceeding acceptable risk levels for the exposure depths defined and evaluated in the final FFS at $6.5 million (ARCADIS estimate). No cost was identified for remediation of groundwater given the limited area impacted. The remedy does address hot spots and therefore the higher threshold for cost has been met.

Sustainability of Selected Remedy.

Consistent with DEQ goals for implementing sustainable practices in site cleanup to the extent practicable, and in general accordance with U.S. EPA guidance including their technology primer titled *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* (OSWER EPA 542-R-08-002, April 2008), the sustainability of both the Existing Site Use and Hypothetical Future Site Use was considered by DEQ.

According to EPA, sustainable practices result in cleanups minimizing the environmental and energy "footprints" of all action taken during a project life. Sustainability is achieved through the application of best management practices (BMPs) that address factors including energy requirements, air emissions, water requirements and associated impacts on water resources, impacts on land and ecosystems, material consumption and waste generation, and impacts on long-term stewardship of a site.

The selected remedies for soil and groundwater under Existing Site Use are the most sustainable of the considered alternatives in that they achieve protectiveness through activities that have little or no carbon footprint – namely maintenance of the existing site cap, and utilization of other engineering and institutional controls to minimize exposure to contaminated soil and groundwater. Energy and air emissions, water use, impacts on land and ecological systems, and material consumption and waste generation associated with the remedies are minimal. Under the Existing Site Use options not chosen, excavation and off-site disposal/treatment of contaminated soil and groundwater (non-hot spot) would occur, resulting in greater energy use and air emissions, and potential impacts on land and ecosystems (if contaminants are released during transport or after landfill disposal).

The selected remedies for soil and groundwater under Hypothetical Future Site Use are likewise the most sustainable (of the protective alternatives evaluated in the FFS) in that they achieve protection while minimizing the generation of greenhouse gas emissions caused by activities such as fossil fuel consumption.

Excavation and off-site disposal of hot spot soil will result in the use of energy, generation of air emissions, etc. Excavation of hot spot soil and off-site disposal are not expected to result in any *additional* energy use/gas emissions as removal of soil is expected to be necessary as part of site redevelopment (to install foundations or sub-grade buildings). Any "excess" emissions could potentially be offset by the site owner/developer during site redevelopment through the use of fuel-efficient heavy equipment, bio-diesel or low-sulfur fuel, and other measures and will be strongly encouraged by DEQ. The engineering and institutional controls selected to minimize human exposure to groundwater will not have a significant carbon footprint.

Remedial Action Plan

For Existing Site Use, the USPS will prepare a Remedial Action Plan or RAP that includes a CMMP, and outlines protocols for the notification and protection of any excavation workers that might enter the site and breach the existing site cap. The document will furthermore discuss requirements for maintenance of the site cap and buildings, limitations on use of the Pintsch and Utility Vault areas based on vapor exposure potential, etc. The RAP will outline plans for completion of a baseline site-wide cap inspection to insure the adequacy of the existing cover. It will also outline protocols for cap inspection and maintenance, and submission of annual cap inspection reports. A closure report will be submitted to DEQ after completion of the above work, after which DEQ will consider issuance of a conditional NFA for the site (conditional given ongoing engineering and institutional controls). DEQ will draft an Easement and Equitable Servitude (E&ES) to be recorded with the property deed by USPS. The E&ES will outline the nature and extent of remaining contamination at the site, the presence of engineering controls (cover, etc.) to prevent access to contamination, the need for periodic inspection and maintenance of the cover, and acknowledge the CMMP.

A more comprehensive RAP will be required by DEQ, prior to site redevelopment, for the Hypothetical Future Site Use. DEQ will expect the RAP to discuss the following:

- A comprehensive discussion of redevelopment plans for the site, and accompanying cap elements;

- A plan for removal of pocket-in-place UST contamination, or residual risk analysis confirming an absence of risk. Under either scenario, confirmatory sampling will be necessary;
- Removal of soil hot spot removal, and related confirmatory sampling;
- Confirmation that areas under site buildings/paving that have not been characterized will be capped or, alternatively, a plan for confirmatory sampling of soil in these areas;
- Protocols regarding screening for, and dealing with, any unexpected contamination that may be encountered during site redevelopment;
- Sampling in the Pintsch and Utility Vault areas to assess vapor barrier requirements;
- Comprehensive discussion of soil excavation, management, and disposal related to site redevelopment;
- Any plans for dewatering, installation of deep borings or piles, foundation work, deep utility placement, etc. that has the potential to exacerbate or otherwise mobilize site soil or groundwater contamination;
- Health and safety measures during site development including those for construction and excavation workers;
- Cap design and installation;
- Cap inspection and maintenance;
- Site institutional controls including the E&ES.

DEQ will require the property owner (or a designated agent) to sign a Remedial Design/Remedial Action (RD/RA) agreement with DEQ. The agreement would formalize the property owner's commitment to implement the selected remedial action to DEQ's satisfaction.

The selected remedial action is protective of human health and the environment. The remedy achieves acceptable levels of risk, as defined by OAR 340-122-0115, as demonstrated by a residual risk evaluation included as part of the *Focused Feasibility Study Report*. This evaluation is a qualitative assessment of the adequacy and reliability of engineering and institutional controls selected to address site risk. The Existing Site Use remedy achieves protection through maintenance of the existing USPS site cap and engineering and institutional controls. The Hypothetical Future Site Use remedy is implemented when the property is redeveloped, and achieves protection short-term through maintenance of the existing cap and long-term by construction and maintenance of a site cover. The selected remedy for soil achieves protection through a combination of removal (excavation and off-site disposal of hot spots), engineering (cover installation and fencing) and institutional (deed restriction) controls.

9.0 PUBLIC NOTICE AND COMMENT

DEQ's proposed remedial action for the site was presented in the "Remedial Action Staff Report For The USPS Site, Portland, Oregon" dated April 30, 2010. This Staff Report and supporting documentation of the Administrative Record were made available for public review and comment from May 3 to June 2, 2010 at DEQ's Northwest Region office in Portland.

Pursuant to ORS 465.320 and OAR 340-122-0100, DEQ issued a public notice on May 3, 2010 requesting public comment on the proposed remedial action. The public notice was published in the Oregon Secretary of State's Bulletin and The Oregonian newspaper announcing the availability of DEQ Staff Report and Administrative Record for public review during a 30-day period. No public comment of any kind was received during the 30-day comment period.

10.0 FINAL DECISION OF THE REGIONAL ADMINISTRATOR

The selected remedial action at the USPS-P&DC site is protective of present and future public health, safety, and welfare, and of the environment; is based on the balancing of the remedy selection factors; and addresses hot spots of contamination to the extent feasible and necessary. The selected remedial action, therefore, satisfies the requirements of ORS 465-315 and OAR 340-122-0040 and 0090.

10.1 DEQ Signature

Nina DeConcini, NWR Administrator
Department of Environmental Quality

7/14/10
Date

APPENDIX A
ADMINISTRATIVE RECORD INDEX

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Kleinfelder, Inc., 1999. *Exposure Risk Characterization and Beneficial Land and Water Use Assessments – Lovejoy Ramp Fill Area*. December 1999.

RETEC, 1996. *Remedial Investigation Report for the Burlington northern Hoyt Street Site.* October 1996.

RETEC, 2004. *Tanner Creek Sewer Investigation and Evaluation, Former Hoyt Street Railyard*. February 2, 2004.

DEQ Voluntary Cleanup Program (NWR) files (ECSI# 2183)

APPENDIX B
LIST OF ATTACHMENTS

ATTACHMENT 1: Site Location Map

ATTACHMENT 2: Facility Maps

ATTACHMENT 3: Soil and Groundwater Sampling Locations

ATTACHMENT 4: DEQ Conditional NFA Determination for USTs

ATTACHMENT 5: General Area of Off-Site MGP-Related Impacts

ATTACHMENT 6: Sewer Maps and Analytical Results

ATTACHMENT 7: Contaminants of Potential Concern (COPC) Screening for Occupational, Excavation, and Construction Workers

ATTACHMENT 8: Occupational and Construction Worker Hot Spots (Hypothetical Future Use)

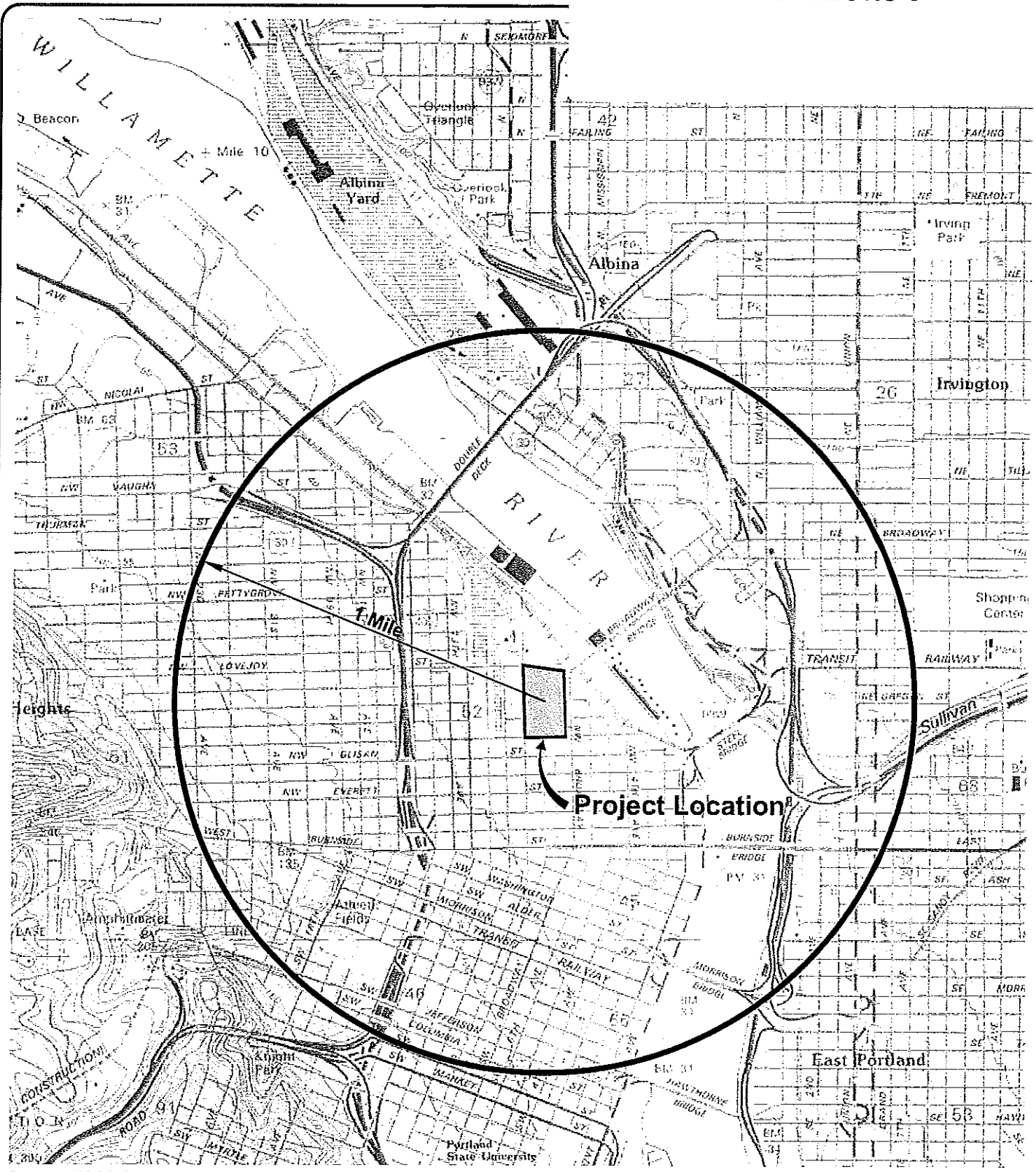
ATTACHMENT 9: COPC Screening for Urban Residents, and Figures Illustrating Urban Resident Hot Spots (Hypothetical Future Use)

ATTACHMENT 10: Remedial Action Objectives and Soil Excess Risk and Hot Spot Volumes

ATTACHMENT 11: Remedial Alternative Screening Tables and Cost Estimates

ATTACHMENT 12: Risk Exceedance Area (Existing Use) for Excavation Workers

Attachment 1



Site Location Map

ARCADIS

United States Postal Service
Portland Processing and Distribution Center
715 NW Hoyt Street
Portland, Oregon 97208

FIGURE
A-1

C:\Data\CAD\Land Projects 2005\AGM – Portland Processing and Distribution Center\dwg\Vicinity Map.dwg << Site Location Map >> June 22, 2005 2:49:45 PM (bCAD)

Attachment 2

NW Ninth Avenue

Coach Cleaning Area

Former Pintsch Gas Plant Area

PARKING GARAGE

Electrical Utility Vault Area

NW Park Ave

NW Hoyt St

VEHICLE MAINTENANCE BUILDING

NW Lovejoy Street

PORTLAND PROCESSING AND DISTRIBUTION CENTER

NW Broadway

LEGEND

- Right-Of-Way line
- Easement line
- Building
- Utility trench

N

0 50 100

SCALE IN FEET (APPROXIMATE)

ARCADIS

Site Detail Map

United States Postal Service
Portland Processing and Distribution Center
715 NW Hoyt Street
Portland, Oregon 97208

FIGURE 2

C:\Data\CAD\Land Projects 2005\AGM - Portland Processing and Distribution Center\dwg\Site Plan.dwg << Site Detail Map >> June 22, 2005 3:10:14 PM (bCAD)

C:\Data\CAD\Projects 2005\AGM - Portland Processing and Distribution Center\dwg\Site Plan.dwg << Former Pintsch Gas Plant Area >> June 22, 2005 3:21:13 PM (bCAD)

NW Ninth Avenue

compressor and purifying rooms

oil tanks (1908–1932 Sanborn Maps)

tool room

above–ground gas tank (1889–1932 Sanborn Maps)

brick foundation encountered by KLB Const. during Lovejoy realignment in 2001

high pressure tanks (1901–1932 Sanborn Maps)

tar well (1908–1932 Sanborn Maps)

oil tanks (1908–1926 Sanborn Maps)

2,500–gallon crude oil UST (1889–1908 Sanborn Maps)

USPS Property

Horse Barn Property

NW Lovejoy Street

LEGEND

Right-Of-Way line

Easement line

N

0 15 30

SCALE IN FEET (APPROXIMATE)

