KITTITAS COUNTY PARCEL 456234
ROSLYN, WASHINGTON 98941

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Prepared for
FORTERRA ROSLYN LLC
October 7, 2020
Project No. 1122.05.01

Prepared by
Maul Foster & Alongi, Inc.
109 East 13th Street, Vancouver, WA 98660

MAUL FOSTER ALONGI

APPENDIX E

PRIOR ENVIRONMENTAL REPORTS

June 30, 2004

Mr. Raul Rosales
MountainStar Resort Development
P.O. Box 887
109 South First Street
Roslyn, Washington 98941

Re: Preliminary Phase I and Limited Phase II Environmental Assessment
Section 17
Roslyn, Washington
17084-00

Dear Mr. Rosales:

This letter report presents the results of our preliminary environmental assessment (Phase I) and limited Phase II environmental assessment at the referenced property located in Roslyn, Washington (Figure 1). The project work scope was completed in accordance with our scope of services dated June 10, 2004. The subject property consists of one parcel that is approximately 23 acres in area (Figure 2). The property is currently vacant. The subject property formerly contained a variety of operations including a foundry, power plant, auto repair areas, and a coal mine. We understand that MountainStar is considering a purchase option of the property. Our environmental assessment provides information on the current conditions and past practices at the property to evaluate whether it is likely that potentially adverse environmental conditions may be present.

Our report begins with a Summary of Findings and Recommendations, which is followed by subsequent sections describing additional information from the work, including:

- Scope of Work;
- Subject Property Description;
- Geology and Hydrology;
- Historical Characterization;
- Regulatory Agency Database List Review;
- Site Reconnaissance;
- Limited Phase II Subsurface Assessment;
- Analytical Results;

- Potential for Contamination; and
- Limitations.

Figure 1 is a Vicinity Map showing the location of the subject property. A Site and Exploration Plan showing subject property features, photograph locations, and sampling locations is presented on Figure 2. Photographs taken during our site reconnaissance are presented in Appendix A. Available Sanborn Fire Insurance Maps are presented in Appendix B. Appendix C presents site assessment reports provided by Environmental Data Resources, Inc. (EDR) under contract to Hart Crowser. Logs from soil hand-auger boring explorations completed during the work are presented in Appendix D. Complete laboratory analytical documentation from Advanced Analytical Laboratory is presented in Appendix E.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Based on our review of historical records, agency database lists, interviews with current owner, our site reconnaissance, and the results of our limited Phase II subsurface investigation, there is a potential for contamination at the subject property. The following summarizes our findings relating to environmental conditions of the subject property.

Potential for Contaminated Soil

Based on field observations at the time of our site reconnaissance, review of historical records, and results of our limited Phase II investigation, soil with potential chemical contaminants is present at several locations of the subject property. The major environmental issues identified at the property include the following:

- **Former Foundry.** A former foundry and the associated slag pile present potential for metals and organics contamination. We obtained a sample of discarded slag material southwest of the former foundry structure, two soil samples immediately adjacent to the slag pile, one soil sample from beneath the former furnace area, and one soil sample from the front of the shop, near the location of reportedly former solvent and tar painting. The sample from beneath the former furnace contained lead at a concentration of 620 milligrams per kilogram (mg/kg), exceeding the cleanup level of 250 mg/kg for unrestricted land use established in the Washington State Model Toxics Control Act (MTCA – Chapter 173-340 WAC). This concentration is below the 1,000 mg/kg cleanup levels for industrial soils.

- **Automotive Fluid Dumping.** A building foundation was reportedly used as a pad by the townspeople to change vehicle oil. This area presents a potential for petroleum hydrocarbon contamination. The foundation area is currently filled with fallen timbers, rusted auto parts, and rusted metal containers that likely held waste automobile fluids. Standing water was visible in the lowest elevation of the area and appeared to have a slight petroleum-like sheen. We obtained a sample of water-saturated soil from the bottom of the foundation area. This sample contained a lead concentration of 250 mg/kg and a zinc concentration of 2.7 mg/kg. These concentrations meet or exceeded their respective MTCA Method A cleanup levels of 250 mg/kg and 2.0 mg/kg, respectively for unrestricted land use. The lead concentration was below the Method A cleanup concentration for industrial soils, however. No petroleum-range hydrocarbons were detected; however, the area that Nick Henderson of MountainStar indicated was most often used for automotive repair activities was filled with discarded timbers and garbage. Soil beneath this area could not be accessed at the time of our work.

- **Former Power Transformers.** The location of former electrical power transformers presents a potential for petroleum hydrocarbon and polychlorinated biphenyls (PCB) contamination. Nick Henderson identified the likely general location of the transformers in a generally flat area with sparse vegetation, but the locations of these transformers could not be definitively identified with information obtained to date. Near-surface soil samples from this area did not contain detectable concentrations of petroleum hydrocarbons or PCBs; however, our samples were obtained from a maximum depth of 1 foot and contamination could potentially exist at a deeper depth.

- **Coal Mine Tailings Pile.** The pile of mine tailings and the coal fragments scattered over surface soils throughout the property presents potential for the presence of polycyclic aromatic hydrocarbons (PAHs) and dust emissions. Although this issue may be considered to be part of a wider-spread regional condition, additional disturbance during property development could require additional mitigative measures, such as control of dust emissions. Appropriate long-term stabilization and/or possible additional reclamation measures may also require consideration.

- **Subsurface Mine Workings.** The presence of the backfilled (possibly collapsed) Number 4 mine shaft entrance at the property, and the likely existence of lateral mine workings could present potential concerns for subsidence and other abandoned mine issues. These issues are beyond the scope of our environmental assessment but could affect land use permitting for development, and should be addressed separately.

- **Wetland Area.** The wetland located at the property is in close proximity to mine workings and other industrial processes. Wetlands and related sensitive area issues are also beyond the scope of our environmental assessment, but will affect land use permitting and development.

- **Groundwater Quality.** Visual observations during the site reconnaissance indicate that groundwater and/or ponded surface water is present within about 10 feet of the ground surface in many parts of the property. Given the long-time industrial use of the property and proximity of off-site commercial and industrial activities, groundwater quality is uncertain but of potential concern relative to potential environmental liability.

Recommendations

Additional Phase II subsurface investigation would be needed to more fully evaluate the nature and extent of potentially-contaminated soil. Investigations should include additional focus on subsurface soils the vicinity of the former foundry and slag pile, automotive fluid dumping area, and reported transformer area. Collection of groundwater samples would also be prudent. Additionally, delineation of the property wetland and assessment of the hazards from abandoned mine workings should be completed prior to the planning stages of any property development activities. In the event of future building demolition or site activities that could potentially disturb subject property soils, a construction contingency plan should be prepared to address potentially impacted soil or other (currently unknown) structures associated with historical activities, such as underground storage tanks (USTs).

SCOPE OF WORK

Our Phase I and limited Phase II environmental assessment included:

- Conducting a historical review of the subject property and surrounding area;

- Reviewing regulatory agency database lists for the subject property and adjacent sites (through Environmental Data Resources, Inc. (EDR));

- Conducting a site reconnaissance to observe the subject property and surrounding properties;

- Conducting nine hand-auger borings in strategic locations on the subject property;

- Submitting selected soil samples for petroleum hydrocarbon, metals, PAHs, and PCBs analyses; and

- Preparing this letter report presenting the findings of our work.

SUBJECT PROPERTY DESCRIPTION

The subject property is located southeast of the intersection of South First Street (State Route 903) and East Dakota Avenue in Roslyn, Washington (Figure 1). The property consists of one parcel, which is approximately 23 acres in area and is currently vacant, undeveloped land. The title to the property is currently vested through SDO L.L.C., a Washington Limited Liability Company.

GEOLOGY AND HYDROGEOLOGY

According to the USGS Geologic Map of the Snoqualmie Pass Quadrangle, Washington (Tabor et al. 2000), the subject property is predominantly underlain by unconsolidated deposits consisting of dense, glacially overridden material of alternating till (very dense sand and gravel), outwash (dense sand and gravel), and lacustrine (hard silt and sand) deposits. Shallow soils up to 1 foot deep encountered during our hand-auger boring explorations were predominantly fill consisting of silty sands with sparse gravel and coal fragments associated with historical mining activities.

The topography of the subject property is generally flat, possibly sloping downward to the south or southeast toward Dakota Avenue East. Based on surrounding area topography, groundwater flow is likely to be to the south, toward Crystal Creek, located over 500 feet to the east and southeast of the subject property. According to the EDR report and the Washington State Department of Ecology (Ecology), the nearest water well is a 628-foot-deep USGS well located within the subject property boundaries. However, no evidence of a well was observed during our site reconnaissance, and no water depth or sampling information for this well was available.

HISTORICAL CHARACTERIZATION

We researched the history of land use activities on the subject property and adjacent sites to identify potential sources of contamination or activities that could impact the subject

property. The historical characterization of the subject property and the adjacent sites was developed from the following sources:

- Topographic Maps (USGS Cle Elum 7.5 Minute Quad 1984);
- Historical Map (undated, likely pre-1930s) provided by Nick Henderson;
- Sanborn Fire Insurance Maps (1888, 1890, 1891, 1899, 1912, 1925, and 1935); and
- Interview with MountainStar employee Nick Henderson.

A Chain of Title was not available for review. Dates in the text refer to historical records and provide an approximate indication of the period of operation for each business or activity identified, except where explicitly stated.

Subject Properties

Review of available historical sources indicates that the vicinity of the subject property was first developed by the 1880s. The entire subject property does not appear on any of the available Sanborn maps, but some of the western portion of the property appears on some of the later Sanborn maps. A historical map, likely dating earlier than the 1930s, was provided by Nick Henderson and showed the locations of buildings on the subject property during the heyday of the mines. This map showed the location of the neighboring streets, the power house, wash house, two barns, two warehouses, the foundry, the tipple and entrance shaft for the Number 4 Mine, the tipple for the Number 6 and Number 8 Mines, and several unlabeled small buildings. Many of these buildings matched with existing concrete foundation features observed during our site reconnaissance and discussed later in this letter report.

According to Nick Henderson, the power house and foundry were fueled by coal and coke, and large electrical transformers were located northeast of the power house, until a new power substation was constructed elsewhere in town sometime between the 1960s and 1980s. In 1909, an explosion in the Number 4 Mine killed several miners. According to Nick, the No. 4 Mine shaft was filled immediately thereafter. The mine was filled again approximately 50 years later after settling reportedly created a safety hazard. The foundry remained active through the mid-1970s. All Roslyn mines were closed by the mid-1960s and all the buildings in the vicinity of the subject property were removed by the 1980s. No additional information regarding the operational details of the historical power house, foundry, or transformers was available from the available information reviewed. The

Burlington Northern Railroad, Plum Creek, and Sapphire Skies owned the property until 2002.

Surrounding Properties

The City of Roslyn was developed in the 1880s following discovery of economically minable coal seams in the area. The following were observed on the Sanborns:

- In 1888, a railroad line was present approximately two blocks north and adjacent to the east of the subject property. This railroad line was in use through at least 1935.
- By 1912, the existing City Hall building was constructed as a YMCA gymnasium and reading room.
- Most of the existing residential buildings west of the subject property were constructed in the late 1920s or early 1930s.

Based on our review of historical documents, interviews, and our site reconnaissance, properties with existing buildings nearest the subject property have remained very similar in appearance and configuration since construction.

REGULATORY AGENCY DATABASE LIST REVIEW

This section describes the regulatory agency database lists reviewed for sites of concern by Environmental Data Resources, Inc. (EDR). EDR is a firm that acquires data from government agencies on various media such as magnetic tape, disk, and hard copy. The purpose of the regulatory agency database list review was to screen for potential sources of contamination or activities of environmental concern for the subject property and adjacent properties. The agency-published databases were screened for sites of potential concern in general accordance with current American Society for Testing and Materials (ASTM) standards. Because our regulatory agency database search was based on current agency records, our results are only as accurate as the records provided.

Regulatory agency database lists reviewed and approximate search distances from the subject property are detailed below:

- Environmental Protection Agency (EPA) National Priorities List (NPL) (April 2004) - List of "Superfund" sites; search radius of 1 mile;

- EPA Region 10 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) List (February 2004) - List of sites which are either proposed to or are on the NPL and sites currently being reviewed for possible inclusion on the NPL; search radius of 1/2 mile;

- EPA Emergency Response Notification System (ERNS) List (December 2003) - List of reported CERCLA oil or hazardous substance releases or spills; search for subject property;

- EPA Region 10 Resource Conservation and Recovery Information System (RCRIS) List (April 2004):

  - Treatment/Storage/Disposal (TSD) - List of generators and transporters of hazardous waste, and TSD facilities; search radius of 1 mile;
  - Large Quantity Generator (LQG), Small Quantity Generator (SQG) - List of facilities that qualify as large or small quantity generators of hazardous wastes under RCRA; search radius of 1/4 mile;

- EPA Region 10 RCRA Corrective Action Sites (CORRACTS) List (March 2004) - List of RCRA facilities which are undergoing corrective action; search radius of 1 mile;

- EPA Region 10 Superfund (CERCLA) Consent Decrees (CONSENT) List (Variable) - List of major legal settlements establishing responsibility and standards for cleanup at NPL sites; search radius of 1 mile;

- EPA Region 10 Facility Index System (FINDS) List (April 2004) - Lists both facility information and “pointers” to other sources that contain more detail; search for subject property;

- EPA Federal Superfund Liens (NPL Liens) List (October 1991) - List of filed Superfund liens; search for subject property;

- EPA PCB Activity Database System (PADS) List (March 2004) - Lists generators, transporters, commercial storers, and/or brokers and disposers of PCBs who are required to notify the EPA of such activities; search for subject property;

- EPA Region 10 RCRA Administrative Action Tracking System (RAATS) List (April 1995) - List of sites under RCRA pertaining to major violators undergoing enforcement actions, search for subject property;

- EPA Region 10 Toxic Release Inventory System (TRIS) List (December 2001) - Inventory of toxic chemicals emissions from certain facilities; search for subject property;

- EPA Toxic Substances Control Act (TSCA) List (December 2002) - Identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list; search for subject property;

- EPA Delisted NPL Sites (Delisted NPL) (April 2004) - Sites identified for deletion from the NPL where no further response is appropriate; search for subject property;

- EPA No Further Remedial Action Planned (NFRAP) List (February 2004) - Identifies sites that have been removed from CERCLIS; search for subject property;

- Federal Records of Decision (ROD) List (April 2004) - List of Superfund Sites where ROD property has been developed; search radius of 1 mile;

- US Department of Transportation (HMIRS) List (February 2004) - List of hazardous material spill incidents reported to DOT; search for subject property;

- Nuclear Regulatory Commission (MLTS) List (April 2004) - List of sites which possess or use radioactive materials and are subject to NRC licensing requirements; search for subject property;

- Washington Confirmed and Suspected Contaminated Sites List (CSCSL) (January 2004) - List of sites currently being investigated by the Washington State Department of Ecology (Ecology) under the Model Toxics Control Act (MTCA); search radius of 1 mile;

- Ecology Hazardous Sites List (HSL) (April 2004) - List of sites assessed and ranked using the Washington Ranking Method (WARM); search radius of 1 mile;

- Ecology Leaking Underground Storage Tank (LUST) Site List (April 2004) - List of registered leaking USTs in Washington; search radius of 1/2 mile;

- Ecology Underground Storage Tank (UST) Registration List (April 2004) - List of registered USTs in Washington; search radius of 1/4 mile;

- Ecology Solid Waste Facilities/Landfill Sites (SWF/LF) (October 2003) - List of permitted solid waste landfills operating in Washington; search radius of 1/2 mile;

- Ecology Independent Cleanup Reports (ICR) (December 2002) - List of sites undergoing cleanup for which reports have been received by Ecology from either the owner or operator; search radius of 1/2 mile. These actions have been conducted without department oversight or approval and are not under an order or decree; and

- Ecology Voluntary Cleanup Program (VCP) Sites (May 2004) - List of sites that have entered either the Voluntary Cleanup Program or its predecessor Independent Remedial Action Program.

EDR conducted a review of the regulatory agency database lists indicated above. The report of the database search provided by EDR includes a list of databases searched, a statistical profile indicating the number of properties within 1 mile of the subject property, selected detailed information from federal and state lists, and an overview map illustrating the identifiable and mappable sites within 1 mile of the subject property. The EDR reports are presented in Appendix C. Refer to the EDR report for more detailed information and additional local database lists reviewed.

We made a Freedom of Information Act (FOIA) request on June 28, 2004, to Ecology to inquire about the availability of regulatory file information for the subject property and nearby sites identified from the EDR database search regarding potential sources of contamination or activities of environmental concern to the subject property. Ecology did not have any files available regarding the subject property or neighboring sites of potential concern.

The following summarizes the results of the database search.

Subject Properties

The subject property was not identified in the agency database lists. No files regarding the subject property were available from Ecology.

Nearby Site Information

Neighboring properties were not identified in the agency database lists with the exception of **City of Roslyn at 201 South First Street (UST and LUST Lists).** This address is located adjacent to the northeast of the subject property. According to the database listing, one leaded gasoline UST was installed at this address in 1982. In 1996, a cleanup was started for the leaking UST. The property was reported cleaned up in August 2001. Ecology did not have any files regarding this address. Based on the surrounding topography, the inferred

groundwater flow in this area is to the south and any releases from this property have a potential for migratory contamination to the subject property.

SITE RECONNAISSANCE

On June 14, 2004, Jessica Robertson and Erin Breckel of Hart Crowser conducted a site reconnaissance to observe the subject property and surrounding area business/land use. Nick Henderson accompanied the Hart Crowser representatives during the site reconnaissance. Nick Henderson is a MountainStar employee, a member of the Roslyn Historical Society, and has reportedly been a resident of the area since childhood. Photographs taken during the site reconnaissance are presented in Appendix A.

Subject Property

Historical building foundations and other evidence of prior activities are present on the property. Two dirt and gravel roads run generally north-south through the property. Vehicles park occasionally in the northwestern portion of the property near City Hall. The majority of the property is covered with sparse grass and shrubs, but a wetland is located in the eastern portion of the property and is easily seen on an aerial photograph as the area with the densest concentration of trees and shrubs. No flowing water was observed in the wetland at the time of our site reconnaissance; however, the water table was very near the surface and the surface was muddy and water-saturated in this area.

A coal tailings pile is located on the southeastern portion of the property. The tailings pile is approximately 100 feet in diameter and roughly 30 feet high. Coal fragments are scattered widely throughout the property. A pile of slag material is located east of the former foundry. The visible portion of the slag pile is approximately 30 feet long by 12 feet wide, and up to about 8 feet tall. The extent of the pile below ground surface is uncertain. Slag consisted of brown to black, iridescent, commonly glassy fragments up to about 1 foot in size. Very sparse vegetation is present on these two piles. Concrete foundations are located on the property and show the locations of the former power plant, foundry, a small building of unknown use, the tipple associated with the Number 4 Mine, and other associated mining equipment. Evidence of other former property features including the Number 4 Mine entrance, the wash house, barns, a railroad trestle, and power transformer areas was not observed. The probable locations of such features were identified by Nick Henderson. Areas near the power transformer areas and interior spaces of the foundry were also poorly vegetated. According to Nick Henderson, the small building foundation was reportedly used as a pad by the townspeople to change vehicle oil. The foundation is currently filled

with fallen timbers, rusted auto parts, and rusted metal containers that likely held automobile fluids. Standing water was visible in the lowest elevation of the area and appeared to have a slight petroleum-like sheen but could not be easily accessed for further examination. Nick Henderson also identified the presumed location of the former furnace inside the foundry, and the approximate vicinity of solvent and spray areas west of the foundry building. Additional information regarding the location of these features was not available from other historical and regulatory agency records reviewed during the work.

No USTs or above-ground storage tanks (ASTs) are currently known to exist at the property. We did not observe current storage or use of any fluids on the property, or any current evidence of vehicle repair or maintenance activities at the property.

Surrounding Property

The subject property is surrounded by the City Hall to the northwest, additional residential and commercial buildings to the north, west, and south, and additional former mine lands to the east and southeast. The path of a former railroad track, now the Coal Mines Trail, runs just beyond and parallel to the eastern property boundary. Concrete foundations for a large former tipple structure and additional tailings piles are present to the northwest. Two fuel ASTs are present behind the City Hall building to the northwest. Surrounding properties were observed from public right of way. We did not observe any additional use or storage of hazardous materials nor any visual indications of USTs, such as vent pipes or fill ports, on the surrounding properties.

LIMITED PHASE II SUBSURFACE ASSESSMENT

Soil Sampling and Analysis

The purpose of our limited Phase II Environmental Assessment was to evaluate potential environmental impacts from the past uses of the property that could affect the development of the subject property. Based on results of the historical characterization, several target areas were identified for completion of shallow, hand-excavated soil borings on the subject property. These areas are identified on Figure 2 and included:

- The vicinity of the former foundry and the associated slag pile;
- The vicinity of the building foundation was reportedly used as a pad by the townspeople to change vehicle fluids;
- The vicinity of the former power transformers; and

- The vicinity of the pile of mine tailings and the coal fragments scattered over surface soils throughout the property.

On April 14, 2004, Hart Crowser completed nine shallow hand-auger soil borings (Figure 2). Boring HB-1 was located near the bottom of the foundation used for changing vehicle fluids; however, the adjacent area of the foundation filled with discarded timbers, garbage, and rusting auto parts could not be accessed. Borings HB-2 and HB-3 were located near the reported entry of the former foundry, and in the vicinity of the former furnace, respectively. Two borings (HB-4 and HB-5) were located near the toe of the slag pile east of the former foundry. Three borings (HB-6, HB-7, and HB-8) were located in the vicinity of the former power transformers. The remaining boring (HB-9) was located in the vicinity of a former railroad trestle on the southern portion of the property. In addition, two grab samples of material in the slag pile (Slag Pile) and in the tailings pile (Tailings Pile) were collected. The hand-auger borings were completed to depths of 0.5 to 1.0 feet below grade. Groundwater was not encountered in the borings. Exploration logs are presented in Appendix D. Soil types generally consisted of silty sand fill soils with varying moisture, gravel, and coal fragment contents.

Discrete soil samples were collected from and screened with an 11.7 uV HNU photoionization (PID) detector for volatile organic vapors indicative of the presence of potential contaminants. No odors or PID measurements greater than 0.1 HNU units indicative of potential contaminants were encountered in soil samples.

Soil samples were temporarily stored in Hart Crowser's locked refrigerators and subsequently submitted to the Advanced Analytical chemical laboratory in Redmond, Washington, for analysis. Selected soil samples were submitted for the following analyses:

- Total Petroleum Hydrocarbons (TPH) by Ecology Method NWTPH-Dx: Samples HB1-S1, HB3-S1, HB6-S1, and HB8-S1;

- PAHs by EPA Method 8270: Samples HB1-S1, HB3-S1, HB5-S1, and HB8-S1;

- PCBs by EPA Method 8082: Samples HB6-S1, and HB8-S1; and

- Total metals (lead, chromium, cadmium, copper, nickel, arsenic, zinc, and mercury by EPA Method 7000-series methods): samples HB1-S1, HB3-S1, HB5-S1, HB8-S1, and Slag Pile.

Analytical Results

Analytical results for soil samples are summarized in Table 1. A chemical data quality review and the laboratory analytical report is presented in Appendix E.

Diesel-Range TPH

Concentrations of diesel-range TPH were not detected in any of the soil samples analyzed.

PAHs and PCBs

Concentrations of PAHs and PCBs were not detected in any of the soil samples analyzed.

Metals

Four soil samples and the sample of slag material were submitted for analysis of metals. Lead, chromium, copper, and zinc were detected the five samples. Cadmium, nickel, and arsenic were also detected in two of the soil samples. Mercury was not detected in any of the samples submitted. The metal detections were less than the applicable MTCA Method A or B cleanup levels with the exception of lead and cadmium in HB-1 (250 and 2.7 mg/kg, respectively) and lead in HB-3 (620 mg/kg). The MTCA Method A soil cleanup levels (unrestricted land use) for lead and cadmium are 250 and 2.0 mg/kg, respectively.

POTENTIAL FOR CONTAMINATION

Subject Properties

Based on the historical property use as a mine, foundry, power plant, and automotive repair area, a potential exists for petroleum, metals, PCB, and PAH impacts to the soil, surface water, and groundwater at the subject property. Concentrations of lead and cadmium higher than MTCA Method A cleanup levels were detected in two soil samples obtained during our limited Phase II activities, from borings located in former automotive repair and foundry areas. Additional analytes were not detected at concentrations exceeding applicable cleanup levels; however, our limited Phase II included only sampling of shallow soils less than 1 foot deep and we were not able to access the subsurface zones with potentially higher concentrations of contaminants.

Surrounding Properties

The presence of fuel ASTs and the historical presence of USTs at the City Hall building present some potential for migratory contaminants to have impacted the subject property. No additional information was available regarding the operational details of the ASTs or USTs. Additional subsurface exploration on the subject property adjacent to the City Hall building would be needed to further evaluate the potential for contamination. The remaining properties to the east of the subject property include additional tailings piles and mine workings and present some potential for migratory contamination.

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of MountainStar Resort Development, for specific application to the subject property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

It should be noted that Hart Crowser relied on information provided by the individuals indicated above. Hart Crowser can only relay this information and cannot be responsible for its accuracy or completeness.

Our work did not include sampling or testing of drinking water for lead content, sampling for indoor air quality, and mold, assessment of sewer systems or wetlands, sampling for radon vapor, a "good-faith" survey of asbestos and lead, work associated with evaluating potential hazards associated with abandoned mine lands, and other items not the standard of practice for our time, unless otherwise noted herein.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred the undersigned.

Sincerely,

HART CROWSER, INC.

JESSICA ROBERTSON
Senior Staff Geochemist
Jessica.Robertson@hartcrowser.com

RICHARD F. MOORE
Principal
rfm@hartcrowser.com

Attachments:
Table 1 - Analytical Results for Soil Samples
Figure 1 - Vicinity Map
Figure 2 – Site and Exploration Plan
Appendix A - Site Reconnaissance Photographs
Appendix B - Sanborn Fire Insurance Maps
Appendix C - Site Assessment Report
EDR, Inc.
Appendix D - Field Exploration Procedures and Exploration Logs
Appendix E - Chemistry Laboratory Certificates of Analyses
Advanced Analytical Laboratory

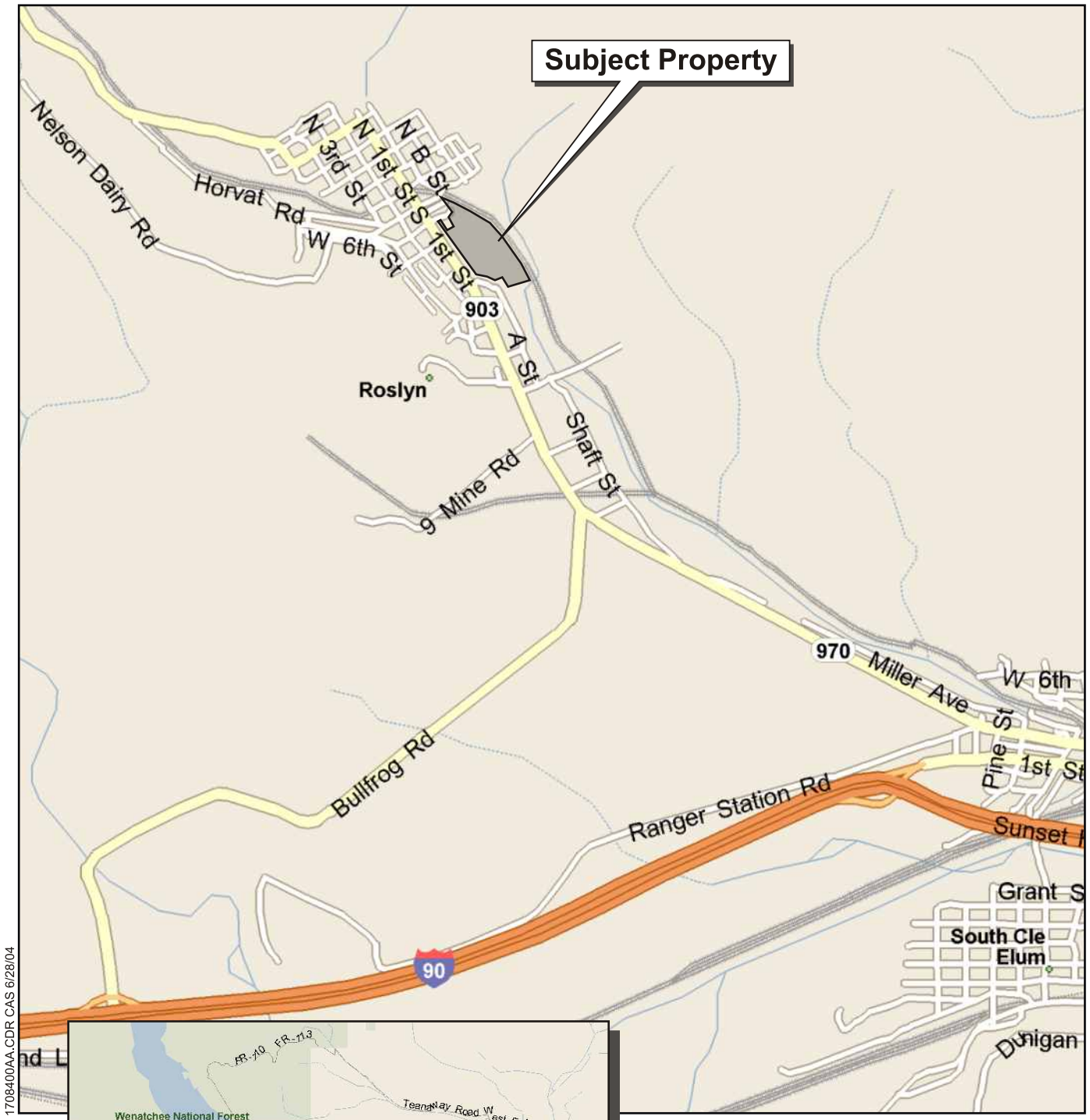
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Table 1 - Analytical Results for Soil Samples

Sample ID:	MTCA Method A Cleanup Level	HB1-S1	HB3-S1	HB5-S1	HB6-S1	HB8-S1	Slag Pile
Metals in mg/kg							
Lead	250/1,000(a)	**250**	**620**	**32**		**30**	**36**
Chromium	19/2,000(b)	**4.4**	**8.9**	**12**		**12**	**5.2**
Cadmium	2	**2.7**	**1.1**	1.0 U		1.0 U	1.0 U
Copper	262(c)	**50**	**170**	**59**		**160**	**18**
Nickel	NE	**21**	**160**	0.5 U		0.5 U	0.5 U
Arsenic	20	**11**	**7.6**	2.0 U		2.0 U	2.0 U
Zinc	5,971(c)	**25**	**180**	**2.2**		**3.3**	**2.8**
Mercury	2	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U

Diesel-range petroleum hydrocarbons, PAHs, and PCBs were not detected in the soil samples submitted for analysis.
NE = None established.
U = Not detected at indicated detection limit.
Blank indicates sample not analyzed for specific analyte.
Detected concentrations are bolded.
Concentrations that exceed the screening criteria are boxed.
(a) MTCA Method A cleanup level for unrestricted land use (250 mg/kg) and industrial soils (1,000 mg/kg).
(b) MTCA Method A cleanup level for Chromium III is 2,000 mg/kg. MTCA Method A cleanup level for Chromium VI is 19 mg/kg.
(c) MTCA Method B cleanup level for protection of groundwater.

Vicinity Map



1708400AA.CDR CAS 6/28/04

Note: Base map prepared from Microsoft Streets and Trips 2002.

HARTCROWSER

17084-00 ***6/04***

Figure 1

Site and Exploration Plan



CAS 6/28/04 1708400-001.DWG

Source: Base map prepared from aerial photo and survey information provided by Goldsmith & Associates.

- Approximate Extent of Wetland Area
- Approximate Former Buildings/Structures Location
- Approximate Unknown Bulding Shown on Historical Map
- Tailing/Slag Pile Location
- Photograph Location, Number, and Direction
- Inferred Groundwater Flow Direction
- HB-1 — Hand-Auger Boring Location and Number
- SLAG — Grab Sample Location and Designation

N

0 200 400

Scale in Feet

HARTCROWSER

17084-00 *6/04*

Figure 2

APPENDIX A
SITE RECONNAISSANCE PHOTOGRAPHS



Photograph 1 - Looking southeast across the subject property along the northern access road from near the northern property boundary.



Photograph 2 - Looking north across subject property from southern portion of property. Tailings pile visible in the distance is north of the subject property across the Coal Mines Trail.



Photograph 3 - Looking east at subject property tailings pile from access road.



Photograph 4 - Looking northwest across likely vicinity of former electrical transformers. Note sparse vegetation.



Photograph 5 - Looking southeast along the western boundary of the slag pile. ←UP.



Photograph 6 - Looking southwest through the former foundry from near the former front entrance. A foundation wall is visible on the left. The poorly vegetated area near the lower center of the photograph is the likely location of the former furnace.



Photograph 7 - Southern portion of the small foundation. This portion is the inaccessible area reportedly used for auto repair. Fallen beams and rusted auto parts are visible. ←UP



Photograph 8 - Looking southeast along at the southern portion of the subject property along the former railroad trestle.