ARCADIS

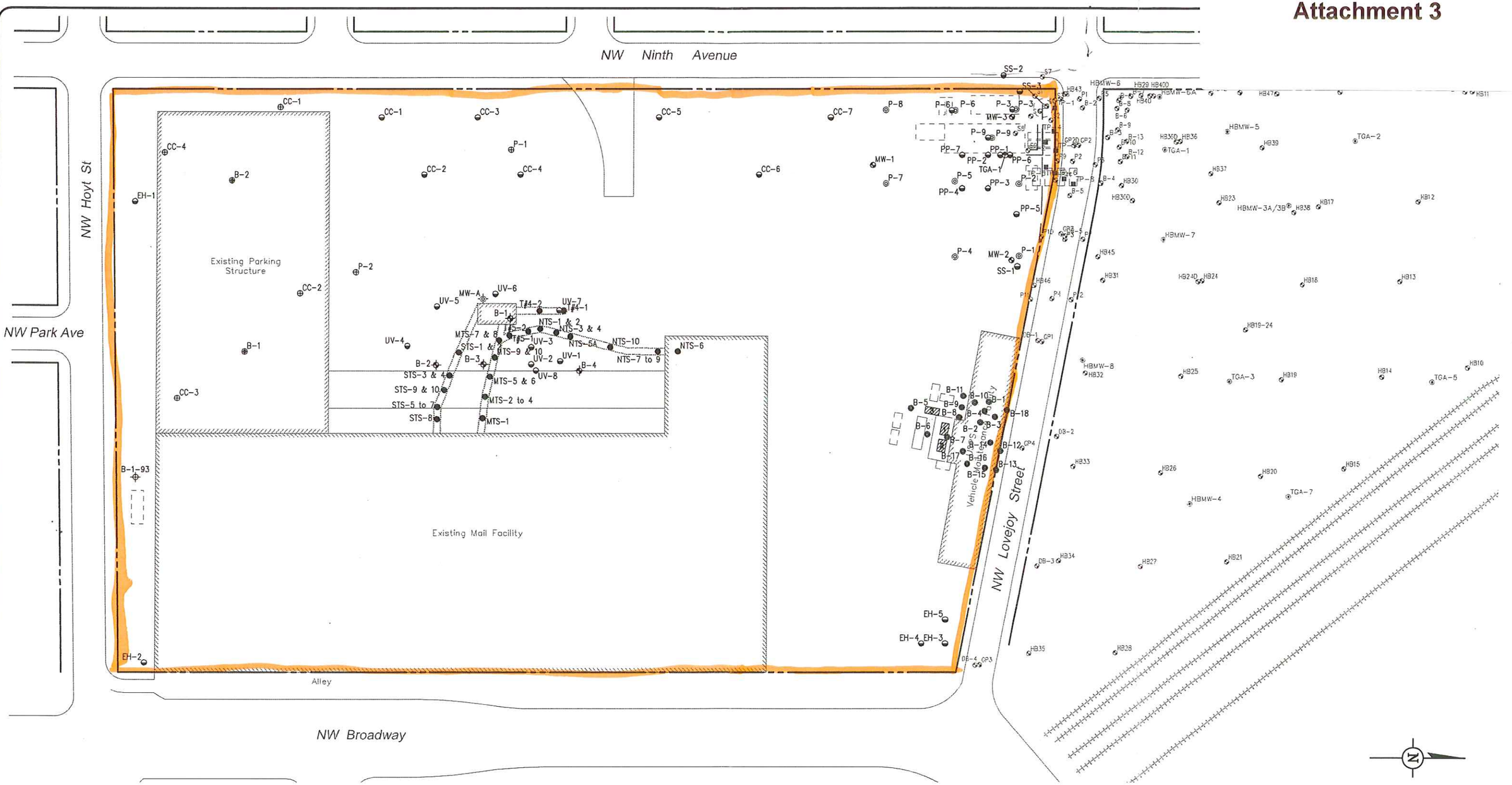
Former Pintsch Gas Plant Area

United States Postal Service
Portland Processing and Distribution Center
715 NW Hoyt Street
Portland, Oregon 97208

FIGURE

12

Attachment 3



LEGEND

- Trench soil sample collected by GeoEngineers in 1997
- Boring completed by GeoEngineers in 1996
- Shallow monitoring well completed by GeoEngineers in 1996
- Shallow monitoring well completed by Alisto in 2000
- Boring completed by Alisto in 2000
- Monitoring well completed by Dames & Moore in 1993
- Hand auger boring completed by Dames & Moore in 1993
- Test pit completed by Dames & Moore in 1993
- Boring completed by Comforth Consultants in 1986
- Boring completed by Geotechnical Resources in 1987
- Boring completed by ARCADIS in 2004
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Building
- Removed underground storage tank

ARCADIS

Sampling Locations

United States Postal Service
Portland Processing and Distribution Center
715 NW Hoyt Street
Portland, Oregon 97208

FIGURE
11

C:\Data\CAD\Projects 2005\AGM - Portland Processing and Distribution Center\dwg\Site Plan.dwg - Sampling Locations >> June 28, 2005 10:12:54 AM (bCAD)

Attachment 4

Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHWEST REGION

June 13, 1997

LES FISH
US POSTAL SERVICE
715 NW HOYT STREET ROOM 4113
PORTLAND OREGON 97208

Re: US Postal Service - Fleet Maintenance
File No. 26-92-068

Dear Mr. Fish:

The Department of Environmental Quality has completed its review of the information submitted to date concerning the underground storage tank (UST) decommissionings and cleanups conducted at 715 NW Hoyt Street in Portland, Oregon. The Department has determined that the cleanups appear to have met the requirements of Oregon Administrative Rules (OAR) 340-122-205 through 340-122-360 and that no further action is required at this time.

This determination is a result of our evaluation and judgment based on the regulations and facts as we now understand them, including:

1. A 300 gallon waste oil, a 1,000 gallon diesel, a 5,000 gallon diesel, a 10,000 gallon gasoline, and a 25,000 gallon heating oil UST were decommissioned at this location. The tanks were recycled at Oregon Pacific Steel.

2. Gasoline, diesel, waste oil, heating oil contamination were discovered during the decommissionings. The gasoline, diesel, and waste oil contamination was detected next to the fleet maintenance building on the north side of the property. The waste oil contamination was detected next to the Post Office Building on the south side of the property. Approximately 226 tons of gasoline, diesel and waste oil contaminated soil were disposed of at Hillsboro Landfill. Approximately 321 tons of heating fuel contaminated soil were taken to Oregon Hydrocarbons for treatment.

3. After cleanup was complete next to the fleet maintenance building, up to 71,000 parts per million (ppm) total petroleum hydrocarbons (TPH) and 245 ppm gasoline were detected in the soil next to and underneath the building and next to the pump island. Most of the remaining contamination is less than three feet below ground surface and is covered by pavement and the foundation of the building. None of this contamination extends below 6 feet below ground surface. Approximately 340 cubic yards of contamination remain in this pocket.

John A. Kitzhaber
Governor

2020 SW Fourth Avenue
Suite 400
Portland, OR 97201-4987
(503) 229-5263 Voice
TTY (503) 229-5471
DEQ-1

4. A maximum of 380 ppm diesel and 190 ppm TPH was detected remaining in the rest of the UST excavations near the fleet maintenance building. These concentrations are below the 500 ppm cleanup level for diesel and heavier hydrocarbons established for this site. Except for the pocket of contamination, no gasoline was detected in confirmatory soil samples.

5. After cleanup was complete in the heating oil tank area, a small pocket of contamination, with up to 770 ppm TPH, remained next to the Post Office Building foundation. No contamination remained in the rest of the excavation above the 500 ppm TPH cleanup level established for the heating oil cleanup.

6. No groundwater was encountered in the excavations. Groundwater is present at approximately 21 feet below ground surface.

7. Two pockets of contamination remain on this property which exceed the currently required cleanup levels for this site, but which the Department approves leaving pursuant to OAR 340-122-355(4) since the removal of this contamination would endanger structures on the property or be prohibitively expensive, and the contamination does not threaten human health, safety, welfare and the environment.

The Department's approval to leave pockets of contamination is based on the site conditions described in the reports as they exist today. Should conditions change allowing access to the contamination, you are responsible for further evaluation of the remaining contamination and any cleanup necessary at that time. You are also responsible for notifying potential purchasers of the property about this remaining pocket of contamination.

The Department's determination will not be applicable if new or undisclosed facts show that the cleanup does not comply with the referenced rules. The Department's determination also does not apply to any conditions at the site other than the release of the petroleum product specifically addressed in the report(s).

Please note that pursuant to OAR 340-122-360(2), a copy of your report must be retained until ten (10) years after the first transfer of the property. We recommend that a copy of this information be kept with the permanent facility records.

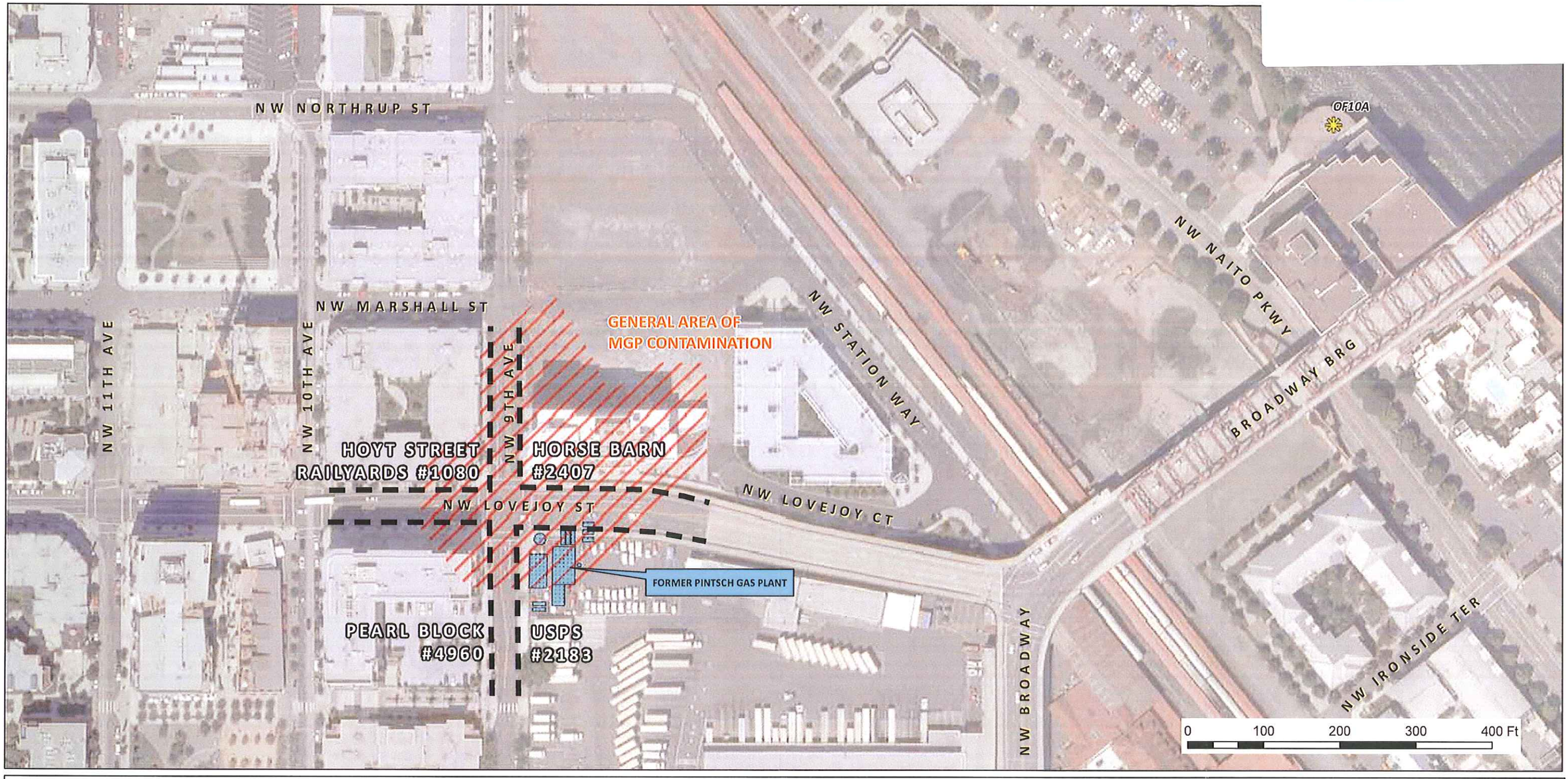
Your efforts to comply with the regulations to ensure that your facility has been adequately cleaned up have been appreciated. If you have any questions, please feel free to contact me at (503) 229-5474.

Sincerely,

Andree Pollock
UST Cleanup Specialist

cc: Shawn Williams
Dames & Moore
1750 SW Harbor Way, Suite 400
Portland, Oregon 97201

Attachment 5



GENERAL AREA OF MGP CONTAMINATION IN SHALLOW GROUNDWATER
PINTSCH GAS PLANT

DEQ
State of Oregon
Department of
Environmental
Quality

Base imagery ca. 2008 from Bing imagery web mapping service.
Pintsch Gas Plant historical site information from AMEC.

G:\GIS_Projects\Northwest_Region\Downtown_Willamette\Pintsch_Gas_Plant\MXDs\PintschPlant_contamination.mxd 5/10/2010

Attachment 6

LEGEND

- STORM SEWER OR STORM AND SANITARY SEWER
- SANITARY SEWER
- ABANDONED SEWER
- SITE BOUNDARY

NOTES:

INTRCPT= INTERCEPTOR SEWER

F.L.= FLOW LINE ELEVATION

TANNER CREEK SEWER OUTFALL (OUTFALL 11)

1997 PDC SEWER

WILLAMETTE RIVER

27-INCH STORM SEWER

TANNER CREEK SEWER

N.W. FRONT AVE.

NW 9TH AVE.

NW 10TH AVE.

NW 11TH AVE.

NW 12TH AVE.

NW 13TH AVE.

NW 14TH AVE.

N.W. BUMBY ST.

N.W. RALEIGH ST.

N.W. PETTYGROVE ST.

N.W. OVERTON ST.

N.W. NORTHRUP ST.

N.W. MARSHALL ST.

N.W. KEARNEY

N.W. JOHNSON ST.

FREMONT

60"x90" 8" CSP 10" CSP 12" CSP 24" V.S.P. 12" V.S.P. 10" CSP 8" VSP 27" VSP 18" VSP 10" CSP 12" VSP 14" VSP 8" VSP 6'-6"x 9'-1" 24" V.S.P. 14" V.S.P. 6'-6"x 9'-5" 6'-0"x 9'-5" 6'-6"x 8'-11" 10" VSP 48" VSP 24" CSP 38"x66" INTRCPT 30" VSP 36" VSP 42" VSP 24" VSP 16" CSP 21" CSP 6" VSP 38"x66" INTRCPT

100 0 200

SCALE IN FEET

SOURCES: CITY OF PORTLAND, DEPARTMENT OF PUBLIC WORKS.

RETEC

BURLINGTON NORTHERN AND SANTA FE RAILWAY BN050-15990-300		**SEWER LOCATION MAP** **PORTLAND, OREGON**
DATE: 02/02/04	DRWN: A.S./SEA	**FIGURE 2-1**

File: H:\15990\15990S027.dwg Layout: Layout1 User: astenberg Plotted: Feb 02, 2004 - 2:14pm Xref's: 0821BASJ, 0821SEWR

LEGEND

- SOIL BORINGS FOR HYDROCARBON CHARACTERIZATION
- SEWER WATER SAMPLES
- SITE BOUNDARY
- SEWER OF INTEREST
- AREA OF SEWER INSPECTION

OUTFALL 11
RASS-1
RASS-2
RASS-8
RASS-5
RASS-7
RASS-6
RASS-4
RASB-10
RASB-9
RASB-8
SOUTHERN FUELING AREA
NORTHERN FUELING AREA
27-INCH STORM SEWER
TANNER CREEK SEWER
WILLAMETTE RIVER
N.W. FRONT AVE.
FREMONT
N.W. GLISAN ST.
NW 9TH AVE.
NW 10TH AVE.
NW 11TH AVE.
NW 12TH AVE.
NW 13TH AVE.
NW 14TH AVE.
N.W. IRVING ST.
N.W. GLISAN ST.
N.W. QUIMBY ST.
N.W. PETTYGROVE ST.
N.W. OVERTON ST.
N.W. NORTHRUP ST.
N.W. MARSHALL ST.
N.W. KEARNEY ST.
N.W. JOHNSON ST.
N.W. RALEIGH ST.

100 0 200
SCALE IN FEET

RETEC

BURLINGTON NORTHERN AND SANTA FE RAILWAY BN050-15990-300		EXTENT OF SEWER INSPECTIONS, SEWER SAMPLING LOCATIONS AND ONSITE SOIL BORING LOCATIONS PORTLAND, OREGON
DATE: 02/04/03	DRWN: A.S./SEA	FIGURE 3-1

File: H:\15990\15990S028.dwg Layout: ANSI_B User: astenberg Plotted: Feb 24, 2003 - 3:25pm Xref's: 0821BAS3; 0821SEWR

Table 4-3b Sewer Water Sampling Analytical Results — High Flow Conditions

		Tanner Creek Sewer				Tanner Creek Sewer		1997 PDC Sewer		27-Inch Storm Sewer			
	Location ID	RASS-4	RASS-4	RASS-2	RASS-2	RASS-1	RASS-1	RASS-8	RASS-8	RASS-6	RASS-7	RASS-6	RASS-5
	Sample Date	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002	12/31/2002
Chemical Name	Sample ID / Unit	RASS4-123102	RASS4-123102 filtere	RASS2-123102	RASS2-123102 filtere	RASS1-123102	RASS1-123102 filtere	RASS8-123102	RASS8-123102 filtere	RASS6-123102	RASS7-123102	RASS6-123102	RASS50-123102
PAH													
Acenaphthene	µg/L	**0.609**	**0.758**	**0.486**	< 0.5	< 0.1	< 0.1	**1.44**	**1.46**	**8.62**	**7.93**	**4.75**	**3.97**
Acenaphthylene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.467**	< 0.4	< 0.3	< 0.3
Anthracene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.949**	**0.755**	**0.413**	**0.368**
Benzo(a)anthracene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	µg/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluoranthene	µg/L	< 0.1	< 0.1	**0.162**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.751**	**0.726**	**0.428**	**0.405**
Fluorene	µg/L	**0.358**	**0.32**	**0.224**	**0.142**	< 0.1	< 0.1	**0.462**	**0.414**	**2.46**	**3.06**	**2.47**	**2.05**
Indeno(1,2,3-cd)pyrene	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	µg/L	**4.25**	**7.29**	**0.357**	**1.71**	< 0.1	< 0.1	< 0.1	< 0.1	**3.08**	**0.979**	**0.631**	**0.47**
Phenanthrene	µg/L	**0.566**	**0.364**	**0.171**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**2.73**	**2.05**	**0.862**	**0.695**
Pyrene	µg/L	**0.163**	< 0.1	**0.313**	< 0.1	< 0.1	< 0.1	**0.296**	**0.121**	**0.974**	**0.999**	**0.571**	**0.557**
Volatiles													
Benzene	µg/L	**4.05**		**2.32**		< 0.5		< 0.5		**28.6**	**12.4**	**4.69**	**4.74**
Ethylbenzene	µg/L	**1.85**		**1.04**		< 0.5		< 0.5		**9.57**	**3.81**	**1.64**	**1.65**
Toluene	µg/L	< 0.5		< 0.5		< 0.5		< 0.5		< 0.5	< 0.5	< 0.5	< 0.5
TOTAL XYLENE	µg/L	< 1		< 1		< 1		< 1		**2.82**	**1.91**	< 1	< 1
Fuel Hydrocarbons													
Diesel Range Organics	mg/L	**1.05 J**	< 0.25	**0.318 J**	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	**0.304 J**	**0.382 J**	< 0.25
TPH Motor Oil (C24 - C36)	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Gasoline Range Hydrocarbons	µg/L	< 80		< 80		< 80		< 80		**168**	**122**	**90.5**	**90.5**

Note:
Detected concentrations are in bold.

Table 4-3a Sewer Water Sampling Analytical Results — Low Flow Conditions

		Tanner Creek Sewer						1997 PDC Sewer	27–inch Storm Sewer		
	Location ID	RASS-4	RASS-2	RASS-2	RASS-2	RASS-1	RASS-1	RASS-8	RASS-6	RASS-7	RASS-5
	Sample Date	10/31/2002	10/31/2002	10/31/2002	10/31/2002	10/31/2002	10/31/2002	10/30/2002	10/30/2002	10/30/2002	10/30/2002
	Sample ID	RASS-4	RASS-2	RASS-2 Filtered	RASS-12	RASS-1	RASS-1 Filtered	RASS-8	RASS-6	RASS-7	RASS-5
Chemical Name	Unit										
PAH											
Acenaphthene	µg/L	0.05	0.47	0.5	0.56	0.5	0.54	0.41	40.9	0.61	0.75
Acenaphthylene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.00	< 0.10	< 0.10
Anthracene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.98	< 0.10	< 0.10
Benzo(a)anthracene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.17	< 0.10	0.10
Benzo(a)pyrene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(b)fluoranthene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(g,h,i)perylene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.17	< 0.10	0.11
Dibenz(a,h)anthracene	µg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluoranthene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.26	0.59	0.51
Fluorene	µg/L	< 0.10	0.12	0.13	0.18	0.17	0.17	0.39	8.24	< 0.10	0.33
Indeno(1,2,3-cd)pyrene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthalene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.50	< 0.10	< 0.20
Phenanthrene	µg/L	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	3.44	< 0.10	< 0.10
Pyrene	µg/L	< 0.10	0.21	< 0.10	0.27	0.22	< 0.10	0.21	3.27	1.14	1.04
Volatiles											
Benzene	µg/L	< 0.50	< 0.50		< 0.50	< 0.50		< 0.50	56.90	1.44	< 0.50
Ethylbenzene	µg/L	< 0.50	< 0.50		< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50
Toluene	µg/L	< 0.50	< 0.50		< 0.50	< 0.50		< 0.50	14.40	0.66	< 0.50
TOTAL XYLENE	µg/L	< 1.00	< 1.00		< 1.00	< 1.00		< 1.00	2.60	< 1.00	< 1.00
Fuel Hydrocarbons											
Diesel Range Organics	mg/L	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
TPH Motor Oil (C24 - C36)	mg/L	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Gasoline Range Hydrocarbons	µg/L	< 80.00	< 80.00		< 80.00	< 80.00		< 80.00	174.00	< 80.00	< 80.00

Note:
Detected concentrations are in bold.

Table 4-3c Hart-Crowser Sewer Water Sampling and Sewer Water Sampling Analytical Results — High Flow Conditions

		Tanner Creek Sewer									1997 PDC Sewer				27-Inch Storm Sewer			
Location ID Collected by: Sample Date Sample ID Chemical Name Unit	RASS-4 RETEC 12/31/2002 RASS4-123102	RASS-4 RETEC 12/31/2002 RASS4-123102 filtere	SS-6 Hart-Crowser	SS-1 Hart-Crowser	RASS-2 RETEC 12/31/2002 RASS2-123102	RASS-2 RETEC 12/31/2002 RASS2-123102 filtere	SS-3 Hart-Crowser	RASS-1 RETEC 12/31/2002 RASS1-123102	RASS-1 RETEC 12/31/2002 RASS1-123102 filtere	RASS-8 RETEC 12/31/2002 RASS8-123102	RASS-8 RETEC 12/31/2002 RASS8-123102 filtere	RASS-6 RETEC 12/31/2002 RASS6-123102	SS-2 Hart-Crowser	RASS-7 RETEC 12/31/2002 RASS7-123102	RASS-5 RETEC 12/31/2002 RASS5-123102	RASS-5 RETEC 12/31/2002 RASS50-123102	SS-4 Hart-Crowser
PAH																		
Acenaphthene µg/L	0.809	0.756	< 0.05	3.7	0.486	< 0.5	8.2	< 0.1	< 0.1	1.44	1.46	5.62	0.52	7.93	4.75	3.97	17
Acenaphthylene µg/L	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	0.467	< 0.2	< 0.4	< 0.3	< 0.3	< 0.2
Anthracene µg/L	< 0.1	< 0.1	0.022 B	1.1 B	< 0.1	< 0.1	1 B	< 0.1	< 0.1	< 0.1	< 0.1	0.948	0.041 B	0.755	0.413	0.388	< 0.01
Benzo(a)anthracene µg/L	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1	4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
Benzo(a)pyrene µg/L	< 0.1	< 0.1	< 0.01	0.11	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
Benzo(b)fluoranthene µg/L	< 0.1	< 0.1	< 0.01	0.022	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	2.5
Benzo(g,h,i)perylene µg/L	< 0.1	< 0.1	< 0.02	< 0.02	< 0.1	< 0.1	< 0.02	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.01
Benzo(k)fluoranthene µg/L	< 0.1	< 0.1	< 0.01	0.079	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	3.7
Chrysene µg/L	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.1	< 0.1	< 0.1	2.4
Dibenz(a,h)anthracene µg/L	< 0.2	< 0.2	< 0.01	< 0.01	< 0.2	< 0.2	< 0.01	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.01	< 0.2	< 0.2	< 0.2	< 0.01
Fluoranthene µg/L	< 0.1	< 0.1	0.064	2.4	0.162	< 0.1	66	< 0.1	< 0.1	< 0.1	< 0.1	0.751	< 0.01	0.726	0.428	0.405	730
Fluorene µg/L	0.358	0.32	< 0.02	3.4	0.224	0.142	15	< 0.1	< 0.1	0.462	0.414	2.46	0.15	3.06	2.47	2.05	120
Indeno(1,2,3-cd)pyrene µg/L	< 0.1	< 0.1	< 0.02	0.14	< 0.1	< 0.1	< 0.02	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.02	< 0.1	< 0.1	< 0.1	1.4
Naphthalene µg/L	4.25	7.29	< 0.05	< 0.05	0.357	1.71	1.3	< 0.1	< 0.1	< 0.1	< 0.1	3.08	< 0.05	0.879	0.631	0.47	< 0.05
Phenanthrene µg/L	0.568	0.364	< 0.01	3.7	0.171	< 0.1	21	< 0.1	< 0.1	< 0.1	< 0.1	2.73	0.076	2.05	0.862	0.695	210
Pyrene µg/L	0.163	< 0.1	0.039	2.4	0.313	< 0.1	17	< 0.1	< 0.1	0.298	0.121	0.974	0.13	0.999	0.571	0.557	210
Volatiles																	
Benzene µg/L	4.05		< 1	24	2.32		< 1	< 0.5		< 0.5		20.6	24	12.4	4.69	4.74	20
Ethylbenzene µg/L	1.85		< 1	15	1.04		< 1	< 0.5		< 0.5		9.57	8	5.81	1.64	1.85	20
Toluene µg/L	< 0.5		< 1	1	< 0.5		< 1	< 0.5		< 0.5		< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 20
TOTAL XYLENE µg/L	< 1		< 1	8	< 1		< 1	< 1		< 1		2.82	2	1.91	< 1	< 1	< 20
Fuel Hydrocarbons																	
Diesel Range Organics mg/L	1.05 J	< 0.25			0.316 J	< 0.25		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25		0.304 J	0.382 J	< 0.25	
TPH Motor Oil (C24 - C36) mg/L	< 0.5	< 0.5			< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	
Gasoline Range Hydrocarbons µg/L	< 80				< 80			< 80		< 80		168		122	90.5	90.5	

Notes:
Detected concentrations are in bold.
Sampling dates or ID's not available for Hart Crowser samples

Table 4-3c Hart-Crowser Sewer Water Sampling and Sewer Water Sampling Analytical Results — Low Flow Conditions