APPENDIX B
SANBORN FIRE INSURANCE MAPS

"Linking Technology with Tradition"

Sanborn® Map Report

Ship To: Jessica Robertson
Hart Crowser, Inc.
1910 Fairview Avenue
Seattle, WA 98102

Order Date: 2/6/2004 **Completion Date:** 2/9/2004
Inquiry #: 1124879.3s
P.O. #: NA
Site Name: MountainStar Office Building
Address: 109 South First Street
City/State: Roslyn, WA 98941
Cross Streets: Dakota

Customer Project: NA
1013409CMK 206-324-9530

Based on client-supplied information, fire insurance maps for the following years were identified

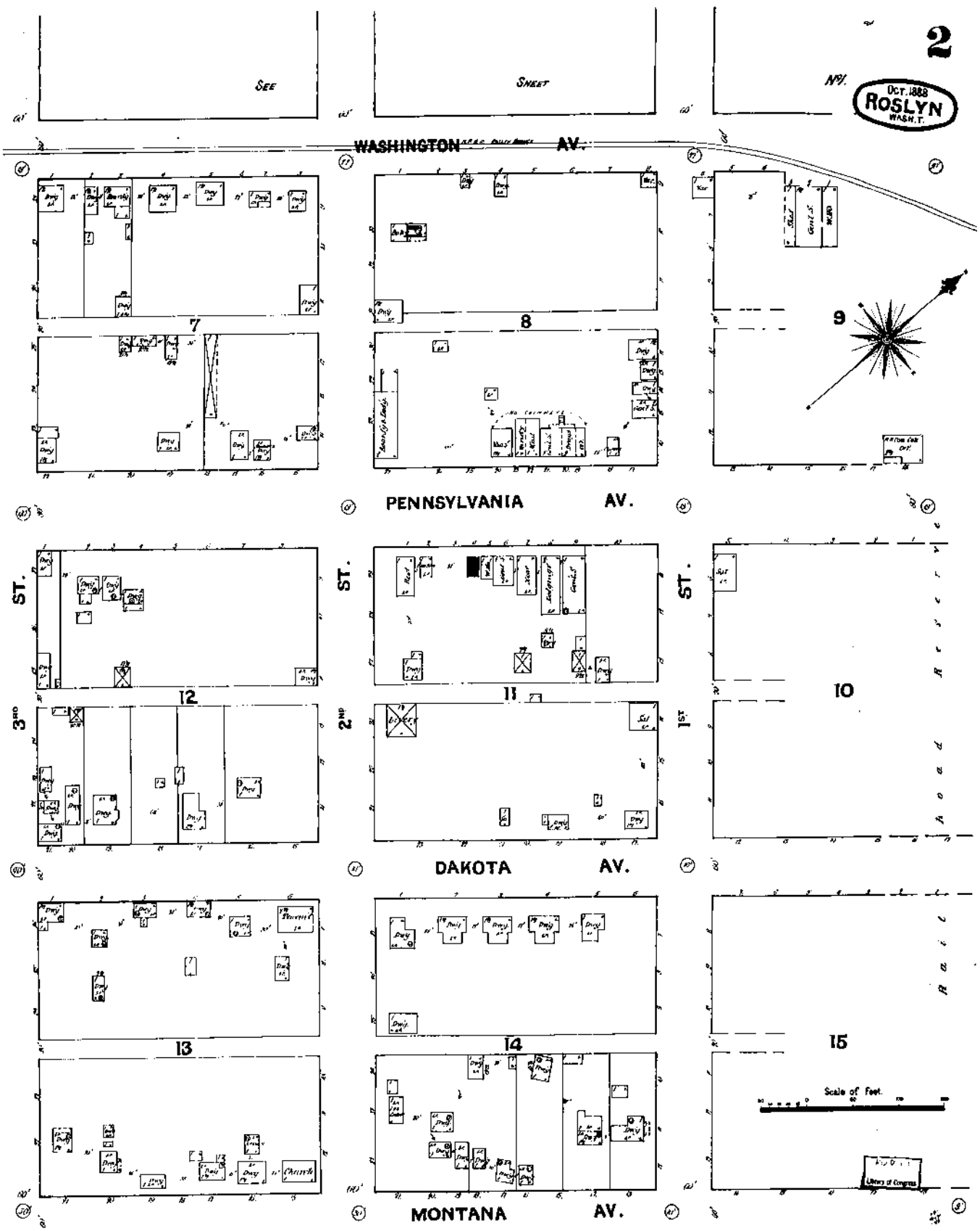
1888 - 1 Map
1890 - 1 Map
1891 - 1 Map
1899 - 1 Map
1912 - 1 Map
1925 - 2 Maps
1935 - 2 Maps

Limited Permission to Photocopy Total Maps: 9

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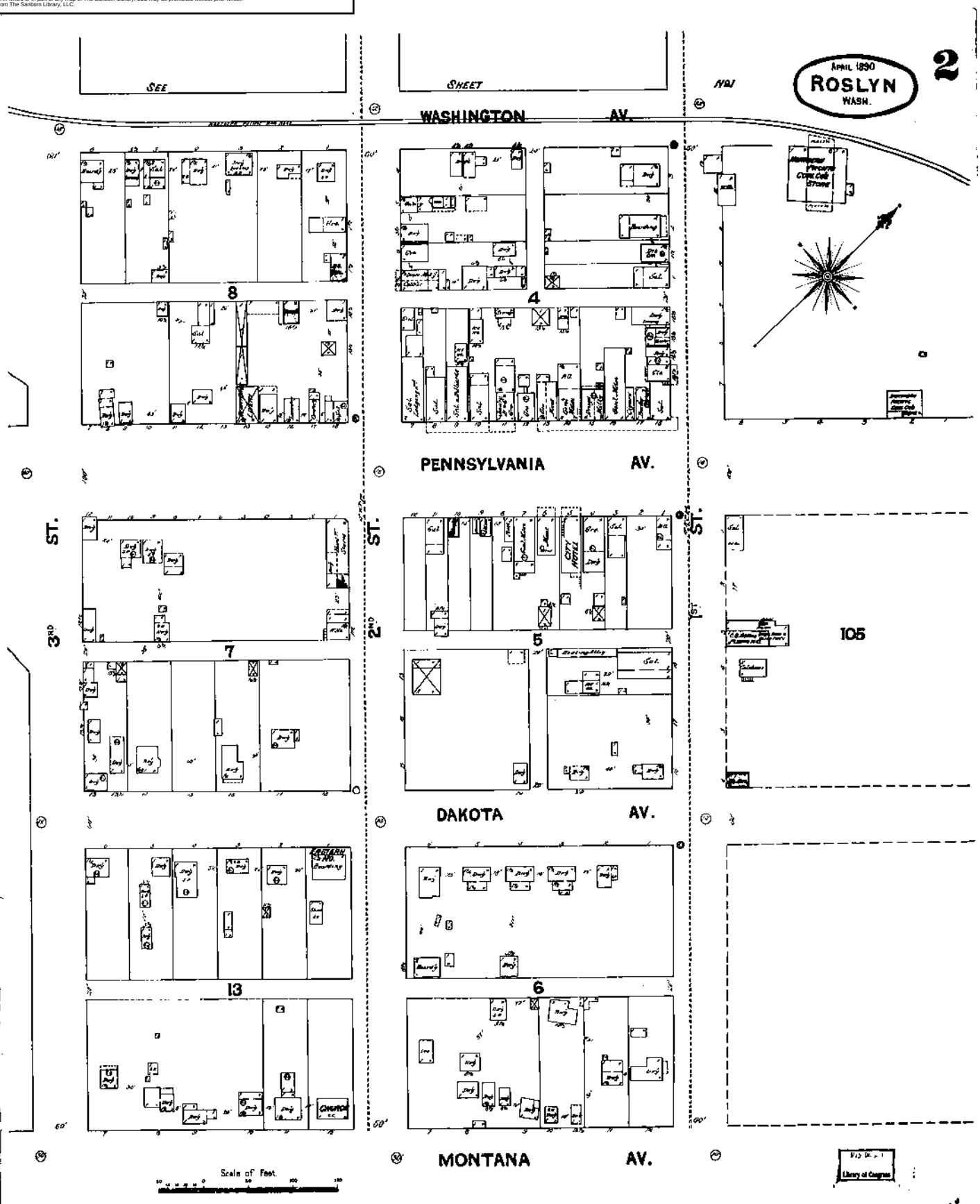
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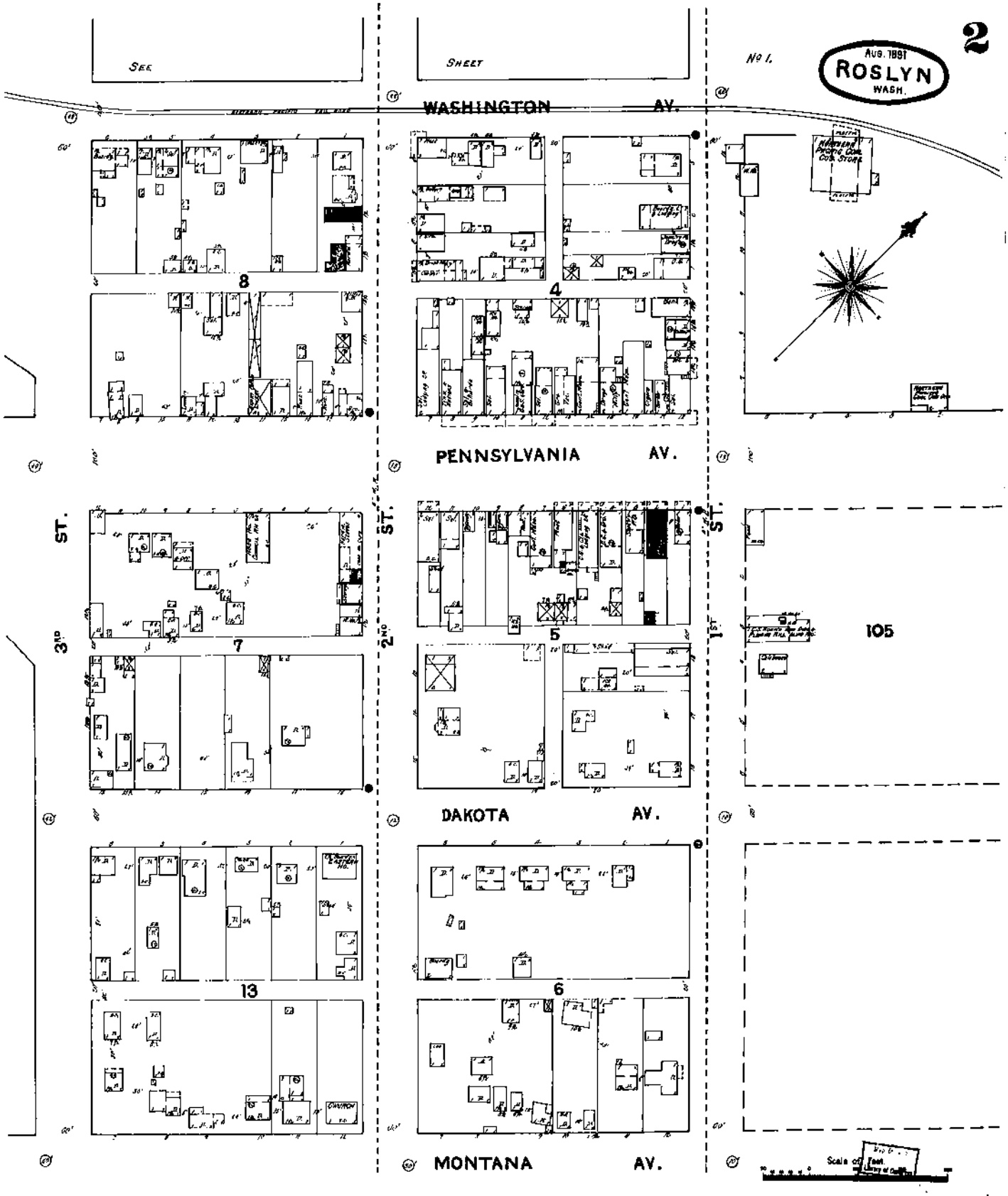
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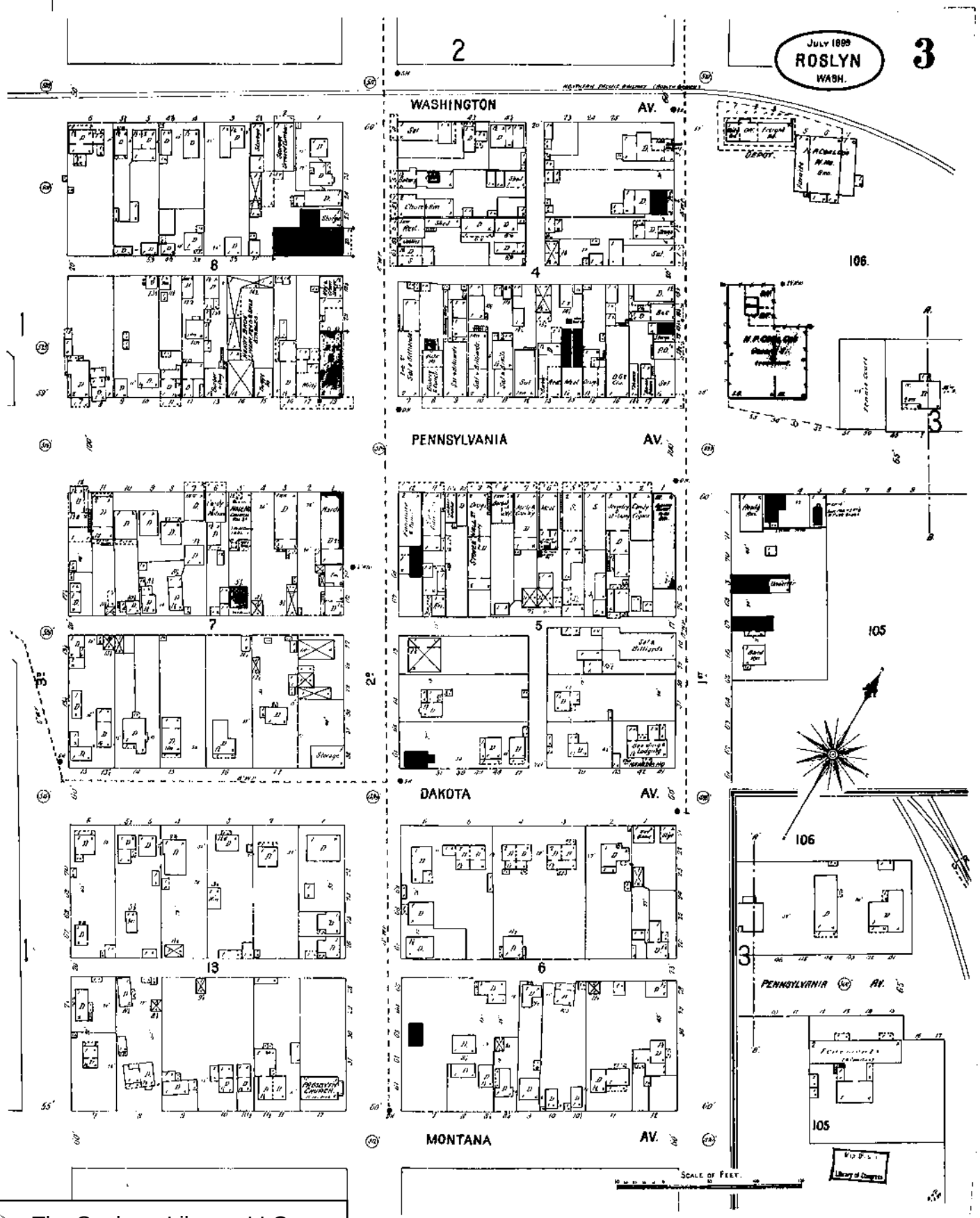


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JULY 1912
ROSLYN
WASH.
7

4
5
6
8

PENNSYLVANIA AV. E.
PENNSYLVANIA AV. W.
DAKOTA
MONTANA

1st N.
1st S.
2d N.
2d S.
3d N.
3d S.

56 (108)
64 (109)
55 (4)
63 (3)
69 (6)
54 (6)
62 (7)
68 (8)

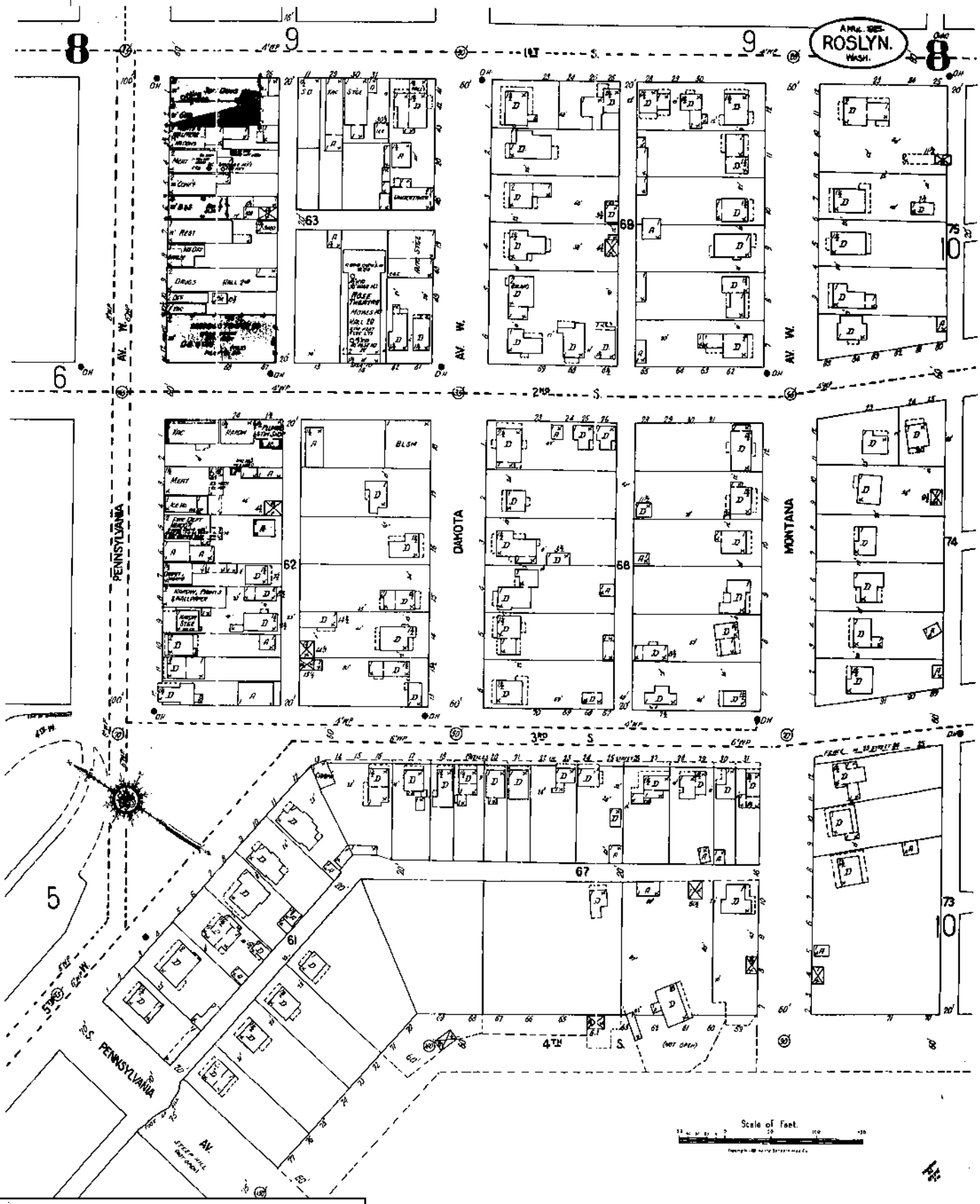
70

Y. M. C. A.
Gymnasium
& Bowling Rts.

Rose Theatre

City Hall

Scale of Feet.



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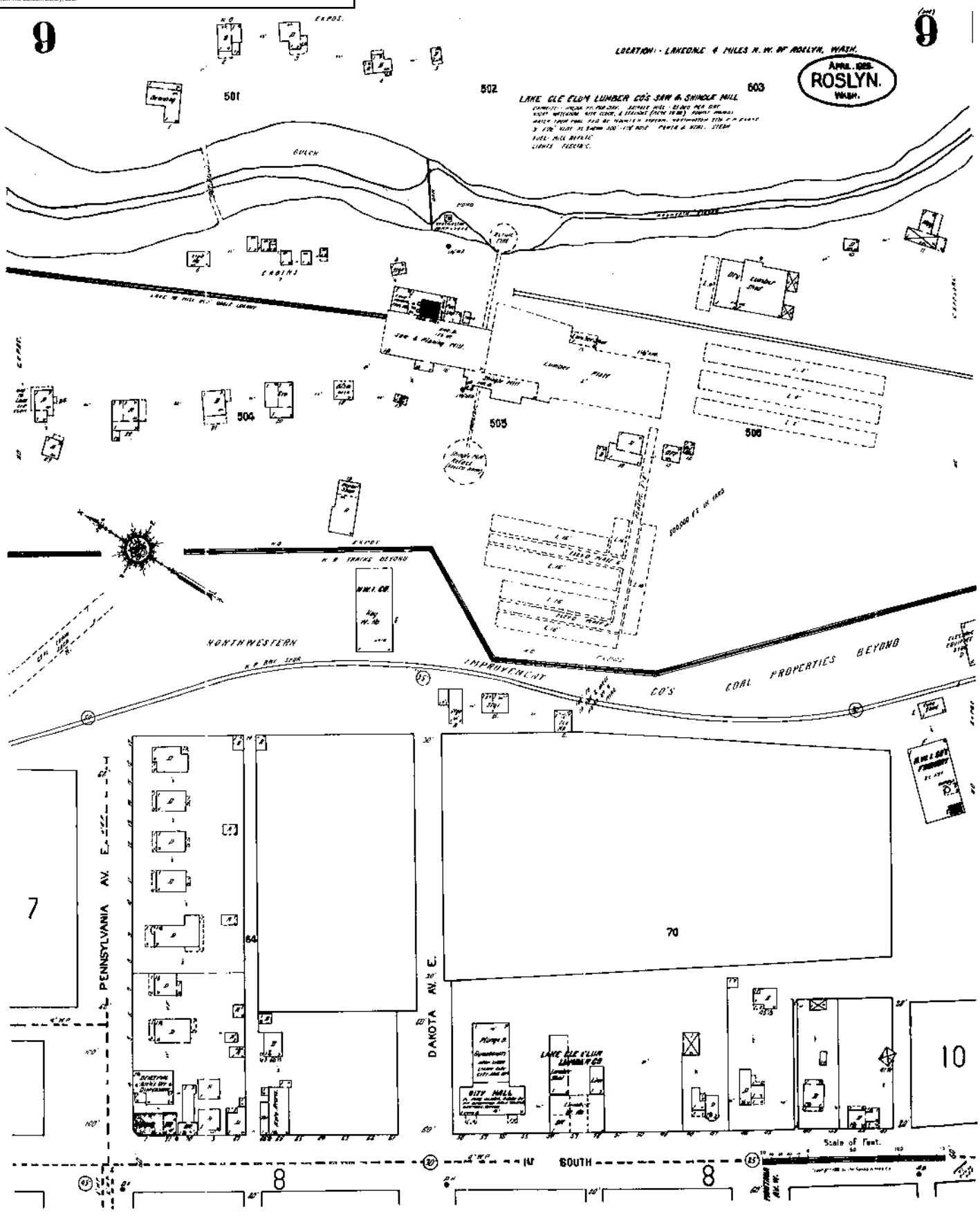
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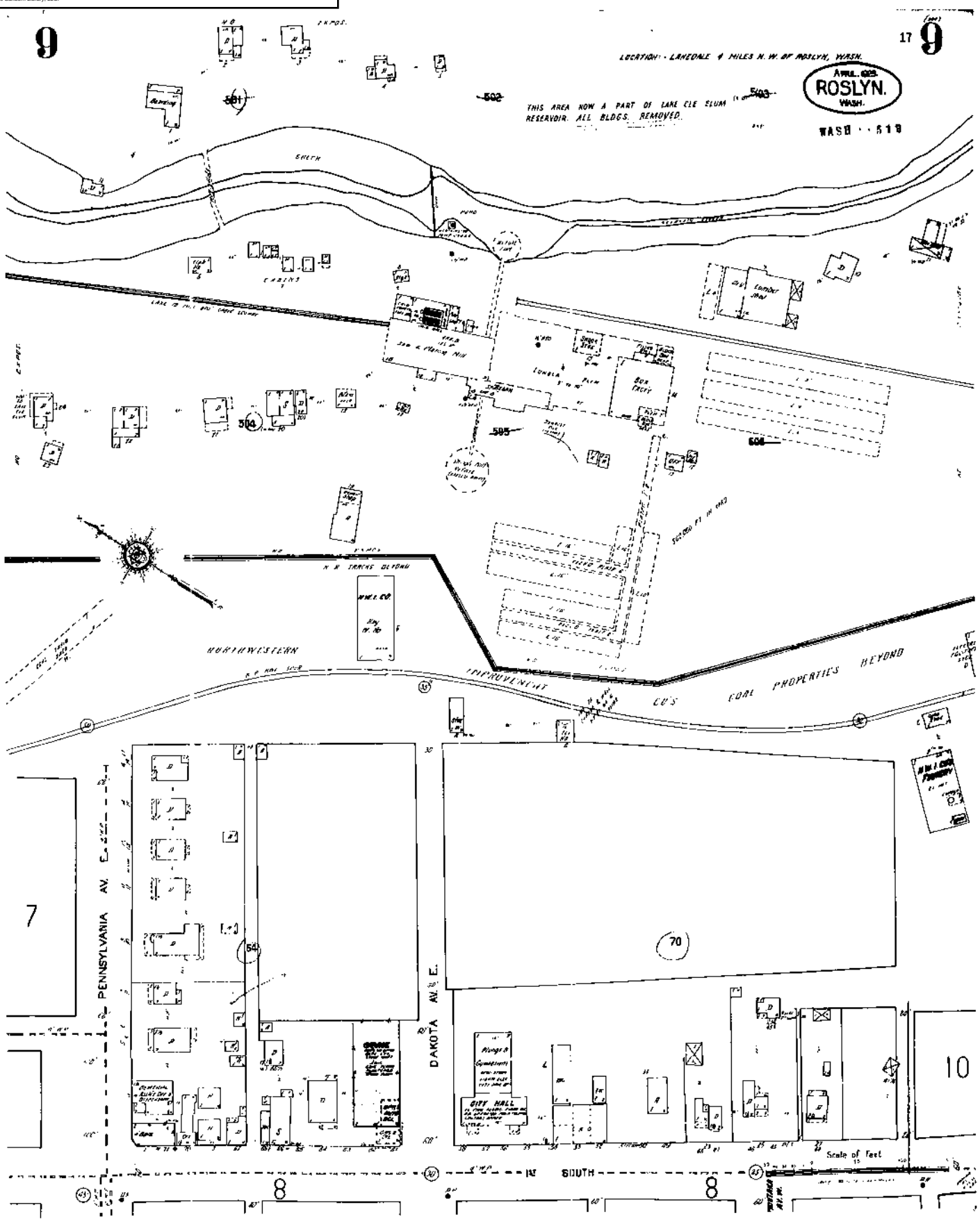
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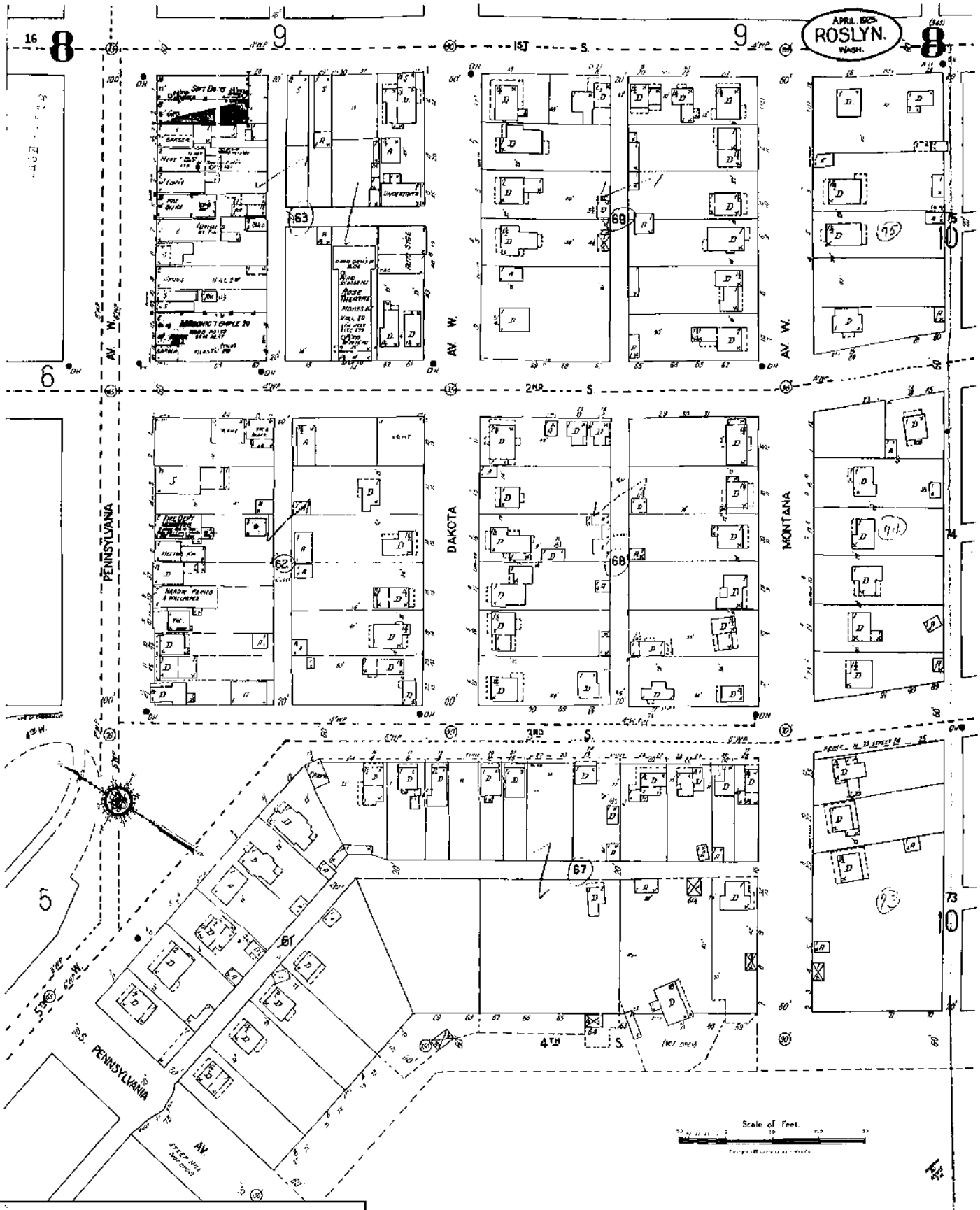


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APPENDIX C
SITE ASSESSMENT REPORT
EDR, INC.



The EDR Radius Map
with GeoCheck®

Section 17
160 South First Street
Roslyn, WA 98922

Inquiry Number: 01219992.1r

June 28, 2004

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	6
Orphan Summary	7
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-7
Physical Setting Source Map Findings	A-8
Physical Setting Source Records Searched	A-15

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

160 SOUTH FIRST STREET
ROSLYN, WA 98922

COORDINATES

Latitude (North):	47.222000 - 47° 13' 19.2''
Longitude (West):	120.990800 - 120° 59' 26.9''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	652119.1
UTM Y (Meters):	5231574.0
Elevation:	2223 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	47120-B8 CLE ELUM, WA
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned
CORRACTS ---------- Corrective Action Report
RCRIS-TSD ---------- Resource Conservation and Recovery Information System
RCRIS-LQG ---------- Resource Conservation and Recovery Information System
RCRIS-SQG ---------- Resource Conservation and Recovery Information System
ERNS ---------- Emergency Response Notification System

STATE ASTM STANDARD

CSCSL ---------- Confirmed & Suspected Contaminated Sites List

EXECUTIVE SUMMARY

HSL Hazardous Sites List
SWF/LF Solid Waste Facility Database
VCP Voluntary Cleanup Program Sites
INDIAN LUST Leaking Underground Storage Tanks on Indian Land
INDIAN UST Underground Storage Tanks on Indian Land

FEDERAL ASTM SUPPLEMENTAL

CONSENT Superfund (CERCLA) Consent Decrees
ROD Records Of Decision
Delisted NPL National Priority List Deletions
HMIRS Hazardous Materials Information Reporting System
MLTS Material Licensing Tracking System
MINES Mines Master Index File
NPL Liens Federal Superfund Liens
PADS PCB Activity Database System
US BROWNFIELDS A Listing of Brownfields Sites
INDIAN RESERV Indian Reservations
FUDS Formerly Used Defense Sites
DOD Department of Defense Sites
RAATS RCRA Administrative Action Tracking System
TRIS Toxic Chemical Release Inventory System
TSCA Toxic Substances Control Act
SSTS Section 7 Tracking Systems
FTTS INSP FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

CSCSL NFA Confirmed & Contaminated Sites - No Further Action
WA ICR Independent Cleanup Reports
SPILLS Reported Spills
CDL Clandestine Drug Lab Contaminated Site List
AST Aboveground Storage Tank Locations
EMI Washington Emissions Data System

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS A Listing of Brownfields Sites
VCP Voluntary Cleanup Program Sites
INST CONTROL Institutional Control Site List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STATE ASTM STANDARD

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Ecology's Leaking Underground Storage Tanks Site List.

A review of the LUST list, as provided by EDR, and dated 04/07/2004 has revealed that there is 1 LUST site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CITY OF ROSLYN	***201 S 1ST ST***	***0 - 1/8 WSW***	***A2***	***6***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Ecology's Statewide UST Site/Tank Report.

A review of the UST list, as provided by EDR, and dated 04/07/2004 has revealed that there is 1 UST site within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CITY OF ROSLYN	***201 S 1ST ST***	***0 - 1/8 WSW***	***A2***	***6***

FEDERAL ASTM SUPPLEMENTAL

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 04/08/2004 has revealed that there is 1 FINDS site within approximately 0.5 miles of the target property.

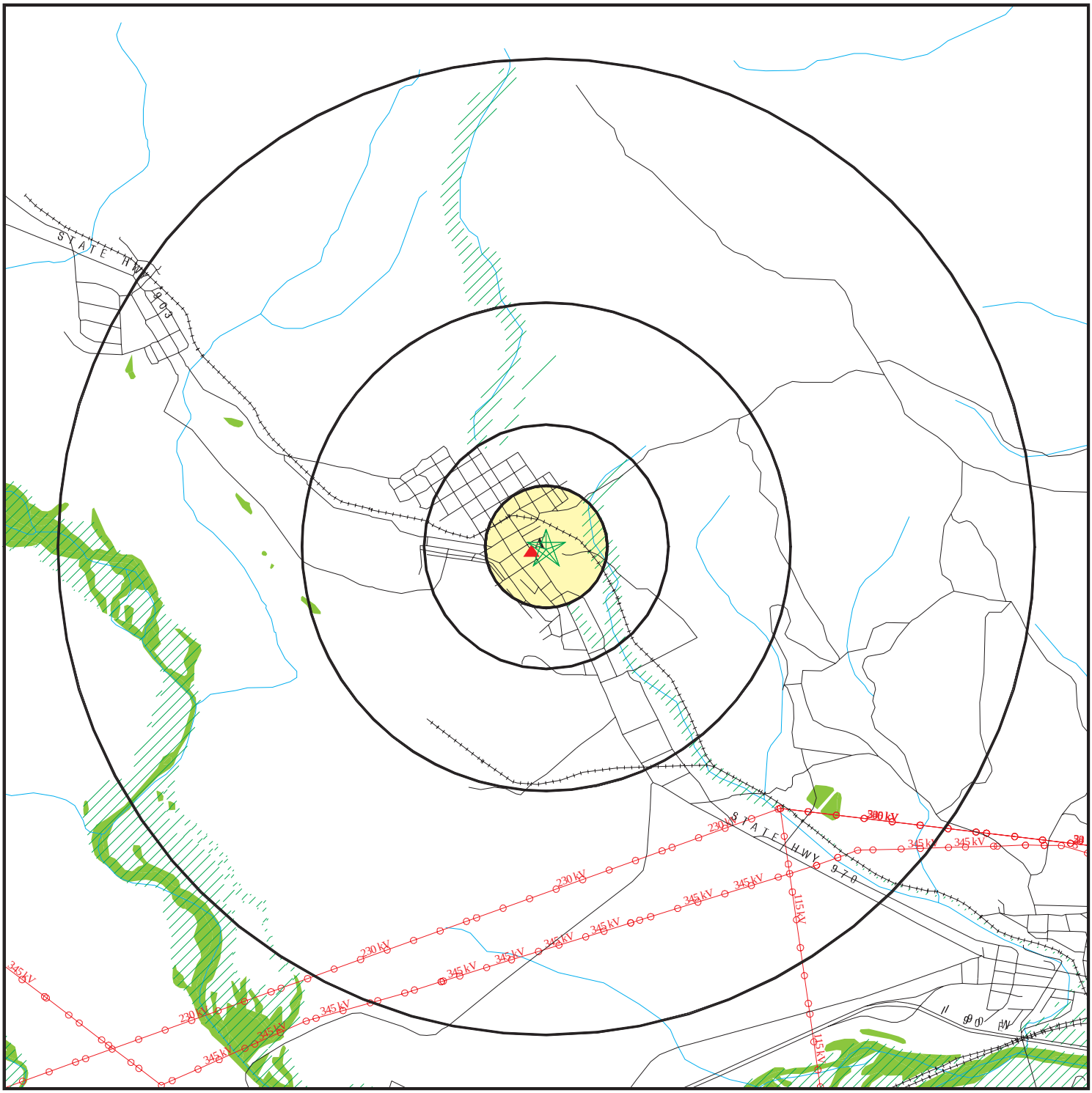
Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
ROSLYN CITY	201 S 1ST ST	0 - 1/8 WSW	A1	6

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
CLE ELUM CITY	CSCSL
HYAK TOWER 89535	CSCSL, VCP
BLEWETT MAINTENANCE SITE	LUST, UST
CLE ELUM WORK CENTER	UST
CLE ELUM WA. LINE SEG. 49 PRINT 376	UST
LESTER WA LINE SEG 49 PRINT 483	FINDS, UST
EAST END MOTORS INC.	UST
G & W OIL AND WOOD, INC	WA ICR, UST
WA DOT BRG 146	RCRIS-SQG, FINDS
WA DOT BRG 142	RCRIS-SQG, FINDS
WA DOT BRG 143	RCRIS-SQG, FINDS
CLE ELUM CORROSIVE SPILL	RCRIS-SQG, FINDS
CLE ELUM ROSLYN SCHOOL DIST	RCRIS-SQG, FINDS
MINERAL SPGS	RCRIS-SQG, FINDS
TEANAWAY CAFE/WIGGINS ESTATE	WA ICR
UNOCAL #0095	WA ICR
118 W. 5TH	CDL
WA DNR CLE ELUM	CSCSL NFA

OVERVIEW MAP - 01219992.1r - Hart Crowser, Inc.