		Tanner Creek Sewer									1997 PDC Sewer	27-Inch Storm Sewer				
Location ID		RASS-4	SS-6	SS-1	RASS-2	RASS-2	RASS-2	SS-3	RASS-1	RASS-1	RASS-8	RASS-6	SS-2	RASS-7	RASS-5	SS-4
Collected by:		RETEC	Hart-Crowser	Hart-Crowser	RETEC	RETEC	RETEC	Hart-Crowser	RETEC	RETEC	RETEC	RETEC	Hart-Crowser	RETEC	RETEC	Hart-Crowser
Sample Date		10/31/2002			10/31/2002	10/31/2002	10/31/2002		10/31/2002	10/31/2002	10/30/2002	10/30/2002		10/30/2002	10/30/2002	
Sample ID		RASS-4			RASS-2	RASS-2 Filtered	RASS-12		RASS-1	RASS-1 Filtered	RASS-8	RASS-6		RASS-7	RASS-5	
Chemical Name	Unit															
PAH																
Acenaphthene	µg/L	0.03	< 0.05	3.7	0.47	0.5	0.56	6.2	0.5	0.54	0.41	40.9	0.52	0.61	0.75	17
Acenaphthylene	µg/L	< 0.10	< 0.2	< 0.2	< 0.10	< 0.10	< 0.10	< 0.2	< 0.10	< 0.10	< 0.10	1.00	< 0.2	< 0.10	< 0.10	< 0.2
Anthracene	µg/L	< 0.10	0.022 B	1.1 B	< 0.10	< 0.10	< 0.10	1 B	< 0.10	< 0.10	< 0.10	2.98	0.061 B	< 0.10	< 0.10	< 0.01
Benzo(a)anthracene	µg/L	< 0.10	< 0.01	< 0.01	< 0.10	< 0.10	< 0.10	4	< 0.10	< 0.10	< 0.10	0.17	< 0.01	< 0.10	0.10	< 0.01
Benzo(a)pyrene	µg/L	< 0.10	< 0.01	0.11	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	2.5
Benzo(b)fluoranthene	µg/L	< 0.10	< 0.01	0.022	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	< 0.01
Benzo(g,h,i)perylene	µg/L	< 0.10	< 0.02	< 0.02	< 0.10	< 0.10	< 0.10	< 0.02	< 0.10	< 0.10	< 0.10	< 0.10	< 0.02	< 0.10	< 0.10	3.7
Benzo(k)fluoranthene	µg/L	< 0.10	< 0.01	0.075	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	2.4
Chrysene	µg/L	< 0.10	< 0.01	< 0.01	< 0.10	< 0.10	< 0.10	< 0.01	< 0.10	< 0.10	< 0.10	0.17	0.016	< 0.10	0.11	< 0.01
Dibenz(a,h)anthracene	µg/L	< 0.20	< 0.01	< 0.01	< 0.20	< 0.20	< 0.20	< 0.01	< 0.20	< 0.20	< 0.20	< 0.20	< 0.01	< 0.20	< 0.20	< 0.01
Fluoranthene	µg/L	< 0.10	0.064	2.4	< 0.10	< 0.10	< 0.10	66	< 0.10	< 0.10	< 0.10	2.28	< 0.01	0.59	0.51	730
Fluorene	µg/L	< 0.10	< 0.02	3.4	0.12	0.13	0.18	15	0.17	0.17	0.39	8.24	0.15	< 0.10	0.33	120
Indeno(1,2,3-cd)pyrene	µg/L	< 0.10	< 0.02	0.14	< 0.10	< 0.10	< 0.10	< 0.02	< 0.10	< 0.10	< 0.10	< 0.10	< 0.02	< 0.10	< 0.10	1.4
Naphthalene	µg/L	< 0.10	< 0.05	< 0.05	< 0.10	< 0.10	< 0.10	1.3	< 0.10	< 0.10	< 0.10	1.50	< 0.05	< 0.10	< 0.20	< 0.05
Phenanthrene	µg/L	< 0.10	< 0.01	5.7	< 0.10	< 0.10	< 0.10	21	< 0.10	< 0.10	< 0.10	3.44	0.076	< 0.10	< 0.10	210
Pyrene	µg/L	< 0.10	0.039	2.4	0.21	< 0.10	0.27	17	0.22	< 0.10	0.21	3.27	0.13	1.14	1.04	210
Volatiles																
Benzene	µg/L	< 0.50	< 1	24	< 0.50		< 0.50	< 1	< 0.50		< 0.50	56.90	24	1.44	< 0.50	20
Ethylbenzene	µg/L	< 0.50	< 1	15	< 0.50		< 0.50	< 1	< 0.50		< 0.50	< 0.50	8	< 0.50	< 0.50	20
Toluene	µg/L	< 0.50	< 1	1	< 0.50		< 0.50	< 1	< 0.50		< 0.50	14.40	< 1	0.88	< 0.50	< 20
TOTAL XYLENE	µg/L	< 1.00	< 1	9	< 1.00		< 1.00	< 1	< 1.00		< 1.00	2.80	2	< 1.00	< 1.00	< 20
Fuel Hydrocarbons																
Diesel Range Organics	mg/L	< 0.25			< 0.25	< 0.25	< 0.25		< 0.25	< 0.25	< 0.25	< 0.25		< 0.25	< 0.25	
TPH Motor Oil (C24 - C36)	mg/L	< 0.50			< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	
Gasoline Range Hydrocarbons	µg/L	< 80.00			< 80.00		< 80.00		< 80.00		< 80.00	174.00		< 80.00	< 80.00	

Notes:
Detected concentrations are in bold.
Sampling dates or ID's not available for Hart Crowser samples

Table A-3. Summary of Selected Constituents of Potential Concern, USPS Portland P&DC, Portland, Oregon.

Constituent of Potential Concern	Summary of COPC Selection Basis for Each Data Set								
	Surface Soil (0-3 ft bgs)			Surface/Subsurface Soil (0-15/16 ft bgs)				Groundwater	
	CC	UV	PP	CC	NE	UV	PP	UV	PP
Volatile Organic Compounds									
1,2,4-Trimethylbenzene	(ND)	[c]	(ND)	(ND)	(ND)	[c]	[a] [c]	(ND)	(ND)
1,3,5-Trimethylbenzene	(ND)	[c]	(ND)	(ND)	(ND)	[c]	[a] [c]	(ND)	(ND)
Benzene	(ND)	[c]	[c]	(ND)	(ND)	[c]	[c]	(ND)	[a] [b] [c]
Naphthalene	(ND)	[c]	[c]	(ND)	(ND)	[c]	[a] [c]	(ND)	[a] [b] [c]
Polycyclic Aromatic Hydrocarbons									
Benzo(a)anthracene	[c]	[a] [b] [c]	[a] [b] [c]	[c]	[b] [c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]
Benzo(a)pyrene	[c]	[a] [b] [c]	[a] [b] [c]	[c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]
Benzo(b)fluoranthene	[c]	[a] [b] [c]	[a] [b] [c]	[c]	[b] [c]	[a] [b] [c]	[a] [b] [c]	[c]	[a] [c]
Benzo(k)fluoranthene	[c]	[a] [c]	[a] [c]	[c]	[c]	[a] [c]	[a] [c]	[c]	[a] [c]
Chrysene	[c]	[c]	[a] [c]	[c]	[c]	[c]	[a] [c]	[c]	[a] [c]
Dibenzo(a,h)anthracene	(ND)	[a] [b] [c]	[a] [b] [c]	(ND)	[b] [c]	[a] [b] [c]	[a] [b] [c]	(ND)	[a] [b] [c]
Indeno(1,2,3-cd)pyrene	[c]	[a] [b] [c]	[a] [b] [c]	[c]	[c]	[a] [b] [c]	[a] [b] [c]	[c]	[a] [c]
2-Methylnaphthalene	[c]	[c]	[a] [c]	[c]	(ND)	[c]	[a] [c]	[c]	[a] [c]
Naphthalene	[c]	[a] [c]	[a] [c]	[c]	[c]	[a] [c]	[a] [c]	[c]	[a] [b] [c]
Total Petroleum Hydrocarbons									
Diesel & Heavy Oil	[c]	[c]	[c]	[c]	[c]	[c]	[a] [c]	(ND)	[c]
Metals									
Arsenic	[a] [b] [c]	[a] [c]	[a] [c]	[a] [b] [c]	(ND)	[a] [c]	[a] [c]	—	—
Chromium	[c]	[c]	[c]	[c]	(ND)	[c]	[a] [c]	—	—
Lead	[c]	[c]	[c]	[c]	(ND)	[c]	[c]	—	—

[a] COPC on individual basis.
[b] COPC on multiple-constituent exposure basis in one medium.
[c] COPC on basis of multiple media.

– Not applicable.
(ND) Constituent was not detected in the indicated data set.
COPC Constituent of potential concern; retained for the risk assessment calculations.
ft bgs Feet below ground surface.

CC - Coach Cleaning Area.
NE - Northeast Area.
PP - Pintsch Plant Area.
UV - Utility Vault Area.

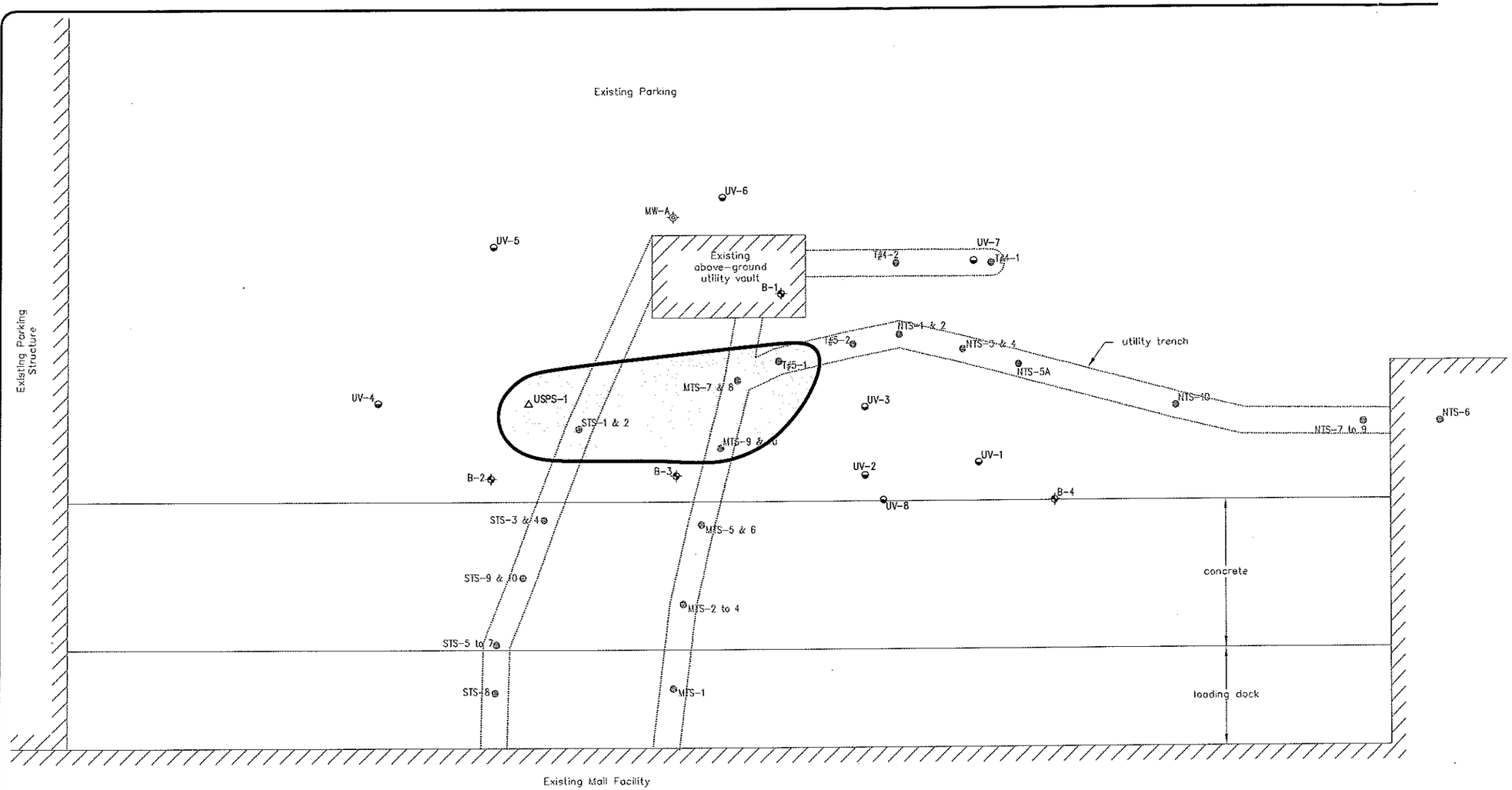
Attachment 7

Table A-57. Summary of Calculated RME Risks and Hazards, USPS Portland P&DC, Portland, Oregon.

RECEPTOR Exposure Medium - Scenario	Calculation Table	Total Excess Lifetime Cancer Risk	Total Noncancer Hazard	Total Noncancer Hazard
		ELCR	**HI**	**Alt HI (TPH Method)**
EXCAVATION WORKER				
Coach Cleaning Area				
Surface/Subsurface Soil *	Table A-18	1E-07	0.02	0.02
Northeast Area				
Surface/Subsurface Soil *	Table A-19	3E-08	0.000001	0.2
Utility Vault Area				
Surface/Subsurface Soil *	Table A-20	4E-07	0.005	0.03
Groundwater	Table A-22	6E-08	0.00001	—
Area Total:		4E-07	0.005	0.03
Pintsch Plant Area				
Surface/Subsurface Soil *	Table A-21	4E-06	0.08	0.07
Groundwater	Table A-23	4E-06	0.02	0.04
Area Total:		8E-06	0.1	0.1
CONSTRUCTION WORKER				
Coach Cleaning Area				
Surface/Subsurface Soil *	Table A-24	4E-06	0.5	0.5
Northeast Area				
Surface/Subsurface Soil *	Table A-25	8E-07	0.00003	0.2
Utility Vault Area				
Surface/Subsurface Soil *	Table A-26	1E-05	0.2	0.2
Groundwater	Table A-28	6E-08	0.00001	—
Area Total:		1E-05	0.2	0.2
Pintsch Plant Area				
Surface/Subsurface Soil *	Table A-27	**1E-04** *	**2** **	0.8
Groundwater	Table A-29	4E-06	0.02	0.04
Area Total:		1E-04	**2** **	0.9
OCCUPATIONAL WORKER				
Surface Soil (0-3 ft bgs)				
Coach Cleaning Area	Table A-30	**3E-05** *	0.2	0.2
Utility Vault Area	Table A-31	**8E-05** *	0.1	0.2
Pintsch Plant Area	Table A-32	**5E-04** *	0.2	0.2
Surface/Subsurface Soil (0-16 ft bgs)				
Coach Cleaning Area	Table A-33	**3E-05** *	0.2	0.2
Northeast Area	Table A-34	6E-06	0.00003	0.5
Utility Vault Area	Table A-35	**8E-05** *	0.09	0.3
Pintsch Plant Area	Table A-36	**9E-04** *	**2** **	1

* The total cancer risk exceeds the benchmark of 1E-05.
** The total noncancer hazard exceeds the benchmark of 1.

Alt HI	Noncancer hazard index based on the Oregon DEQ (2003) TPH approach.		
ELCR	Excess lifetime cancer risk.	RME	Reasonable maximum exposure.
ft bgs	Feet below ground surface.	TPH	Total pertroleum hydrocarbons.
HI	Hazard index.		



LEGEND

- Building
- Boring completed by ARCADIS in 2004
- Trench sample collected by GeoEngineers in 1997
- Monitor well completed by GeoEngineers in 1996
- Boring completed by GeoEngineers in 1996
- Trench soil sample collected by Dames & Moore in 1997
- Approximate limits of hot spot area

N

0 15 30

SCALE IN FEET
(APPROXIMATE)

Note: Sampling locations and site features are approximate based on consultant reports.

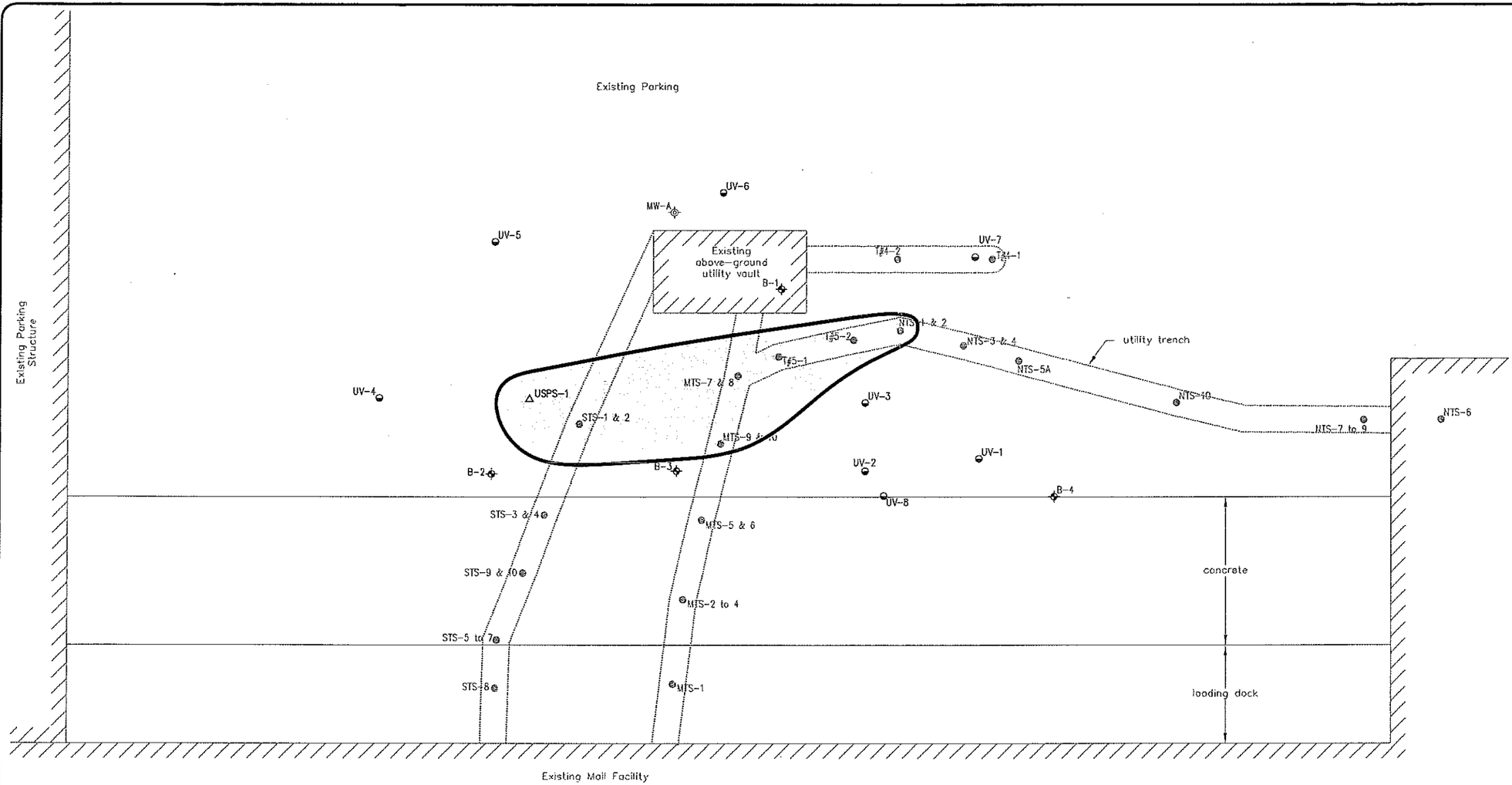
ARCADIS

Highly Concentrated Hot Spot Area
Occupational Worker, Surface Soil (0'-3')
Electrical Utility Vault Area

USPS - Portland Processing and Distribution Center
715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-6

C:\Data\CAD\Projects\AGM - Portland Processing and Distribution Center\dwg\Site Plan.dwg << USPS - Hot Spot Occ - Surface >> April 6, 2006 11:46:28 AM (bCAD)



LEGEND

- Building
- Boring completed by ARCADIS in 2004
- Trench sample collected by GeoEngineers in 1997
- Monitor well completed by GeoEngineers in 1996
- Boring completed by GeoEngineers in 1996
- Trench soil sample collected by Dames & Moore in 1997
- Approximate limits of hot spot area

N

0 15 30

SCALE IN FEET
(APPROXIMATE)

Note: Sampling locations and site features are approximate based on consultant reports.

ARCADIS

Highly Concentrated Hot Spot Area
Occupational Worker, Surface & Subsurface Soil (0'-6')
Electrical Utility Vault Area

USPS - Portland Processing and Distribution Center
715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-7

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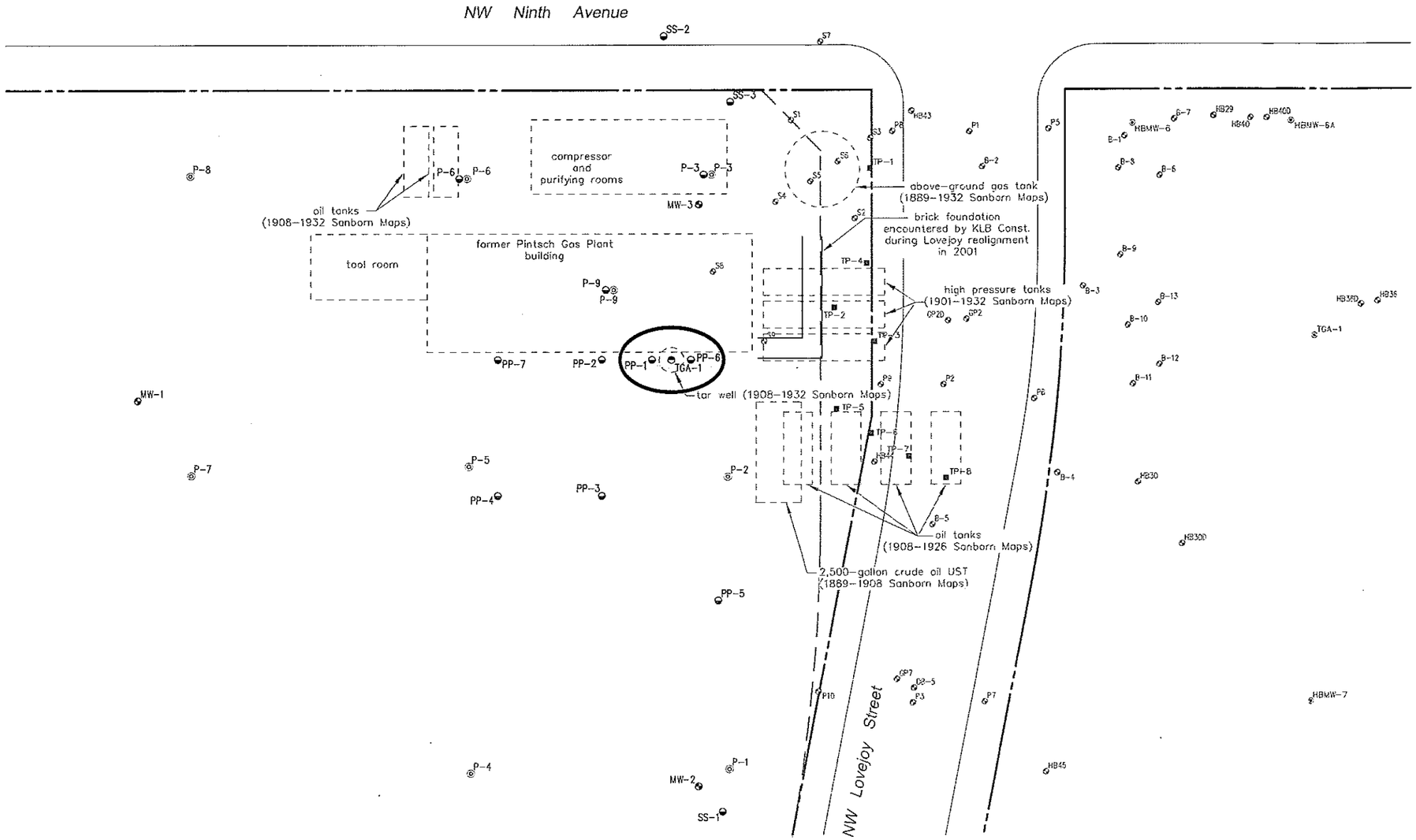

LEGEND

- Boring completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Shallow monitor well completed by Alisto in 2000
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Approximate limits of hot spot area

Note: Sampling locations and site features are approximate based on consultant reports and Sanborn Maps.

ARCADIS

Highly Concentrated Hot Spot Area
Construction Worker, Surface & Subsurface Soil (0'-16')
Former Pintsch Gas Plant Area

USPS - Portland Processing and Distribution Center
715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-8

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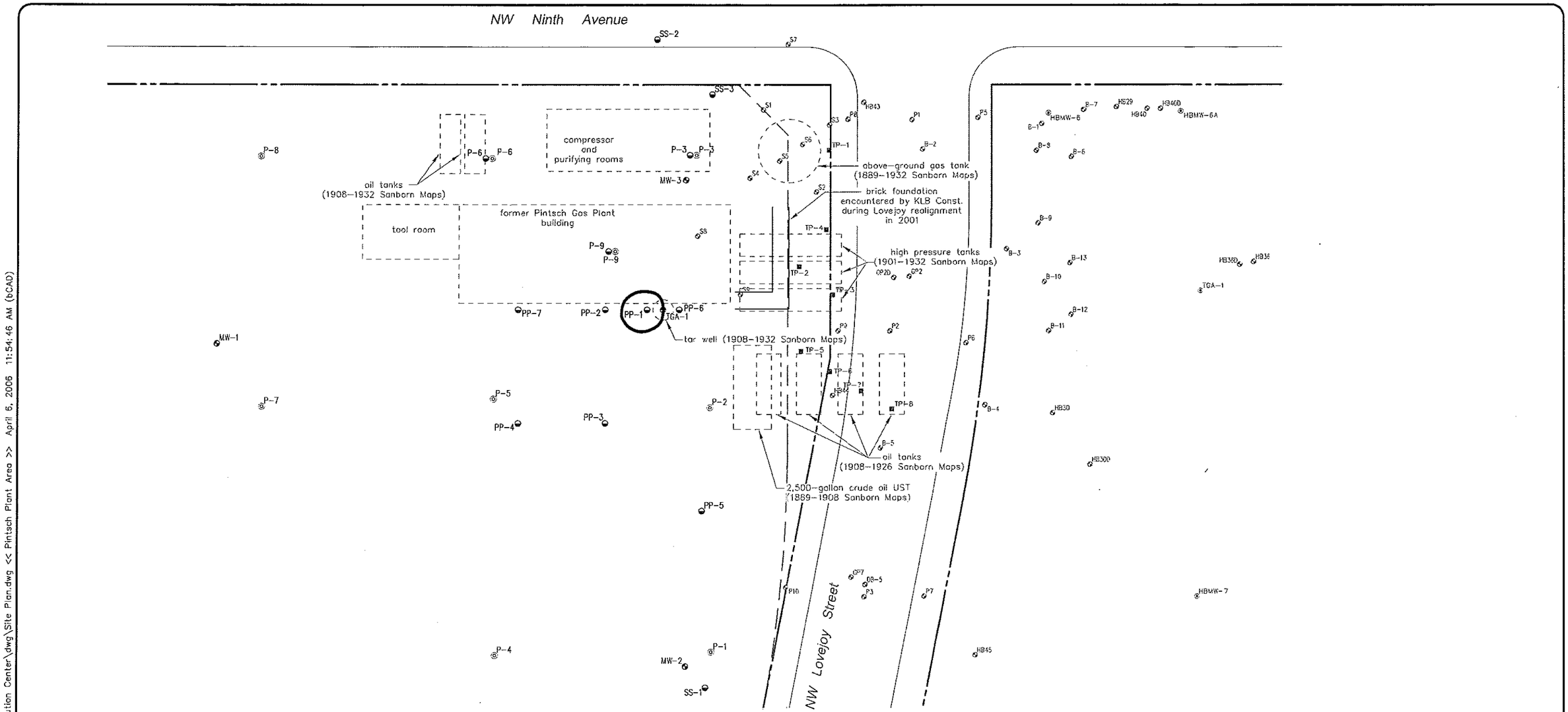

LEGEND

- Boring completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Shallow monitor well completed by Alisto in 2000
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Approximate limits of hot spot area

Note: Sampling locations and site features are approximate based on consultant reports and Sanborn Maps.