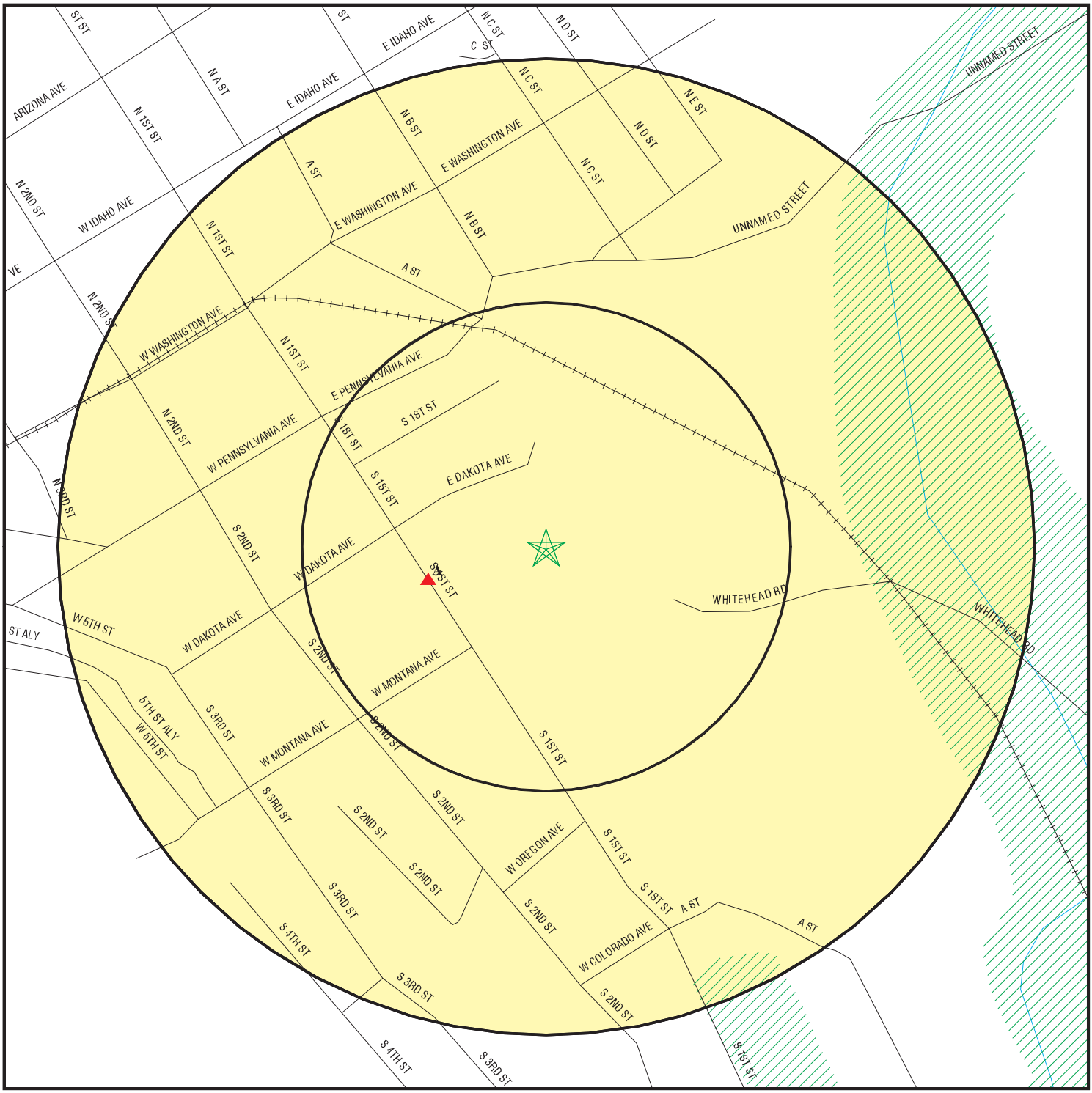


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands

TARGET PROPERTY:	Section 17	CUSTOMER:	Hart Crowser, Inc.
ADDRESS:	160 South First Street	CONTACT:	Jessica Robertson
CITY/STATE/ZIP:	Roslyn WA 98922	INQUIRY #:	01219992.1r
LAT/LONG:	47.2220 / 120.9908	DATE:	June 28, 2004 8:02 am

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DETAIL MAP - 01219992.1r - Hart Crowser, Inc.



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone

TARGET PROPERTY:	Section 17	CUSTOMER:	Hart Crowser, Inc.
ADDRESS:	160 South First Street	CONTACT:	Jessica Robertson
CITY/STATE/ZIP:	Roslyn WA 98922	INQUIRY #:	01219992.1r
LAT/LONG:	47.2220 / 120.9908	DATE:	June 28, 2004 8:02 am

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.500	0	0	0	0	0	0
Proposed NPL		1.500	0	0	0	0	0	0
CERCLIS		1.000	0	0	0	0	NR	0
CERC-NFRAP		0.750	0	0	0	0	NR	0
CORRACTS		1.500	0	0	0	0	0	0
RCRIS-TSD		1.000	0	0	0	0	NR	0
RCRIS Lg. Quan. Gen.		0.750	0	0	0	0	NR	0
RCRIS Sm. Quan. Gen.		0.750	0	0	0	0	NR	0
ERNS		0.500	0	0	0	NR	NR	0
STATE ASTM STANDARD								
CSCSL		1.500	0	0	0	0	0	0
HSL		1.500	0	0	0	0	0	0
State Landfill		1.000	0	0	0	0	NR	0
LUST		1.000	1	0	0	0	NR	1
UST		0.750	1	0	0	0	NR	1
VCP		1.000	0	0	0	0	NR	0
INDIAN LUST		1.000	0	0	0	0	NR	0
INDIAN UST		0.750	0	0	0	0	NR	0
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.500	0	0	0	0	0	0
ROD		1.500	0	0	0	0	0	0
Delisted NPL		1.500	0	0	0	0	0	0
FINDS		0.500	1	0	0	NR	NR	1
HMIRS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
NPL Liens		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
US BROWNFIELDS		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.500	0	0	0	0	0	0
FUDS		1.500	0	0	0	0	0	0
DOD		1.500	0	0	0	0	0	0
RAATS		0.500	0	0	0	NR	NR	0
TRIS		0.500	0	0	0	NR	NR	0
TSCA		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
CSCSL NFA		1.000	0	0	0	0	NR	0
WA ICR		1.000	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS		0.500	0	0	0	NR	NR	0
CDL		0.500	0	0	0	NR	NR	0
AST		0.500	0	0	0	NR	NR	0
WA Emissions		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.500	0	0	0	0	0	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0
INST CONTROL		0.750	0	0	0	0	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

A1
WSW
< 1/8
332 ft.

Relative:
Higher

Actual:
2229 ft.

ROSLYN CITY — **FINDS** **1007071475**
201 S 1ST ST — **110015480932**
ROSLYN, WA 98941

Site 1 of 2 in cluster A

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Wasington Department of Ecology Facility/Site Identification System

---

A2
WSW
< 1/8
332 ft.

Relative:
Higher

Actual:
2229 ft.

CITY OF ROSLYN — **LUST** **U000919758**
201 S 1ST ST — **UST** **N/A**
ROSLYN, WA 98941

Site 2 of 2 in cluster A

LUST:

Facility ID:	1849	Ecology Region:	CRO
Release ID:	411382	Release Date:	10/11/1996
Release Status:	Cleanup Started	Status Date:	10/11/1996
Alternate Name:	Not reported		
Lat/Lon	47.221950 / 120.992400		
Affected Media:	Soil		
FS ID:	39286399		

Facility ID:	1849	Ecology Region:	CRO
Release ID:	411382	Release Date:	10/11/1996
Release Status:	Reported Cleaned Up	Status Date:	08/06/2001
Alternate Name:	Not reported		
Lat/Lon	47.221950 / 120.992400		
Affected Media:	Soil		
FS ID:	39286399		

UST:

Facility ID:	39286399
Site ID:	1849
Install Date:	11/01/1982
Capacity:	111 to 1,100 Gallons
Status:	Removed
Tank Name:	1
Substance:	LEADED GASOLINE
Compartment #:	1
Ecology Region:	Central

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
CLE ELUM	1005445333	WA DOT BRG 146	SR 10 MP 95.51	98922	RCRIS-SQG, FINDS
CLE ELUM	1005445334	WA DOT BRG 142	SR 10 MP 89.34 TO 89.37	98922	RCRIS-SQG, FINDS
CLE ELUM	1005445335	WA DOT BRG 143	SR 10 MP 95.39 TO 95.42	98922	RCRIS-SQG, FINDS
CLE ELUM	1001490907	CLE ELUM CORROSIVE SPILL	W 1ST ST 100 BLOCK IN ALLEY	98922	RCRIS-SQG, FINDS
CLE ELUM	S104971890	WA DNR CLE ELUM	RTE 2 BOX 16 AIRPORT RD	98922	CSCSL NFA
CLE ELUM	U000595827	CLE ELUM WORK CENTER	RT 2 BOX 16 AIRPORT RD	98922	UST
CLE ELUM	U000925884	CLE ELUM WA. LINE SEG. 49 PRINT 376	M.P. 24.9 3RD SUB. PORTLAND DIV	98922	UST
CLE ELUM	1007074768	LESTER WA LINE SEG 49 PRINT 483	MP 59 4TH SUB PACIFIC DIVISION	98922	FINDS, UST
CLE ELUM	1000920474	CLE ELUM ROSLYN SCHOOL DIST	2692 SR 903	98922	RCRIS-SQG, FINDS
CLE ELUM	S104851978	CLE ELUM CITY	HWY 903	98922	CSCSL
CLE ELUM	U001128827	BLEWETT MAINTENANCE SITE	SR 97, MP 178.2	98922	LUST, UST
CLE ELUM	S103509769	TEANAWAY CAFE/WIGGINS ESTATE	HWY 970	98922	WA ICR
CLE ELUM	U000591289	EAST END MOTORS INC.	RT BX 1,1102 E FIRST STREET	98922	UST
CLE ELUM	U003024718	G & W OIL AND WOOD, INC	CEMETARY RD	98922	WA ICR, UST
CLE ELUM	1001491019	MINERAL SPGS	US HWY 97 MP 153 BLEWETT PASS	98922	RCRIS-SQG, FINDS
CLE ELUM	S103510914	UNOCAL #0095	INTERSECTION OF FIRST ST. AND SHORT AVE	98922	WA ICR
HYAK	S106045078	HYAK TOWER 89535	FOREST SERVICE RD 126	98922	CSCSL, VCP
ROSLYN	S106082890		118 W. 5TH		CDL

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/27/04
Date Made Active at EDR: 05/21/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 05/04/04
Elapsed ASTM days: 17
Date of Last EDR Contact: 05/04/04

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 04/27/04
Date Made Active at EDR: 05/21/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 05/04/04
Elapsed ASTM days: 17
Date of Last EDR Contact: 05/04/04

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/26/04
Date Made Active at EDR: 04/02/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 03/22/04
Elapsed ASTM days: 11
Date of Last EDR Contact: 03/22/04

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 02/26/04
Date Made Active at EDR: 04/02/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 03/22/04
Elapsed ASTM days: 11
Date of Last EDR Contact: 03/22/04

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/15/04
Date Made Active at EDR: 04/15/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 03/25/04
Elapsed ASTM days: 21
Date of Last EDR Contact: 03/08/04

RCRIS: Resource Conservation and Recovery Information System
Source: EPA
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 04/13/04
Date Made Active at EDR: 05/13/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 04/20/04
Elapsed ASTM days: 23
Date of Last EDR Contact: 04/20/04

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/03
Date Made Active at EDR: 03/12/04
Database Release Frequency: Annually
Date of Data Arrival at EDR: 01/26/04
Elapsed ASTM days: 46
Date of Last EDR Contact: 04/26/04

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/01/01
Database Release Frequency: Biennially
Date of Last EDR Contact: 03/16/04
Date of Next Scheduled EDR Contact: 06/14/04

CONSENT: Superfund (CERCLA) Consent Decrees
Source: EPA Regional Offices
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: N/A
Database Release Frequency: Varies
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 04/08/04
Database Release Frequency: Annually
Date of Last EDR Contact: 04/05/04
Date of Next Scheduled EDR Contact: 07/05/04

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/27/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 05/04/04
Date of Next Scheduled EDR Contact: 08/02/04

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/08/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/05/04
Date of Next Scheduled EDR Contact: 07/05/04

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 02/17/04
Database Release Frequency: Annually
Date of Last EDR Contact: 04/20/04
Date of Next Scheduled EDR Contact: 07/19/04

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/19/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/05/04
Date of Next Scheduled EDR Contact: 07/05/04

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 03/05/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/04
Date of Next Scheduled EDR Contact: 06/28/04

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/12/04
Date of Next Scheduled EDR Contact: 05/24/04

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-564-3887
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 03/30/04
Database Release Frequency: Annually
Date of Last EDR Contact: 05/12/04
Date of Next Scheduled EDR Contact: 08/09/04

DOD: Department of Defense Sites
Source: USGS
Telephone: 703-692-8801
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/02/04
Date of Next Scheduled EDR Contact: 05/10/04

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202 564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: N/A
Database Release Frequency: Quarterly
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

INDIAN RESERV: Indian Reservations
Source: USGS
Telephone: 202-208-3710
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/02/04
Date of Next Scheduled EDR Contact: 05/10/04

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 04/14/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/15/04
Date of Next Scheduled EDR Contact: 06/14/04

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: N/A
Database Release Frequency: N/A
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

FUDS: Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 10/01/03
Database Release Frequency: Varies
Date of Last EDR Contact: 04/26/04
Date of Next Scheduled EDR Contact: 07/05/04

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/08/04
Date of Next Scheduled EDR Contact: 06/07/04

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/01
Database Release Frequency: Annually
Date of Last EDR Contact: 03/23/04
Date of Next Scheduled EDR Contact: 06/21/04

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/02
Database Release Frequency: Every 4 Years
Date of Last EDR Contact: 03/05/04
Date of Next Scheduled EDR Contact: 06/07/04

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-564-2501

Date of Government Version: 04/13/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/22/04
Date of Next Scheduled EDR Contact: 06/21/04

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-5008
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/01
Database Release Frequency: Annually
Date of Last EDR Contact: 04/19/04
Date of Next Scheduled EDR Contact: 07/19/04

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-2501
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/13/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/22/04
Date of Next Scheduled EDR Contact: 06/21/04

STATE OF WASHINGTON ASTM STANDARD RECORDS

CSCSL: Confirmed & Suspected Contaminated Sites List
Source: Department of Ecology
Telephone: 360-407-7200
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 01/14/04
Date Made Active at EDR: 03/02/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 02/17/04
Elapsed ASTM days: 14
Date of Last EDR Contact: 02/17/04

HSL: Hazardous Sites List
Source: Department of Ecology
Telephone: 360-407-7200
The Hazardous Sites List is a subset of the CSCSL Report. It includes sites which have been assessed and ranked using the Washington Ranking Method (WARM).

Date of Government Version: 04/25/04
Date Made Active at EDR: 04/29/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 04/16/04
Elapsed ASTM days: 13
Date of Last EDR Contact: 03/09/04

SWF/LF: Solid Waste Facility Database
Source: Department of Ecology
Telephone: 360-407-6132
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 10/01/03
Date Made Active at EDR: 12/10/03
Database Release Frequency: Annually
Date of Data Arrival at EDR: 11/05/03
Elapsed ASTM days: 35
Date of Last EDR Contact: 04/06/04

LUST: Leaking Underground Storage Tanks Site List
Source: Department of Ecology
Telephone: 360-407-7200
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 04/07/04
Date Made Active at EDR: 05/19/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 04/19/04
Elapsed ASTM days: 30
Date of Last EDR Contact: 01/15/04

UST: Underground Storage Tank Database
Source: Department of Ecology
Telephone: 360-407-7170
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 04/07/04
Date Made Active at EDR: 05/13/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 04/19/04
Elapsed ASTM days: 24
Date of Last EDR Contact: 01/15/04

VCP: Voluntary Cleanup Program Sites
Source: Department of Ecology
Telephone: 360-407-7200
Sites that have entered either the Voluntary Cleanup Program or its predecessor Independent Remedial Action Program.

Date of Government Version: 05/18/04
Date Made Active at EDR: 06/18/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 05/18/04
Elapsed ASTM days: 31
Date of Last EDR Contact: 05/17/04

INDIAN UST: Underground Storage Tanks on Indian Land
Source: EPA Region 10
Telephone: 206-553-2857

Date of Government Version: 03/11/04
Date Made Active at EDR: 03/25/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 03/12/04
Elapsed ASTM days: 13
Date of Last EDR Contact: 02/23/04

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 10
Telephone: 206-553-2857
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 03/11/04
Date Made Active at EDR: 03/25/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 03/12/04
Elapsed ASTM days: 13
Date of Last EDR Contact: 01/27/04

STATE OF WASHINGTON ASTM SUPPLEMENTAL RECORDS

CSCSL NFA: Confirmed & Contaminated Sites - No Further Action
Source: Department of Ecology
Telephone: 360-407-7170
The data set contains information about sites previously on the Confirmed and Suspected Contaminated Sites list that have received a No Further Action (NFA) determination. Because it is necessary to maintain historical records of sites that have been investigated and cleaned up, sites are not deleted from the database when cleanup activities are completed. Instead, a No Further Action code is entered based upon the type of NFA determination the site received.

Date of Government Version: 01/14/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/17/04
Date of Next Scheduled EDR Contact: 05/17/04

ICR: Independent Cleanup Reports
Source: Department of Ecology
Telephone: 360-407-7200
These are remedial action reports Ecology has received from either the owner or operator of the sites. These actions have been conducted without department oversight or approval and are not under an order or decree.

Date of Government Version: 12/01/02
Database Release Frequency: Quarterly
Date of Last EDR Contact: 02/18/04
Date of Next Scheduled EDR Contact: 05/17/04

SPILLS: Reported Spills
Source: Department of Ecology
Telephone: 360-407-7450
Spills reported to the Spill Prevention, Preparedness and Response Division.

Date of Government Version: 04/06/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/05/04
Date of Next Scheduled EDR Contact: 07/05/04

AST: Aboveground Storage Tank Locations
Source: Department of Ecology
Telephone: 360-407-7562
A listing of aboveground storage tank locations regulated by the Department of Ecology's Spill Prevention, Preparedness and Response Program.

Date of Government Version: 03/05/04
Database Release Frequency: Varies
Date of Last EDR Contact: 03/02/04
Date of Next Scheduled EDR Contact: 05/31/04

CDL: Clandestine Drug Lab Contaminated Site List
Source: Department of Health
Telephone: 360-236-3380
Illegal methamphetamine labs use hazardous chemicals that create public health hazards. Chemicals and residues can cause burns, respiratory and neurological damage, and death. Biological hazards associated with intravenous needles, feces, and blood also pose health risks.

Date of Government Version: 02/27/04
Database Release Frequency: Varies
Date of Last EDR Contact: 03/08/04
Date of Next Scheduled EDR Contact: 06/07/04

EMI: Washington Emissions Data System
Source: Department of Ecology
Telephone: 360-407-6040

Date of Government Version: 12/31/01
Database Release Frequency: Annually
Date of Last EDR Contact: 04/19/04
Date of Next Scheduled EDR Contact: 07/19/04

LOCAL RECORDS

KING COUNTY:

Abandoned Landfill Study in King County
Source: Seattle-King County Department of Public Health
Telephone: 206-296-4785
The King County Abandoned Landfill Survey was conducted from October through December 1984 by the Health Department's Environmental Health Division at the request of the King County Council. The primary objective of the survey was to determine if any public health problems existed at the predetermined 24 sites.

Date of Government Version: 04/30/85
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 10/21/94
Date of Next Scheduled EDR Contact: N/A

SEATTLE COUNTY:

Abandoned Landfill Study in the City of Seattle
Source: Seattle - King County Department of Public Health
Telephone: 206-296-4785
The Seattle Abandoned Landfill Survey was conducted in June and July of 1984 by the Health Department's Environmental Health Division at the request of the Mayor's Office. The primary objective of the survey was to determine if any public health problems existed at the predetermined 12 sites.

Date of Government Version: 07/30/84
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 10/21/94
Date of Next Scheduled EDR Contact: N/A

SEATTLE/KING COUNTY:

Seattle - King County Abandoned Landfill Toxicity / Hazard Assessment Project
Source: Department of Public Health
Telephone: 206-296-4785
This report presents the Seattle-King County Health Department's follow-up investigation of two city owned and four county owned abandoned landfills which was conducted from February to December 1986.

Date of Government Version: 12/31/86
Database Release Frequency: No Update Planned

Date of Last EDR Contact: 08/14/95
Date of Next Scheduled EDR Contact: N/A

SNOHOMISH COUNTY:

Solid Waste Sites of Record at Snohomish Health District
Source: Snohomish Health District
Telephone: 206-339-5250

Date of Government Version: 01/12/04
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 04/19/04
Date of Next Scheduled EDR Contact: 07/19/04

TACOMA/PIERCE COUNTY:

Closed Landfill Survey
Source: Tacoma-Pierce County Health Department
Telephone: 206-591-6500
Following numerous requests for information about closed dumpsites and landfills in Pierce County, the Tacoma-Pierce County Health Department decided to conduct a study on the matter. The aim of the study was to evaluate public health risks associated with the closed dumpsites and landfills, and to determine the need, if any, for further investigations of a more detailed nature. The sites represent all of the known dumpsites and landfills closed after 1950.

Date of Government Version: 09/01/02
Database Release Frequency: No Update Planned

Date of Last EDR Contact: 03/19/03
Date of Next Scheduled EDR Contact: N/A

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

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BROWNFIELDS DATABASES

VCP: Voluntary Cleanup Program Sites
Source: Department of Ecology
Telephone: 360-407-7200
Sites that have entered either the Voluntary Cleanup Program or its predecessor Independent Remedial Action Program.

Date of Government Version: 05/18/04
Database Release Frequency: Varies

Date of Last EDR Contact: 05/17/04
Date of Next Scheduled EDR Contact: 08/16/04

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: N/A
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

INST CONTROL: Institutional Control Site List
Source: Department of Ecology
Telephone: 360-407-7170
Sites that have institutional controls.

Date of Government Version: 03/11/04
Database Release Frequency: Varies

Date of Last EDR Contact: 03/09/04
Date of Next Scheduled EDR Contact: 06/07/04

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Daycare Center Listing
Source: Department of Social & Health Services
Telephone: 253-383-1735

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SECTION 17
160 SOUTH FIRST STREET
ROSLYN, WA 98922

TARGET PROPERTY COORDINATES

Latitude (North):	47.222000 - 47° 13' 19.2''
Longitude (West):	120.990799 - 120° 59' 26.9''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	652119.1
UTM Y (Meters):	5231574.0
Elevation:	2223 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3. Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

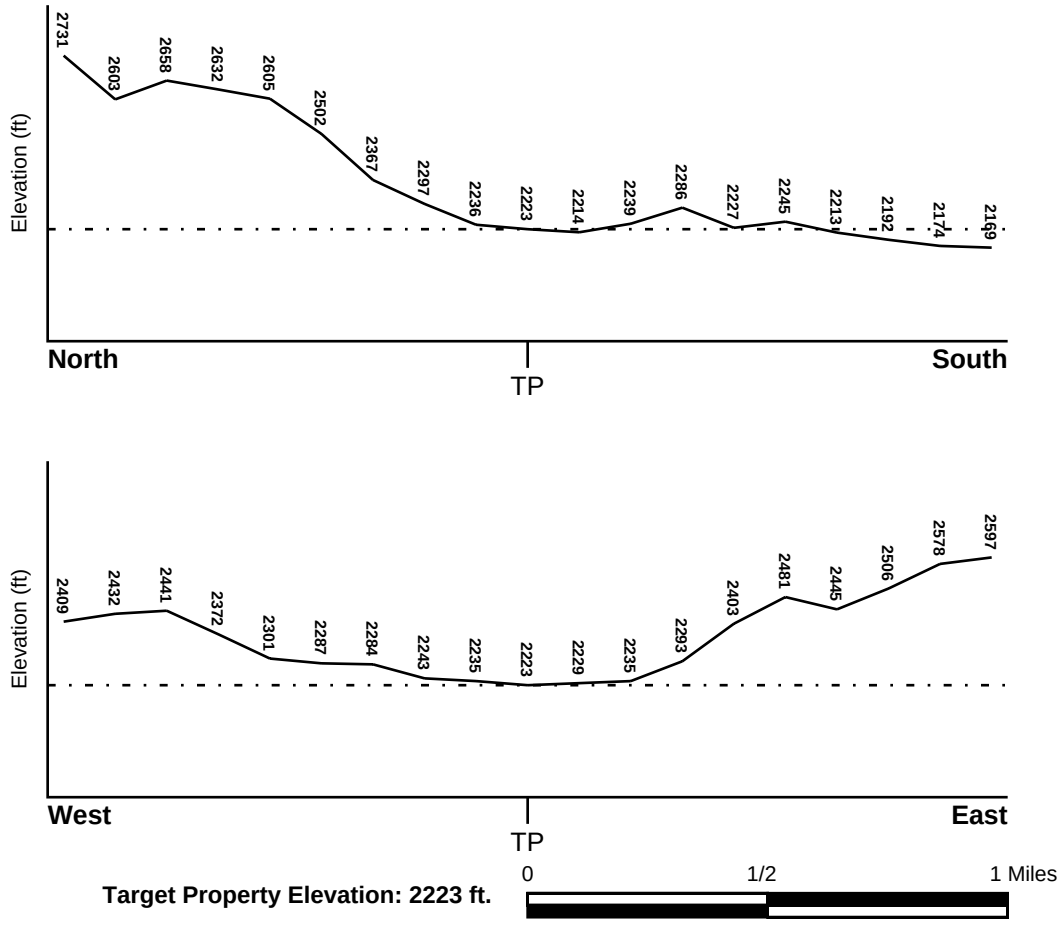
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

USGS Topographic Map:	47120-B8 CLE ELUM, WA
General Topographic Gradient:	General South
Source:	USGS 7.5 min quad index

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 2223 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
KITTITAS, WA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 5302990005A

Additional Panels in search area:
5300950232B
5300950231B
5300950234B
5300950233B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
CLE ELUM	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Cenozoic
System:	Tertiary
Series:	Eocene
Code:	Tec *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Continental Deposits

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	ROSLYN
Soil Surface Texture:	sandy loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: MODERATE

Depth to Bedrock Min: > 60 inches

Depth to Bedrock Max: > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	14 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 6.50 Min: 5.60
2	14 inches	36 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 6.50 Min: 5.60
3	36 inches	60 inches	loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 6.50 Min: 5.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: gravelly - sandy loam
loam
very cobbly - loam

Surficial Soil Types: gravelly - sandy loam
loam
very cobbly - loam

Shallow Soil Types: gravelly - sandy loam

Deeper Soil Types: extremely cobbly - sandy loam
weathered bedrock
very cobbly - loamy sand
clay loam
very gravelly - loamy sand
very gravelly - sandy loam

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked, in the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objective of the records review (see 7.1.1), and (3) whether they are obtained, pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
2	USGS1090714	1/8 - 1/4 Mile SE
3	USGS1090758	1/4 - 1/2 Mile SSE
4	USGS1090760	1/2 - 1 Mile NW
A5	USGS1090766	1/2 - 1 Mile South
A6	USGS1090765	1/2 - 1 Mile South
A7	USGS1090764	1/2 - 1 Mile South
8	USGS1090715	1/2 - 1 Mile West
9	USGS1090755	1/2 - 1 Mile SSW
10	USGS1090759	1/2 - 1 Mile WSW
11	USGS1090753	1/2 - 1 Mile SSW
12	USGS1090761	1/2 - 1 Mile WNW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

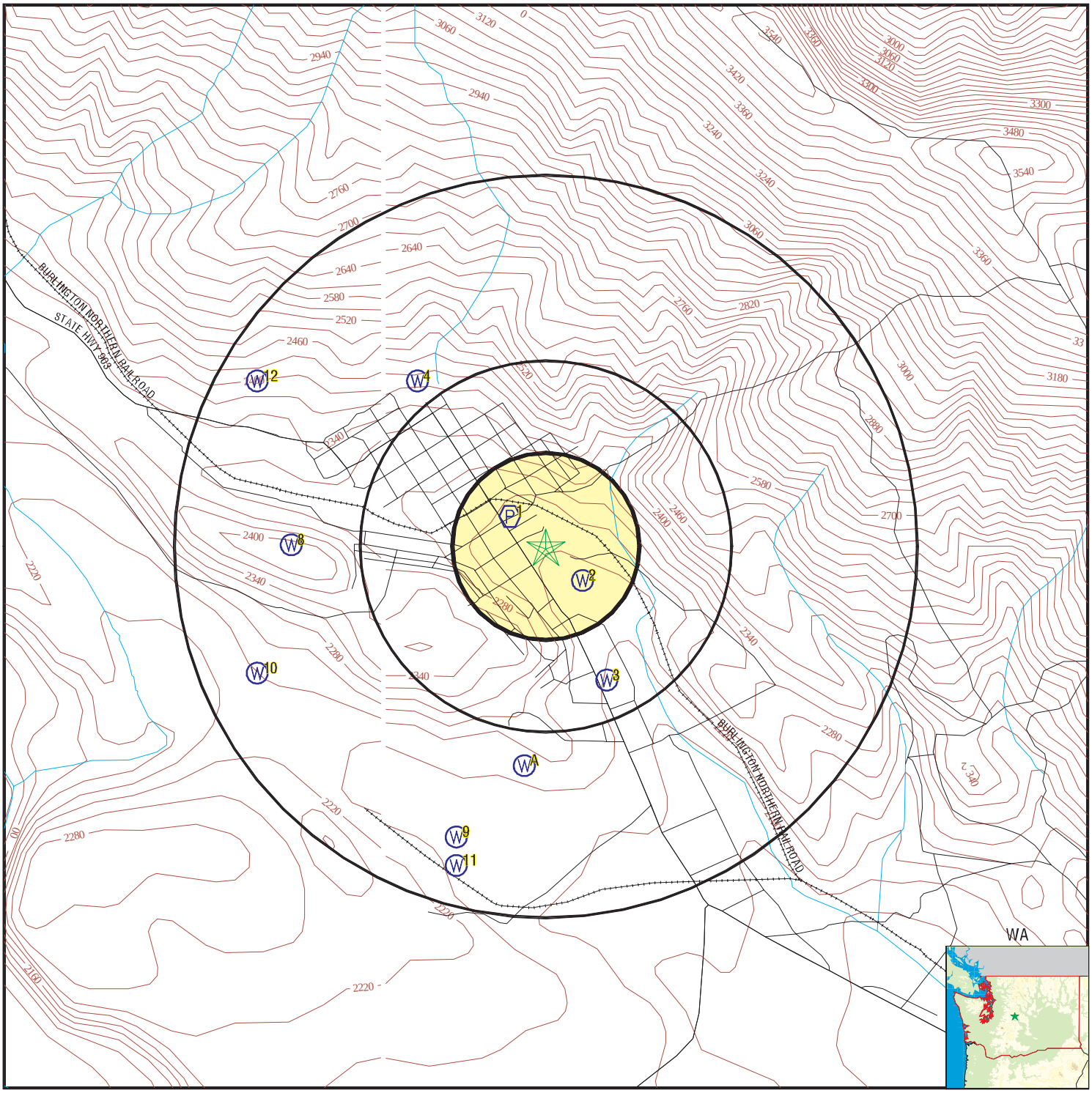
MAP ID	WELL ID	LOCATION FROM TP
1	WA5319941	1/8 - 1/4 Mile NW

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 01219992.1r



County Boundary
Major Roads
Contour Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location
Closest Hydrogeological Data

TARGET PROPERTY:	Section 17	CUSTOMER:	Hart Crowser, Inc.
ADDRESS:	160 South First Street	CONTACT:	Jessica Robertson
CITY/STATE/ZIP:	Roslyn WA 98922	INQUIRY #:	01219992.1r
LAT/LONG:	47.2220 / 120.9908	DATE:	June 28, 2004 8:02 am

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
NW
1/8 - 1/4 Mile
Higher | **FRDS PWS** | **WA5319941**

PWS ID:	WA5319941	PWS Status:	Active
Date Initiated:	7706	Date Deactivated:	Not Reported
PWS Name:	LAST RESORT P.O. BOX 532 ROSLYN, WA 98941		

Addressee / Facility: Not Reported

Facility Latitude:	47 13 24	Facility Longitude:	120 59 30
City Served:	Not Reported		
Treatment Class:	Untreated	Population:	00000008

PWS currently has or had major violation(s) or enforcement: Yes

Violations information not reported.

ENFORCEMENT INFORMATION:

System Name:	LAST RESORT		
Violation Type:	Max Contaminant Level, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2003-08-01 - 2003-08-31	Analytical Value:	0
Violation ID:	0306117	Enforcement ID:	Not Reported
Enforcement Date:	Not Reported	Enf. Action:	Not Reported

2
SE
1/8 - 1/4 Mile
Lower | **FED USGS** | **USGS1090714**

Agency:	USGS	Site ID:	471315120591501
Site Name:	20N/15E-17R01		
Dec. Latitude:	47.22067		
Dec. Longitude:	-120.9887		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2800		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	18920101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	628	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

3
SSE
1/4 - 1/2 Mile
Lower

FED USGS **USGS1090758**

Agency:	USGS	Site ID:	471301120591001
Site Name:	20N/15E-20A01		
Dec. Latitude:	47.21679		
Dec. Longitude:	-120.98731		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2160		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	18890101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	865	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

4
NW
1/2 - 1 Mile
Higher

FED USGS **USGS1090760**

Agency:	USGS	Site ID:	471343120594901
Site Name:	20N/15E-17F01		
Dec. Latitude:	47.22845		
Dec. Longitude:	-120.99814		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	1640		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	18900101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	372	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

A5
South
1/2 - 1 Mile
Lower

FED USGS **USGS1090766**

Agency:	USGS	Site ID:	471352120593703
Site Name:	20N/15E-20G03		
Dec. Latitude:	47.21345		
Dec. Longitude:	-120.99175		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	177.92		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	19050101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	1025	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

A6
South **FED USGS** **USGS1090765**
1/2 - 1 Mile
Lower

Agency:	USGS	Site ID:	471352120593702
Site Name:	20N/15E-20G02		
Dec. Latitude:	47.21345		
Dec. Longitude:	-120.99203		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2320		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	19050101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	949	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

A7
South **FED USGS** **USGS1090764**
1/2 - 1 Mile
Lower

Agency:	USGS	Site ID:	471352120593701
Site Name:	20N/15E-20G01		
Dec. Latitude:	47.21345		
Dec. Longitude:	-120.99231		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2320		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	19040101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	708	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

8
West
1/2 - 1 Mile
Higher

FED USGS **USGS1090715**

Agency:	USGS	Site ID:	471320121001501
Site Name:	20N/15E-17N01		
Dec. Latitude:	47.22206		
Dec. Longitude:	-121.00536		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2333		
Hydrologic code:	17030001		
Topographic:	Hillside (slope)		
Site Type:	Ground-water other than Spring		
Const Date:	18890101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	600	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

9
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS1090755**

Agency:	USGS	Site ID:	471239120594101
Site Name:	20N/15E-20L02		
Dec. Latitude:	47.21067		
Dec. Longitude:	-120.99592		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2240		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	19040101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	132	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

10
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS1090759**

Agency:	USGS	Site ID:	471302121002201
Site Name:	20N/15E-19B01		
Dec. Latitude:	47.21706		
Dec. Longitude:	-121.00731		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2205		
Hydrologic code:	17030001		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	19020101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	833	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

11
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS1090753**

Agency:	USGS	Site ID:	471235120594101
Site Name:	20N/15E-20L01		
Dec. Latitude:	47.20956		
Dec. Longitude:	-120.99592		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2240		
Hydrologic code:	17030001		
Topographic:	Not Reported		
Site Type:	Ground-water other than Spring		
Const Date:	19040101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	486	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

12
WNW
1/2 - 1 Mile
Higher

FED USGS **USGS1090761**

Agency:	USGS	Site ID:	471343121002201
Site Name:	20N/15E-18H01		
Dec. Latitude:	47.22845		
Dec. Longitude:	-121.00731		
Coord Sys:	NAD83		
State:	WA		
County:	Kittitas County		
Altitude:	2205		
Hydrologic code:	17030001		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	18900101	Inven Date:	19530915
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	Not Reported		
Hole depth:	833	Source:	driller
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for KITTITAS County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 98922

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.200 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-Minute DEMs correspond to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Water Wells
Source: Department of Transportation
Telephone: 360-705-7444
Group A well location points in Washington State.

Kitsap County Water Wells in Washington
Source: Public Utility District No. 1 of Kitsap County
Telephone: 206-779-7656

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

APPENDIX D
FIELD EXPLORATION PROCEDURES AND EXPLORATION LOGS

APPENDIX D
FIELD EXPLORATION PROCEDURES AND EXPLORATION LOGS

Hart Crowser completed nine soil hand-auger borings on the subject property and collected soil samples. The field procedures and methods used for this work are described below. Exploration locations for this work are illustrated on Figure 2.

Soil Hand Borings

Nine hand-auger borings were completed on June 14, 2004. Hart Crowser field representatives (Jessica Robertson and Erin Breckel) completed the explorations with hand tools. Soil samples were collected from discrete depths in the explorations. Hart Crowser field representatives logged soil descriptions and placed soil in pre-cleaned 4-ounce glass sample jars. Filled sample jars were stored in a cooler with blue ice. Soils were screened in the field for the presence of volatile organic compounds (VOCs) using a PID. The Hart Crowser project manager selected samples for chemical analysis at representative locations to assess soil quality based on observed signs of potential contamination.