ARCADIS

Highly Concentrated Hot Spot Area
Occupational Worker, Surface Soil (0'-3')
Former Pintsch Gas Plant Area

USPS - Portland Processing and Distribution Center
715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-9

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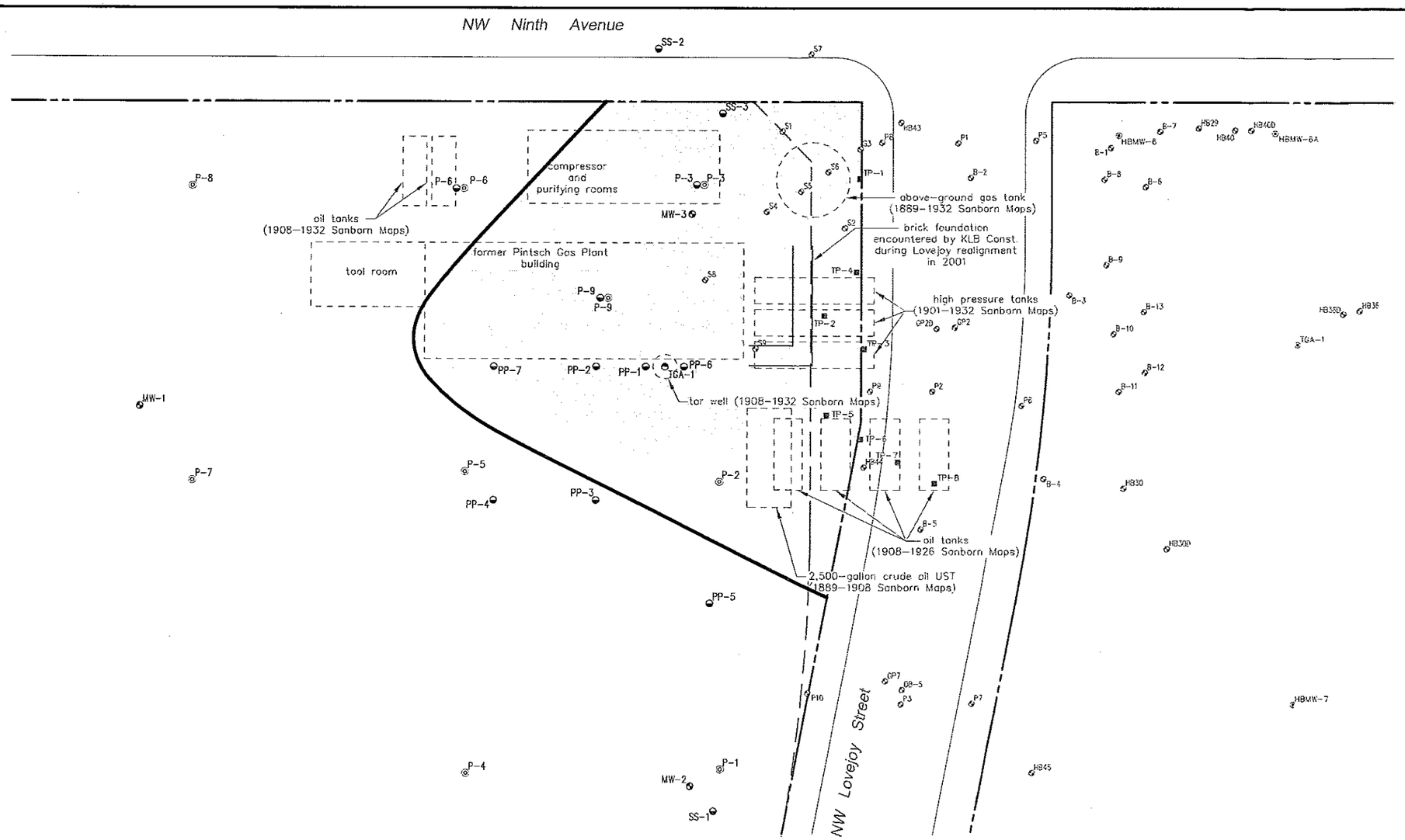

LEGEND

- Boring completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Shallow monitor well completed by Alisto in 2000
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Approximate limits of hot spot area

N

0 15 30

SCALE IN FEET
(APPROXIMATE)

Note: Sampling locations and site features are approximate based on consultant reports and Sanborn Maps.

ARCADIS

Highly Concentrated Hot Spot Area
Occupational Worker, Surface & Subsurface Soil (0'-16')
Former Pintsch Gas Plant Area

USPS - Portland Processing and Distribution Center
715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-10

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Table A1-3. Summary of Selected Constituents of Potential Concern, USPS Portland P&DC, Portland, Oregon.

Constituent of Potential Concern	Summary of COPC Selection Basis for Each Data Set				
	Surface Soil (0-3 ft bgs)				
	CC	S	NE	UV	PP
Polycyclic Aromatic Hydrocarbons					
Benzo(a)anthracene	[c]	[c]	[c]	[a] [b] [c]	[a] [b] [c]
Benzo(a)pyrene	[a] [c]	[c]	[a] [b] [c]	[a] [b] [c]	[a] [b] [c]
Benzo(b)fluoranthene	[c]	[c]	[c]	[a] [b] [c]	[a] [b] [c]
Benzo(k)fluoranthene	[c]	[c]	(ND)	[a] [c]	[a] [c]
Chrysene	[c]	[c]	[c]	[a] [c]	[a] [c]
Dibenzo(a,h)anthracene	(ND)	(ND)	(ND)	[a] [b] [c]	[a] [b] [c]
Indeno(1,2,3-c,d)pyrene	[c]	[c]	[c]	[a] [c]	[a] [b] [c]
2-Methylnaphthalene	[c]	[c]	(ND)	[c]	[a] [c]
Naphthalene	[c]	[c]	(ND)	[a] [c]	[a] [c]
Total Petroleum Hydrocarbons					
Diesel & Heavy Oil	[c]	[c]	[c]	[a] [c]	[a] [c]
Metals					
Arsenic	[a] [b] [c]	(ND)	[a] [b] [c]	[a] [c]	[a] [c]
Iron	[a] [c]	(ND)	[a] [c]	(ND)	(ND)
Lead	[a] [b] [c]	(ND)	[c]	[c]	[c]

[a] COPC on individual basis.
[b] COPC on multiple-constituent exposure basis in one medium.
[c] COPC on basis of multiple data sets.

– Not applicable.
(ND) Constituent was not detected in the indicated data set.
CC Former Coach Cleaning Area.
COPC Constituent of potential concern; retained for the risk assessment calculations.
ft bgs Feet below ground surface.
NE Northeastern Area.
PP Former Pintsch Gas Plant Area.
S Southern Area.
UV Electrical Utility Vault Area.

Attachment 9

Table A1-29. Summary of Calculated RME Risks and Hazards, USPS Portland P&DC, Portland, Oregon.

RECEPTOR Exposure Medium - Scenario	Calculation Table	Total Excess Lifetime Cancer Risk	Total Noncancer Hazard	Total Noncancer Hazard
		ELCR	**HI**	**Alt HI (TPH Method)**
AGE-ADJUSTED URBAN RESIDENT				
Former Coach Cleaning Area				
Surface Soil (0-3 ft bgs)	Table A1-17.	4E-05 *	1	0.9
Soil via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Attachment A2.	—	—	acceptable[1]
Southern Area				
Surface Soil (0-3 ft bgs)	Table A1-18.	3E-06	0.0003	0.07
Soil via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Attachment A2.	—	—	acceptable[1]
Northeastern Area				
Surface Soil (0-3 ft bgs)	Table A1-19.	2E-05 *	0.5	1
Soil via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Attachment A2.	—	—	acceptable[1]
Electrical Utility Vault Area				
Surface Soil (0-3 ft bgs)	Table A1-20.	6E-04 *	0.3	1
Soil via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Attachment A2.	—	—	acceptable[1]
Groundwater via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Table A3-5.	—	0.00001	—
Former Pintsch Gas Plant Area				
Surface Soil (0-3 ft bgs)	Table A1-21.	4E-03 *	0.6	2 **
Soil via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Attachment A2.	—	—	acceptable[1]
Groundwater via Inhalation of Volatiles Migrating to Indoor/Outdoor Air	Table A3-6.	9E-07	0.1	—

* The total cancer risk exceeds the benchmark of 1E-05.

** The total noncancer hazard exceeds the benchmark of 1.

[1] The total noncancer hazard was not calculated; noncancer hazard is acceptable as demonstrated by Site-specific RBC values calculated for vapor intrusion of ">MAX" or ">100,000 mg/kg" (see Attachment A2).

— Not applicable.

Alt HI Noncancer hazard index based on the Oregon DEQ (2006) TPH approach.

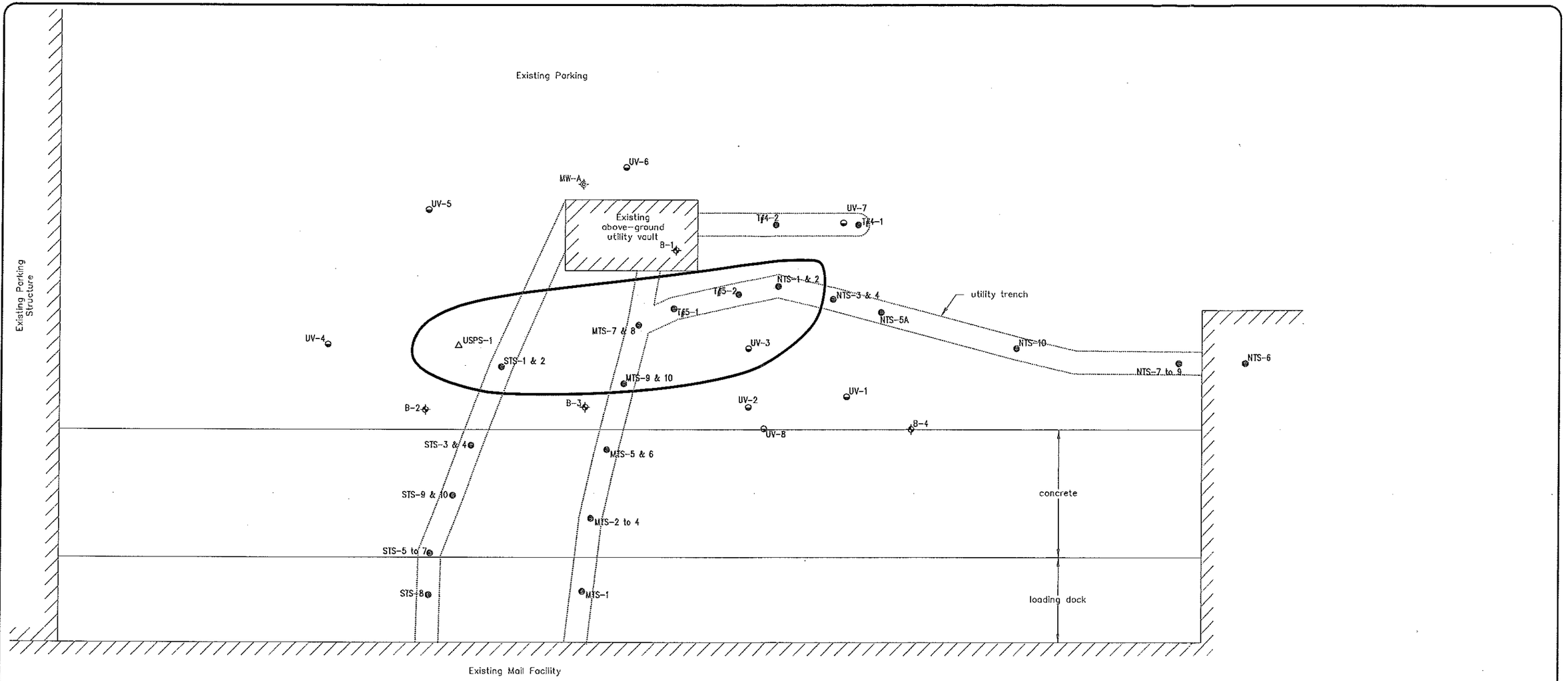
ELCR Excess lifetime cancer risk.

ft bgs Feet below ground surface.

HI Hazard index.

RME Reasonable Maximum Exposure.

TPH Total petroleum hydrocarbons.



LEGEND

- Building
- Boring completed by ARCADIS in 2004
- Trench sample collected by GeoEngineers in 1997
- Monitor well completed by GeoEngineers in 1996
- Boring completed by GeoEngineers in 1996
- Trench soil sample collected by Dames & Moore in 1997
- Approximate Hypothetical Hot Spot Area

N

0 15 30

SCALE IN FEET (APPROXIMATE)

Note: Sampling locations and site features are approximate based on consultant reports (not surveyed).

ARCADIS

Future Use
Hypothetical Highly Concentrated Soil Hot Spot Area
Urban Resident, Surface Soil (0'-3')
Electrical Utility Vault Area

USPS Portland P&DC, 715 NW Hoyt Street, Portland, Oregon 97208

FIGURE

A-6

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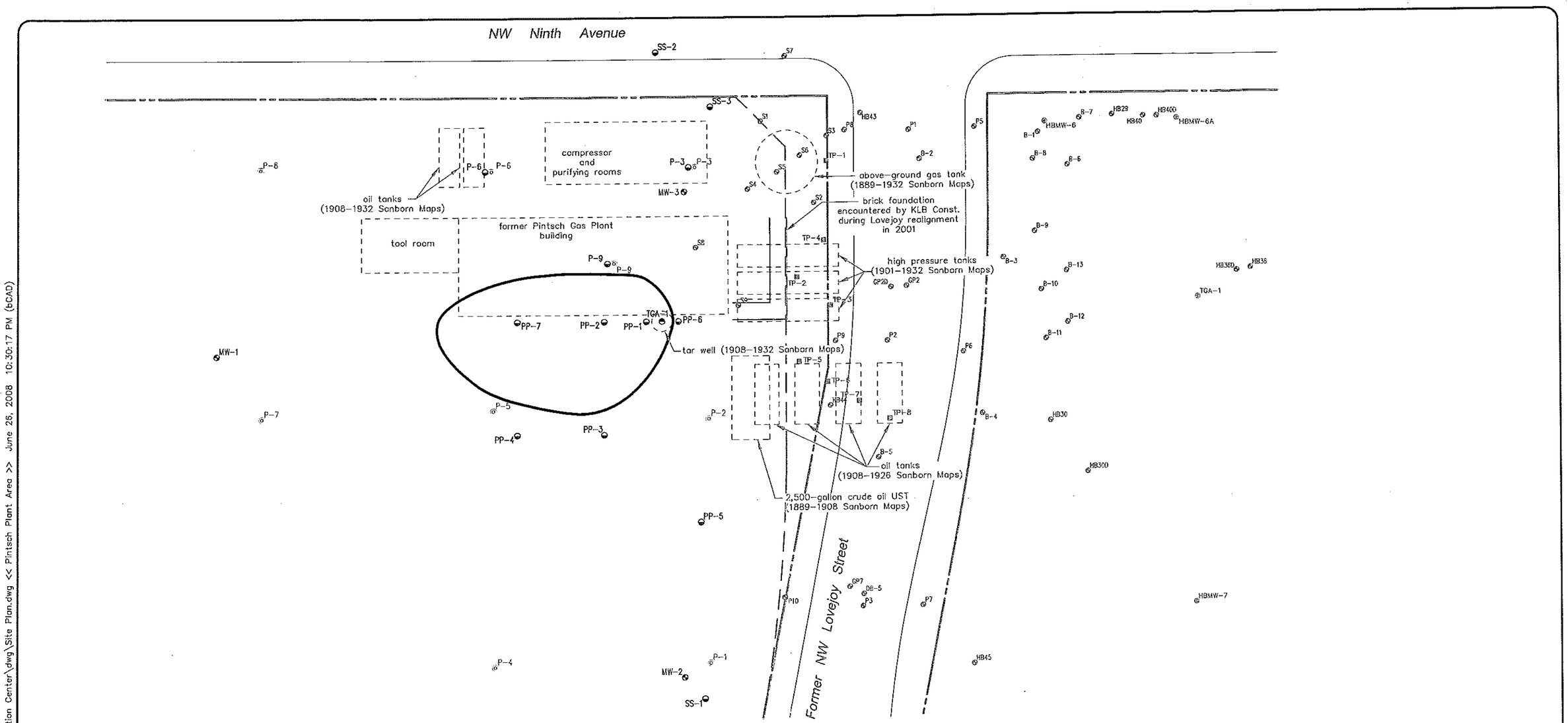

LEGEND

- Boring completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Shallow monitor well completed by Alisto in 2000
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Approximate Hypothetical Hot Spot Area

Note: Sampling locations and site features are approximate based on consultant reports and Sanborn Maps (not surveyed).