Hand-auger borings were completed to depths ranging from approximately 0.5 to 1 foot below ground surface. All borings were backfilled with the excavated soil.

Soil Classification

The Hart Crowser field representative visually classified the soil samples in general accordance with ASTM Method D 2488 as depicted on Figure D-1, prepared a log of soils encountered in the exploration, and recorded pertinent observations regarding conditions, types of soils encountered, and the depth to water. The exploration logs are presented in Table D-1. Soil descriptions include the following properties: relative density of sands and gravels/ consistency of silts and clays, moisture, color, minor constituents, and major constituents. The presence of non-soil substances (e.g., debris etc.) and odors or visual observations such as sheen that may indicate contamination were also noted.

Attachments:
Table D-1 - Logs of Hand-Auger HB-1 through HB-9
Figure D-1 - Key to Exploration Logs

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Table D-1 - Log of Hand-Auger Borings HB-1 through HB-9

Exploration Number	Sample Number	Depth in Feet	Soil Description	PID Reading
HB-1	S-1	0.0 to 0.5	Dark brown, moist to wet, very silty SAND with occasional gravel, brick fragments, some fine roots	<0.1
HB-2	S-1	0.5 to 0.6	Dark brown, wet, very silty SAND, many fine roots, leaf debris	<0.1
HB-3	S-1	0.4 to 0.5	Brown, moist, silty SAND, few fine roots	<0.1
HB-4	S-1	0.5 to 1.0	Brown, moist, very silty SAND, few fine roots	<0.1
HB-5	S-1	0.3 to 0.5	Brown, moist, very silty SAND, few fine roots	<0.1
HB-6	S-1	0.5 to 1.0	Grayish brown, damp, slightly silty, slightly sandy GRAVEL with coal fragments	<0.1
HB-7	S-1	0.5 to 1.0	Grayish brown, moist, slighty silty, slightly gravellly SAND	<0.1
HB-8	S-1	0.5 to 1.0	Grayish brown, moist, slightly silty, gravelly SAND, small sparse coal fragments	<0.1
HB-9	S-1	0.5 to 1.0	Brown, damp, very silty SAND, occasional gravel	<0.1

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance(N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

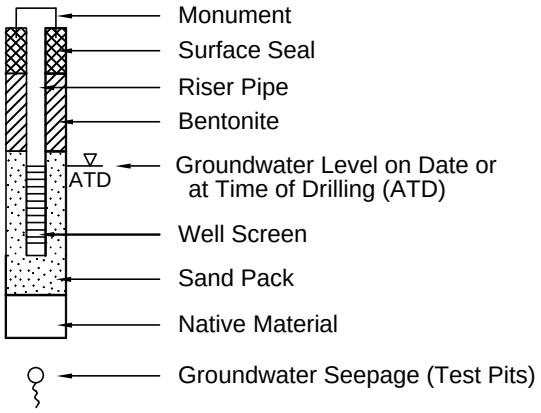
	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends

Sampling Test Symbols

Boring Samples		Test Pit Samples	
⊠	Split Spoon	⊠	Grab (Jar)
⧅	Shelby Tube	⧄	Bag
▥	Cuttings	⧅	Shelby Tube
◫	Core Run		
*	No Sample Recovery		
P	Tube Pushed, Not Driven		

Groundwater Observation Wells



Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits Water Content in Percent Liquid Limit Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	*In Situ* Density Test

HC Standards\Standard Report Figures\A-1's\A-1 Standard

HARTCROWSER

17084-00 ***6/04***

Figure D-1

APPENDIX E
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

APPENDIX E
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Six soil samples collected on June 14, 2004, were submitted to Advanced Analytical Laboratory of Redmond, WA for analysis of one or more of the following:

- Total Metals –Chromium, Lead, Cadmium, Copper, Arsenic, Zinc, Nickel, and Mercury by EPA Method 7000 series;
- NWTPH-Dx;
- PAHs (EPA Method 8270); and
- PCBs (EPA Method 8082).

The following criteria were evaluated in the standard data quality review process for the results:

- Holding Times;
- Method Blanks;
- Surrogate Recoveries;
- Laboratory Control Sample Recoveries;
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries; and
- Laboratory Duplicate Relative Percent Differences (RPDs).

Soil Samples

Total Metals. All required holding times were met. No method blank contamination was detected. Laboratory duplicate RPDs were acceptable.

NWTPH-Dx. All required holding times were met. No method blank contamination was detected. Laboratory duplicate RPDs were acceptable. Surrogate recoveries were within laboratory control limits.

PAHs. All required holding times were met. No method blank contamination was detected. Surrogate recoveries, LCS, and MS/MSD recoveries were within laboratory control limits.

PCBs. All required holding times were met. No method blank contamination was detected. Surrogate recoveries, LCS, and laboratory duplicate RPDs were within laboratory control limits.

The soil data, as qualified, are acceptable for use.

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CERTIFICATES OF ANALYSIS
ADVANCED ANALYTICAL LABORATORY

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A40621-1
Client:	Hart Crowser
Project Manager:	Jessica Robertson
Client Project Name:	Mountain Star, Sec.17
Client Project Number:	17084
Date received:	06/21/04

Analytical Results

NWTPH-Dx, mg/kg		MTH BLK	HB1-S1	HB3-S1	HB6-S1	HB8-S1	Dupl HB8-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Kerosene/Jet fuel	20	nd	nd	nd	nd	nd	nd
Diesel/Fuel oil	20	nd	nd	nd	nd	nd	nd
Heavy oil	50	nd	nd	nd	nd	nd	nd
Surrogate recoveries:							
Fluorobiphenyl		102%	103%	103%	104%	102%	103%
o-Terphenyl		102%	89%	90%	93%	88%	89%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Post-it® Fax Note 7671 | Date 6/23/4 | # of pages ▶ 6
To Jessica Robertson | From VAL IVANOV
Co./Dept. Hart Crowser | Co. AAL
Phone # | Phone #
Fax # 206 328 5581 | Fax #

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A40621-1
Client:	Hart Crowser
Project Manager:	Jessica Robertson
Client Project Name:	Mountain Star, Sec.17
Client Project Number:	17084
Date received:	06/21/04

Analytical Results

PAH(8270), mg/kg		MTH BLK	LCS	HB1-S1	HB3-S1	HB5-S1	HB8-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Naphthalene	0.10	nd		nd	nd	nd	nd
Acenaphthylene	0.10	nd		nd	nd	nd	nd
Acenaphthene	0.10	nd	81%	nd	nd	nd	nd
Fluorene	0.10	nd		nd	nd	nd	nd
Phenanthrene	0.10	nd		nd	nd	nd	nd
Anthracene	0.10	nd		nd	nd	nd	nd
Fluoranthene	0.10	nd		nd	nd	nd	nd
Pyrene	0.10	nd	83%	nd	nd	nd	nd
Benzo(a)anthracene	0.10	nd		nd	nd	nd	nd
Chrysene	0.10	nd		nd	nd	nd	nd
Benzo(b)fluoranthene	0.10	nd		nd	nd	nd	nd
Benzo(k)fluoranthene	0.10	nd		nd	nd	nd	nd
Benzo(a)pyrene	0.10	nd		nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene	0.10	nd		nd	nd	nd	nd
Dibenzo(ah)anthracene	0.10	nd		nd	nd	nd	nd
Benzo(ghi)perylene	0.10	nd		nd	nd	nd	nd
Surrogate recoveries:							
Fluorobiphenyl		103%	103%	87%	92%	97%	90%
o-Terphenyl		104%	99%	102%	99%	98%	99%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
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Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A40621-1
Client:	Hart Crowser
Project Manager:	Jessica Robertson
Client Project Name:	Mountain Star, Sec.17
Client Project Number:	17084
Date received:	06/21/04

Analytical Results				MS	MSD	RPD
PAH(8270), mg/kg		MTH BLK	Slag Pile	HB1-S1	HB1-S1	HB1-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Naphthalene	0.10	nd	nd			
Acenaphthylene	0.10	nd	nd			
Acenaphthene	0.10	nd	nd	89%	83%	7%
Fluorene	0.10	nd	nd			
Phenanthrene	0.10	nd	nd			
Anthracene	0.10	nd	nd			
Fluoranthene	0.10	nd	nd			
Pyrene	0.10	nd	nd	98%	89%	10%
Benzo(a)anthracene	0.10	nd	nd			
Chrysene	0.10	nd	nd			
Benzo(b)fluoranthene	0.10	nd	nd			
Benzo(k)fluoranthene	0.10	nd	nd			
Benzo(a)pyrene	0.10	nd	nd			
Indeno(1,2,3-cd)pyrene	0.10	nd	nd			
Dibenzo(ah)anthracene	0.10	nd	nd			
Benzo(ghi)perylene	0.10	nd	nd			
Surrogate recoveries:						
Fluorobiphenyl		103%	86%	102%	97%	
o-Terphenyl		104%	103%	100%	96%	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A40621-1
Client:	Hart Crowser
Project Manager:	Jessica Robertson
Client Project Name:	Mountain Star, Sec.17
Client Project Number:	17084
Date received:	06/21/04

Analytical Results

8082(PCBs), mg/kg		MTH BLK	LCS	HB6-S1	HB6-S1 Dupl	HB8-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
A1221	0.20	nd		nd	nd	nd
A1232	0.20	nd		nd	nd	nd
A1242 (A1016)	0.20	nd		nd	nd	nd
A1248	0.20	nd		nd	nd	nd
A1254	0.20	nd		nd	nd	nd
A1260	0.20	nd	120%	nd	nd	nd
Surrogate recoveries:						
Tetrachloro-m-xylene		120%	125%	108%	110%	110%
Decachlorobiphenyl		80%	85%	83%	82%	91%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number: A40621-1
Client: Hart Crowser
Project Manager: Jessica Robertson
Client Project Name: Mountain Star, Sec.17
Client Project Number: 17084
Date received: 06/21/04

Analytical Results

Metals (7010), mg/kg		MTH BLK	LCS	HB1-S1	Dupl HB1-S1	HB3-S1	HB5-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04	06/22/04
Lead (Pb)	1.0	nd	96%	250	260	620	32
Chromium (Cr)	2.0	nd	116%	4.4	4.5	8.9	12
Cadmium (Cd)	1.0	nd	106%	2.7	2.6	1.1	nd
Copper (Cu)	1.0	nd	107%	50	47	170	59
Nickel (Ni)	0.5	nd	101%	21	29	160	nd
Arsenic (As)	2.0	nd	112%	11	12	7.6	nd
Zinc (Zn)	1.0	nd	101%	25	24	180	2.2
Mercury (Hg) (7470A)	0.5	nd	105%	nd	nd	nd	nd

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A40621-1
Client:	Hart Crowser
Project Manager:	Jessica Robertson
Client Project Name:	Mountain Star, Sec.17
Client Project Number:	17084
Date received:	06/21/04

Analytical Results

Metals (7010), mg/kg		MTH BLK	HB8-S1	Slag Pile
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/22/04	06/22/04	06/22/04
Date analyzed	Limits	06/22/04	06/22/04	06/22/04
Lead (Pb)	1.0	nd	30	36
Chromium (Cr)	2.0	nd	12	5.2
Cadmium (Cd)	1.0	nd	nd	nd
Copper (Cu)	1.0	nd	160	18
Nickel (Ni)	0.5	nd	nd	nd
Arsenic (As)	2.0	nd	nd	nd
Zinc (Zn)	1.0	nd	3.3	2.8
Mercury (Hg) (7470A)	0.5	nd	nd	nd

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Sample Custody Record

Samples Shipped to: Advanced Analytical

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17064 LAB NUMBER

PROJECT NAME Mountain Star, Section 17

HART CROWSER CONTACT Jessica Robertson

Jessica Robertson/Evan Brocket

SAMPLED BY:

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Dx	PAH (8270)	PCBs (8082)	Total Metals+	*As, Cd, Cu, Cr, Pb, Hg, Ni, Zn	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	HB-1/S-1		6/14/04		Soil	X	X		X		2	
	HB-2/S-1		6/14/04		Soil						2	
	HB-3/S-1		6/14/04		Soil	X	X		X		2	
	HB-4/S-1		6/14/04		Soil						2	
	HB-5/S-1		6/14/04		Soil		X		X		2	
	HB-6/S-1		6/14/04		Soil	X		X			2	
	HB-7/S-1		6/14/04		Soil						2	
	HB-8/S-1		6/14/04		Soil	X	X	X	X		2	
	HB-9/S-1		6/14/04		Soil						2	
	Tailings Pile		6/14/04		Soil						1	
	Slag Pile		6/14/04		Soil		X		X		1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
	TIME		TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
	TIME		TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS:
☐YES ☐NO ☐N/A
GOOD CONDITION
☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND
☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No.
for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☑ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

CULTURAL RESOURCES SURVEY COVER SHEET

Authors: Tucker O. Orvald, M.S. and Dr. Steven Hackenberger

Title of Report: Roslyn Historic District No. 4 Coal Mine (45KT2784) Industrial Space Cultural Resource Assessment, Upper Kittitas County, Washington

Date: December 2008

County: Kittitas Township: 20N Range: 15N Section: 17

USGS 7.5' Quads: Cle Elum, WA - provisional edition 1984
Ronald, WA - provisional edition 1989

Acres: ~30

CD submitted? Yes **X** No

Does this replace a draft? **X** Yes No

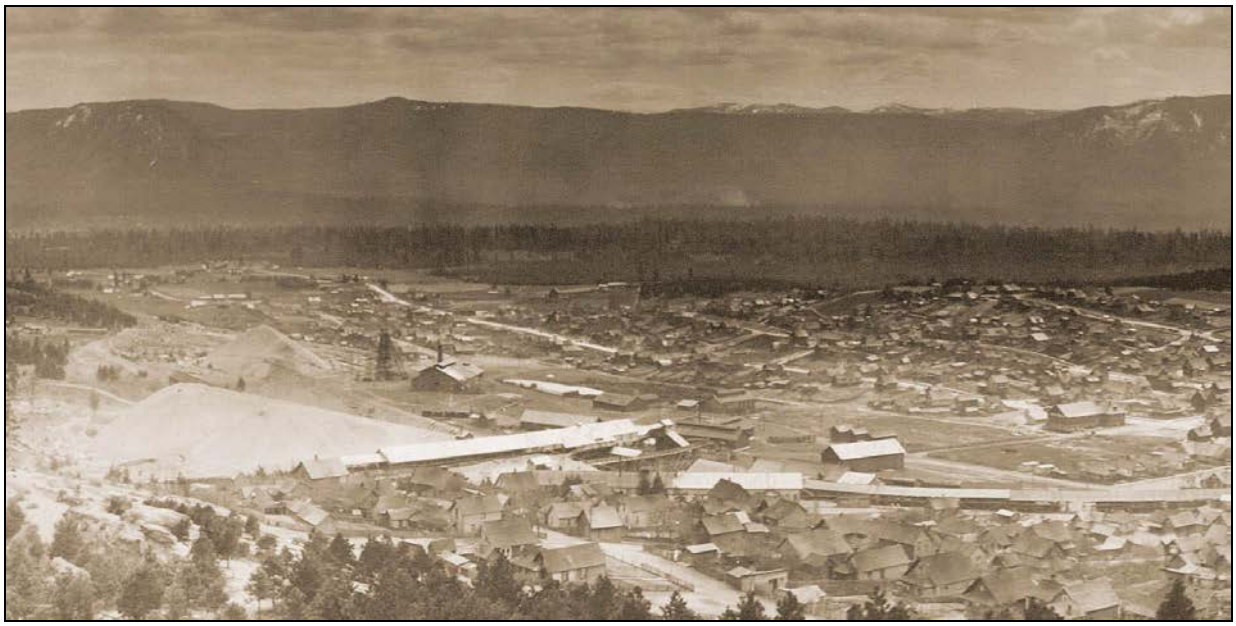
Sites Found? **X** Yes No

TCP(s) found? Yes **X** No

DAHP Archaeological Site #: 45KT2784

This report is submitted to meet the requirements of Archaeological Excavation permit No.2008-15 (Steven Hackenberger and Shane Scott CWU-CWAS)
See Section 6.4 (shovel probing), Appendix C (permit), Appendix D and E (artifact inventory), and Appendix F (negative results of deep trenching).

ROSLYN HISTORIC DISTRICT No. 4 COAL MINE (45KT2784) INDUSTRIAL SPACE CULTURAL RESOURCE ASSESSMENT, UPPER KITTITAS COUNTY, WASHINGTON



Prepared for

SUNCADIA, LLC
4244 Bullfrog Road, Suite 1
Cle Elum, Washington 98922

Prepared by

Tucker O. Orvald, M.S. and Dr. Steven Hackenberger
Central Washington Anthropological Survey
Central Washington University
400 University Way Ellensburg, WA
98926-7542

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EXECUTIVE SUMMARY

In anticipation of potential future Master Planned Development in Roslyn, Washington, Suncadia, LLC contracted Central Washington University (CWU) to conduct a cultural resource assessment of the Roslyn Historic District No. 4 Mine Industrial Area in upper Kittitas County. Central Washington Anthropological Survey (CWAS) personnel performed background research and pedestrian survey for the 30+ acre project area and identified and recorded an extensive historic coal mining related archaeological site. During pre-field historic mining map research and ensuing fieldwork, CWAS personnel mapped and documented some 38 historic archaeological features, including foundations, slabs, footings, tipple piles, and berms; and four historic artifact trash dump concentrations.

CWAS produced a detailed, feature level archaeological site form for the property and submitted it to the Washington State Department of Archaeology and Historic Preservation (DAHP). DAHP personnel assigned trinomial 45KT2784 to the industrial archaeological site. Historic archaeological site 45KT2784 is a contributing component to the Roslyn Historic District, which is listed on the National Register of Historic Places (Lenz 1977).

CWAS applied for and received an archaeological excavation permit from DAHP for limited subsurface survey across 45KT2784 (Appendix C). Although the proposed Suncadia led development did not materialize, CWAS conducted preliminary field work in selected project area. CWAS conducted systematic shovel probing in three loci of 45KT2784 to identify the nature of potential subsurface historic components (Appendix D and E) and to sample the property for the presence of precontact archaeological materials. Shovel probing resulted in the identification and collection of historic glass, brick, clinker, and metal artifacts in all loci; however, precontact materials were not identified in probes of deep trenches (Appendix F).

CWAS also drafted a feature specific Cultural Resource Management Plan (CRMP) for the No. 4 Mine District CRMP. This plan (see Appendix F) can be updated and finalized if Suncadia LLC or other parties resume development for the project area. The plan will both: 1) guide interpretation efforts for future public involvement and 2) provide a structure for mitigation of proposed development across the property.

ACKNOWLEDGEMENTS

CWAS would like to thank Paul Eisenberg, Vice-President of Suncadia, Dr. Steven Hackenberger of the CWU Anthropology Department, and Dr. Morris Uebelacker of the CWU Geography and Land Studies Department, for their support in this endeavor. Appreciation is extended to Jim Dawson of Dawson Associates and to Marcia Hadley, of Gamble-Hadley, design architects for the proposed No. 4 Mine District project. The results of the assessment would not have been possible without the detail oriented work of Tucker Orvald (CWAS), and the Kilpatricks, of Sand Poil Surveying. Shane Scott (CWAS) managed the permit process, conducted the final phase of field work, and provided significant input and report editing. Shane and Julie Lind are to be credited for developing the high quality GIS applications and maps. We would also like to thank the undergraduate and graduate students of the CWU Anthropology Department and the CWU Resource Management Graduate Program for their assistance in the field. Special thanks to C.J Anderson (CWU-REM) who helped pull together many of the historical sources and photographs cited in this report. Continuing thanks go to Nick Henderson of the Roslyn Museum for access to historic photographs and insight on the cultural resources that comprise the No. 4 Mine District, and archaeological site 45KT2784.

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1. INTRODUCTION

Artifacts and archaeological features present on the ground surface offer a unique record of human land use that can provide an important connection to the past for modern populations, as well as a chronicle of human land use (Dunnell and Dancey 1978; Bicchieri 1994). The heritage and scientific values we attach to these non-renewable cultural resources are recognized in federal and state regulatory compliance requirements intended to avoid or limit their disturbance and destruction. In an ongoing effort to conserve cultural resources in the Roslyn, Washington area, Suncadia, LLC contracted Central Washington University (CWU) to identify, document, and assess the archaeological record present on property contiguous with the Roslyn Historic District.

Initially referred to as the "Section 17 Property," Kittitas County parcel Number 456234 is currently owned by the City of Roslyn. Suncadia has an option to buy the thirty plus acre property, as well as additional adjacent parcels, and intends to develop them for mixed residential and commercial use. The City of Roslyn and Suncadia are in the process of preparing an Environmental Impact Statement (EIS) for the proposed Master Plan Development (MPD). Although known and used by Roslyn locals as a transportation corridor and informal recreation ground, Lenz (1977:3) referred to the area as the *Roslyn Historic Industrial Open Space* and deemed it a contributing component of the Roslyn Historic District. The property is currently zoned light industrial and residential. A shorter moniker, the *No. 4 Mine District*, is currently favored for the property and the proposed development.

The No. 4 Mine District, currently an abandoned industrial open space, is located at the eastern boundary of the City of Roslyn, largely within the footprint of City limits, which is the same boundary Lenz (1977) defined for the Roslyn Historic District (Figure 1). The thirty-acre potential development site is located east of State Route 903, between East California Avenue on the south, and Dakota Avenue to the north. The Northern Pacific (N.P.) Railroad, and its business vehicles the N.P. Coal Co. and the Northwestern Improvement Co. (N.W.I.), used the area historically for underground bituminous coal mining and its support from the mid 1880s into the mid 20th Century. At various times from the mid 1880s through the 1970s, the No. 4 Mine area included the N.P. Railroad's Roslyn-Ronald railway branch line, a coal-fired steam power plant, and the No. 4 Coal Mine, with its vertical shaft, headframe, tipple, hoist house, and mountainous waste rock bank, or tipple pile. In addition to the No. 4 and its immediate surface structures, the industrial area served as the coal transportation locus for the N.P. Coal Company's No. 1 and No. 2 mines and the N.W.I. Co. coal mines No. 6 and No. 8, with their once extensive tipple structure, and four looming culm banks. Additional structures

formerly on the property include a sawmill, a miners' wash house, various warehouses and storage sheds, stables, coal cart runways and trestles, short line railroad sections, and the Roslyn Foundry. Nearly all of the structures related to coal mining surface operations are removed and demolished and remain as remnant foundations, slabs, berms, and tipple piles.

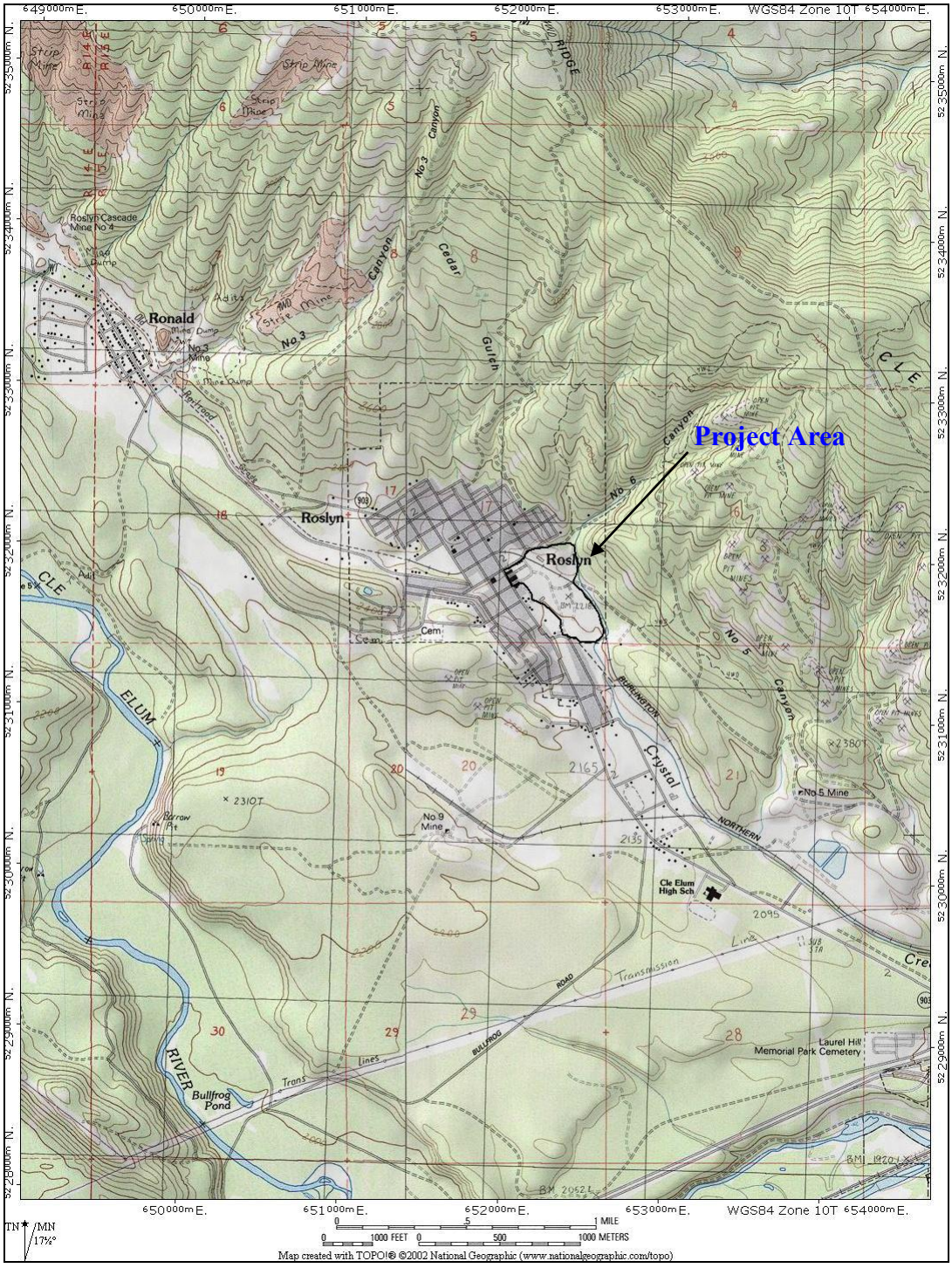


Figure 1. Upper Kittitas Co. project location depicted on Ronald & Cle Elum quads.

1.1 PROJECT DESCRIPTION

The No. 4 Mine District MPD, proposed by Suncadia, LLC, calls for transformation of approximately 30 acres of open space between First Street and the Coal Mines Trail, formerly the N.P. Railroad Roslyn-Ronald branch line. The project would potentially include a mix of residential, commercial, interpretive/historic, and open space uses (Figure 2). The property is currently zoned for a combination of multi-family residential and light industrial use. Anthropogenic sediments of coal, cinders, sand, waste rock, and artifacts cover much of the MPD site surface, which will require deposition and compaction of structural fill (ICE 2006). At completion, the MPD could include up to 200 housing units, including cottages, duplexes, single-family homes, lofts and apartments. Suncadia would also develop approximately 118,000 square feet of commercial and small retail use spaces on the ground floor of two-story mixed-use buildings, with residential space above. Preliminary plans call for structures to exhibit architectural styles present throughout the Roslyn Historic District.

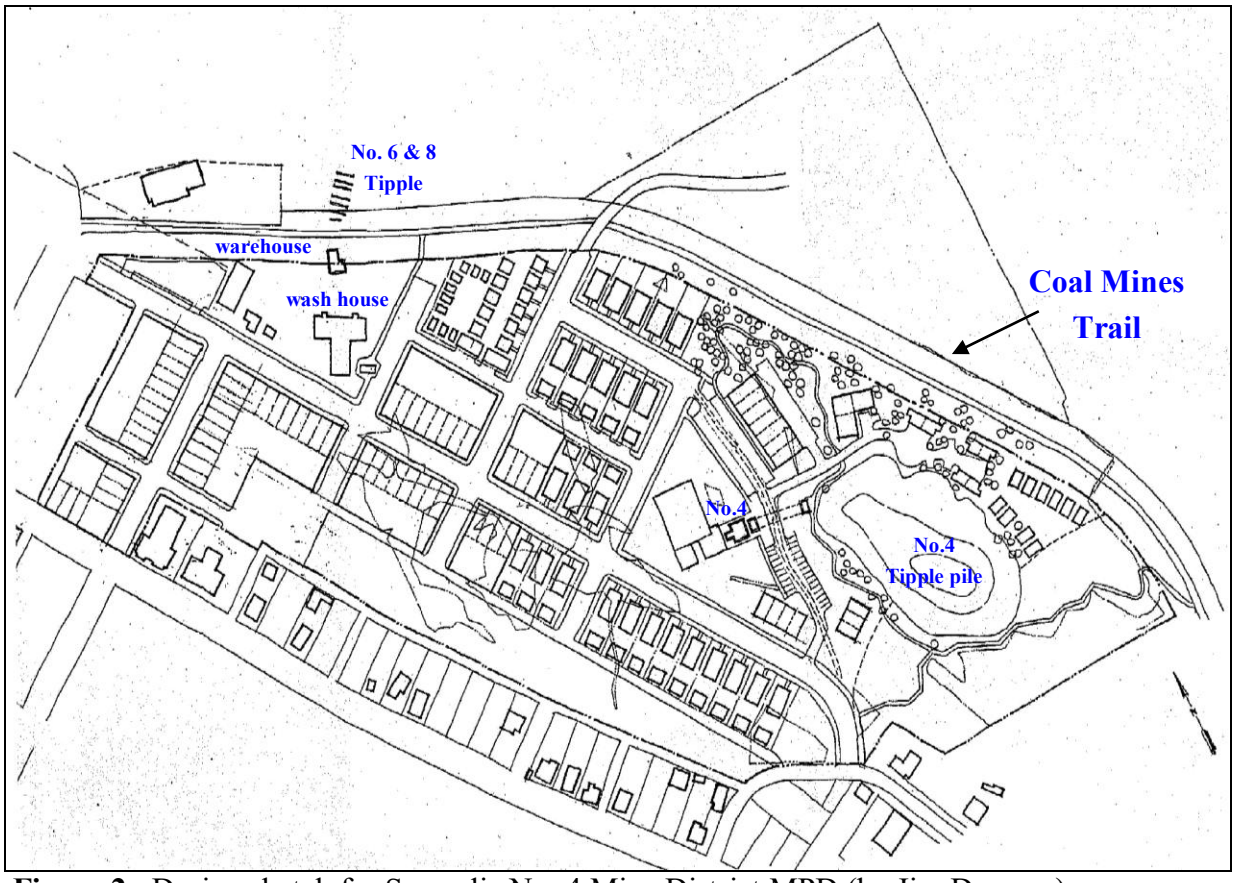


Figure 2. Design sketch for Suncadia No. 4 Mine District MPD (by Jim Dawson).

As part of the MPD, Suncadia may also recreate several historic structures for cultural, social, and commercial uses. A brick masonry power house may be constructed for commercial use at the original N.W.I. Co. power plant location. Close by, the headframe over the No. 4 Mine

shaft would be reconstructed as a commemorative element to the eleven miners killed in the 1909 explosion (Cle Elum Echo 1909). Closer to the No. 6 and No. 8 tipple structure, the miners' wash house may also be recreated as an interpretive facility combined with commercial purposes. The warehouse at the northern end of the property is planned as a multiple use community pavilion, as is part of the surrounding open space. Two small storage buildings, located close to the Wash House may also be recreated for park or commercial purposes. All of these efforts would include interpretive elements.

Open space would comprise approximately twelve acres of the total site area. Open space would be located in the southern portion of the site, in areas characterized as wetland, the No. 4 Mine Tipple Pile and connections to the Coal Mines Trail, the former Northern Pacific Railroad spur line right-of-way. A greenbelt of approximately four acres would be maintained on the western portion of the site. Open space would also surround the redeveloped historic buildings. Paths and footbridges, using the existing City of Roslyn right-of-way, would provide pedestrian connections through the open spaces to the existing community. Vehicle access would utilize existing streets.

1.2 SCOPE OF WORK

Suncadia contracted CWU to conduct an inventory and analysis of cultural resources on the proposed MPD project site to address City of Roslyn and state regulatory compliance requirements as part of property development planning. This investigation constitutes an initial phase in implementing a plan for the conservation of archaeological resources located on the physical project property associated with the Roslyn Historic District. Analysis is focused on identifying and explaining the archaeological features and artifacts across the project area. This will require pairing extensive historic data for the locality with the physical remains observed at the surface and in the near subsurface. Formulation of one or more historic contexts with which to evaluate the property and determine the effect project development at the No. 4 Mine area is also central. For the No. 4 Mine site, the process is divided into two phases: identification and recording; and mining site evaluation under Criterion D of the National Historic Preservation Act.

Cultural resource investigations entailed several elements, including background research, pedestrian survey, archaeological site documentation, Global Positioning Systems (GPS) and Geodetic Total Station (GTS) mapping, application for an excavation permit, subsurface survey, backhoe trenching, and production of this report of findings. CWU services included the following cultural resource tasks:

1.2.1 Cultural Resource Tasks

1. Definition of an Area of Potential Effect (APE) for purposes of data collection and subsequent impact evaluation.
2. Continued consultation with the Washington State Department of Archaeology and Historic Preservation (DAHP) and the Yakama Nation regarding cultural resource concerns for the City of Roslyn and Suncadia.
3. Archival review of project site and area history, including historic maps and photographs, cultural resource investigation reports, archaeological site inventory forms, and relevant historical and environmental literature.
4. Systematic surface pedestrian survey of the APE to determine the location and extent of artifacts and archaeological features associated with the No. 4 Mine and surrounding area, as well as the lower No. 6 & No. 8 mine-related features that could be potentially adversely affected by site development.
5. Document historic features and artifact concentrations identified across the APE during pedestrian survey, and produce a detailed Washington State Archaeological Site Inventory Form for submission to DAHP. The site form effort will include collection of GIS compatible spatial data for all documented archaeological resources and the generation of a feature specific site map, to scale.
6. Write and submit and an archaeological excavation permit application for preliminary subsurface survey across the site and for potential future mitigation work at the No. 4 Mine Industrial Site.
7. Conduct preliminary subsurface survey and limited deep trenching to identify the presence of buried precontact and historic period artifacts or archaeological deposits, or areas with domestic artifacts within the APE.
8. Produce a report of findings. The report will constitute an inventory of archaeological resources identified on and near the project area, provide a historic and environmental context for Roslyn coal mining related cultural resources and make recommendations for avoidance and mitigation of foreseeable adverse impacts. The City of Roslyn, Suncadia, and CWU staff will determine which portions of the research may or may not be disclosed publicly to protect cultural resources and any documented archaeological artifacts, features, or sites, as required by RCW 42.56.300.

9. Temporarily store artifacts collected over the course of subsurface investigations. The ownership and disposition collected artifacts will be determined by the City, Suncadia, and CWU, and will be consistent with protocols established by state law.

1.2.2 Additional Efforts

Supplemental aspects of the investigation relevant to the Roslyn-Suncadia MPD project include determining the locations for several historic structures on the property that are either no longer standing or are reduced to incomplete remnant sandstone or concrete foundations. These structures include the wash house, the warehouse at the northern end of the property, the steam power plant, with adjacent hoist house and boiler house, and the No. 4 mine shaft and tipple structure. In addition, CWAS personnel consented to placement of cyclone fence corners at the select located building corners to act as visual cues for an early public involvement event on the development site on September 8, 2007.

A final effort by CWAS entailed the formulation of a preliminary *Cultural Resource Management Plan* (CRMP) for the No. 4 Mine District MPD and the historic industrial archaeological site documented during the inventory effort. The No. 4 Mine District CRMP is similar in character and scope to that devised by CWU, Suncadia, and the Yakama Nation for the Suncadia Master Planned Resort (MPR) Rope Rider Golf Course, located on the N.W.I. Co. No. 9 Mine Complex, or National Register of Historic Places (NRHP) eligible archaeological site, 45KT1380 (Churchill 1998; Smith 2005; Smith, Uebelacker and Orvald 2005).

1.2.3 The EIS

Historic preservation is a primary concern for the City of Roslyn's growth management planning (Browitt 2001; Beardsley 2007). As the State Environmental Policy Act (SEPA) lead agency, the City of Roslyn has determined that the project proposal may have a significant adverse impact on the environment. Therefore, an Environmental Impact Statement (EIS) is required under RCW 43.21C030(2)(c). As the applicant, Suncadia volunteered to prepare an EIS prior to the City's determination. The draft EIS addresses the direct, indirect, and cumulative impacts of the proposed project, reasonable mitigation measures, and significant adverse impacts that cannot be avoided. Construction-related impacts will also be identified.

1.3 THE PROJECT AREA

The project area is located in upper Kittitas County within the eastern limits of the City of Roslyn, in Section 17 of Township 20 North - Range 17 East, Willamette Meridian. Roslyn

and the MPD site are located in an area of historic bituminous coal mining, which at different times from 1880s through the 1970s included a branch railroad line, a sawmill, a steam power plant, the various No. 4 Mine surface structures, the No. 6 and No. 8 tipple structure, a wash house, stables, storage buildings, and the Roslyn Foundry. The area also served the first industrial coal mines in the Roslyn Coal field, the No. 1 and No. 2., followed by the No. 4 Mine, and later the processing and delivery infrastructure for No. 6 and No. 8 mines, located on Cle Elum Ridge. The power plant provided electricity to several N.W.I. mines in the area, including the No. 3 Mine in Ronald, the No. 5 and no. 7 in Cle Elum, a sawmill, Roslyn's domestic and commercial needs, and the Roslyn Foundry. Remnant sandstone foundations, concrete slabs, and footings for various historic industrial structures, berms and gravel prisms for rail transportation, two linear berm and depressions ponds, and immense culm banks, known locally as 'tipple piles' are present across the site (Figure 3 and Figure 4).



Figure 3. Overview southeast from top of southern No. 6 & No. 8 tipple pile.



Figure 4. Overview northwest from top of southern No. 6 & No. 8 tipple pile.

1.4 AREA OF POTENTIAL EFFECT

The proposed MPD project entails substantial alteration of over thirty acres of flat, gently sloping land in the southeast portion of Section 17. Modifications to the ground surface, primarily by past mining activities, have resulted in widespread areas of fill (ICE 2006). As bounding properties are owned by other landowners, and development is restricted to the project footprint, CWAS defined the project Area of Potential Effect (APE) as the entire the 30 plus acre area encompassed by Kittitas County parcel numbers 456234 and 10162. Parcel 456234 includes most of the MPD project area, and parcel 10162 includes a small horse pasture area, immediately northwest of the central project area, across Dakota Avenue. This definition of the APE is relevant to potential direct physical adverse effects to the integrity of the property as an archaeological site.

CWAS consultations highlighted the potential for both adverse and favorable effects from the proposed project to the Roslyn Historic District by virtue of changes to the No. 4 Mine District industrial area and to the surrounding community. The APE is a larger concern, and one that the EIS process will address. A recent digital aerial image of the project area with survey control data, parcel boundaries, and contour data may be found in Appendix A.

Initial ground disturbing activities associated with construction include clearing and grading much of the property, as well as the installation of an expansive mantle of structural fill, up to four feet in depth. Future construction, including structures, utilities installation, vehicle access and parking, and landscaping may all constitute future impacts to the property depending on their placement on the project site. The No. 4 Mine District MPD may require the removal and/or burial of many of the remnant foundations, concrete slabs, pilings, berms, and pit features that occur across the APE. Conversely, the MPD will commemorate and showcase the location of the historic No. 4 Mine shaft, and recreate structure elements of the historic industrial area, which is itself an element of the greater Roslyn Historic District.

2. ENVIRONMENTAL SETTING

2.1 REGIONAL GEOLOGY

The project area is located on the eastern side of the central Cascade Mountains, near the boundary between the northern Cascades and the Southern Cascades physiographic provinces, and west of the Columbia Basin (McKee 1972; Franklin and Dyrness 1973:6). The Cascades in this vicinity consist primarily of tertiary sedimentary and volcanic rocks overlain by Pleistocene glacial sediments (Tabor, Wright Jr., Frizzell Jr., Swanson, Byerly and Bentley 1982; Tabor, Frizzell, Booth and Waitt 2000). Pleistocene glaciers carved steep-sided bedrock valleys oriented in a general northwest-southeast direction. Two relatively steep bedrock ridges, Easton Ridge and Cle Elum Ridge, generally trend northwest-southeast, and border the project area to the west and northeast, respectively.

Pleistocene valley glaciers filled the basin floors with outwash gravels, lake sediments, and glacial moraines (Porter 1979). The Cle Elum River Valley lies southwest of the project area, and is the result of Pleistocene glacial erosion and deposition ands Holocene incision. Glacial lakes were created periodically by impoundment of water behind terminal moraines. Cle Elum Lake is the result of these processes, with the current dam constructed within the moraine which created a natural dam across the Cle Elum River Valley. Keechelus and Kachess are the results of similar glacial erosion and deposition processes, and all three lakes drain in a generally south to southeasterly direction into the upper Yakima River basin. Alpine valley glacial erosion and subsequent Holocene alluvial erosion have resulted generally low-relief topography up the Yakima River basin, a condition the N.P. Railroad found requisite in its selection of Snoqualmie Pass and nearly Stampede Pass for the Cascade Branch of the railway (Saunders 1914:20; Renz 1980; Lewty 1995).

2.1.1 Bedrock Geology

Tectonic activity between the Cretaceous and mid-Tertiary periods resulted in the formation of a sedimentary basin in eastern portion of the central Cascade Range. A thick sequence of non-marine sediments filled the basin; the Swauk, Teanaway, and Roslyn Formations were all deposited during the Eocene in what is referred to as the Swauk Basin. A sequence of sandstone, basalt, and sandstone characterizes bedrock geology of the lower Cle Elum River valley and the upper Yakima River basin. It is in the sandstone of the Roslyn Formation that high quality bituminous coal occurs.

The Swauk Formation is the oldest of the Eocene rocks mapped in the project area and consists of sandstone, conglomerate, and volcanic rocks. A narrow area on the west side of Easton Ridge is mapped as Swauk Formation (Tabor et al. 1982). The Teanaway Formation consists of primarily of basalt and comprises most of Easton Ridge.

The Roslyn Formation consists of thickly bedded, non-marine arkosic sandstone with shale and the various coal seams that ignited the historic industrial resource extraction activity and settlement of the Roslyn, Cle Elum, and Ronald area (Saunders 1914). The Roslyn Formation is exposed above Roslyn on Cle Elum Ridge and underlies the unconsolidated sediments beneath the project area and most of Roslyn, Ronald, Cle Elum, and the lower Cle Elum River valley. Holocene aged sandstone derived alluvium and Pleistocene loess comprise most of the overlying deposits in the project area. Deeper glacial drift deposits of Pliocene and Quaternary age are also present and are both glaciofluvial and glaciolacustrine in origin (Porter 1979; Tabor et al. 1982; Tabor et al. 2000; ICE 2006).

2.1.2 The Roslyn Coal Field

Willis (1886) first mentioned coal mining from the so-called Roslyn beds, which he observed as similar to those found in the Puget Sound area. Russell (1900:123-127) named the formation that Smith (1904:6-7) and Smith and Calkins (1906:4) subsequently described. The main body of the Roslyn Formation, characterized by thickly bedded white sandstone, crops out along the crest of Cle Elum Ridge and along its deeper ravines and draws. Bressler (1951, 1956) studied the Roslyn definitively, documented its fluvial origin, and divided it into three sandstone sub-units, which consist of a lower member with abundant conglomerate, a middle member, and an upper, coal-bearing member. The three members total some 2,000 meters in thickness. Walker (1980) described the Roslyn Formation and its coal beds and, on the basis of structural interpretations, estimated its thickness to be 2,590 meters. Foster (1960:109) considered the Roslyn Formation to be of middle to late Eocene age on the basis of fossil leaves and sparse vertebrate remains. The coal field is isolated on the eastern Cascades slope.

The Roslyn-Cle Elum coal field is the only coal body of importance in Washington located on the eastern slope of the Cascades (Saunders 1914; Dart 1948; Beikman, Gower and Dana 1961). The coal field is located southeast of Lake Cle Elum and north of the confluence of the Cle Elum and Yakima Rivers, which cross the southwestern and southern parts of the field. The Roslyn coal field covers an area of some thirty square miles. The coal bearing sequence is limited to the upper 1,560 feet of the Roslyn Formation, and contains eight major beds of coal ranging in thickness from to twenty-one feet to less than three feet; portions of the beds are interbedded with medium to very fine grained sandstone and siltstone (Saunders 1914).

Coal is defined by the relative amount of carbon it contains, as well as the heat value it produces when burned. Roslyn Formation coal interbeds and the Roslyn-Cle Elum coal field consists of several beds of bituminous coal. The most common type of coal, it can be either shiny or a dull black, is easy to light and burns with a smoky yellow flame. Bituminous coal occurs throughout the western United States, including the Cascade Range, and is suited for a range of uses, from domestic to industrial.

2.1.3 Coal Field Structure

The structure of the Roslyn Formation and local surface geomorphology lends itself to development and exploitation of the coal field (Daniels 1914:158; Saunders 1914:54; Dart 1948). The upper, coal bearing portion of the formation is exposed along the crest and the slopes of Cle Elum Ridge. Tectonic forces have resulted in a folding of the basin as a whole; with dips in the sedimentary sequence of sandstone, shale, and bituminous coal varying between 9° and 30°. The dip of the Roslyn Formation is in the same southwesterly direction as the ridge-slope, and coal is visible in outcrops at the ridge-crest and along the ravines and draws dissecting the slope. Daniels (1914:160) aptly described the formation as "a spoon-shaped, synclinal trough having a southeasterly pitch."

The primary coal bed in the Roslyn field of economic importance is the Roslyn bed, which averages slightly over four feet in thickness. Within the project area, the Roslyn bed occurs some 630 feet below the surface, however, it is irregularly exposed along the outline of the ravine above Roslyn and the project area (Saunders 1914:50). The structure of the coal field, the character of its coal beds, and the topography of the surface in relation to the beds, have largely determined development of the coal mining methods in the Roslyn coal field (Daniels 1914:162; Francaviglia 1991:14).

2.2 SURFACE GEOLOGY

Pleistocene glacial geomorphology indicates that some of the largest alpine glaciers of the Cascades occurred in the upper Yakima River Basin (Porter 1979; Waitt 1979). Pleistocene glaciers filled the basin floors of the upper Yakima River and the Cle Elum River and their tributaries with outwash gravels, lake sediments, and glacial moraines. The stratigraphic and relative geographic positions of glacial moraines and outwash terrace deposits indicate some three episodes of glacial advance. Porter (1979) identified the three major glacial advances in the upper Yakima River Basin from oldest to youngest as the Thorp, Kittitas, and Lakedale drift deposits.

The glacial sediments and depositional features in the Roslyn area are largely comprised of Lakedale drift. Porter (1979) divided Lakedale drift in to four stratigraphic members based on soil development, weathering characteristics, and geomorphic relationships. From oldest to youngest, the Lakedale members are labeled as Bullfrog, Ronald, Domerie, and Hyak. Porter (1979) also identified the individual members according to moraine and outwash terrace relationships, stratigraphic position, and thickness of overlying loess deposits.

Loess typically mantles Pleistocene age deposits in the region, and originates from wind deflation of glacial deposits, which results in transport and deposition of the fine-grained particles. Loess across the glacial outwash terraces of Cle Elum River valley generally consists of seventy percent fine sand and thirty percent silt (Kindred 2005).

2.2.1 Sediments and Soils

Holocene alluvium derived from the ravines and draws of Cle Elum Ridge above Roslyn mantle much of the project area, and overly residual glacial sediments. The position of the relatively flat lying basin of the project area at the base of the primary ravine above town – the No. 6 Canyon of the Cle Elum 7.5' quadrangle, is cause for the formation of an alluvial fan at the northern margin of the project area. Surface geology in the low-relief southwestern portion of Section 17 is mapped as alluvium. Alluvium is described as silt, sand, and gravel largely derived from the siltstone, sandstone, and coal deposits of the Roslyn Formation. Sandstone bedrock and glacial sediments underlie alluvium across the project area at depths greater than three meters (ICE 2006:3).

The well-drained soils in the timbered areas of upper Kittitas County are members of the Teanaway, Cle Elum, Pend Oreille, Volperie, Bertolotti, Roslyn, and Springdale series (Smith, Dwyer and Schafer 1937:40). Soils in the project area are well-drained and loamy and primarily part of the Roslyn fine sandy loam body.

In the spring of 2006, Suncadia contracted Icicle Creek Engineering (ICE) to conduct a geotechnical evaluation of the No.4 Mine. It was concluded that the majority of the property is comprised of various degrees of anthropogenic fill. This fill is the result of years of mining activity and is generally unstable for construction purposes. Modifications to the ground surface, primarily by past mining activities, have resulted in widespread areas of fill particularly in the area southwest of the Coal Miner's Trail (Figure 5).

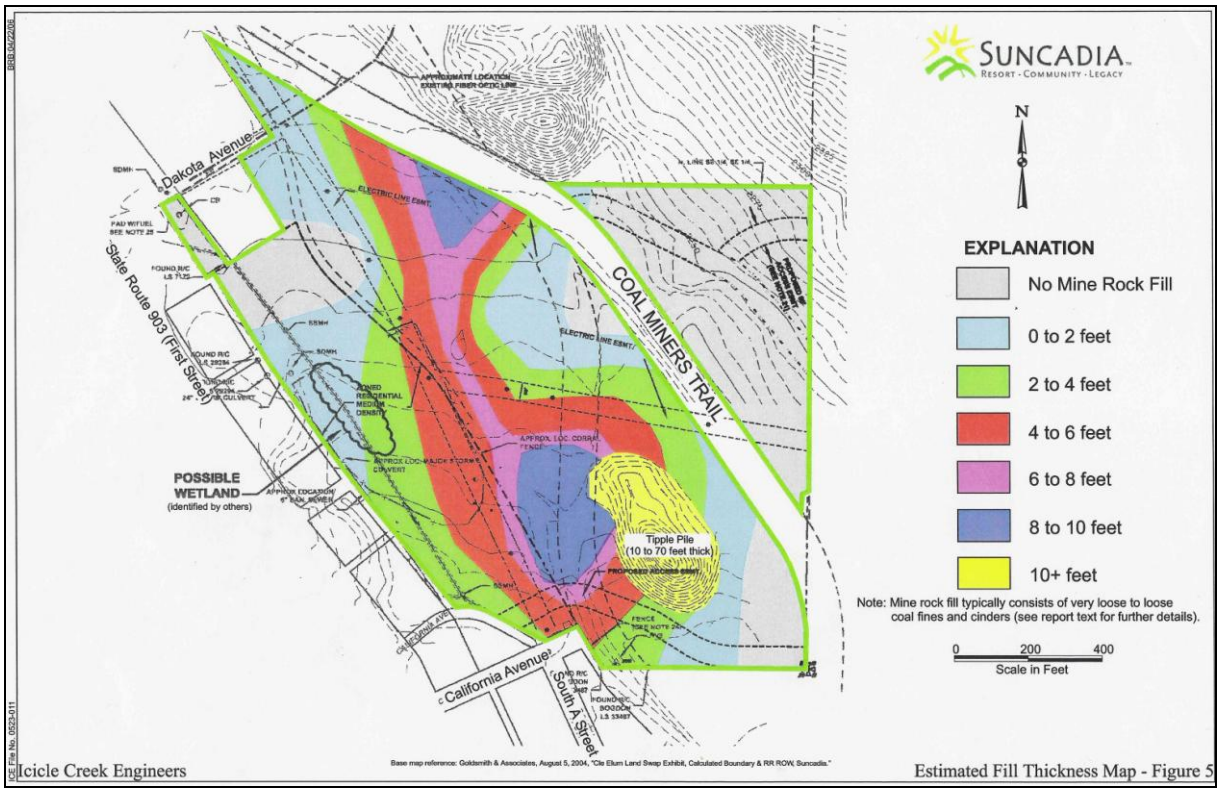


Figure 5. Estimated fill thickness map by Icicle Creek Engineering 2006.

2.3 VEGETATION

The project area falls within the rain-shadow of the Cascade Mountains and in the transition zone between the mesic forested uplands of the upper Yakima River Basin and the semi-arid Shrub Steppe of the Columbia Plateau. A xerophytic forest of ponderosa pine occurs along the eastern slopes of the Cascades, typically open forest mixed with grass and shrubs. Roslyn lies near the boundary between the Douglas fir *(Pseudotsuga menziesii)* and Ponderosa pine-Grand fir *(Pinus ponderosa/Abies grandis)* plant association zones as defined by Franklin and Dyrness (1973). Native vegetation would be largely dependant on slope, aspect and moisture availability. Additional over-story vegetation includes mesic species such as aspen (*Populus tremuloides*) and cedar (*Chamaecyparis nootkantensis*). Riparian forests along the Clem Elum River and larger tributaries include an over-story of ponderosa, black cottonwood

(*Populus tripocarpa*), and red alder (*Alnus rubra*). Historic and modern mining and mining related activities within the project area have substantially altered native vegetation.

Under-story vegetation includes Oregon grape (*Mahonia aquifolium*), oceanspray (*Holodiscus discolor*), red elderberry (*Sambucus racemosa*), hazelnut (*Corulus cornuts*), vine maple (*Acer cercinatum*), black hawthorne (*Crataegus douglasii*), wild rose (*Rosa* spp.), sunflower (*Helianthus* spp.), strawberry (*Fragaria* spp.), evergreen and Himalayan blackberry (*Rubus* spp.), salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), indian paint brush (*Castilleja* spp.), yarrow (*Achillea* spp.), fireweed (*Epilobium angustifolium*), indian hemp (*Apocynum cannabinum*), lupine (*Lupinus* spp.) and pinegrass (*Calamagrostis rubescens*).

2.3.1 Project Area Vegetation

CWU personnel identified a diverse set of plant species within the No. 4 Mine District project area. Variability in vegetation is the result of historic and modern settlement, with invasive weed species dominating the open space area. Mesic vegetation occurs in seasonally and perennially wet areas, and in some cases is configured to the extent of historic ground disturbance features, leaking waterlines, and the altered course of the No. 6 Canyon drainage, or Smith Creek. Common names for vegetation observed in the project area includes: Knapweed, Tansy, Tumble Mustard, Mullein, Prickly Lettuce, Salsify, White and Yellow Sweet Clover, Wormwood Sage, Snow Berry, Basin Wild Ryegrass, Scouring Rush, Horsetail, Bracken Fern, Cattail, Night shade, Buttercup, Burdock, Bulrush, Yellow Dock, Chicory, Dog Bane, Pea, Holly Hocks, Oregon Grape, Strawberry, Gumweed, Yarrow, Mint, Field Pennycress, Black Cottonwood, Red Osier Dogwood, Ponderosa Pine, Willow, Blue Elderberry, Choke Cherry, Service Berry, Black Hawthorne, Alder, Beaked Hazelnut, Aspen, Lombardy Poplar and Rose. Domestic fruit trees include Red and Yellow Apple, Pear, Yellow Plum and Cherry.

Historic photographs of the No. 4 Mine District project area depict the locality as largely devoid of vegetation. In some of the early photographs, tree stumps are evident across the open space area (Figure 6). Later photographs depict the industrial area without vegetation, as were many of the slopes surrounding the Roslyn. This was due to local timber harvesting and maintenance of the industrial area. Subsequent to cessation of mining activity in the Roslyn area, vegetation, both introduced and native, has reestablished itself. Cottonwood and willow have preferentially grown in lower elevation areas of the project area, where groundwater is closer to the surface.

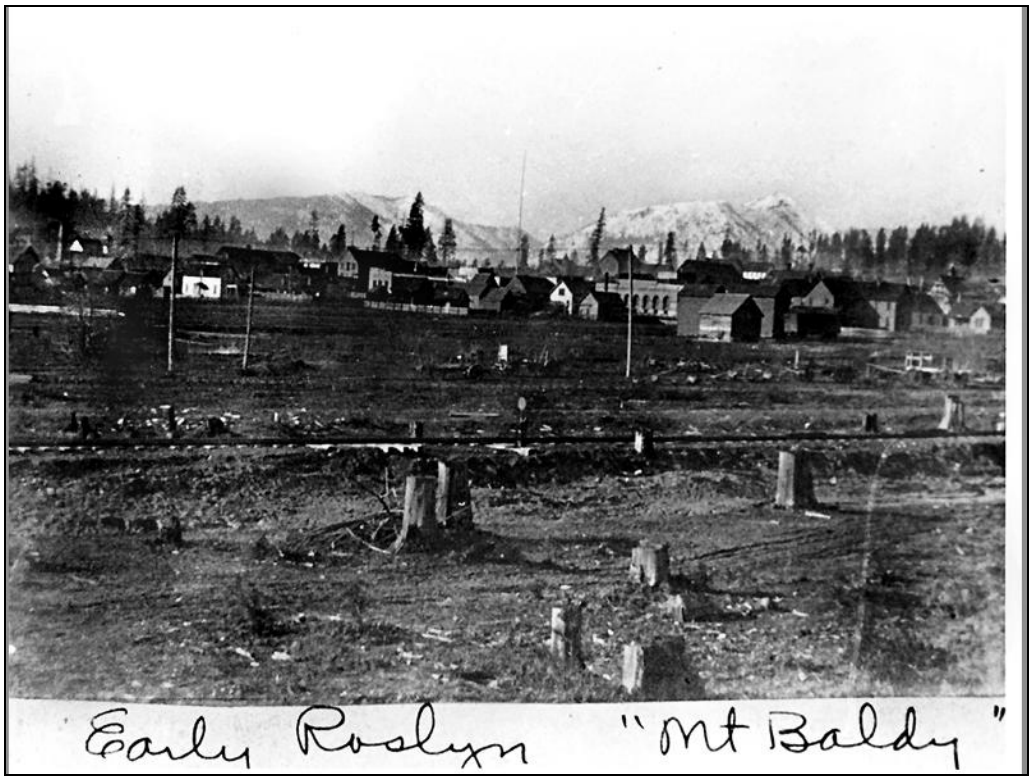


Figure 6. Early photograph of Roslyn industrial area devoid of vegetation.

3. CULTURAL SETTING

The barrier of the Cascade Mountains has long posed a challenge for human travel in the Pacific Northwest (Prater 1980; Marsh 2004). Native Americans were the first humans to confront the Cascades, seeking out topographic lows, or mountain passes, to create a network of travel routes over the range, linking seasonal food acquisition and regional trade (Rice 1964; Zweifel and Reid 1991; Eitemiller, Fraser, Sullivan and M. L. Uebelacker 1995). The earliest Europeans to enter the area, the explorers and fur traders, who would open the West, followed many of the same routes, as did settlers seeking the Puget Sound, followed by cattle drivers, wagon roads, and the railroads.

3.1 ETHNOHISTORIC BACKGROUND

The project area is situated at the western edge of the Columbia Plateau culture area; land traditionally occupied by the Wanapum, Yakama, Kittitas, and Middle Columbia peoples (Ray 1936; Spier 1936:16, 43; Ames, Dumond, Galm, and Minor 1998; Schuster 1998). Distinguishing features of Plateau Culture include riverine focused landuse, with dispersed, mobile settlement patterns and a generalized subsistence breath with a diverse subsistence

base centered on anadromous fish and extensive root and game resources. Other features include overlapping subsistence resource utilization across social groups, extension of kinship ties through intermarriage, and trade networks with institutionalized trading partners and regional affairs (Walker 1998:3). The Kittitas Valley, the upper Yakima River Basin, and the lower Cle Elum River valley are most closely associated with the Kittitas Indians, also known as the upper Yakama.

The Kittitas maintained a number of village sites in the Kittitas Valley and along the Yakima River, among which were two villages in the valley near the present day town of Kittitas; the permanent village of *kla' la* opposite the Yakima River and Taneum Creek confluence; the large village of *yumi'c*, situated four miles below the present town of Thorp; *ti'plas* at the mouth of Swauk Creek; the permanent village of *tia'nawns* near the mouth of the Teanaway River; the large village of *ta'txanxca* near Indian John Hill on the south bank of the Yakima; and the important summer camp of *tlie'lam* at the southern end of glacial Lake Cle Elum (Ray 1936:45, 46).

Landuse activities of the Kittitas followed a generalized, dispersed, mobile design shared by many peoples of the Columbia Plateau cultural area. Food resource procurement strategy mapped on to the cyclical availability of anadromous fish, root crops, berries, and upland game animals. The seasonal round in the region entailed progressive movement in springtime for root crop gathering and to salmonid fisheries, summer upland hunting and gathering, fall fishing and hunting, and the winter stopover at main stem riverine village locales (Eitemiller et al. 1995). Storable and tradable foodstuffs obtained during these activities served as seasonal resource surpluses, and were processed as winter stores.

No. 4 Mine District project area is located within ceded lands of the Confederated Tribes and Bands of the Yakama Nation. The area around the project area was extensively utilized by Native People until 1906, when a crib dam placed at the outlet of Lake Cle Elum devastated the local anadromous fish run. Native populations continued to access the upper basin for seasonal huckleberry gathering and for hunting. For a detailed discussion of the ethnographic and the archaeological background of the project area and the upper Yakima River Valley, refer to Griffin and Churchill (1998).

Native American archaeological sites have not been identified within the No.4 Mine District project area. Throughout the larger 7,000 plus acre Suncadia Master Plan Resort, a total if 31 precontact archaeological sites and one traditional root gathering area have been identified and documented (Griffin and Churchill 1998).

3.2 PREHISTORY OVERVIEW

Archaeological investigation of the Columbia Plateau spans one hundred years. Early efforts concentrated in main-stem riverine settings along the Columbia and Snake rivers as a result of large-scale reclamation projects. Such federal conservation archaeology coincided with the Culture History period of Americanist archaeology and produced what Dunnell (1979:438) termed, "characterizations of time and space in terms of archaeological content." Such characterizations are now routinely applied to the greater Plateau (Campbell 1950; Swanson 1956, 1962; Nelson 1969; Leonhardy and Rice 1970; Galm, Hartmann, Masten, and Stephenson 1981; Greengo 1982, 1986). Ames et al. (1998) and Chatters and Pokytylo (1998) provide cultural historical overviews for the broader Columbia Basin region.

Archaeological periods and phases represent, for the most part, spans of time during which settlement and subsistence are assumed to have changed very little (Bicchieri 1975). Phase ranges are based on a combination of radiocarbon dates and chronologies largely based on projectile point forms (Nelson 1969). While arbitrary and in need of refinement, differences amongst phases are interpreted to represent adaptation shifts that occurred throughout the prehistoric sequence. Table 1 summarizes archaeological characteristics of the Columbia Plateau in terms of generally recognized archaeological phases and the chronological periods to which they are assigned (adapted from Nelson 1969, Leonhardy and Rice 1970, Galm et al. 1981; Chatters 1984, and Ames et al. 1998). Archaeological evidence spanning the prehistoric sequence is divided into five units based on aspects of climate, settlement, subsistence, and technology.

Table 1. Columbia Plateau Culture History.

Years B.P.	Description of Culture Historical Phases & the Clovis Period
250-	**Historic Period** - Introduction of the horse, non-indigenous diseases, and Euro-American technology lead to major cultural change. Settlement patterns changed due to the need to pasture horses and the ability horses provided for long-distance transportation. Diseases brought about significant population collapse. Euroamericans settle in the region.
2,500-250	**Cayuse Phase** - Population concentrated in large, nucleated winter pit-house villages. People dispersed in spring to gather roots and in the fall and winter to hunt. Seasonal round became increasingly diverse and well organized over time. Use of highland areas greatly increased during this period. Trade with coastal and interior groups also became increasingly common.
4,500-2,500	**Frenchman Springs Phase** - Appearance of semi-subterranean houses and more specialized camps for hunting, root collecting, and plant processing (Chatters 1984). Several types of contracting-stemmed and split-stemmed, corner-removed points dominate (Nelson 1969). Many have argued for that the ethno-graphically observed "Plateau Culture" had emerged by the end of the phase.

Years B.P.	Description of Culture Historical Phases & the Clovis Period
8,000-4,500	**Vantage Phase** - Characterized by mobile opportunistic foragers primarily adapted to riverine environments micro-environments (Chatters 1986; Galm et al. 1985). Increasing reliance on fish. Sites are located along drainage margins and projectile points are typically leaf-shaped (Cascade) and large side-notched (Nelson 1969).
10,500-8,000	**Windust Phase** - Characterized by small, mobile bands of foragers/collectors exploiting a wide range of resources using a seasonal settlement system (Chatters 1986). Sites are generally small and exhibit low artifact densities. Large shouldered or basal notched lanceolate projectile points are diagnostic (Rice 1972).
12,000-10,500	**Clovis Period** - Characterized by small, mobile bands of hunter-gatherers that exploited a wide range of subsistence resources, including bison and elk. Sites are small, exhibit low artifact densities, and are associated with early landforms, particularly upland plateaus. Large lanceolate, fluted projectile points (Clovis points) are diagnostic.

3.3 HISTORIC BACKGROUND

Euro-American history of the upper Yakima River Basin is predominantly tied to resource extraction themes including exploration, fur trapping, transportation, coal and hard-rock mining, private irrigation, federal reclamation, logging, and most recently, recreation. Euro-American settlers began arriving in Kittitas Valley after the Washington Territory was formed in 1853. Abundant grassland provided excellent grazing for cattle on route initially to mining communities in British Columbia and later to markets in the Puget Sound (Prater 1981). Cattle ranching flourished, and along with the discovery of gold in Swauk Creek, generated the first real influx of settlers in the late 1860s (Lyman 1919; Jordan 1964). The completion of the Northern Pacific Railroad Cascades Branch in 1887, connecting Ellensburg with Tacoma, led to the accelerated growth of the newly incorporated City of Ellensburg as a regional trade hub (Renz 1980; Lewty 1995). The Chicago, Milwaukee, & St. Paul Railroad, now the John Wayne Trail, completed its path over the Cascade Mountains in 1909 Prater 1981).

3.3.1 Upper Yakima River Basin History

By the mid-19th Century, in the wake of the Lewis and Clark expedition, the fir trade, and the westward push of Manifest Destiny, an increasing number of immigrants flowed into the Pacific Northwest, many of whom would make their way to the Puget Sound. Early commercial routes over the Cascades also followed the old routes, but travel was slow and uN.P.redictable. Continued settlement in the Puget Sound area prompted the first surveys for a route over the mountains in the mid-1850s. The first surveys, conducted for territorial governor Isaac Stevens by George McClellan, failed to identify a clear and reasonable route over the mountains, and the first rough wagon road was not completed until the 1860s (Prater 1981).

The Snoqualmie Wagon Road, through what is today Snoqualmie Pass, was the major route between east and west until the 1880s, when railroads became the primary means of transport in the region (Prater 1981). In additional to access provided by the wagon road, the discovery of gold in the Swauk watershed, east of the Roslyn area, intensified interest and settlement throughout the Kittitas Valley and the spurred growth of the community of Ellensburg (Lyman 1919).

3.3.2 The Roslyn-Cle Elum Coal Field and the Northern Pacific Railroad

Exactly which Euro-Americans discovered coal in the Roslyn area and when they did so is not known. Many stories suggest that local settlers were aware of the upper Yakima River basin coal resources as early as the 1860s, but commercial interest began only with the rumored arrival of railroads in the area in the 1880s (Jordan 1964). Although a survey team from the Union Pacific Railroad failed to find significant coal deposits in 1883, local production began around that time with small shipments to blacksmiths and others in and around Ellensburg (Daniels 1914:153; Saunders 1914:17).

George Virden, who settled in the lower Swauk Creek Basin, claimed that he was the first man to discover the Roslyn coal (Jordan 1964). While trapping and prospecting around Lake Cle Elum, Virden came across a coal outcrop. Virden took the first sack of coal from Roslyn and had it tested by a blacksmith in Ellensburg to show its value. Thinking it could not amount to anything, he did not file on the land. He also hauled the first load of coal from Roslyn for his own homestead blacksmith shop. Saunders (1914:17) credits a Mr. Isaiah Buchanan with knowledge of coal in the Roslyn area in 1871 or 1872. Saunders (1914:17) also acknowledges Wm. McKay as among the first in the Roslyn coal field as well as a primary source for early history of its development.

The arrival of the Northern Pacific (N.P.) Railroad is where the story of coal in the eastern Cascades begins. In 1886, the N.P. Railroad sent a survey team to Cle Elum that discovered what is today known as the Roslyn-Cle Elum Coal Field (Daniels 1914:153; Saunders 1914:17; Dart 1948). The N.P. Railroad began almost immediately to develop its newly discovered coal resource, including surveying and building a new branch line to the field from Cle Elum, where the company was working to complete the rail link over Stampede Pass (Saunders 1914:17; Renz 1980:123; Lewty 1995).

Construction of the branch line to Roslyn and above it to Ronald, and ever-increasing numbers of settlers, led directly to the settlement and growth of what today is upper Kittitas County. Cle Elum, Roslyn, and Ronald all owe their existence to the activities of the N.P.

Railroad and to several coal companies, which were tied, either formally or indirectly to the railroad.

Cle Elum was founded in 1886, and was temporarily the headquarters for railroad construction in the area. Roslyn was officially founded several months later and built on land owned by the N.P. Railroad and later, its subsidiaries, the Northern Pacific Coal Company and the Northwestern Improvement Company (N.W.I.). With the primary mines, transportation infrastructure, a company general store, housing, and services all owned and controlled by the N.P. Railroad, Roslyn was a classic company town, where corporate paternalism would structure and govern daily life for decades (Lenz 1977; Shideler 1986; Metheny 2007). Roslyn quickly became the leading community in the upper Yakima River basin.

3.3.3 Roslyn Coal Mining 1886-1963

The N.P. Railroad opened the first coal mines in the Roslyn coal field, the No. 2 and No. 1 mines in August of 1886, located on the lower slopes of Cle Elum Ridge immediately north of Roslyn (Daniels 1914:153; Saunders 1914:17; Prater 1994). The company eventually opened ten different mines in the coal field between 1886 and 1944, and closed the last mine in the area in 1963. From 1886 to 1963, approximately 65 million tons of coal was produced from the Roslyn Coal Fields (Shannon and Wilson 1977). Over that period, it would become the largest producer of coal in Washington, and the primary property owner in the Roslyn area. In addition to the N.P. Railroad and its subsidiary coal mining and land management companies, other coal producers included the Roslyn-Cascade Coal Company and the Roslyn Fuel Company, as well as several small private operations.

During the 1886-1963 coal mining period, over 64 million tons, or one cubic mile of coal, was produced from the Roslyn-Cle Elum coal field. Peak production occurred in 1920, when near two million tons of coal was extracted (Dart 1948; Shideler 1986; Smith 2005). This followed a string of highly productive years for coal production in the upper Yakima River basin. Despite the opening of the No. 9 Mine in 1928, and the introduction of machines in the mining process, total area production fell below one million tons per year by 1930. By that time, only four of the N.W.I. mines were still operational. Notwithstanding a small surge in production during World War II, by the mid-1940s total annual production fell below 1898 levels. The last commercial mine in the area, the No. 9 Mine, closed in 1963. Most experts estimate that the remaining reserves of coal in the Roslyn-Cle Elum field range from 170 to 270 million tons of coal (Dart 1948; Shideler 1986).

The majority of the coal extracted from the Roslyn-Cle Elum field was used for transportation. The first coal shipments were used by the N.P. Railroad to fuel its locomotives. The N.W.I. Co. used its coal exclusively for locomotive power and for local power generation at least through 1914 (Daniels 1914:178, 185). Coal from the eastern cascades was also used for steamships, which even after the arrival of the railroads remained a major source of transport and trade in the U.S.

In addition to its use for locomotives and ships, Roslyn coal was used for domestic energy. The coal beds of Kittitas County supplied home and commercial heat for much of the eastern Washington (Daniels 1914:185-186). Roslyn area coal was also burned locally in the local N.W.I. power plant to provide electrical power for mine operations and municipal power for the communities of the Roslyn and Ronald. The N.W.I. power plant produced power for the adjacent No. 4 Mine in Roslyn, the No. 3 Mine in Ronald, and the No. 5 and No. 7 mines between Roslyn and Cle Elum.

Changes in the nature of fuel resources would eventually catch up with the coal industry. The emergence of another fossil fuel, oil, led to dramatic reductions in the amount of coal mined in the Roslyn-Cle Elum field, as well as the number of miners who brought it to light. By the mid-1920s, numerous mines in the area closed in response to decreased demand for coal and coal based energy, and the development of cheaper coal reserves in other western states. This, coupled with the development of hydroelectric power in the Pacific Northwest, eventually closed the Roslyn-Cle Elum coal fields. A summary of coal mining history in the upper Yakima River basin and the Roslyn-Cle Elum coal field is provided in Table 2.

Table 2. Working timeline for coal mining in the upper Yakima River Basin.