ARCADIS

Future Use
Hypothetical Highly Concentrated Soil Hot Spot Area
Urban Resident, Surface Soil (0'-3')
Former Pintsch Gas Plant Area

USPS Portland P&DC, 715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
A-7

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Attachment 10

Table 1. Remedial Action Objectives, Continuation of Existing Site Use

Medium	Risk-Based Concentrations[1]
Soil Risk Exceedances	**Excavation Workers** benzo(a)pyrene: 59 mg/kg **Volatilization to Outdoor Air** **Occupational Workers** naphthalene: 27 mg/kg
Groundwater Risk Exceedances	**Excavation Workers** benzo(a)pyrene: 0.002 mg/L naphthalene: 0.5 mg/L

mg/kg milligram per kilogram

mg/L milligram per liter

[1] Risk-based concentrations are provided in the *Final Remedial Investigation Report and Risk Assessment Report* (ARCADIS 2006).

Table 2. Remedial Action Objectives, Assumed Hypothetical Change in Site Use in Future	
Medium	**Risk-Based Concentrations[1]**
Soil Risk Exceedances	**Excavation Workers** benzo(a)pyrene: 59 mg/kg **Construction Workers** arsenic: 13 mg/kg benz(a)anthracene: 21 mg/kg benzo(a)pyrene: 2.1 mg/kg benzo(b)fluoranthene: 21 mg/kg dibenz(a,h)anthracene: 2.1 mg/kg indeno(1,2,3-c,d)pyrene: 21 mg/kg naphthalene: 580 mg/kg **Occupational Workers** arsenic: 7 mg/kg* benz(a)anthracene: 2.7 mg/kg benzo(a)pyrene: 0.27 mg/kg benzo(b)fluoranthene: 2.7 mg/kg benzo(k)fluoranthene: 27 mg/kg dibenz(a,h)anthracene: 0.27 mg/kg indeno(1,2,3-c,d)pyrene: 2.7 mg/kg naphthalene: 23 mg/kg **Urban Residents** arsenic: 7 mg/kg* lead: 400 mg/kg** benz(a)anthracene: 0.33 mg/kg benzo(a)pyrene: 0.033 mg/kg benzo(b)fluoranthene: 0.33 mg/kg benzo(k)fluoranthene: 3.3 mg/kg chrysene: 33 m/kg dibenz(a,h)anthracene: 0.033 mg/kg indeno(1,2,3-c,d)pyrene: 0.33 mg/kg naphthalene: 25 mg/kg **Volatilization to Outdoor Air** **Occupational Workers** naphthalene: 27 mg/kg **Urban Residents** naphthalene: 15 mg/kg **Vapor Intrusion Into Buildings** **Occupational Workers** ethylbenzene: 12 mg/kg naphthalene: 99 mg/kg **Urban Residents** ethylbenzene: 2.2 mg/kg naphthalene: 18 mg/kg

Table 2. Remedial Action Objectives, Assumed Hypothetical Change in Site Use in Future	
Medium	**Risk-Based Concentrations[1]**
Soil Hot Spots	**Construction Workers** benzo(a)pyrene: 210 mg/kg **Occupational Workers** benz(a)anthracene: 270 mg/kg benzo(a)pyrene: 27 mg/kg dibenz(a,h)anthracene: 27 mg/kg **Urban Residents** benz(a)anthracene: 33 mg/kg benzo(a)pyrene: 3.3 mg/kg benzo(b)fluoranthene: 33 mg/kg dibenz(a,h)anthracene: 3.3 mg/kg indeno(1,2,3-c,d)pyrene: 33 mg/kg
Groundwater Risk Exceedances	**Excavation Workers** benzo(a)pyrene: 0.002 mg/L naphthalene: 0.5 mg/L **Construction Workers** benzo(a)pyrene: 0.002 mg/L naphthalene: 0.5 mg/L
Groundwater Hot Spots	Not Applicable

mg/kg milligram per kilogram
mg/L milligram per liter

1 Risk-based concentrations (RBCs) are provided in the Final RI Report, Appendix A - Risk Assessment Report (ARCADIS 2006) and in the Baseline Risk Assessment – Hypothetical Urban Residential Evaluation (Appendix A). DEQ's acceptable risk levels were exceeded for a subset of constituents in each area. However, a summary of RBCs for all areas is shown rather than individual RBCs for each area. Exceedances of individual risk levels and highly concentrated hot spot values for each area are summarized in Appendix C.

* The arsenic risk-based concentration (RBC) for occupational workers and urban residents is shown as the background level of 7 mg/kg since this background level is higher than the calculated RBCs for these receptors.

** An RBC cannot be calculated for lead. Therefore, EPA's Region 6 medium-specific screening level for lead in residential soil of 400 mg/kg is used.

Table 3. Areas/Volumes of Media Requiring Remedial Action Assessment, Hypothetical Risk Level Exceedance Areas						
Medium	**Location**	**RAO**	**Constituent(s) Exceeding RAO**	**Approximate Area (square feet)**	**Depth (feet)**	**Estimated In-Situ Volume (cubic yards)**
Soil	Electrical Utility Vault Area	Prevent human health risk level exceedances.				
		Construction Workers	2 cPAHs	4,274	6	950
		Occupational Workers	5 cPAHs arsenic	12,562	3	1,396
		Urban Residents	6 cPAHs arsenic	15,297	3	1,700
Soil	Former Coach Cleaning Area	Prevent human health risk level exceedances.				
		Construction Workers	arsenic	89,208	5	16,520
		Occupational Workers	arsenic	92,676	3	10,297
		Urban Residents	benzo(a)pyrene arsenic lead	99,838	3	11,093
Medium	**Location**	**RAO**	**Constituent(s) Exceeding RAO**	**Approximate Area (square feet)**	**Depth (feet)**	**Estimated In-Situ Volume (cubic yards)**
Soil	Former Pintsch Gas Plant Area	Prevent human health risk level exceedances.				
		Excavation Workers	benzo(a)pyrene	5,533	10	2,049
		Construction Workers	5 cPAHs	8,853	10	3,279
		Occupational Workers	6 cPAHs arsenic	12,378	3	1,375
		Urban Residents	7 cPAHs arsenic	12,637	3	1,404
Soil		Prevent human health risk level exceedances.				
	Northeast Corner Area	Occupational Workers*	arsenic	1,836	3	204
		Urban Residents	benzo(a)pyrene arsenic	3,129	3	348
	Southwest Corner Area	Urban Residents	benzo(a)pyrene	3,472	3	386
Groundwater	Former Pintsch Gas Plant	Prevent human health risk level exceedances.				
		Excavation Workers and Construction Workers	benzo(a)pyrene	16,904	NA	NA

Table 4. Areas/Volumes of Media Requiring Remedial Action Assessment, Hypothetical Highly Concentrated Hot Spot Areas						
Medium	**Location**	**RAO**	**Constituent(s) Exceeding RAO**	**Approximate Area (square feet)**	**Depth (feet)**	**Estimated In-Situ Volume (cubic yards)**
Soil	Electrical Utility Vault Area	Contain or remove highly concentrated hot spots of contamination in soil.				
		Occupational Workers	benzo(a)pyrene	2,066	3	230
		Urban Residents	4 cPAHs	3,729	3	414
Soil	Former Pintsch Gas Plant Area	Contain or remove highly concentrated hot spots of contamination in soil.				
		Construction Workers	benzo(a)pyrene	351	10	130
		Occupational Workers	3 cPAHs	130	3	14
		Urban Residents	5 cPAHs	2,468	3	274

Note: The extent of highly concentrated hot spots and soil volume calculations are based on investigation data and assumptions; actual areas and volumes determined by results of confirmation samples may be more or less than calculated. Hot spot areas are identified in the Final RI Report, Appendix A - Risk Assessment Report (ARCADIS 2006) and in Appendices A and C of this FFS Report.

Attachment 11

Table D-1. Remedial Alternative Screening
USPS Portland P&DC

Remedial Alternative	Description	Achieves Protection Standard in OAR 340-122-0040(2)(a)?	Balancing Factors						Balancing Factors, Total Score[a]	Extent to Which Alternative Remediates and/or Removes Hot Spots as Required by OAR 340-122-0090(4)?	Recommended Remedial Alternative	Comments
			Effectiveness	Long Term Reliability	Implementability	Implementation Risk	Cost Reasonableness	Community and State Acceptance				
Continuation of Existing Site Use												
Applied Weighting Factor, No Hot Spots[b]:			0.17	0.17	0.17	0.17	0.17	0.17				
Soil												
USPS S1 No Action	No action would be taken for this alternative, which is evaluated as a baseline.	No	Unacceptable / 1	Unacceptable / 1	Good / 5 (no implementation required)	Good / 5 (no implementation risk)	Good / 5 (no cost)	Poor / 2	3.2	No Hot Spots		This alternative is not acceptable because it does not meet RAOs.
USPS S2 Institutional and Engineering Controls	Use of institutional and engineering controls to prevent unacceptable exposure to impacted soil, including execution of a Site E&ES.	Yes	Good / 5	Good / 5	Good / 5	Good / 5 (no implementation risk)	Good / 5	Good / 5	5.0	No Hot Spots	√	This alternative provides a cost-effective means of achieving RAOs.
Groundwater												
USPS GW1 No Action	No action would be taken for this alternative, which is evaluated as a baseline.	Yes	Moderate / 4	Moderate / 4	Good / 5 (no implementation required)	Good / 5 (no implementation risk)	Good / 5 (no cost)	Poor / 2	4.2	No Hot Spots		It is unclear whether the community and State would acceptance this alternative because it does not provide a formal restriction for groundwater use.
USPS GW2 Institutional and Engineering Controls	Use of institutional and engineering controls to prevent unacceptable exposure to impacted shallow groundwater, including execution of a Site E&ES.	Yes	Good / 5	Good / 5	Good / 5	Good / 5 (no implementation risk)	Good / 5	Good / 5	5.0	No Hot Spots	√	This alternative provides a cost-effective means of achieving RAOs.
Hypothetical Change in Site Use												
Applied Weighting Factor, Soil Hot Spots[b]:			0.21	0.21	0.17	0.17	0.08	0.17				
Soil												
Future S1 No Action	No action would be taken for this alternative, which is evaluated as a baseline.	No	Unacceptable / 1	Unacceptable / 1	Good / 5 (no implementation required)	Good / 5 (no implementation risk)	Good / 5 (no cost)	Poor / 2	2.9	No Hot Spot Removal		This alternative is not acceptable because it does not meet RAOs.
Future S2 Institutional and Engineering Controls	Use of institutional and engineering controls to prevent unacceptable exposure to impacted soil, including execution of a Site E&ES.	Yes	Moderate / 4	Moderate / 4	Good / 5	Good / 5 (no implementation risk)	Good / 5	Moderate / 4	4.5	No Hot Spot Removal		This alternative provides a cost-effective means of achieving RAOs.
Future S3 Hot Spot Removal and Institutional and Engineering Controls	Excavation and offsite disposal of all hot spot soil shown on Figures 4 through 8 to a maximum depth of 10 feet and use of institutional and engineering controls to prevent unacceptable exposure to residual impacted soils that exceeds risk levels.	Yes	Good / 5	Good / 5	Moderate / 4	Moderate / 4	Moderate / 4	Good / 5	4.6	Hot Spots Removed to the Extent Feasible	√	This alternative is effective in meeting RAOs. Implementability is scored moderate for excavating all identified hot spot areas. There is moderate implementation risk and cost reasonableness. This alternative is responsive to DEQ's preference for hot spot removal.
Future S4 Risk Level Exceedance Area Removal	Excavation and offsite disposal of all risk level exceedance soil shown on Figures 3 and 9 through 20 to a maximum depth of 10 feet.	Yes	Good / 5	Good / 5	Fair / 3	Moderate / 4	Poor / 2	Good / 5	4.3	Hot Spots Removed to the Extent Feasible		This alternative is effective in meeting RAOs, but would be fairly difficult to implement due to large soil excavations/volumes and close proximity to structures (e.g., vault area and Lovejoy Ramp). Also, there is moderate implementation risk and costs are not reasonable compared to the protection achieved by lower cost alternatives.
Groundwater												
Future GW1 No Action	No action would be taken for this alternative, which is evaluated as a baseline.	No	Unacceptable / 1	Unacceptable / 1	Good / 5 (no implementation required)	Good / 5 (no implementation risk)	Good / 5 (no cost)	Poor / 2	3.2	No Hot Spots		This alternative is not acceptable because it does not meet RAOs.
Future GW2 Institutional and Engineering Controls	Use of institutional and engineering controls to prevent unacceptable exposure to impacted shallow groundwater, including execution of a Site E&ES.	Yes	Good / 5	Good / 5	Good / 5	Good / 5 (no implementation risk)	Good / 5	Good / 5	5.0	No Hot Spots	√	This alternative provides a cost-effective means of achieving RAOs.

[a] Remedial Alternative Ratings / Scores:

Good	5
Moderate	4
Fair	3
Poor	2
Unacceptable	1

[b] All balancing factors are weighted equally for groundwater and for a continuation of existing Site use because no hot spots were identified. Soil hot spots have been identified for a hypothetical change in Site use and weighting factors reflect a higher threshold for cost reasonableness in favor of effectiveness and long term reliability per OAR 340-122-0090 (4).