1833	First reported coal discovery in Washington Territory at junction of Cowlitz and Toutle Rivers
1871-2	First Euro American knowledge of coal in Roslyn area
1882-3	Extraction of coal from Roslyn field for local use (to Ellensburg)
1886	N.P. Railroad sends survey party to prospect for coal in upper Yakima River basin July - First Cle Elum plat filed Summer - N.P. Railroad opens Roslyn No. 1 and No. 2 mines in Smith Creek Canyon and completes branch line from Cle Elum to Roslyn with Chinese labor September - First Roslyn plat filed December - First coal (1,500 tons) sent out via rail
1887	N.P. Coal Co. opens No. 3 Mine north at Ronald and completes branch line to mine
1888	August-September - First labor strike in Roslyn-Cle Elum field, N.P. Coal Co. imports African-American workers for the mines – Roslyn fire destroys town
1889	City of Roslyn incorporated
1892	May 10 - Explosion at No. 1 Mine kills 45 men

1893	N.P. Coal Co. sinks 650' vertical Roslyn Shaft, later named the No. 4 Mine
1894	N.P. Coal Co. No. 4 Mine in operation
1897	N.P. Railroad organizes the Northwestern Improvement Company
1898	N.P. Coal Co. transfers area holdings (mines, company store, town itself) to N.W.I. Co.
1903	N.W.I. Co. opens No. 5 Mine east of Roslyn
1906	N.W.I. Co. opens No. 6 Mine on Cle Elum Ridge north of Roslyn
1907	N.W.I. Co. opens No. 7 Mine between Roslyn and Cle Elum
1909	October 3 explosion and fire at No. 4 Mine kills 10 – mine closed to coal extraction
1916	N.W.I. Co. opens No. 8 Mine on Cle Elum Ridge north of Roslyn
1928	First machinery introduced into Roslyn-Cle Elum mines
1929	N.W.I. Co. opens No. 9 Mine, accesses Roslyn coal bed and the No. 4 mine workings
1935	N.W.I. Co. builds central washing plant to clean coal from Nos. 3, 5, and 9
1943	N.W.I. Co. drives manway for No. 10 Mine; mine never in operation
1956-7	N.W.I. Co. liquidated
1963	Closure of No. 9 Mine (last working mine in Roslyn-Cle Elum field)

3.3.3.1 Roslyn-Cle Elum Coal Miners

The earliest miners in the Roslyn-Cle Elum field came from various parts of the United States, drawn westward like so many others by the allure of land, work, and opportunity. The first to arrive were miners from the coal fields of the eastern U.S., Pennsylvania in particular. Many of the earliest miners in the country came from the British Isles. Though many identified them as English, in reality most came from the coal fields of Scotland and Wales. As the American coal economy expanded in the 19th Century, many of these miners carried their expertise and knowledge westward, eventually arriving in the eastern Cascades as coal production began in the late 1800s.

These early miners were soon followed by a diverse array of ethnicities, originally drawn to the U.S. during the great European migration waves of the 19th Century – immigrants from Northern and Western Europe, followed by an even larger wave from Southern and Eastern Europe in the later years of the century. This surge of immigration created the American 'melting pot' and spurred the economic boom that was ushered in on the backs of coal miners. Arriving on the East Coast, many of these European immigrants followed the steps of the British miners, and made their way westward. At the peak of the Roslyn-area production in 1920, twenty-eight different ethnic groups could be identified amidst the upper Kittitas County population, including peoples from places such as Italy, Czechoslovakia, Croatia, Russia, and Sweden (Daniels 1914: 157, 180; Shideler 1986).

Also part of the varied social tapestry of the Roslyn area was the African-American community (Shideler 1986; Francaviglia 1991:106). During the first coal labor strike in 1888,

the N.P. Coal Co. brought in African-Americans into the region as replacement labor (Daniels 1914:157). In spite of the animosity created by ongoing labor troubles, many of the imported workers remained in the area to work the mines and establish themselves in the local community. In 1900, nearly one-third of Roslyn's population was African-American (Shideler 1986). A distinct community remained throughout the 20th Century until the last mine was closed in 1963.

The rich ethnic heritage of the Roslyn area is still reflected today in the cemeteries of Roslyn. Considering its small size, the twenty-five cemeteries found west of town are surprising (Francaviglia 1991:110-111). The large number is explained with the realization that many of these cemeteries are reserved exclusively for one of some twenty-eight different social groups that form part of Roslyn's diverse human past.

3.3.4 Coal Mining in the Roslyn-Cle Elum Coal Field

At an environmental level, geologic structure of the Roslyn Formation, the character of its primary coal seams, and surface topography relative to the primary coal beds are responsible for the development mining methods in the Roslyn-Cle Elum coal field, and in particularly the No. 4 Mine project area (Daniels 1914:158, 162; Saunders 1914:54; Francaviglia 1991:17). Both Daniels (1914:162) and Saunders (1914:54) note that the shape of the coal field, the simplicity of the Roslyn bed's structure have made for the easy development and exploitation of the Roslyn coal field. Relative ease of extraction and close proximity transportation are important factors in low cost, high output coal production in the Roslyn-Cle Elum field.

In a general, an underground coal mine is characterized by one or more of three methods of entry. There are three main types of underground mines: slope mines with an access tunnel descending at a pronounced angle; drift mines enter the ground horizontally, often from a hillside opening; and shaft mines with vertical or nearly vertical openings, requiring the use of lifts (Francaviglia 1991:17).

Slope mining is a method of accessing horizontally continuous, valuable geologic material such a coal. A sloping access shaft travels downwards toward the coal seam. Slope mines differ from drift mines and shaft mines, which access coal seams by tunneling horizontally or straight down, respectively. Horizontal workings off the shaft are called drifts, galleries, or water levels. The mine shaft is used to access an underground mining facility. These extend from the central shaft towards the coal seam. The point of contact between these levels and the shaft itself is known as the inset, shaft station, or plat.

In the Roslyn-Cle Elum field, underground coal mining has been opened by one ore more of the following methods:

- Drifts or 'water levels' on the coal seam accessed from outcrops along ravines. Drift mines were known as "hill workings."
- Slopes on the coal from outcrops on the hillsides.
- Rock tunnels to the coal and slopes from the point of intersection to the rise & dip.
- Vertical shafts to the coal and slopes from the shaft bottoms

In the Roslyn-Cle Elum coal field, these methods of accessing underground coal seams occur in simple form or in a combination of forms, which changed as the mine was developed (Table 3).

Table 3. Entry Methods – N.P. Coal Co. & N.W.I. Co. mines, Roslyn seam.

Mine	Location	Entry Method
Roslyn No. 1 Mine	at Roslyn	Drift and Incline
Roslyn No. 2 East Side Mine	at Roslyn	Drift and Incline
Roslyn No. 2 Slope Mine	at Roslyn	Drift and Slope
Roslyn No. 3 Mine	1½ miles W of Roslyn	Incline & Slope w/
Roslyn No. 4 Mine	at Roslyn	Vertical Shaft w/ Slope
Roslyn No. 5 Mine	1½ miles SE of Roslyn	Slope & Rock Tunnel
Roslyn No. 6 Mine	¾ miles NE of Roslyn	Series of Drifts
Roslyn No. 7 Mine	½ miles NW of Cle Elum	Slope & Rock Tunnel
Roslyn No. 8 Mine	¾ miles NW of Roslyn	Incline and Slope
Roslyn No. 9 Mine	1 mile S of Roslyn	Slope

In the late 19th Century and the early 20th Century, there were two main methods of working for underground coal mining: longwall mining and room-and-pillar mining. In general, coal deposits occur as enormous, widespread beds of coal. In longwall mining, after the construction of a main entry, two parallel tunnels would be cut several hundred feet apart. Miners would then be able to work at the broad coal face between the tunnels, allowing the roof to collapse behind them as they moved forward. Originally developed in Europe, longwall mining was more efficient for coal extraction, though more costly due to the extra work associated with tunnel building. Various attempts to use the longwall method were made in the Roslyn coal field in its early stages, but were abandoned due to the varied conditions of the coal seams and mine arrangements (Daniels 1914:167).

After early longwall mining efforts, all mining done in the Roslyn-Cle Elum coal field was performed using the room-and-pillar method. In this classic mining method, main entries would be opened into the coal bed, stretching horizontally not the coal seam. Along the main passageway, usually at intervals of approximately 400 feet, miners would tunnel out side

entries, creating rectangular sections of the coal seam. From these passageways miners would open rooms of varying width directly into the coal seam. As a room was worked, the active end was known as the coal face. Depending on the thickness of the coal seam, a coal face could be as low as two or three feet and as high as ten feet or more. Miners at the coal face would leave behind pillars of in situ coal as they worked through a room; pillars were simply unmined sections of coal that helped support the active passageways. After all the rooms in a section, or panel, had been completed, the processes of pillar removal would begin. Miners removed pillars in retreat from the finished end of the section, and pillar removal left unsupported sections of the mine. The more skilled and efficient miners were in charged with pillar removal, as it was even more dangerous than normal activity at a coal face. The resulting instability and frequent collapses in the mined sections would effectively end the productive life of these sections, and mining would continue in the same fashion in another segment of the mine.

3.3.5 Daily Work in a Coal Mine

At the beginning of a shift, a miner would check in at the lamp house, make sure he had enough blasting powder for the shift, and work his way into the mine. As he would stay underground for the duration of the shift, the miner would also carry a lunch bucket and any tools needed. In some mines, the workers would walk into the mine to the active coal face, and out again at the end of their shift. As the mines grew deeper and became more extensive, it was more common and efficient to send miners in and out of the mine on passenger versions of coal cars.

A miner's daily work consisted of four major tasks: undercutting, drilling, blasting and loading. Undercutting meant digging out rock from the base of the coal face, which would allow the coal and rock to collapse in a pile of rubble that could be loaded and hauled out of the mine. All of the undercutting was done by hand until cutting machines were introduced into the Roslyn area in the late 1920s. After the coal face was undercut to a sufficient degree, the miners drilled holes into the coal face, a laborious task usually performed with a hand auger or drill. A miner would drill a long hole into the top of a wall of coal, wrap black powder in newspaper, and insert the charge into the hole with an iron rod. After making a squib, or fuse, of wax paper and more powder, the miner would light the powder and leave. The blast would often dislodge as much as a ton of coal, which the miner would then load into coal cars. Coal cars weighed around 1,500 pounds empty, and could be filled with as much as 2,500 pounds of coal and rock – over one ton of coal per car. The actual loading of the cars usually finished the daily process since miners preferred to start the day with clean work surrounding the coal face, for maximum production on a shift.

Once a coal car was loaded, it was transported to the surface often through a vast network of tracks and tunnels. In some mines trips were hauled to the surface by mules, in others by electric locomotives or by an electric powered hoist system. Once collected into strings of cars, trips would be pulled from the mine, they would be hoisted to the tipple, where coal was sorted and weighed. The fruit of a miner's toil was conveyed into railroad cars for shipment. The cars would then be sent back into the mine, and the entire laborious process would continue.

In addition to the miners working the coal face, there were numerous other jobs inside of the mine. The need to haul coal with mules required mule skinners and tracklayers, as well as rope riders to help guide the trips out of the mine. Inside the mine, men were also employed to maintain the rails, grease machinery and coal cars, and as trappers and pump men to direct air throughout the mine. At the surface, the mile workforce included hoist operators, blacksmiths and shop workers, carpenters, and those employed for coal sorting in the tipple, plus the administrative employees and mine management staff.

In a coal mine, all air must come from the outside. In shallow or less extensive mines, the natural movement of air could help ventilate the mine, although relying on purely natural ventilation was risky. More commonly, however, air had to be delivered into the mine, both for the miners and to disperse the potentially lethal gases that would accumulate in the tunnels. In the Roslyn coal field, as elsewhere, pumps and ventilation shafts were used to bring fresh air into the mine and to circulate it abut. The pumps used in this process were originally steam powered, then electric. All mines also had surface vents and fans, which in many cases would be boosted by exhaust fans with in the mines themselves. Down in the mine, the movement and direction of air was accomplished through a variety of means. Abandoned sections the mines were closed off by use of battices, at first made of wood or canvas then later, concrete. In active segments of the mine, air would be directed through the use of canvas or movable wooden partitions, all in an effort to ensure that the previous stream of air was not diluted or diffused. So important was this task that bin many coal fields young boys were employed to oversee the barriers, moving them as needed for a coal trip or miners to pass through.

3.3.5.1 Surface Operations

The surface appearance and buildings of a coal mine gave little indication of the vast underground networks beneath them. The most important and noticeable features of the mine was the tipple structure. The tipple was the structure where the trips of coal were processed, sorted, and loaded into railroad cars for transport. After trips were hauled from the mine, they were sent down parallel cart tracks into the tipple structure, where they were dumped into a

series of rock chutes and bins. Some mines also used shaking screens to separate coal from small rocks and debris. Most sorting in the tipple was done by hand. After the coal was sorted and sent into the appropriate chute that ran directly to a rail car. Non-coal debris was sent into the side-dump cars, which were then hoisted up to the top of the culm, gob, or tipple pile and dumped. In addition to the tipple structure, the tipple pile was one of the more conspicuous features of mine operations, growing in size as the mine was extended and developed.

To the casual observer, the seemingly random distribution of buildings and storage facilities made little apparent sense, but the economic imperative to maximize coal production ensured that everything at the mine was functionally important. Among the most important were those facilities that stored and maintained equipment, as well as administered the daily workings of the mine.

When a miner undercut a coal face, it was usually necessary to prop the rock up with wooden wedges so that it would not collapse on the miner. Wedges were also used to strengthen and secure timber supports within the mine. A fully functional carpenter shop was responsible for building wedges, as well as a variety of wooden objects used at the mine site. Next to the shop was a storage room where wedges were stored.

The mine shop was a fully functioning industrial service center for the mine. Shop workers repaired mine equipment on-site, including coal carts, hoists, and other heavy machinery. The shop held a range of equipment, from drill presses and wheels to hoists, saws, and a full array of metalworking tools. By having a fully functioning repair facility at the mine, disruptions to coal production could be minimized.

Over time, the most important amenity at the mine was the Wash House. In 1922, the N.W.I. Co. built a wash house for workers blow the tipple for the No. 6 and No. 8 mines. In the wash house, workers would change out of dirty mining clothes, shower with hot running water, and put on their clean clothes before leaving the mine site. The wash house consisted of three rooms – the dirty room, the shower room, and the clean room. A separate boiler room and water tanks provided hot water for the wash house. The boilers were fired by coal from the mine itself. Wash houses were welcomed by the mineworkers, who originally had to return home at the end of the day dirty, tired, and wet. Many miners had access to better facilities at the wash house than at their own homes.

3.3.5.2 Labor Relations

When coal companies such as the N.P. Coal Co. opened their first mines in the Roslyn area, miners were paid an hourly wage. Within two years, however, the coal companies tried to

impose a new age standard on the field, pay based on tonnage of coal produced. To the outsiders this proposal might make sense, as more productive miners would reap the rewards of their hard work. Because part of a mine's daily tasks resulted in very little actual coal production, this attempt to impose a production standard on the miner was met with intense resistance.

Miners paid by the ton referred non-mining tasks they were required to perform as dead work, as they had little to do with actually producing coal. Among these tasks was the laying of track, brushing the roof (creating headroom by removing rock from the ceiling), propping timbers, cleaning out debris from the room, and a host of minor tasks that occupied a significant portion of the miner's daily labor.

The battle over pay structures frequently resulted in labor troubles, ranging from work slowdowns to strikes, including the earliest strike by the Knights of Labor that eventually led to the largest African-American contingent of miners in the Roslyn area (Daniels 1914:157; Shideler 1986). Payment for dead work was one of the key demands in the early mine unionization movement, but the uneasy relationship between mine ownership and mine labor stretches throughout the history of coal mining, with a long legacy of strikes and bitter disputes that disrupted families and communities throughout the coal fields of America and Europe (Metheny 2007).

3.3.5.3 Working Conditions

Inside the mine, fine coal dust – an unavoidable result of carving away at a coal face – was everywhere. Ever-present coal dust was primarily responsible for the chronic respiratory conditions that miners would develop over time. Miners developed methods to control the amount of coal dust floating through the mine, including spraying the coal face with water and a method known as rock dusting, involving the application of a fine rock powder – the most common was limestone – to limit the dust that would arise from mining activities.

Besides the coal dust that filled the mine, there were numerous dangerous gases that posed a hazard to miners and the mine itself. Known as damps, these gases could be present in a variety of combinations. The three most notable gases were known as fire damp, white damp, and black damp. Fire damp, or methane, is found in nearly every mine, along with a diluted methane-air mixture. Both varieties of fire damp are formed by the natural decomposition process, and are highly combustible. White damp is usually only found in a mine after and explosion, a fire, or sometimes the blasting process. White damp is highly poisonous; the primary component is carbon monoxide. The third dangerous gas, black damp, is mostly carbon dioxide, and received its name because the presence of black damp would dim a

miner's lamp, removing the oxygen from an area. In the presence of black damp, a miner could rapidly lose consciousness and frequently die of suffocation or choking.

In addition to the immediate and short term health risks posed to miners, coal dust and these gases also posed a more immediate problem: they could cause mine explosions. When mixed with the variety of gases (damps) found in a typical mine, coal dust increased the potential for a fatal explosion, which is one reason why controlling coal dust was a priority in the mines.

Coal mining has always been one of the world's most dangerous occupations, and the mines of Roslyn were subject to the same collapses, cave-ins, and fires as mines elsewhere in the world. The greatest immediate danger for a coal miner, from the earliest days of mining to the present day, has been the threat of falling rock and collapse of the mine itself. Not only could falling rock and debris crush miners, it could also block off mine passages and air shafts, both vital for surviving a disaster. Experienced miners learned to interpret the creaking and shifting of the overburden above their heads, alert to any indication of imminent collapse.

3.3.6 Roslyn Mine Accidents

While collapses and cave-ins were the most immediate dangers for coal miners, the most spectacular were fires and explosions. The history of mining is filled with tragic accounts of mine accidents that killed or injured dozens of miners in an instant. In the Roslyn-Cle Elum field, there were numerous smaller explosions and fires, but only two major mine disasters in the seven decades the mines were open.

The first of these disasters was an explosion at the first mine opened in the field, the Roslyn No. 1 in the ravine north of Roslyn. On May 10, 1892, after six years in operation, an explosion at the mine resulted in the death of forty-five miners (Prater 1994). An investigation concluded that the cause was inadequate ventilation within the mine. The accident spurred the N.P. Coal Co. to improve working conditions in the Roslyn mines. Despite the tragedy, the mine remained open until the 1920s.

The most spectacular of the Roslyn mine disasters was the explosion and fire at the No. 4 Mine on October 3, 1909. On a Sunday morning, as the faithful of Roslyn and Cle Elum were gathering to attend church services, a sudden explosion and fireball filled the sky, leading many to believe the end of the world had arrived (Cle Elum Echo 1090). Instead, the spectacular explosion and its aftermath signaled a tragedy, as ten miners lost their lives as flames shot several hundred feet into the air. The mine tipple and several mine buildings were destroyed in the fire, and coal production ceased at the No. 4 Mine forever (Figures 7 & 8).



Figure 7. Tipple pile overview in aftermath of October 3, 1909 No. 4 explosion.



Figure 8. Ground view after explosion with No. 4 shaft, hoist house & power plant.

4. LITERATURE REVIEW

4.1 BACKGROUND DATA

Griffin and Churchill (1998) provide a thorough land use history of the Roslyn–Cle Elum area, as well as a cultural resources inventory of the 7,000 acre Suncadia Master Planned Resort. The report reviews prehistory, ethnographic background, and the historic background of the upper Yakima River basin and the lower Cle Elum River basin.

An elegant historic context for the Roslyn Historic District, which includes references to the No. 4 Mine industrial area, may be found in the National Register of Historic Places (NRHP) Inventory Nomination Form (Lenz 1977).

For a comprehensive historical overview of the communities of Roslyn, Ronald, Cle Elum and the history of mining activities across the coal field and the project area, see "Coal Towns of the Cascades" (Shideler 1986) and "Spawn of Cold Dust" (Operation Uplift 1955).

The United States Geologic Survey is perhaps the best single source of historical information for mining in a particular district or coal field (Francaviglia 1991:59; Noble and Spude 1997:7). Edwin J. Saunders (1914) compiled a definitive report on coal mining in upper Kittitas County that addresses the geological structure of the Roslyn-Cle Elum coal field and traces the development of mining from the 1870s discovery period until 1913, when he conducted fieldwork. Joseph Daniels (1914) compiled an invaluable history section with mining methods in Chapter VII. The bulletin is illustrated, well written, and describes the coal mining process, including extraction techniques, mining infrastructure, transportation systems, and production history. The bulletin is an invaluable historical document and provides a benchmark for the period 1913, against which change in the study area can be identified. The Bulletin also included two maps, a geologic scale map coal field and a map depicting the primary mines, with their subterranean works, at the core of the Roslyn-Cle Elum field.

4.2 EXISTING DATA

Current knowledge about documented archaeological properties both in the APE and within one mile of the APE are based upon a review of existing historic property and archaeological site records, archaeological inventories, and consultation with knowledgeable sources. Research on existing data consisted of a review of historic and precontact archaeological site records and report files at the Department of Archaeology and Historic Preservation (DAHP) office in Olympia, and a review of pertinent environmental and historical literature. CWAS

personnel reviewed archival data on file at DAHP to assist in the identification of cultural deposits that may be present within the project area. While no archaeological properties were identified in the project area, the project area boundary does lie within the Roslyn Historic District boundary (DT2), which is the same as the 1914 and the modern Roslyn City limits footprint (Lenz 1977; Beardsley 2007). CWAS staff reviewed the DAHP site record and cultural resource report library database for the No. 4 Mine District area (Table 4).

Table 4. Documented cultural resources in the project vicinity.

Designation	Description	Reference
DT2	Roslyn Historic District	Lenz 1977
45KT514	N.W.I. Company Store	
45KT1269	Old Roslyn Town Dump	Griffin & Churchill 1998
45KT1379		Griffin & Churchill 1998
45KT2077		Griffin & Churchill 1998
45KT2078	Ducktown Dump	Griffin & Churchill 1998
45KT2100	Linear Feature Site	
45KT2143		
45KT2562	Sliding Rock Site	Powell 2004
45KT2563	Roslyn Reservoir	Powell 2004
45KT2564	No. 8 Mine Incline	Powell 2004
45KT2565	Ronald-Roslyn Power Pole Line	Powell 2004
45KT2784	No. 4 Mine Industrial Site*	Orvald 2007

*DAHP assigned trinomial for No. 4 Mine Industrial Site as documented by CWAS in 2007.

Twenty-five years after documentation and eligibility determination for the Roslyn Historic District, Lenz and Miller (2002) conducted a study of district on behalf of the City of Roslyn to assess its proposed expansion. Lenz and Miller (2002) discuss and recommend a fuller landscape scale view of the historic district, identify mine locations, and conduct background literature research, including locating historic maps necessary for additional study, and expansion of the district to accommodate the numerous coal mines extending form Cle Elum to Ronald.

As part of the review process of Forest Practices Application 2702808, for proposed timber harvesting on Cle Elum Ridge, David Powell (2004) documented four historic archaeological sites within a mile of the project area. Of these four sites, two are relevant to the present study, the No. 8 Mine Incline (45KT2564) and Ronald-Roslyn Power Pole Line (45KT2565). Although removed physically, the No. 8 Mine Incline is associated with remnant No. 6 & No. 8 tipple structure footings located within the project area. The Ronald-Roslyn Power Pole Line is a removed portion of the Ronald No. 3 mine power transmission line from the Roslyn

power plant within the project area. Powell (2004) documented the power line from the northern edge of Roslyn City limits to Ronald, based largely on the narrow linear clearcut marking its extent. The line extended through Roslyn and across the No. 4 Mine project area to the N.P. Cola Co. and later the N.W.I. Co. steam power plant.

The project area and nearby archaeological sites, historic properties, and the extent of the Roslyn Historic District are depicted with their geographic positions relative to the project area in Figure 9. The newly documented No. 4 Mine industrial Site, 45KT2784, appears in the figure as well (Orvald 2008).

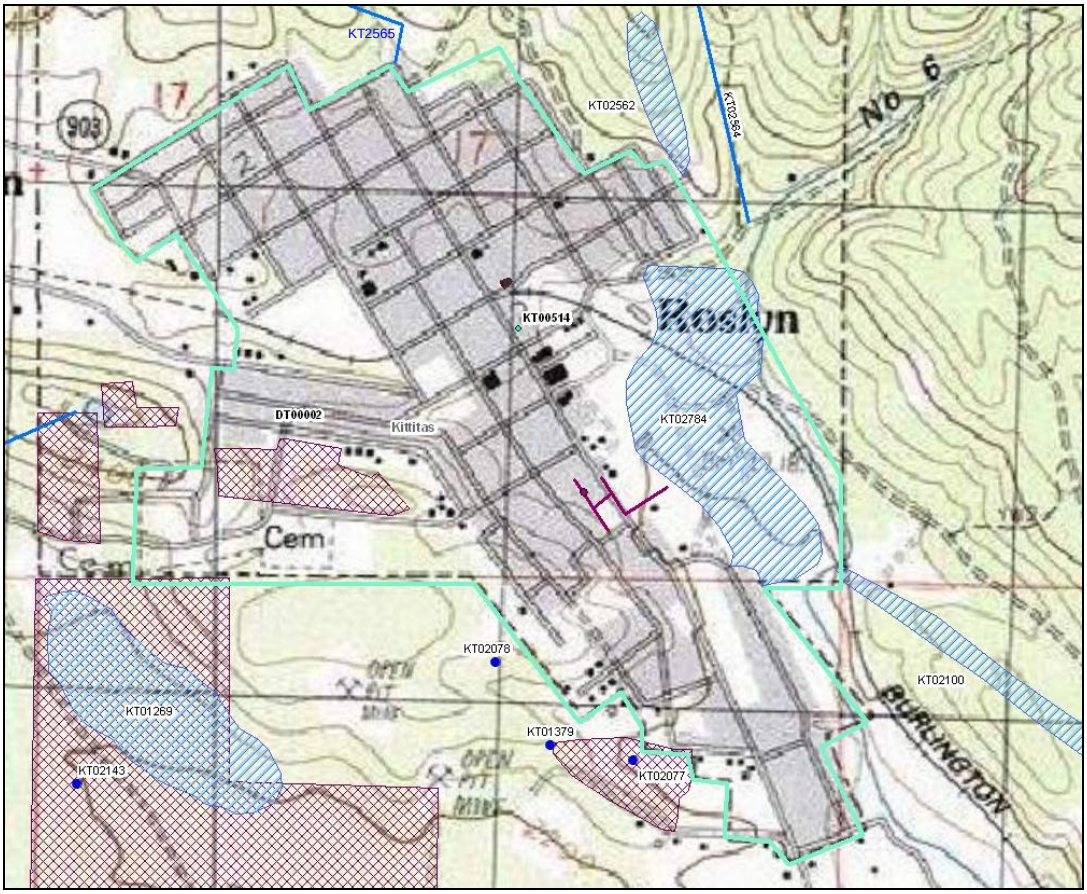


Figure 9. DAHP GIS-generated Cle Elum 7.5' quad with local cultural resources.

5. RESEARCH DESIGN

The primary objective of this investigation is the identification, documentation, and conservation of archaeological resources present within and near the project area; and preliminary interpretation of the historic No. 4 Mine industrial space as a coal mining related archaeological site. A primary concern is the inventory of artifacts, cultural deposits, and archaeological features occurring across the project APE, defined by the extent of potential ground disturbance associated with the Suncadia MPD project. Of secondary concern, and fundamentally tied to the inventory, is the historical explanation of identified artifacts and features, and the definition of one or more cultural resource feature systems converging in the No. 4 Mine industrial space. Of tertiary importance are the acknowledgement of potential adverse effects to archaeological resources in the project area, and the formulation of a management plan to mitigate potential future impacts from the project development.

Historic mining sage, Donald Hardesty (1988:9-11) defines a feature system as a linking concept for transforming archaeological resources into property types. Hardesty's feature systems are networks or geographical clusters of archaeological features that can be linked to the same human activity, in the present case, the technological industrial extractive process of underground coal mining and related industrial activities. Background research and direct fieldwork inventory will identify what physically remains of the historic industrial area associated with the surrounding Roslyn Historic District. To accomplish this, CWAS conducted preliminary background research, systematic visual pedestrian survey, subsurface – shovel probing survey, and limited deep trenching.

Stepped processes for the identification and National Historic Register (NRHP) eligibility evaluation of mining sites are vigorously documented (Noble 1989; Hardesty 1990; Noble and Spude 1992, 1997; Hardesty and Little 2000: 97-118; Little and Siebert 2000:14; HARD Mining Sites Team 2007:96). Little and Seibert (2001:12) identify a five-step process for identifying an archaeological property's eligibility under Criteria A-D. The HARD Mining Site Team (2007:96) tailored this process to mining sites, and divided it into separate phases. For the present study, CWAS will consider a two phased approach, with the present effort restricted to Phase-I:

Phase I: ***Identification and Recording the No. 4 Mine Industrial Space***

1. Determine the property's structure, content, and the classes of data it may contain.

2. Identify the appropriate historic context by which to evaluate the property.

Phase II: ***Evaluation of the No. 4 Mine archaeological site under Criterion D.***

3. Identify important research themes and questions that might be addressed by the site data.
4. Considering the property's integrity, structure, and content, assess whether the data it contains are of sufficient quality to address these important research issues.
5. Identify the important information that the property is likely to contain.

5.1 IDENTIFICATION AND RECORDING

In National Park Service (N.P.S) Bulletin 42, Noble and Spude (1997:7) outline a process for mining site survey, documentation, and analysis. It is recommended that mining property surveys should begin with preliminary research related to the mine or its related industrial activities, followed by the actual field survey of the physical archaeological remains, and finally, property analysis designed to reanimate the operational system that once functioned at the mine. It is noted that this stepped process is particularly important in cases such as the contemporary property No. 4 Mine and surrounding vacant historic industrial area which, for the most part, lacks standing buildings and structures (Noble and Spude 1997:7). Implementation of the plan is focused on the remains of mining activities themselves.

5.1.1 Preliminary Research

CWAS initiated preliminary research during the process of reviewing the environmental and cultural setting for the No. 4 Mine MPD project and during preparation of historic context statement for mining in the Roslyn-Cle Elum coal field, and particularly for coal mining activities at the locality scale for the No. 4 Mine District project area.

Historic research (see above) provides context for the identification of the industrial-mining properties and archaeological features of the project area.. Specific documentary research is the necessary first step taken prior to archaeological survey and site recording to identify the general mining practices and the specific surface structures and features that remain at the No. 4 Mine District.

Data sources include the DAHP database and archives, the Roslyn Museum, the CWU Brooks Library and special collections department, the Ellensburg Public library, and the Washington State Archives in Ellensburg. This research provides information for one or more historic contexts and also guide archaeological site documentation, including surface pedestrian

survey, subsurface survey, and limited trenching across the APE. Other archives and libraries and sources of information include the following:

- Government Land Office (GLO) cadastral and survey records available at the Bureau of Land Management website.
- The Roslyn Museum
- The CWU Brooks Library and Archive
- The Ellensburg Public library
- The Washington State Archives in Ellensburg.

5.1.2 Field Survey

With the preliminary research documentation in hand, CWAS will proceed with an in-field inventory of the physical remains of historic and modern activities at the No. 4 Mine industrial site and the MPD project area. As a general rule, the scale of observation is focused on archaeological features, primarily in the forms of foundations, slabs, footings, rock piles, berms, depressions, klinker deposits, artifact concentrations, and vegetation signatures. All diagnostic portable artifacts will be documented.

During the field survey, CWU field personnel will identify and map any evidence of earth-moving activity. The following are terms and situational definitions for archaeological inventory of the No. 4 Mine District project area:

> ***Precontact:*** Dating approximately before the year 1800.
>
> ***Historic:*** Dating between the years 1800 and approximately 1960.
>
> ***Artifact:*** Anything which exhibits any physical attributes that can be assumed to be the results of human activity (Dunnell 1971:117).
>
> ***Archaeological Feature:*** A non-portable artifact such as a building foundation or concrete slab, rock cairn, talus slope depression, berm, or a blazed tree.
>
> ***Archaeological Isolate:*** A lone artifact or artifact cluster with a surface density less than ten artifacts per 100 square meters.
>
> ***Archaeological Site:*** One or more archaeological features and/or an artifact cluster with a surface density of ten or more artifacts in a 100 square meter area.

5.1.2.1 Pedestrian Survey

The survey will include deliberate visual inspection of the entire project APE, which consists of Kittitas County parcel Number 456234 and the 'Horse Pasture' at the corner of East Dakota

Avenue and South A Street. CWU will conduct systematic pedestrian survey across the entire APE with a transect interval of ten meter or less between crew members. Five procedural rules will guide the pedestrian survey (Table 5). These rules allow for a systematic approach that provides a ten percent surface sample of the distribution of the archaeological record across an explicitly defined space (Dancey 1974). Location data for the survey and identified archaeological resources will be initially documented with a Trimble GeoXT Global Positioning System (GPS) unit with meter accuracy and visually, with digital images. CWAS will conduct and direct more accurate mapping with a Geodetic Total Station (GTS). Suncadia, LLC contractor, Sand Poil Surveying, will assist in survey grade feature mapping.

Table 5. Procedural rules for pedestrian survey (adapted from Dancey 1974).

Rule 1.	Inspect the surface for artifacts and features, not sites.
Rule 2.	Sample the environmental diversity of the survey area.
Rule 3.	Work within explicitly defined units.
Rule 4.	Cover the ground in a patterned course.
Rule 5.	Record exact locations of artifacts and features in as many cases as possible.

5.1.2.2 Subsurface Survey

1) Are subsurface cultural deposits present?
2) Are structural remains and/or other types of in situ features present?
3) What is the basic depositional or geomorphic history?
4) Taking into account #3 and other data, do the cultural deposits have integrity?

5.1.2.3 Deep Trenching

In addition to systematic subsurface survey, CWAS will conduct limited deep trenching within the No. 4 Mine project area, with the intention of identifying precontact artifacts and intact cultural deposits. Subsurface exploration for precontact archaeological deposits was proposed for the No. 4 Mine area for two reasons. Firstly, parts of the project area are deeply buried with historic fill, and deep backhoe trenches are necessary to expose any original surface or possible earlier living surfaces. Secondly, a stream system and related alluvial fans and terraces once existed in this area and identification of these features may enable an assessment of the probability of intact archaeological deposits.

Currently, there are two streams that flow toward the project area from the east and north, and both are now diverted along the northeast side of the raised N.P. branch line rail bed, now the Coal Mines Trail. No defined stream is apparent in the mining area west of the trail; however

a stream once flowed through this area and was purposefully filled. Low areas in the landscape probably still mark the original stream.

In 2005, Icicle Creek Engineers excavated 25 test pits across the property using a track-mounted excavator. Details of the subsurface exploration program, along with the test pit logs, are presented in their geotechnical report (ICE 2006: Appendix B). CWAS will use the ICE (2006) fill thickness map and stratigraphic data from individual geotechnical test pits to guide deep trenching efforts.

5.1.3 Property Analysis

Property analysis refers to the need to link identified and often disparate physical remains to the former reality of working coal mines and the related social systems. A key issue is the identification of specific mining activities

6. RESULTS

6.1 THE NORTHERN PACIFIC RAILWAY AND THE N.W.I. CO.

When the Northern Pacific was chartered in 1864, it received from Congress a grant of approximately 50 million acres of undeveloped land along its route through the northern tier of western states. The land department was organized in 1871 to manage this vast resource, which consisted of arable and semi-arid open lands, as well as extensive forested and mountainous tracts. In addition to forest products, the lands contained substantial mineral resources including coal, oil, gas, and iron and copper ores. Over the succeeding hundred years, the department worked to dispose of lands to settlers and commercial developers, as a means to building up the rail system's traffic base, and to manage large unsold tracts in order to exploit the natural resources they contained. Much of this work was carried on through the N.P.'s natural resources subsidiary, the Northwestern Improvement Company.

D. S. Lamont, Vice President of Northern Pacific Railroad, organized the N.W.I. Co. on October 15, 1897 for the acquisition and development of mining properties. Throughout its history, the N.W.I. Company engaged in an almost continual legal dialogue with the federal government regarding the nature and value of its enormous land grant. One of the early transactions of the N.W.I. was the 1897 purchase of all the unsold land grant lands between the Missouri River and Glendive, Montana, totaling some 5.5 million acres. In July 1899, the Northern Pacific Coal Company sold all of its coal properties to N.W.I to manage the mining properties and other lands owned by Railroad.

On January 17, 1898, the company was incorporated by the State of Washington and allowed to conduct business within the state. In 1899, the Northwestern Improvement Company purchased the Northern Pacific Coal Company, which included the coal mines at Roslyn and Cle Elum, Washington. For the next five decades, the mines at Roslyn and Cle Elum supplied the coal fuel needed by the steam engines of the Northern Pacific Railroad. By the early 1950s, the conversion of locomotives from steam to diesel led to the decline of coal mining in the region and their eventual closures in the early 1960s. The N.W.I. was placed in liquidation on December 27, 1956 because of the declining coal requirements of the railroad due to the conversion to diesel and power (N.P. Annual Report, 1956). On March 3, 1970, the Northwestern Improvement Company's subsidiary, the Northern Pacific Railroad, merged with Burlington Lines Incorporated to create Burlington Northern.

6.1.1 Northwestern Improvement Company Records

The Minnesota Historical Society Library in St. Paul, Minnesota retains the largest single collection of historical documents from the Northern Pacific Railroad Company and its subsidiary, the N.W.I. Company. The collection includes the Northern Pacific Railway Company records for branch lines, subsidiaries, and related companies and is inclusive of the dates 1909-1966 (N.P. 1956). The bulk covers the years 1913 to ca. 1926, and consists of 375 files in 19 boxes. The collection includes correspondence, reports, accounts, and related materials documenting the development and operation of the N.W.I.'s coal properties, and in particular, the Roslyn, Cle Elum, and Red Lodge, Montana mines. File Number 58 in Box-9 includes photographs of miners and machinery.

The CWU Brooks Library special collection archives retain a set of N.W.I. Company field survey notebooks for the years 1908-1923. The collection consists of eleven leather bound field survey noted books composed by surveyors of the N.W.I. Co. of Cle Elum, for the years 1908 to 1923. The notebooks are handwritten copies and contain material for surveys of construction projects in Cle Elum and Roslyn conducted by the N.W.I. Company. Included within the pages of the notebooks are sketches of regional topography, buildings, railroad lines, mine shafts, bore holes, and other geographical indicators. This set of survey books covers project related primarily with the N.W.I. No. 5 and No. 7 mines, on Cle Elum Ridge, south of Roslyn and the No. 4 Mine District project area.

6.1.2 The Horse Pasture Block Background Research

CWAS personnel compiled background history for the corner block of Roslyn defined by Dakota Avenue and South A Street. The October 1888 Sanborn Map depicts the south half of Block 10 and the north half of Block 15 as empty of buildings. A saloon is shown in the Northwestern corner facing 1st street at the corner with Pennsylvania, outside the project area. On the April 1890 Sanborn Map, Block 10 is designated Block 105. The map shows the addition of a two part building with a brick chimney labeled C. S. Adams Sash, Dorr and Planning Mill, Blind Factory. This building would set in what is today the east-west alley that splits the block. Just south of the current alley, a rectangular structure is labeled "Calaboose." This is the jail that local informants say burned down and was moved into the basement of the building that is now City Hall and the City Library (the former YMCA and former Men's Athletic Club). The Calaboose occupies the location that is now under the Osmonovitch residence. In the southwest corner of the same lot (1st and Dakota; under the current Suncadia building, is a smaller rectangular structure labeled "Blacksmity."

On the August 1891 Sanborn map, the "Blacksmity" is absent, and the other buildings remain, although the saloon is re-labeled, "Feed." The July 1899 map shows a new complex of three

buildings along Pennsylvania Avenue. The buildings include a "Reading Room", possible "Photo" studio, and a structure labeled with abbreviations that in part stand for Northern Pacific Company Building. Two carpenter shops on appear on 1st, the southern most of these is in the former location of the Milling Factory. The Calaboose structure is drawn with a square form or has been replaced by a new building and is labeled "Band Room."

The 1912 Sanborn map shows the development of both the "Bank" and "Beneficial Associations Office and Dispensary," as well has the four dwellings and office building of what informants refer to as "Company Row." A dwelling appears south of the Bank separate from the northern most of the two carpenter shops. The northern most carpenter shop (see Sanborn map 1899) is modified in shape and labeled "Crockly & Notions". A dwelling is also attached to the south of this structure so that it borders the ally now labeled "64." Within the project area on the south side of this alley the southern carpenter shop (see Sanborn map 1899) shifts locations or is rebuilt and labeled, "harness." A small detached dwelling appears on the alley behind the Harness shop. To the south of the project area the YMCA Gymnasium and Reading Room appears on the corner of 1st and Dakota where the present day City Hall and Library stand. On the far right edge of the Sanborn Map, back into the project area behind the YMCA building, two structures are labeled, "Beer Stge." (Beer Storage).

The blueprint city and mining company map with ownership information from 1914-1920's, shows that the southwest corner of the Sanborn Map Block 105 (see Sanborn Map 1912) is devoid of structures and is owned by the St. Thomas Lodge #54 F.&A.M. (Masons) as of June 23, 1914. The structure labeled, "Harness" on the Sanborn map along with the small dwelling on the alley is designated as belonging to "P. Giovonini" as of October 20, 1921 (spelling maybe Giovanini and the date is difficult to decipher). The blueprint shows seven dwellings in company row. The larger company office is replaced by three uniform size dwellings with outbuildings at the back of their lots. This map also shows a concrete sewer line running north and south behind the Giovonini, Lodge, and YMCA properties.

With all the building activity in the vicinity, the area does contain a high potential for historic archaeological deposits. Adjacent to 1st street and Alley 64, associated with building debris and activities associated with wood working, blacksmithing, a jail, a harness shop and one small dwelling, as well as an historic sewer line. The location of the present day horse pasture is never illustrated as having buildings or identified activities.

The manuscript, "Spawn of Coal Dust: a History of Roslyn 1886-1955," outlines the origin and ownership of the building that may currently house the Suncadia offices on the corner of 1st and Dakota. A building history is given as follows:

1916: Mike Shawb has a 30 x 70 foot building used as a saloon under management by various individuals. Nicholas Rees and His son-in-law Will Crooks start the Roslyn Motor Company, the first auto company in Roslyn. They sell gas, oil, Firestone tires, and Briscoe and Kissel Cars.

1919: Mike Schwab remodels the building and enlarges it to the present (1955) size of 50x100 feet.

1921: Andy Dean leases the building and runs company until 1924.1924: Joe Schwab (son of Mike Schwab) takes over and runs "the business" until 1943 when ill health forces his retirement.

1943: Joe buys the building from his father Mike.

1949: Don Cadwallder leased the building and ran the company until 1954.

1954-1955: Pete Osiadacz uses the building for a used car and wrecking business.

There may be historical confusion between the Roslyn Motor Company and the Cascade Motor Company. The manuscript does not include a map or reference the location of these respective businesses. Andrew Dean is mentioned in both accounts. The Cascade Motor Company is noted as established in 1928 in a concrete building 60 x 150 feet. Mr. Andrew Dean buys the lot from Mr. Bevilaqua. The Dean residence was moved from Jonesville and is next to the garage (possibly the Osmonovitch house). The Dean family operated the company for 15 years as a garage and gas station (1928-1955). Mr. and Mrs. Bob Maggs ran the garage from 1955 on. It is unknown whether there were two separate businesses with two separate locations.

6.1.3 Historic Maps and Photographs

Aside from the Saunders (1914) U.S. Geological Survey Bulletin, the most valuable information for the understanding the archaeological materials present in the project area may be found in historic maps and photographs, available at Suncadia, the State Archives in Ellensburg, the Ellensburg Public Library, and the Roslyn Museum.

CWAS personnel acquired paper copies and a large format digital copy of the N.W.I. map of the City of Roslyn (1911) for use in determining the former locations for several structures no longer standing in the project area (Figure 10). By 1911, the map depicted most industrial structures in the open space area, with the notable exception of the N.W.I. Co. Sawmill. CWAS personnel made use of two features on the 1991 map which are still in existence today; the Bore Hole and the northernmost corner of the Y.M.C.A. parcel. The Bore Hole is a massive linear sandstone foundation with iron bolts and a vertical steel casing installed in the

late 1800s for geologic exploration and later, possibly used for groundwater drainage. CWAS documented the Bore Hole as Feature-12 in the site inventory form. The steel casing remains in situ and is accessible for modern mapping purposes. The northern corner of the Y.M.C.A. lot is depicted on the ground surface with a modern survey nail.

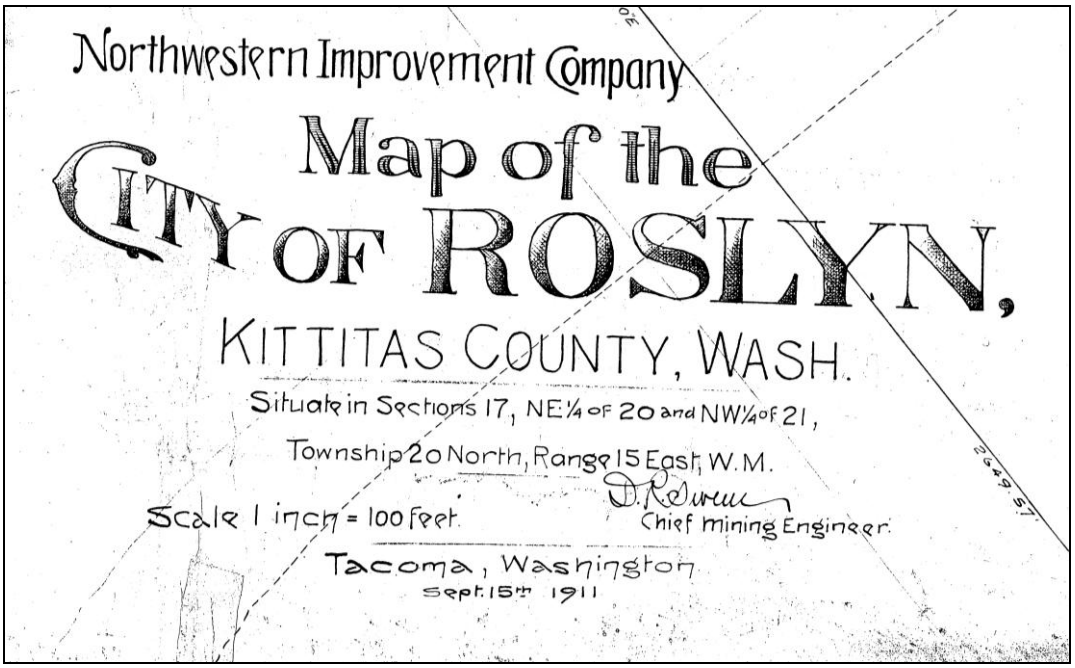


Figure 10. Title portion for the 1911 N.W.I. Map of the City of Roslyn.

CWAS personnel utilized the N.W.I. map (1911) to calculate distances and bearings from known positions to designated structure corners, including the Wash House and Heating Plant, the Beer Houses and the Ware House. A CWAS cartographer used the existing scale on the map of one inch to the mile to identify distances from the two known points to deserted former structure corners to identify their locations in the study area. The map scale was also used to determine the dimensions for numerous structures in the project area.

CWAS determined map orientation by calculating the magnetic declination for the study area for the year 1911. The NOAA magnetic declination calculator produced a declination of 23° 2’ East for the 1911 Wash House position 47° 13’ 20.52” North Latitude - 120° 59’ 23.66 East Longitude. This declination was compared with the orientation of modern features depicted on the 1911 N.W.I. map and found to be in agreement with the 2007 declination of 16° 31’ East for the project area declination. With scale and orientation assigned to the map and the project area, CWAS calculated polar coordinates for several structures no longer visible in the project area (Figure 11).

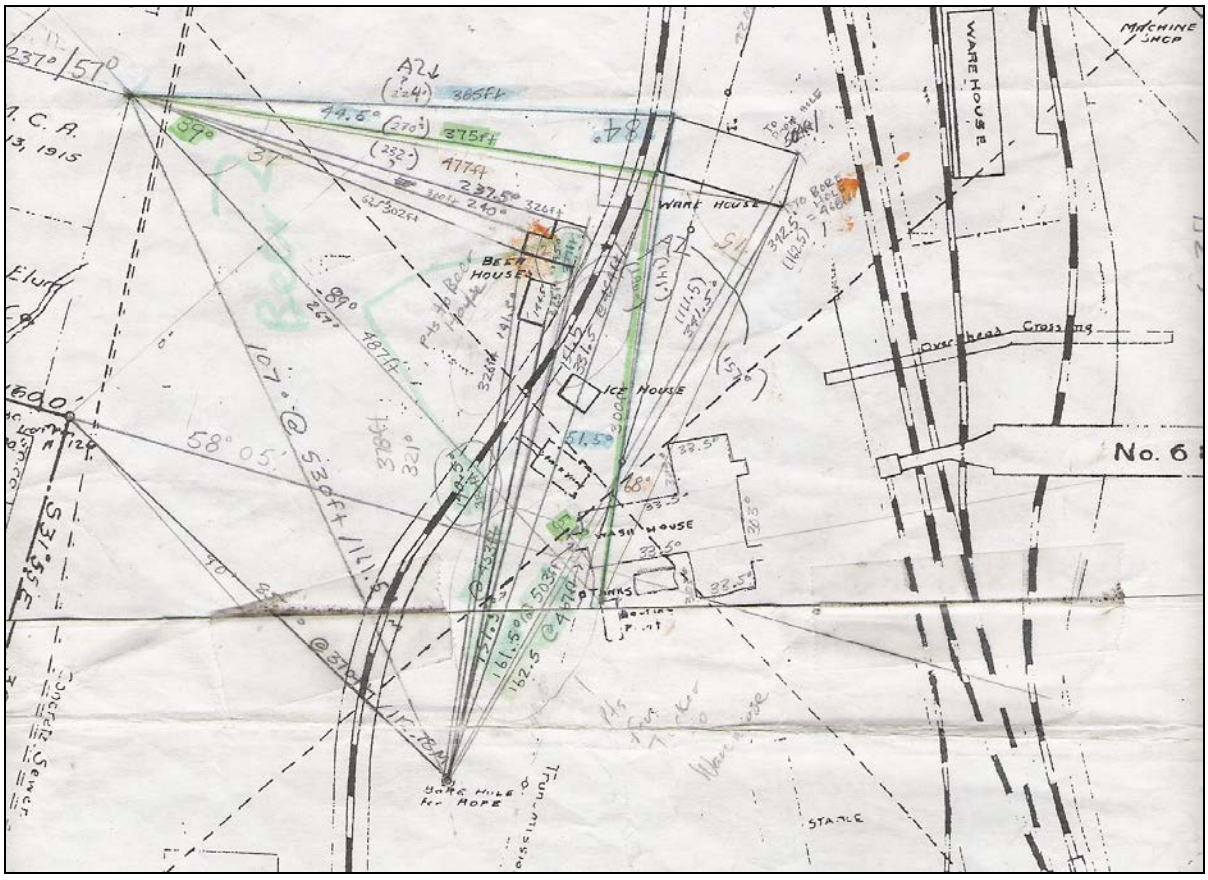


Figure 11. N.W.I. map (1911) with polar calculations for structure locations.

Ultimately, Suncadia design architects requested that CWAS determine locations for the corners of the wash house, the northern warehouse, the power plant (including the attached boiler room and No. 4 Mine hoist house) and the No. 4 Mine shaft and tipple. CWAS did not perform historic map calculations for structure corners for the power plant and its associated structures, as they remain partially visible on the ground surface and are not located close enough to the bore hole and Y.M.C.A. control points.

Based on historic map calculations, CWAS personnel determined positions for at least two corners of the wash house and the warehouse. Field crew then used building dimensional data to determine the positions for each building footprint, with the aid of hand tapes and right triangle geometry. CWAS crew designated the corners of each structure with survey lath and mapped them with a meter accuracy GPS unit. CWAS personnel later used an auger to drill four four-inch post holes at each corner location for installation of temporary L-shaped chain link fencing to act as visual cues for public review and comment during a 2007 open house for the proposed MPD project.

With permission from Suncadia contractor Goldsmith Engineering, CWAS arranged for geodetic total station (GTS) mapping of remnant foundation features with the Kilpatricks, of Sand Poil Surveying. Survey-grade position data for archaeological features and local topography were ultimately employed in a to scale site map exhibit similar to that produced for the Suncadia No. 9 Mine (45KT1380) Rope Rider CRMP (Smith, Orvald and Uebelacker 2005).

6.2 FIELD SURVEY RESULTS

In July 2007, and under the direction of the author, CWAS personnel and students of the CWU Anthropology Department Archaeological Field School conducted systematic pedestrian survey over approximately a 36-acre area and identified portable surface artifacts and surface visible archaeological features. The team was made up of CWAS staff and archaeological technicians, CWU Anthropology Department faculty, CWU Resource Management (REM) graduate students and CWU undergraduates (Appendix B). The field survey resulted in the identification of an expansive historic industrial archaeological site, defined primarily by the horizontal extent of mining and mining related archaeological features. The effort resulted in the identification of total of 38 historic features and four historic artifact concentrations, interpreted as refuse dumps. Survey coverage exceeded the limits of the project area parcel, as archaeological features extended beyond the parcel boundary.

CWAS matched the identified features as closely as possible with labeled structures depicted on historic project area maps and historic photographs. In some cases, CWAS personnel returned to specific loci within the project area in hopes of identifying features depicted in historic documentation. Field personnel documented each feature with a descriptive narrative, plan and profile illustrations, digital images, and with GPS or GTS mapping. CWAS produced a 50-plus page Washington State Archaeological Site Inventory Form and submitted it to DAHP for inclusion in the state database. DAHP subsequently assigned trinomial 45KT2784 to the archaeological site, which lies nearly completely within the Roslyn Historic District boundary. As Lenz and Miller (2002) pointed out in a City of Roslyn sponsored document, mines and surface mining features surround the Roslyn Historic District and are inextricably linked to the fabric of the community. As such, they may well qualify as contributing resources to the NRHP eligible historic district; however removed they are from its 1914 City limits boundary.

6.2.1 Historic Industrial Archaeological Site 45KT2784

The Roslyn Historic District No. 4 Mine Industrial Open Space is located on the eastern slopes of the Cascade Mountain range in the upper Yakima River basin of Kittitas County, Washington. The 36-acre historic industrial open space is situated at the eastern margin of the coal mining town of Roslyn, and extends from the bottom of No.6 Canyon to Crystal Creek and the northeastern periphery of town. Bordering the site to the southwest are a residential development area and State Route 903 (First Street), to the northwest are residential/industrial development and Dakota Avenue, to the north are four abandoned tipple piles, to the northeast are forested land and rural residential development, and to the south, residential and open space areas - primarily pasture. The greater portion of the open space area is nearly level and continuous with the early town site of Roslyn. Modifications to the ground surface, primarily by past mining activities, have resulted in widespread areas of fill across the entire open space area. Figures 12 and 13 depict the boundary of the archaeological site as well as the location of 38 documented historic features and four historic artifact concentrations.

6.2.1.1 Coal Mining Property Types

Introduction to Property Type Categories
Prospecting and Extraction Property Types
Coal Mining Property Types
Tipple Piles - -Waster rock piles
Cut Banks, channels
Shafts, Adits, Slopes and facilities in their vicinity
Underground Workings
Open Pit Mines
Coal Processing Property Types
Tipple
Coal washers
Ancillary Mining Property Types
Structural Remains
Site-Specific Transportation Features
Site Specific Water Conveyance Features
Inter-site, Mining Support Property Types
Inter-site Linear Transportation Features
Inter-site Water Conveyance Features
Inter-site Utilities

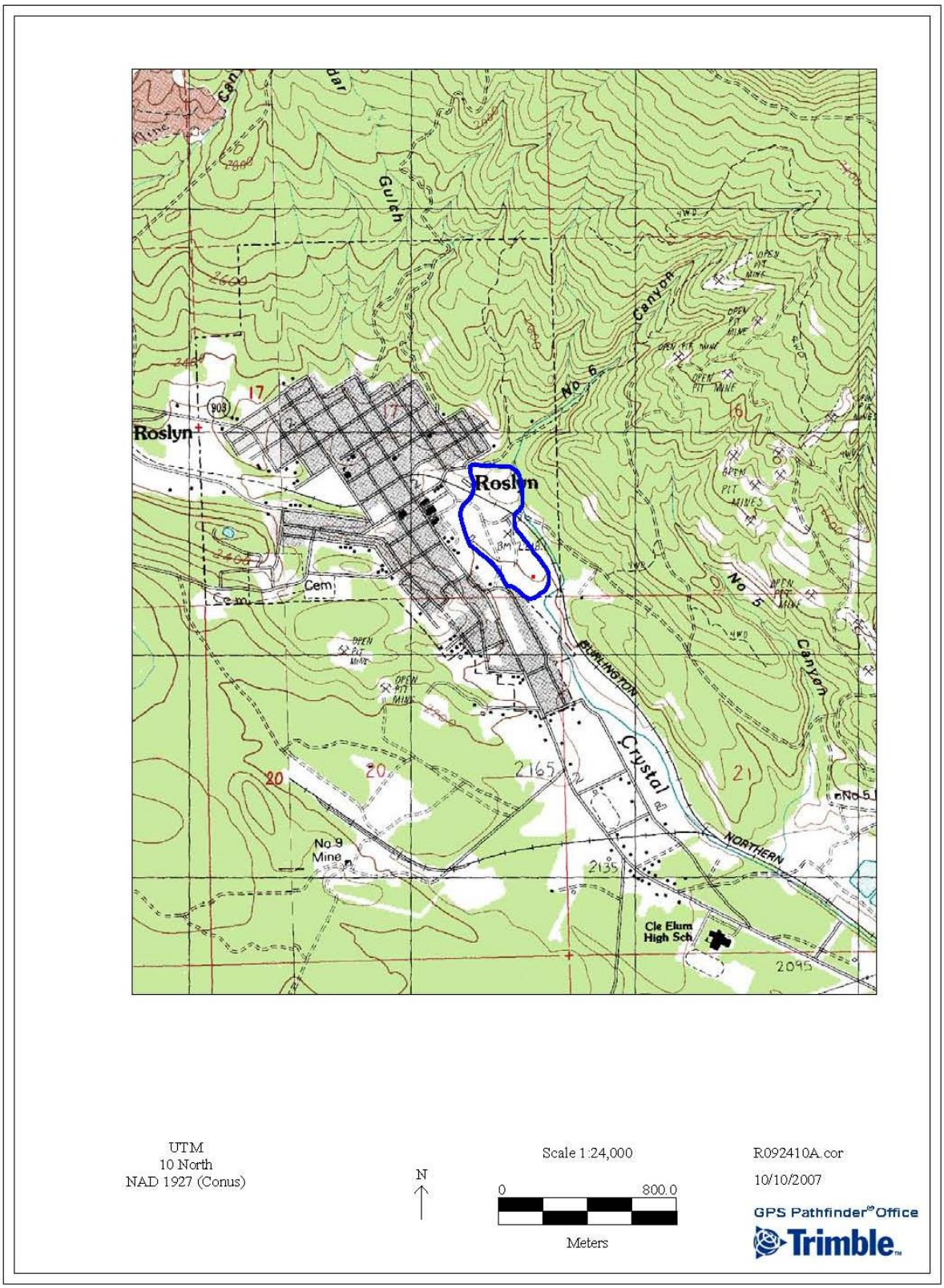


Figure 12. Historic archaeological site boundary map for 45KT2784.

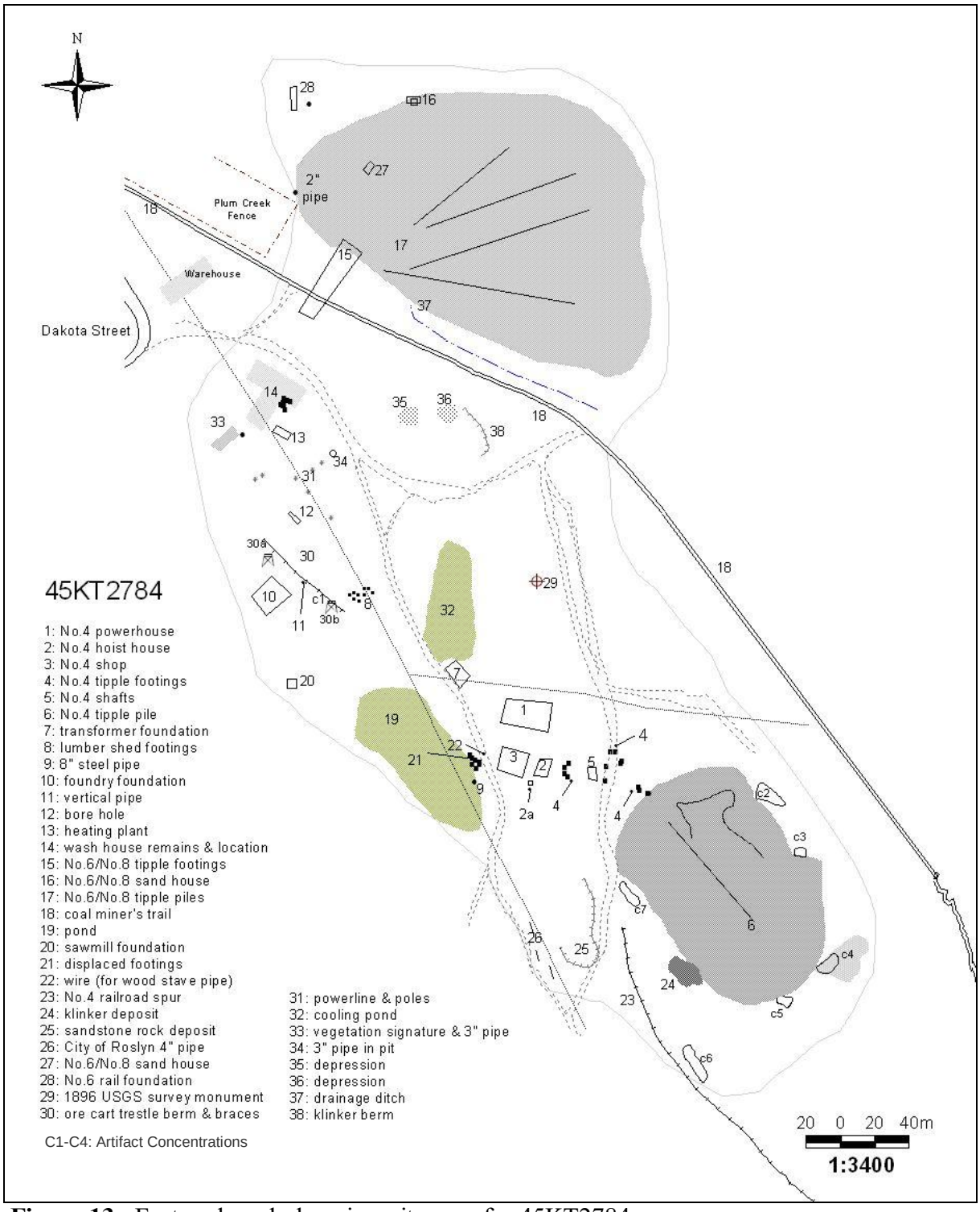


Figure 13. Feature based plan view site map for 45KT2784.

6.3 PROPERTY ANALYSIS

Following surface pedestrian survey, subsurface shovel probing survey, artifact analysis, and preliminary data review, CWAS conducted property analysis for the No. 4 Mine industrial

Space. This entailed a review of pertinent historical data identified during preliminary background research and furthered by post-field research, prompted by data from fieldwork and ancillary sources.

6.3.1 Historic Photography

Historic photographs made available from the Roslyn Museum, the Ellensburg Library, Suncadia, and the Fred Kruger historical collection at the CWU Brooks Library proved invaluable in understanding the changing historic and modern environment of the project area. Historic photography allows for better analysis of how much of the industrial coal mining and transportation site has changed through time on a general level as well as a feature, or structure specific scale.

Perhaps the finest historic photograph depicting the No. 4 Mine Industrial Space is a 1927 black and white panorama of Roslyn, taken from sandstone outcrops on Cle Elum Ridge northwest of the project area (Figure 14). An intact industrial coal mining and railroad transportation space complete with the post-1909 No. 4 Mine tipple, the N.W.I. Co. power plant, pond, lumber shed, foundry, stables, wash house, No. 6 & No. 8 tipple, warehouses, N.P. branch railway, and the YMCA building are evident at the height of Roslyn coal production. Figure 14 is an enlarged portion of the far left photograph. Note the stark industrial landscape, devoid of vegetation, with expansive open space contiguous with Roslyn.

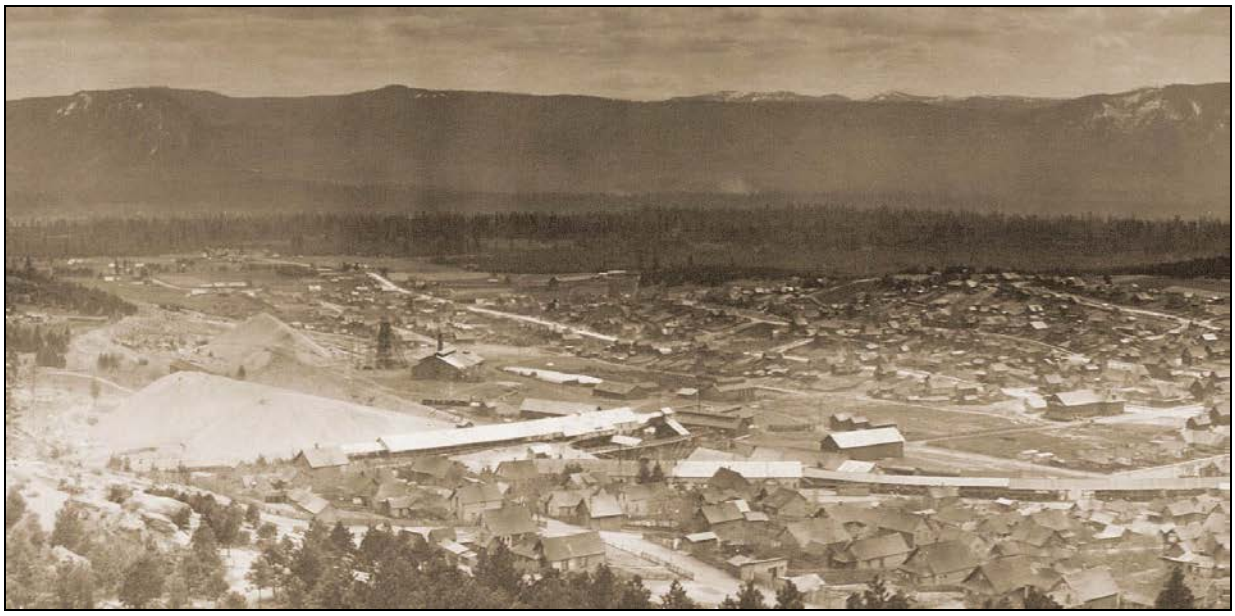


Figure 14. Clip of 1927 panorama with intact Roslyn Historic District industrial area.

6.3.2 Historic Maps

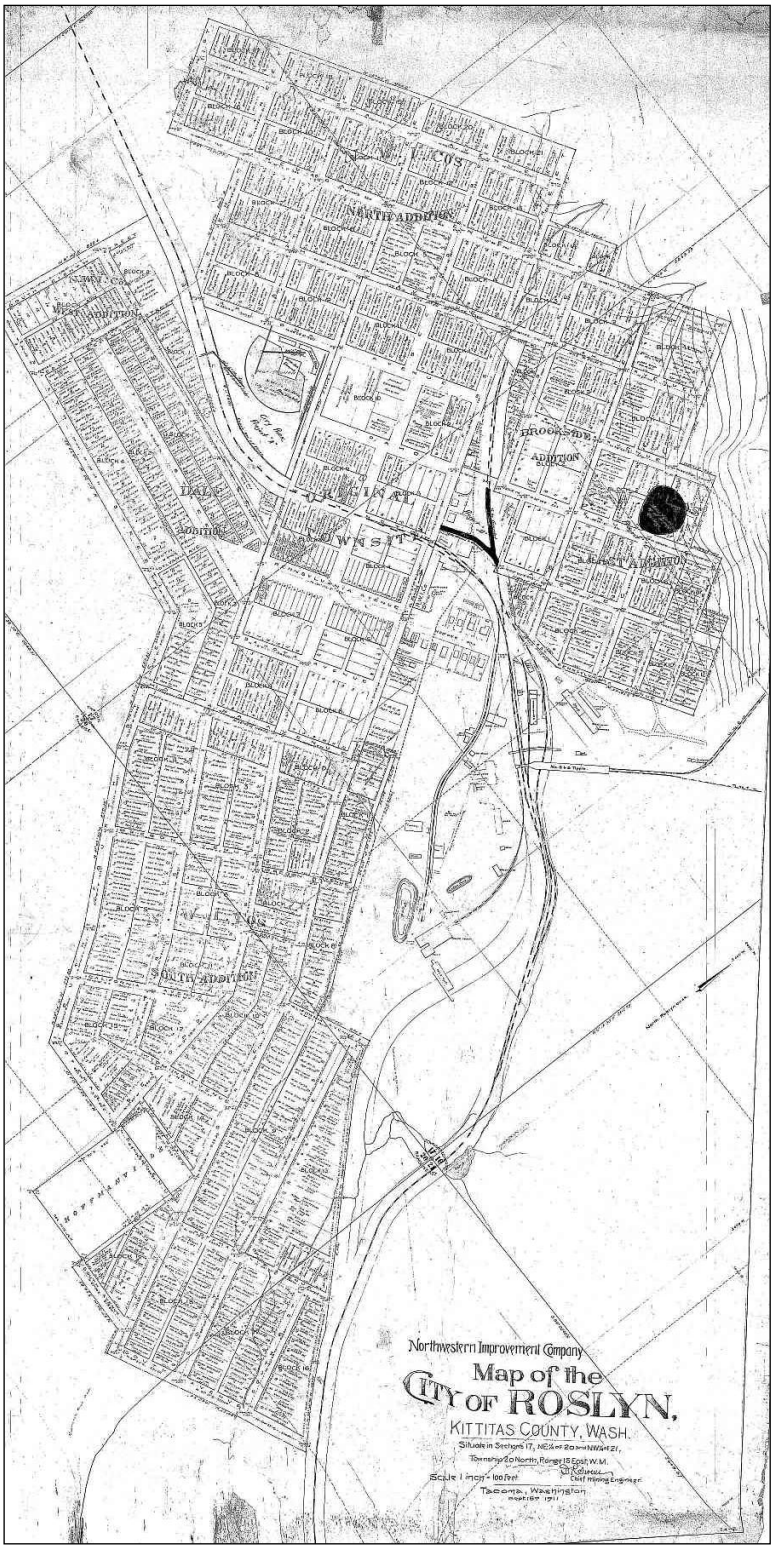


Figure 15. 1922 N.W.I. Co. City of Roslyn Map

Historic N.W.I. Co. maps made available through Suncadia, the Roslyn Museum, and the State Archives in Ellensburg are also invaluable in assessing the spatial dimension of historic coal mining infrastructure in the No. 4 Industrial Space (N.W.I. Co. 1908, 1911, 1913, 1918, 1922). CWAS personnel examined and made digital images of the several N.W.I. Co. maps in the Ellensburg Archives for use prior to field work and in the present property analysis. A most valuable map for both field work and analysis is the 1922 N.W.I. Co. map of Roslyn and the adjacent industrial space. Dated 1911 in the legend, the 'white map,' depicts Roslyn and the project area in detail, complete with residential names and dates, and labels for various structures across the industrial space (Figure 15). The map likely dates to 1922 or later, based on minimum residential dates.

6.3.3 The Power Plant

The generator provided direct current power for all mining related used in the area and alternating current for the town's commercial and residential use. The N.P. Coal Co. constructed the masonry power plant structure near the same time it excavated the 640 foot vertical No. 4 mineshaft (Figure 16). On March 16, 1893 and April 8, 1895 the Roslyn City Council issued franchises to individuals to build an electric light and power plant. August 9, 1897 they issued a franchise to the Northern Pacific Coal Company (Ordinances 51, 77 and 92). The power plant was built in the industrial area at the east edge of town.



Figure 16. N.W.I. power plant & No. 4 hoist house, headframe and tipple (pre-1909).

6.3.3.1 The Corliss Steam Engine

A Corliss steam engine is a steam engine, fitted with rotary valves and with variable valve timing, invented by and named after the American engineer George Henry Corliss (Figure 17). Corliss engines are generally 35% more fuel efficient than conventional steam engines with fixed cutoff. This increased efficiency made steam power more economical than water power, allowing industrial development away from millponds. Corliss engines were typically used as stationary engines to provide mechanical power to line shafting in factories and mills and to drive dynamos to generate electricity (Figure 18). They were generally large and

developed several hundred horse power albeit at low speed, turning massive flywheels weighing several tones at about 100 revolutions per minute.

By 1859, all of the key features of what we now know as the Corliss engine were in place. Patents granted to Corliss and others incorporated rotary valves and crank shafts in-line with the cylinders. The Corliss 1849 patent expired in 1870; the term of this patent had been extended by U.S. Patent reissue 200 on May 13, 1851 and U.S. Patent reissues 758 and 763 in 1859. After 1870, numerous other companies began to manufacture Corliss engines. Among them, the William A. Harris Steam Engine Company, the Worthington Pump and Machinery Company, and Allis-Chalmers. In general, these machines were referred to as Corliss engines regardless of who made them.