Table D-2. Rough Order of Magnitude (ROM) Cost Estimates to Excavate Hypothetical Hot Spots
USPS Portland P&DC, Portland, OR

Base Costs			Construction Worker (CW)	Occupational Worker (OW)		Urban Resident (UR)	
			Former Pintsch Gas Plant Area, Figure 6	Electrical Utility Vault Area, Figure 4	Former Pintsch Gas Plant Area, Figure 7	Electrical Utility Vault Area, Figure 5	Former Pintsch Gas Plant Area, Figure 8
Depth of Excavation (feet):			10	3	3	3	3
Volume of Excavation, In-Situ (cubic yards):			130	230	14	414	274
Work Plan with HASP	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000
Mobilization	$10,000		$10,000	$10,000	$10,000	$10,000	$10,000
Remove/Dispose Asphalt	$30	/square yard	$1,170	$6,887	$433	$12,430	$8,227
Excavation	$10	/cubic yard	$1,300	$2,296	$144	$4,143	$2,742
Hand Augering/Shoring	$20,000		$0	$0	$0	$20,000	$0
Trucking	$20	/ton	$3,900	$6,887	$433	$12,430	$8,227
Disposal (soils)	$60	/ton	$11,700	$20,660	$1,300	$37,290	$24,680
Sampling/Analytical	$400	/sample	$4,000	$6,400	$3,200	$6,400	$6,400
Backfill - Purchase, Place, Transport	$15	/cubic yard	$1,950	$3,443	$217	$6,215	$4,113
Repave	$45	/square yard	$1,755	$10,330	$650	$18,645	$12,340
Supervision	$85	/hour	$1,020	$2,040	$1,020	$4,080	$2,040
Project Management	$175	/hour	$350	$700	$350	$1,400	$700
Reporting	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000
Contingency	30%		$14,143	$23,893	$8,324	$42,910	$26,841
		Estimated Cost:	**$61,288**	**$103,536**	**$36,072**	**$186,943**	**$116,309**
						Total Estimated Cost, Removal of All Hot Spots*:	**$337,617**

* The total estimated cost includes removal of all hot spot areas shown on Figures 4 through 8. Total costs to remove individual hot spots for each receptor are not added to avoid an overestimation of costs (e.g., the occupational worker hot spot in the Electrical Utility Vault Area will be removed if the urban resident hot spot is removed in this area).

Assumptions:

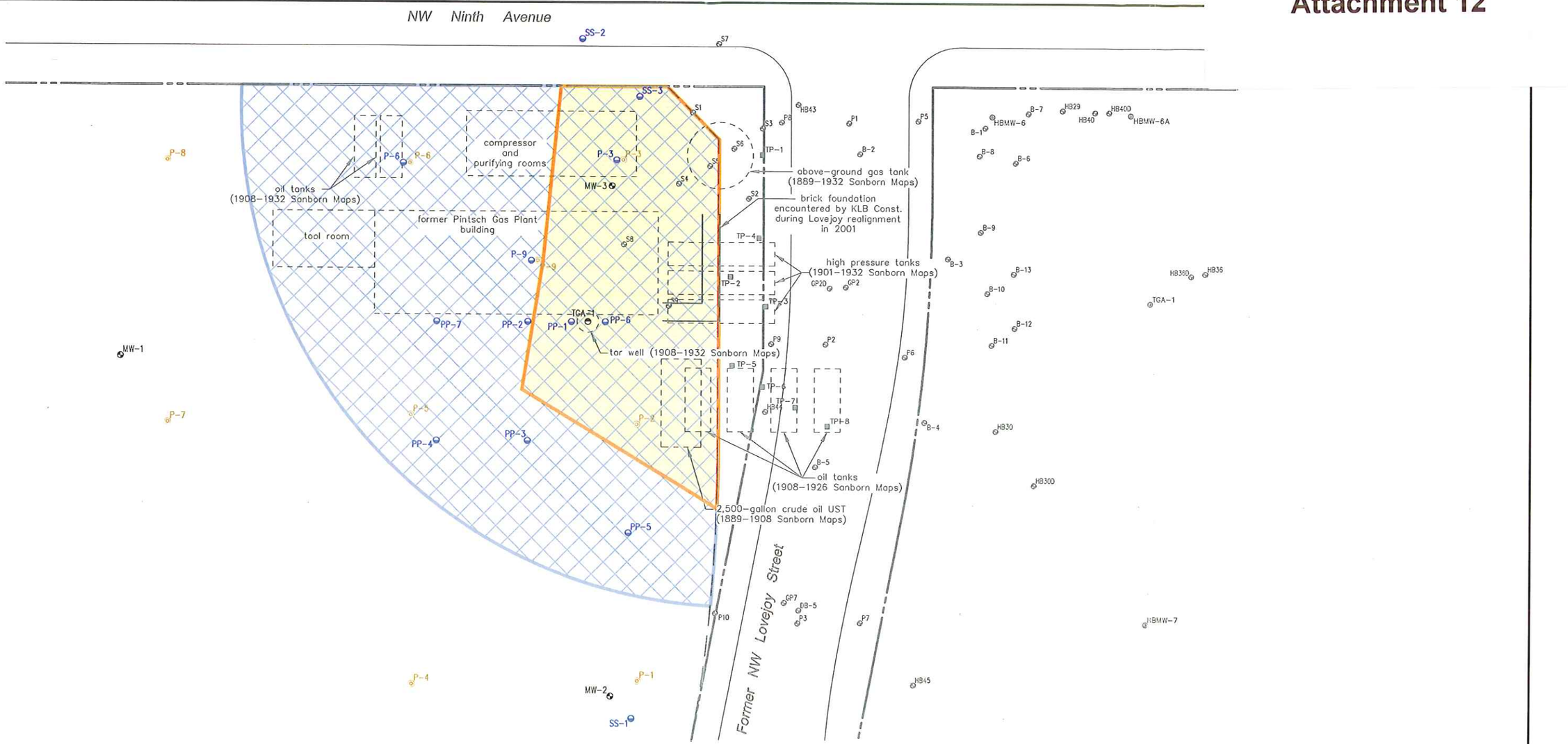
All costs are rough order of magnitude (ROM) and shown in net present value (2008 dollars).
The level of accuracy of these estimated costs is rough order of magnitude (ROM) as defined by the American Association of Cost Engineers. The accuracy is approximately plus 50% and minus 30%. Cost estimates at this level may be used to compare alternatives, but should not be used to plan, finance, or develop projects
Non-hazardous waste disposal at Hillsboro Landfill in Hillsboro, Oregon.
Cost estimates were developed to support ROM estimates and are based on comparisons with similar projects, engineering judgment, discussions with contractors/vendors, and RSMeans Heavy Construction Cost Data, 22nd Annual Edition (Reed Construction Data, Inc. 20
Actual subcontractor estimates were not requested/used to develop estimates.
Trucking assumes $1.00 per ton-mile and 20 miles from Site to Hillsboro Landfill.
Costs assume that depth to water will be greater than the excavation depth shown. If groundwater is encountered, solidification and water collection/disposal will be needed and these costs are not included.
1.5 tons loose, excavated soil per cubic yard of in-situ soil.
Estimates do not include additional costs associated with operation/logistical issues to ensure continued Site operation during work.
A lump sum cost is assumed for hand augering/shoring to support excavations. Costs may be higher and it may be difficult to complete excavations in some areas due to safety and structural integrity concerns.

Table D-3. Rough Order of Magnitude (ROM) Cost Estimates to Excavate Hypothetical Risk Level Exceedance Areas
USPS Portland P&DC, Portland, OR

Base Costs			Excavation Worker (EW)	Construction Worker (CW)			Occupational Worker (OW)				Urban Resident (UR)				
			Former Pintsch Gas Plant, Figure 3	Electrical Utility Vault Area, Figure 9	Former Coach Cleaning Area, Figure 10	Former Pintsch Gas Plant Area, Figure 11	Electrical Utility Vault Area, Figure 12	Former Coach Cleaning Area, Figure 13	Former Pintsch Gas Plant Area, Figure 14	Northeast Corner Area, Figure 15	Electrical Utility Vault Area, Figure 16	Former Coach Cleaning Area, Figure 17	Former Pintsch Gas Plant Area, Figure 18	Northeast Corner Area, Figure 19	Southwest Corner Area, Figure 20
Depth of Excavation (feet):			10	6	6	10	3	3	3	3	3	3	3	3	3
Volume of Excavation, In-Situ (cubic yards):			2,049	960	16,520	3,279	1,396	10,297	1,376	204	1,700	11,093	1,404	348	386
Work Plan with HASP	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Mobilization	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Remove/Dispose Asphalt	$30	/square yard	$18,443	$14,247	$297,357	$29,510	$41,873	$308,917	$41,260	$6,120	$50,989	$332,790	$42,123	$10,430	$11,573
Excavation	$10	/cubic yard	$20,493	$9,498	$165,200	$32,789	$13,958	$102,973	$13,753	$2,040	$16,997	$110,931	$14,041	$3,477	$3,858
Hand Augering/Shoring	$20,000		$20,000	$20,000	$0	$20,000	$20,000	$0	$20,000	$0	$20,000	$0	$20,000	$0	$5,000
Trucking	$20	/ton	$61,478	$28,493	$495,600	$98,367	$41,873	$308,920	$41,260	$6,120	$50,990	$332,793	$42,123	$10,430	$11,573
Disposal (soils)	$60	/ton	$184,433	$85,480	$1,486,800	$295,100	$125,620	$926,760	$123,780	$18,360	$152,970	$998,380	$126,370	$31,290	$34,720
Sampling/Analytical	$400	/sample	$8,000	$7,200	$14,000	$11,200	$7,200	$9,600	$7,200	$5,600	$7,200	$9,600	$7,200	$6,400	$6,400
Backfill - Purchase, Place, Transport	$15	/cubic yard	$30,739	$14,247	$247,800	$49,183	$20,937	$154,460	$20,630	$3,060	$25,495	$166,397	$21,062	$5,215	$5,787
Repave	$45	/square yard	$27,665	$21,370	$446,036	$44,265	$62,809	$463,375	$61,889	$9,180	$76,484	$499,185	$63,184	$15,645	$17,360
Supervision	$85	/hour	$11,220	$6,120	$84,660	$17,340	$10,200	$53,040	$8,160	$1,020	$10,200	$53,040	$8,160	$1,020	$1,020
Project Management	$175	/hour	$3,850	$2,100	$29,050	$5,950	$3,500	$18,200	$2,800	$350	$3,500	$18,200	$2,800	$350	$350
Reporting	$5,000		$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Contingency	30%		$120,396	$67,126	$984,451	$185,611	$108,891	$708,374	$106,720	$20,055	$128,948	$760,895	$108,619	$29,777	$33,792
		Estimated Cost:	$621,717	$290,880	$4,265,963	$804,314	$471,861	$3,069,619	$462,462	$86,905	$558,773	$3,297,211	$470,682	$129,033	$146,433
														Total Estimated Cost, Removal of All Risk Level Exceedance Areas:	$6,619,326

* The total estimated cost includes removal of all risk level exceedance areas shown on Figures 3 and 9 through 20. Total costs to remove individual risk level exceedance areas for each receptor are not added to avoid an overestimation of costs (e.g., the occupational worker risk level exceedance areas will be removed if urban resident risk level exceedance areas are removed).

Assumptions:
Estimated costs are shown in net present value (2008 dollars).
The level of accuracy of these estimated costs is rough order of magnitude (ROM) as defined by the American Association of Cost Engineers. The accuracy is approximately plus 50% and minus 30%. Cost estimates at this level may be used to compare alternatives, but should not be used to plan, finance, or develop projects
Non-hazardous waste disposal at Hillsboro Landfill in Hillsboro, Oregon.
Cost estimates were developed to support ROM estimates and are based on comparisons with similar projects, engineering judgment, discussions with contractors/vendors, and RSMeans Heavy Construction Cost Data, 22nd Annual Edition (Reed Construction Data, Inc. 2007).
Actual subcontractor estimates were not requested/used to develop estimates.
Trucking assumes $1.00 per ton-mile and 20 miles from Site to Hillsboro Landfill.
Costs assume that depth to water will be greater than the excavation depth shown. If groundwater is encountered, solidification and water collection/disposal will be needed and these costs are not included.
1.5 tons loose, excavated soil per cubic yard of in-situ soil.
Estimates do not include additional costs associated with operation/logistical issues to ensure continued Site operation during work.
A lump sum cost is assumed for hand augering/shoring to support excavations. Costs may be higher and it may be difficult to complete excavations in some areas due to safety and structural integrity concerns.



LEGEND

- Boring completed by ARCADIS in 2004
- Boring completed by Alisto in 2000
- Shallow monitor well completed by Alisto in 2000
- TGA well completed by ARCADIS in 2004
- Right-Of-Way line
- Easement line
- Risk Level Exceedance Area for soil
- Risk Level Exceedance Area for groundwater

0 15 30
SCALE IN FEET
(APPROXIMATE)

Note: Sampling locations and site features are approximate based on consultant reports and Sanborn Maps (not surveyed).

ARCADIS

Current or Future Use
Soil and Groundwater Risk Level Exceedance Areas
Excavation Worker
Former Pintsch Gas Plant Area

USPS Portland P&DC, 715 NW Hoyt Street, Portland, Oregon 97208

FIGURE
3

C:\Data\CAD\Projects\AGM – Portland Processing and Distribution Center\dwg\Site Plan.dwg << Pintsch Plant Area >> May 2, 2008 12:04:34 AM (bCAD)

Appendix B

Annual Cover Inspection Form, USPS Portland P&DC

Annual Cover Inspection Form

USPS Portland P&DC
715 Northwest Hoyt Street
Portland, Oregon 97208

Date of Inspection: _____ **Year:** _____

Time of Inspection: _____

Inspected By: _____

Signature of Inspector: _____

Cover Inspection:

	Cover disturbance and/or breach in cover observed? (Yes or No)	Photographs taken? (Yes or No)	Remarks
Former Coach Cleaning Area			
Electric Utility Vault Area			
Former Pintsch Gas Plant Area			
Vehicle Maintenance Facility Area (cover outside building)			
Northeast Corner of Site			
P&DC Building and Parking Area (cover outside building)			
Landscaped Areas			

Note: Cover inspection areas (paving and landscaped areas) are shown on Figure 2 of the Contaminated Media Management Plan (Exponent 2011). USPS will inspect the structure floors only if damage is suspected due to a major event (e.g., an earthquake).

Description of Areas Requiring Maintenance or Repairs: _____