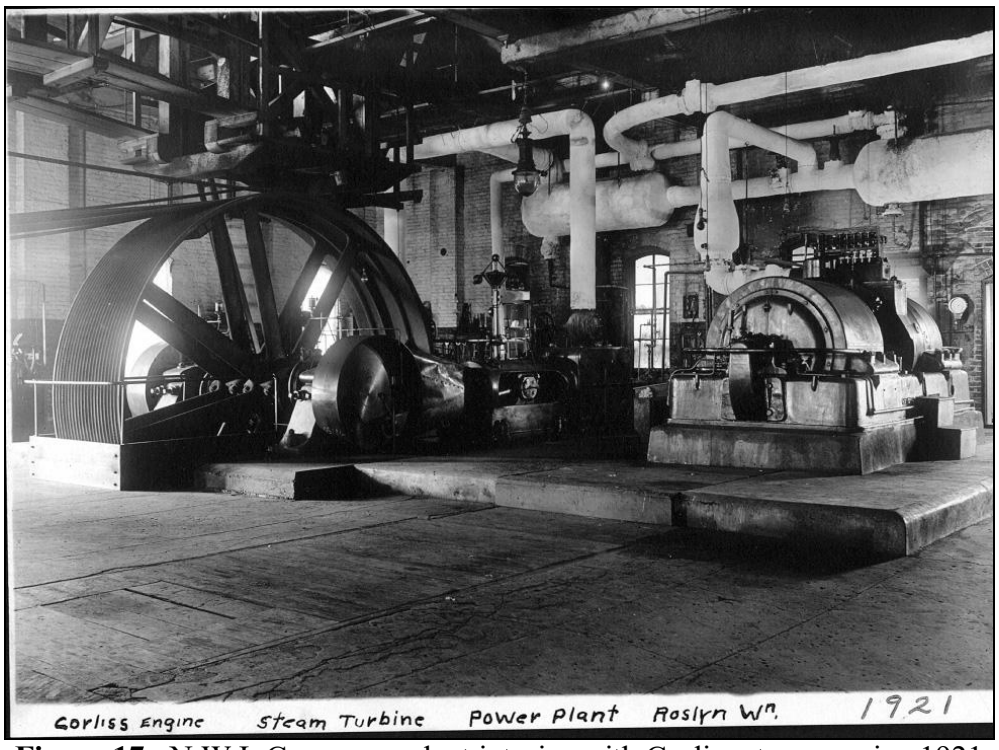


Figure 17. N.W.I. Co. power plant interior with Corliss steam engine 1921.

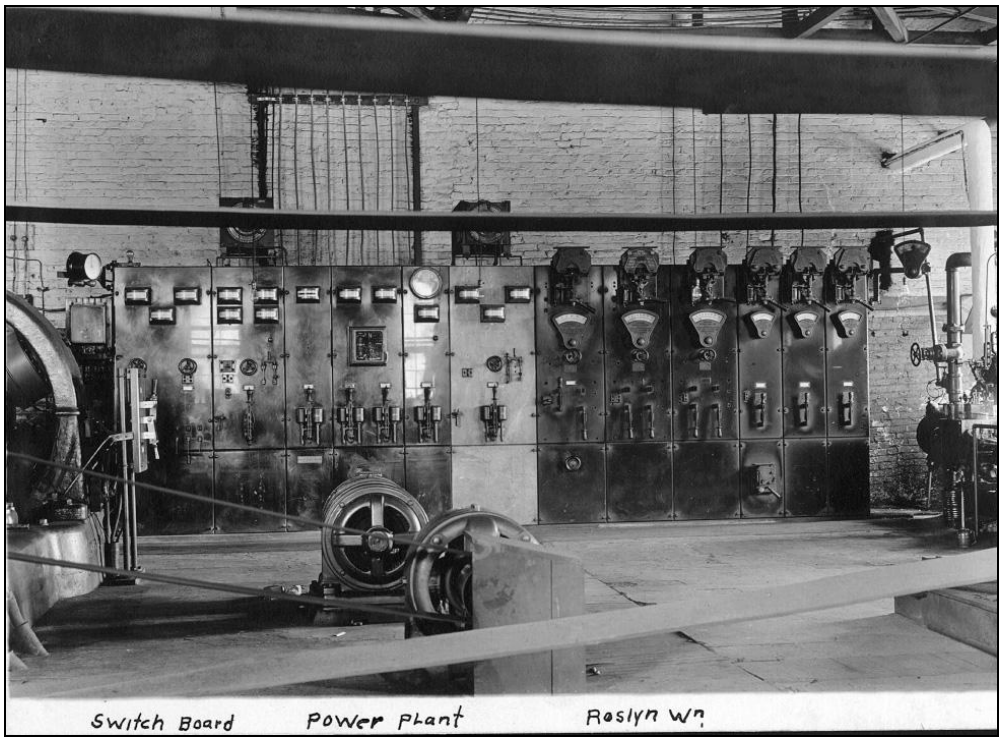


Figure 18. N.W.I. Co. power plant interior – switch board, 1920s.

6.3.4 The No. 4 Mine Surface Structures

The entire MPD project area and most of the City of Roslyn and the slopes of Cle Elum Ridge northeast of town are underlain by the subterranean workings of the No. 1, No. 2, No. 4, No. 6, and No. 8 coal mines. Based on a review of historic mine maps available for viewing at the Washington State Archives in Ellensburg, the 6th through the 11th Levels of the No. 4 Mine underlie the project area at a depth ranging from 490 to 725 feet below the ground surface (N.W.I. 1922).

6.3.4.1 No. 4 Mine Tipple

(Figure 19).

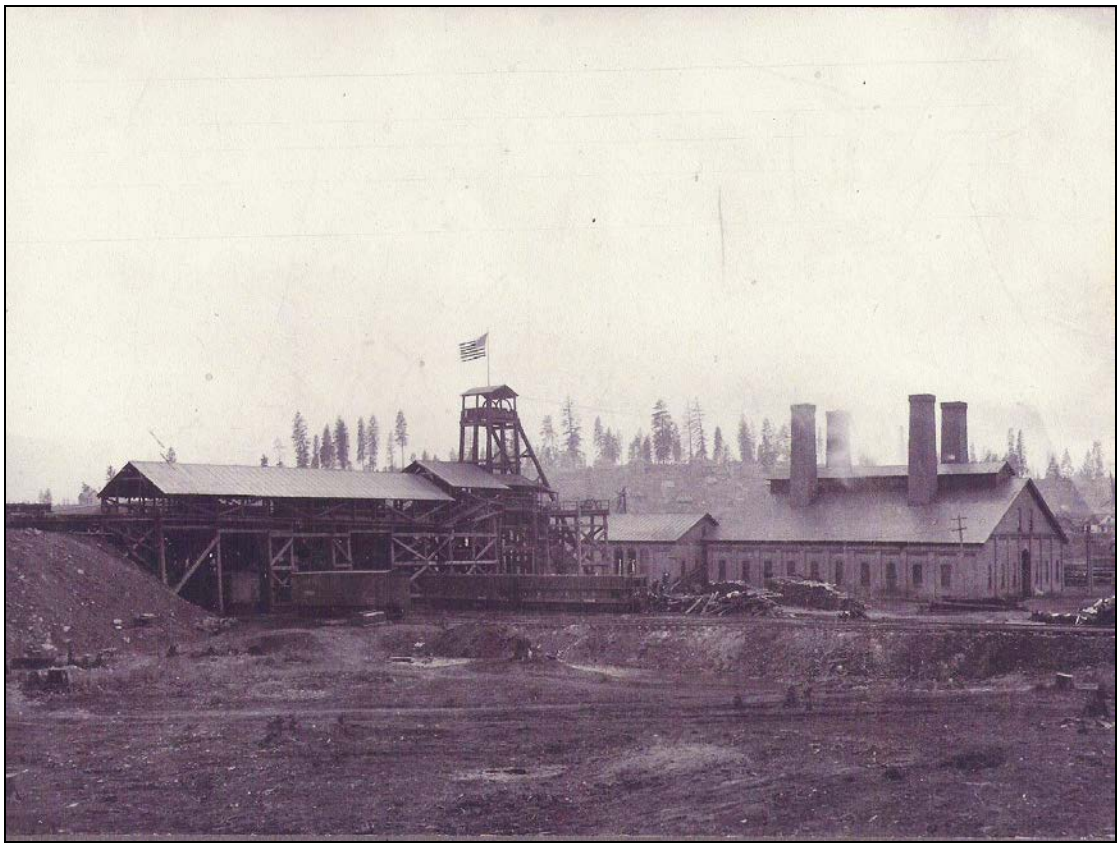


Figure 19. No. 4 Mine Tipple, Headframe, Hoist House, and Power Plant (pre-1909).

6.3.4.2 The No. 4 Mine Shafts

The method of entry (and ventilation) for the No. 4 Mine was accomplished with two adjacent vertical shafts, sunk vertically to a depth of 650 feet (198 meters) to the Roslyn coal seam (Saunders 1914:17). Excavation of the Roslyn Shaft, later named the No. 4 Mine shaft, began in the year 1893 and was completed the following year. It is likely that the original shafts were adversely affected by the 1909 explosion, and were modified as the No. 4 Mine shaft was put to use as a dewatering feature, with an iron girder headframe and tipple structure. At some point before the 1954 air photo, the entire above ground structure was removed, the shafts were partly filled, and the location buried with fill, as was much of the former industrial area.

On April 12, 2006, Icicle Creek Engineers excavated the overburden off the top of the decommissioned No. 4 Mine Shaft and exposed the parallel vertical shafts (ICE 2006). With the assistance of former Roslyn coal miner, John Ferro, and Nick Henderson, of the Roslyn Museum, Icicle Creek Engineers exposed the concrete liners to the primary shaft and the adjacent ventilation shaft (Figure 20). ICE reburied the shafts and liners following the investigation.



Figure 20. Exposed No. 4 Mine shaft with concrete liner (ICE 2006: Figure A-3)

6.3.5 The Miner's Wash House

(Figure 21).



Figure 21. 1920 photograph of the No. 6 and No. 8 Mines - Miners' Wash House.

6.3.6 No. 6 & No. 8 Mine Tipple

(Figure 22).

(Figure 23).

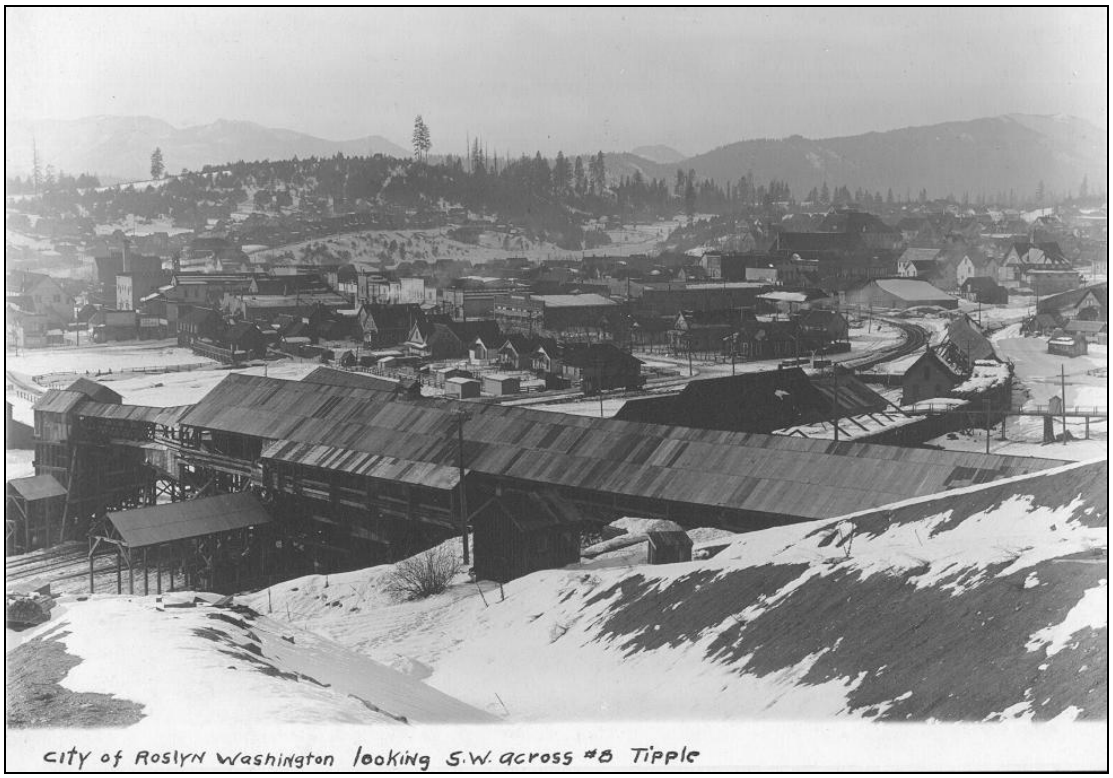


Figure 22. Historic photograph - SW overview No. 6 & No. 8 Mine Tipple & Roslyn.



Figure 23. 1922 photograph - NW view of the No. 6 & No. 8 Tipple structure.

6.4 SHOVEL PROBING

To address the potential for subsurface archaeological resources across archaeological site 45KT2784 and the adjacent Horse Pasture parcel, CWAS personnel conducted systematic subsurface survey in five loci. These areas include the Wash House (Feature 14) and surrounding area, the location for the former barn/stables, the concrete Transformer Slab - Feature 7 at the lower end of the Cooling Pond - Feature 32), Artifact Concentration 4, southeast of the No. 4 Mine Tipple pile, and in the Horse Pasture (Figure 24).

On April 28, 2008 CWAS submitted an archaeological excavation permit application to the Washington DAHP for access to archaeological site 45KT2784 (Appendix C). The excavation permit allows for legal subsurface exploration of the otherwise protected archaeological site (RCW 27.53). Additionally, the permit defines a mitigation process through data recovery with appropriate volumetric extraction. The research design is an aid for assessing whether the archaeological site is eligible to the National Register of Historic Places. All artifacts removed under this permit will be curated according to the standards stipulated. Of particular importance in this permit is the defined protocol for the inadvertent discovery of human remains. CWAS personnel will implement the protocol upon the discovery of any human remains.

CWAS personnel and a mix of undergraduate and graduate students of the CWU Anthropology Department performed the shovel probing on several occasions from April through July 2008. CWAS personnel excavated a total of 133 circular shovel probes across five separate subsurface survey grids (Appendix D). The shovel probes measured 30 cm in diameter and were hand excavated with round nose shovels to a general depth of 50 centimeters. Field personnel sifted all excavated matrix was through ¼" hardware cloth onto tarps. All screened sediments were returned to the probe hole following completion. All artifacts were collected, bagged and taken to the CWU Anthropology lab for analysis.

Lab personnel cleaned all collected artifacts and organized them into four categories based on composition and function. Analytical artifact categories include: construction debris, domestic debris, glass, and ceramics. CWAS defined domestic debris as any artifact that would be utilized by individuals. This category includes household object such as clothing, dining utensils, grooming items, consumable item vessels, etc. Construction debris includes those items that would be involved with construction of building. Items in this category include while or fragmentary brick, concrete, nails, stone, tile, etc. If identified glass or ceramic fragments could not be readily placed in the construction or domestic category, they were defaulted into their respective category. CWAS lab personnel separately bagged and summarized all temporally diagnostic artifacts (Appendix E).

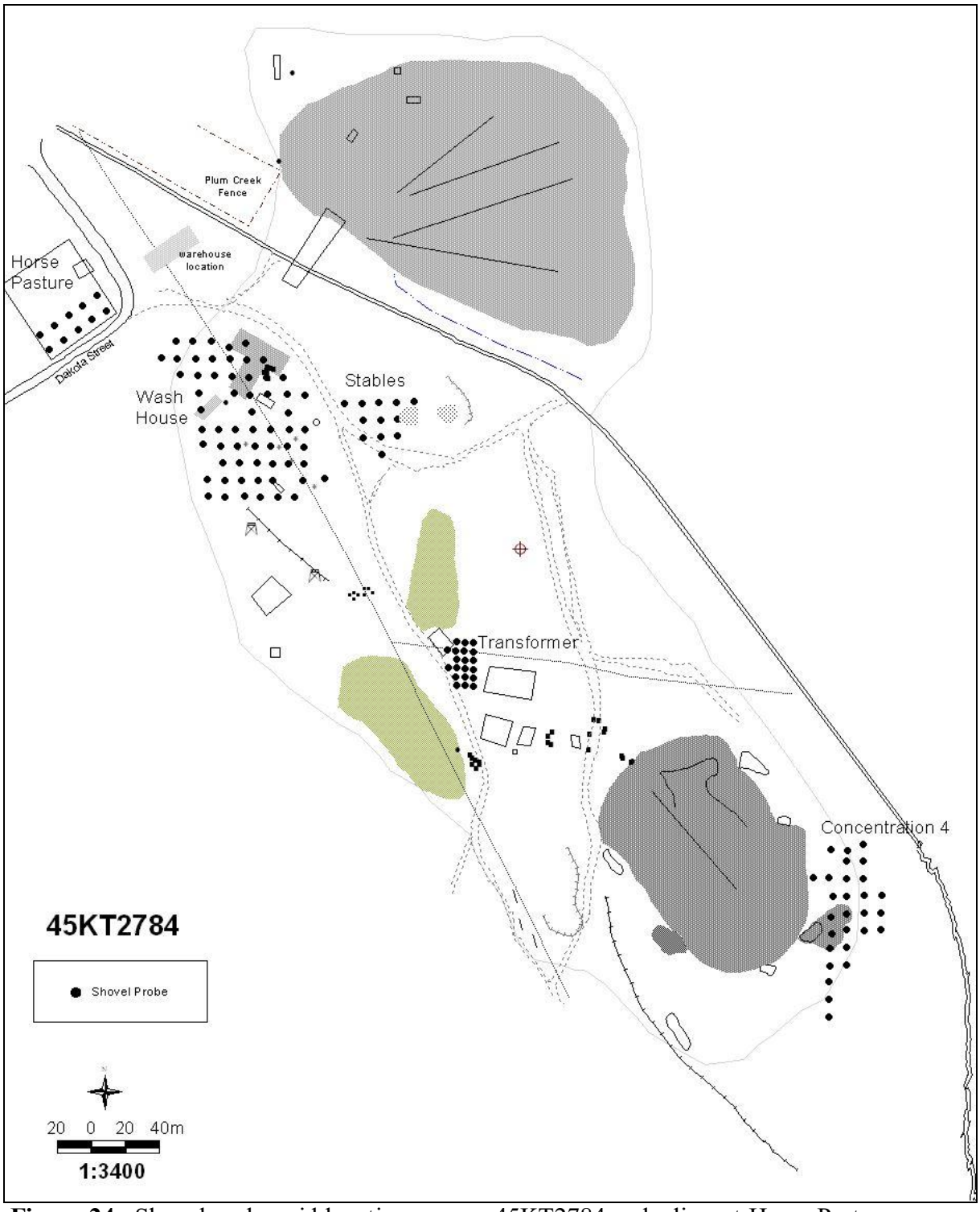


Figure 24. Shovel probe grid locations across 45KT2784 and adjacent Horse Pasture.

6.4.1 Subsurface Survey Results

Subsurface survey across 45KT2784 and in the adjacent Horse Pasture area yielded a generous amount of historic artifacts, generally consistent with the historic fill and debris

described in the ICI (2006) geotechnical report. The survey did not result in the identification of precontact artifacts. CWAS personnel conducted subsurface survey over a total area of 13,318 square meters, or 3.3 acres of 45KT2784 and the Horse Pasture. The subsurface survey samples for the five discrete grids are depicted in Table 6 by area and volume.

Table 6. Subsurface survey area and volume sampled by shovel probing grid.

Survey Grid	Survey Area m^2	Survey Area Acreage	Volume m^2
Wash House	7,091	1.75	2.43
Stables	1,163	0.29	0.54
Transformer	802	0.20	0.86
Concentration IV	3,061	0.76	1.22
Horse Pasture	1,201	0.30	0.45
Totals:	13,318	3.30	5.96

The Wash House locus was subject to subsurface survey investigation on April 18, 19 and 21, 2008. CWAS personnel surveyed a ten meter grid throughout the Wash House area and excavated a total of 54 shovel probes. The area around the Wash House selected for subsurface investigation given to the fact that the ICI geotechnical report (2006) identified little fill in the area, and the potential for the area to provide artifacts indicative of mining related activity in the general area of the Wash House, the tack yard, and the two 'Beer Houses.' The artifacts collected from probes in this area include construction debris (n=141), domestic debris (n=178), glass (n=205) and ceramic (n=20). The total artifact count in this area is 544. Of these artifacts collected, all were fragmentary and non-diagnostic except for 19 or 3.4% of the total artifacts.

A ten meter grid was surveyed in the Stables area, west of the Wash House grid, and a total of 12 shovel probes were excavated. The Stables area was subject to investigation on April 26, 2008. The Stables area was subject to investigation due to the fact that the geotechnical report identified that little imported fill was present in the area. The artifacts identified in this area include construction debris (n=121), domestic debris (n=80), glass (n=135) and ceramic (n=20). The total artifact count in this area is 356. Of these artifacts collected, all were fragmentary and non-diagnostic except for 6 or 1.6% of the collected artifacts.

CWAS surveyed a five meter interval grid along the southeast margin of the concrete slab foundation known as the Transformer (Feature 7) area. A total of nineteen shovel probes were excavated on April 26, 2008. The Transformer area was subject to investigation in an attempt to better understand the function of the former structure. Labeled on the 1911 N.W.I. map as a 'Sand House,' the feature bears pouring forms and securing bolts, which suggest the

presence of large machinery? This fact and the feature's position between the Power Plant and the Cooling Pond indicate that the feature was part of power generation and transmission. The artifacts identified in this area include construction debris (n=30), domestic debris (n=18), glass (n=13) and ceramic (n=3). The total artifact count in this area is 64. Of these artifacts collected, all were fragmentary and non-diagnostic except for four or 6.2% of the collected artifacts.

Concentration IV was surveyed with a ten meter grid of 27 shovel probes on April 25, 2008 (Figure 25). The area around Artifact Concentration IV was subject to investigation due to the high counts of visible artifacts in the area, the relative lack of historic fill, and its proximity to a watercourse, however modified it may be. The artifacts identified in this area include construction debris (n=722), domestic debris (n=692), glass (n=737) and ceramic (n=119). The total artifact count in this area is 2275. Of these artifacts collected, all were fragmentary and non-diagnostic except for 54, or 2.3% of the collected artifacts.



Figure 25. Shovel probing east of the No. 4 Mine Tipple pile.

CWAS personnel surveyed a ten meter grid in the Horse Pasture area and a total of ten shovel probes were excavated on April 26, 2008. The Horse Pasture area was subject to investigation due to the fact that the geotechnical report identified that little imported fill was present in the area. The area is bounded by a parking lot and house to the west, a street alley to the north, a paved road to the east, and East Dakota Avenue to the south. A small barn is

located in the northeastern part of the pasture along South A Street. Thick pasture grass covers the ground surface, and it had been in use for one or more horses and recently as 2007. Visibility is poor throughout most of the area except for a small area in the southwestern portion. CWAS personnel excavated ten shovel probes ten meter intervals spaced in two rows of five probes. The artifacts identified in this area include construction debris (n=9), domestic debris (n=7), glass (n=10) and ceramic (n=2). The total artifact count in this area is 28. All artifacts were fragmentary and non-diagnostic.

6.4.1 SHOVEL PROBING CONCLUSIONS

The excel sheet in Appendix C is a complete record of the materials removed. It is evident that a large deposit of historic artifacts is located in all if the tested areas. The diagnostic artifacts were re-bagged, re-labeled, photographed and assigned an artifact number. A record of the diagnostic artifacts is available in Appendix D. It is reasonable to deduce that similar artifact concentrations will be found throughout 45KT2784. As noted in the geotechnical report produced by Icicle Creek Engineering (2006), a dense layer of coal and clinker intermixed with fragmentary historic artifacts is evident throughout this property. Due to the dense layer of artifacts present on this property, ground disturbing activities should only be performed after archaeological mitigation efforts.

6.4.2 Location of Project Data

All project data including field notes, illustrations, maps, GTS data, GPS data, GIS data, digital images, background documents and research materials are located in the CWAS office in Ellensburg, Washington. All artifacts collected from shovel probes are temporarily curated at the Anthropology Department lab in Farrell Hall on the CWU campus in Ellensburg, WA. Final disposition of collected artifacts will be decided by appropriate staff at the City of Roslyn, Suncadia, and CWU staff.

7. CONCLUSION AND RECOMMENDATIONS

7.1 SUMMARY

The No. 4 Mine District Master Planned Development, proposed by Suncadia, LLC, calls for transformation of approximately 30 acres of City of Roslyn owned property currently zoned for a combination of multi-family residential and light industrial use, between First Street and the Coal Mines Trail. The project would potentially include a mix of residential, commercial, interpretive/historic and open space uses. At completion, it could include approximately 200 housing units, including cottages, duplexes, single-family homes, lofts and apartments. Suncadia would also develop approximately 118,000 square feet of commercial and small retail use spaces on the ground floor of two-story mixed-use buildings with residential space above. Preliminary plans call for structures to exhibit architectural styles representative of the Roslyn Historic District.

CWAS personnel and students of the 2007 CWU Anthropology Department Archaeological Field School conducted systematic pedestrian survey over a 36-acre area and identified portable surface artifacts as well as surface archaeological features. This survey resulted in the identification of site 45KT2784. A total of 38 historic features were identified, described and mapped. CWAS determines that this property is a contributing element to the larger Roslyn Historic District and any action that takes place on the property must be planned and executed in a way that the historic integrity of the property is not compromised.

7.2 DISCUSSION

The relationship between inventory and significance also must be considered in any comprehensive plan for assessing the significance of mining sites. What is the relationship between the archaeologically visible features in a site inventory and what should be assessed for significance? The traditional "reductionist" approach is to assess the significance of individual features, such as mine shafts or machine pads. Such easily observable and isolated features, however, may be only a small part of a much larger complex of features and objects, all of which have originated in the same human activity. In mining sites, examples would include the surviving remnants of the hoisting system for a mine or an ore reduction system for a mill. Hardesty (1988b:9-11) refers to such complexes as "feature systems." The feature system is an interface of the spheres of history, archaeology, and ethnography; that is, it is defined by combining information from documentary accounts, the memory of living

informants, and observations of the archaeological record. A good argument can be made for evaluating the significance of feature systems as a whole, rather than individual features.

The concepts of visibility and focus (Deetz 1977)

The concepts can be used in four ways to evaluate the National Register eligibility of mining sites

Visibility refers to the actual above ground physical recourses, while focus referees to a pattern of impressions in the earth which remain evident even in the absence of visible above-ground resources

A mining site with focus, but no visibility would possibly be eligible

Such a mining site would contain features such as mine portals, foundations, slabs, head frames, tipple piles, rail trestles, road prisms, trash dumps and isolated objects which reflect interpretable changes in mining technology and cycles of occupation and abandonment a context statement, an analysis of property types associated with the context and an individual property form to nominate eligible resources

The need to evaluate mining resources as complete systems

7.2.1 Hardesty Feature Systems

Hardesty (1988:9-11) defines the features system as one linking concept for transforming archaeological resources into property types (Hardesty and Little 2000:23-24). Feature systems are networks or geographical clusters of archaeological features that can be linked to the same human activity, such as a technological process like coal mining, or a specific social organization, for example a neighborhood or individual households. The feature system is defined by combining archaeology, history, and ethnography ad is used as an interpretive tool; in ways is similar to the site complex defined by Lewis Binford (1983:117) for interpreting the archaeology of hunting and gathering sites. Documentary or ethnographic images of a technological process such as coal mining and transport, for example, are used as models to identify and interpret archaeological features that are associated with the process. The surviving physical remains, in turn, are used to elaborate and modify the documentary and ethnographic images of the technology. Feature systems are defined by working within this interactive framework. The definition of feature systems often crosscuts archaeological sites

if a relatively long period of time is represented. Features systems are the physical remains of synchronic processes or organizations, but the archaeological record is the cumulative end product of all past human activities at the site. Mines, for example, are archaeological sites that might include the physical remains of hoisting works from different time periods and using different technologies. In the 1860s the most typical hoisting system was a whim, followed in the 1870s by steam-driven hoist engines systems in the deep underground mines and in the 1890s by the introduction of an electric-engine driven system. Each of these hoisting systems is defined as a separate feature system.

Table 7. Property Types Based on Stages of Mineral Processing (Noble & Spude 1992).

Prospecting/Mine Exploration Property Types	Drill holes and Bore holes
	Hand-dug prospect pits
	Power shovel driven trenches
	Bulldozer cuts
Mine Development & Exploitation Property Types	Hoisting works such as headframes and hoist engines
	Open pits, shafts, drifts, tunnels, adits
	Ventilation systems such as air shafts or blowers
	Power systems such as steam boilers or electric generator houses
	Drainage systems such as Cornish pumps
	Water delivery systems
	Ore bins or tipples
Mine Development & Exploitation Property Types	Transportation systems such as short line railroads or ore cart runways, inclines
	Maintenance and administrative facilities such as blacksmith shops, assay laboratories, offices, and workers' housing

7.2.2 Deetz: Visibility & Focus

In his classic book in Small Tings Forgotten, James Deetz (1977) introduced the concepts of visibility and focus as measures of the integrity of archaeological sites (Hardesty and Little 2000:46). Visibility refers to the relative abundance of material re minas. It is the extent to which the physical remains of a historic property have survived and are observable today. Focus is the degree to which the physical remains are readable or interpretable and can be linked to the historic property (v. Deetz 1977:94-94). For example, does a property contain the mixed deposits of several occupations and time periods, or the intact remains of a single occupation during a short period of time? These concepts of visibility and focus may be used to assess the extent to which historical and archaeological sites have retained integrity. Under criteria A-C, all of which require that archaeological remains be capable of conveying or illustrating historic properties, both good visibility and focus are needed. However, to be considered eligible or contributing under criterion D requires only good focus and does not require visibility. The property must be a significant and focused or interpretable repository of information needed to answer one or more of the questions defined in the research design. In many but not all cases, the property must contain a substantial buried or surface archaeological deposit that is relatively undisturbed. The property also must be associated with the palace and time period of the historic context.

7.3 CONCLUSIONS

The results of our inventory and preliminary evaluation of No. 4 Mine Industrial Area provide the basis for a discussion of the significance and integrity of the archaeological resources within the project area (45KT2784). The following sections outline considerations related to assessing the historic integrity of 45KT2784 as a significant archaeological site and as a contributing element of the Roslyn Historic District.

7.3.1 Integrity

Technical information on the National Register of Historic Places (NRHP) defines integrity as the ability for a historic property to convey significance (Noble and Spude 1997: 19). To be listed in the National Register, a property must be revealed as significant *and* it must also retain integrity. The National Register traditionally recognizes the integrity of historic properties through seven aspects or qualities, including location, design, setting, materials, workmanship, feeling and association. These qualities are routinely discussed under a statement of significance for the subject property in a NRHP registration form.

The Roslyn Historic District is nominated to the National Register (Lenz 1977). The N.W.I. No. 4 Mine Industrial Area lies within the Roslyn Historic District boundary and is therefore a

contributing component of the district. Lenz (1977) described the area as "an historic industrial open space" and included it within the historic district boundary (Lenz 1974: 4).

As a mining and industrial property, 45KT2784 lacks conspicuously visible buildings. The property does, however have associated features including the N.W.I. No. 4 Mine shaft, headframe and tipple structure footings, enormous looming tailings piles, structure foundations, ore cart track berms, trash dumps and isolated artifacts.

The important principle inherent in the assessment of integrity for mining and industrial activity sites like 45KT2784, is that the integrity of mining sites will frequently hinge not so much on the condition of the extant buildings, but rather on the degree to which the overall mining and industrial system remains intact and visible. This method of evaluating integrity requires a holistic look that comprehensively considers all the component parts of a mining/industrial system. If clear evidence of a complete system remains intact, deterioration of individual aspects of the system may not eliminate the overall integrity of the resource. The following historic integrity section elucidates how the seven aspects of integrity obtain to 45KT2784 as an archaeological component of the Roslyn Historic District.

7.3.1.1 Location

Location is the place where the historic property was constructed or the place where historic events occurred. Integrity of location refers to whether the property has been moved or relocated since its construction. A property is considered to have integrity of location if it was moved before or during its period of significance. Integrity of location means that a mine, power plant, saw mill or foundry remain in their original locations.

A place where mining once occurred is not inherently moveable, but components used to conduct mining and other industrial activities can be destroyed and moved off site. In the case of 45KT2784, all of the above-ground works are removed, and the structures that held them reduced to sandstone foundations, concrete slabs, piers, and footings. Although this fact precludes the opportunity to conserve intact structures, infrastructure and machinery, the locations and relative positions for many primary structures remain apparent and identifiable. This can yield information to understand the No. 4 Mine and the surrounding industrial area as a system, even though individual components are deteriorated or largely gone. Archaeologically, 45KT2784 will maintain integrity of location as long as enough of its defining features remain in place.

7.3.1.2 Design

Design is the composition of elements that constitute the form, plan, space, structure, and style of properties, which change through time. Mines and mills evolve through time with the

introduction of new technology or expansion of the mining operation. Contemporary evaluation of an industrial area's integrity should be based on its ability to illustrate the property's progression over time.

Smokestacks may be raised or removed; wooden tipple structures destroyed and replaced with steel girder derricks; hoisting equipment and ventilation may change to reflect advancing technology. Changes made to continue the function of the property during its career may acquire significance in their own right. These changes do not necessarily constitute a loss of integrity of design. However, the removal of equipment that served as the power plant — the boiler, steam engine, has a considerable impact on the property. The design integrity of coal mining and industrial sites is reflected by the survival of ancillary buildings and structures. The decision to nominate a station should include an assessment of the design integrity of the property as a complex. The loss or substantial alteration of ancillary resources, such as keeper's quarters, oil houses, cisterns, and tramways, for example, may constitute a significant loss of design integrity.

7.3.1.3 Setting

Setting is the physical environment of a historic property that illustrates the character of the place. Historic mines and industrial areas were industrial complexes that contained a multitude of functions. In many cases, the industrial features typical of a mining operation are considered unsightly or dangerous. The appearance created by these vestiges of past industrial activity represents important aspects of setting that can actually contribute to the integrity of the property.

Integrity of setting remains when the surroundings of a historic property, archaeological site, or historic district, such as the Roslyn Historic District, have not been subjected to radical change. Integrity of setting for an archaeological site such as the N.W.I. No. 4 Industrial Area (45KT2784), a contributing component of a historic district would be compromised, for example, if it were now completely surrounded by modern development.

7.3.1.4 Materials

Materials are the physical elements combined in a particular pattern or configuration to form the aid during a period in the past. Integrity of materials determines whether or not an authentic historic resource still exists. Integrity of materials is largely inapplicable to the archaeological record. Archaeological site 45KT2784 does not retain integrity of materials for its above ground and near sub-surface features. Retaining integrity of materials for subsurface features requires evidence that sympathetic materials are used during the course of repair and restoration.

7.3.1.5 Workmanship

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period of history. Workmanship is important as it can furnish evidence of the technology of the craft, illustrate the aesthetic principles of a historic period, and reveal individual, local, regional or national applications of both technological practices and aesthetic principles. To the largest extent possible, mining and related industrial properties should retain evidence of original workmanship. Integrity of workmanship is not particularly applicable to the above ground features across 45KT2784 (with the possible exception of the vertical 640 foot No. 4 Mine Shaft), as they are only remnants of the former structures. Integrity of workmanship can be expected for subterranean features of the mine not adversely affected by subsidence and collapse following the termination of coal mining.

7.3.1.6 Feeling

Feeling is the quality that a historic property has in evoking the aesthetic or historic sense of a past time period. Although it is itself intangible, feeling is dependent upon the property's significant physical characteristics that convey its historic qualities. Integrity of feeling is enhanced by the continued use of an historic property and for archaeological sites, is largely dependant on interpretation efforts.

Industrial properties are largely abandoned sites, because mining and industrial properties are based on natural resource extraction, whether coal mining, steam and electricity generation or timber milling. Structures are simply abandoned when coal reserves are depleted or the regional or national resource economy changes. The loss of this feeling of abandonment due to encroaching modern development can diminish the integrity of a mining or industrial property.

7.3.1.7 Association

Association is the direct link between a property and the event or persons for which the property is significant. Integrity of association will exist in cases where mine structures, machinery, and other visible features remain to convey a strong sense of connectedness between mining properties and contemporary observers' ability to discern the historical activity which occurred at the location.

7.4 RECOMMENDATIONS

As a contributing element of the NRHP nominated Roslyn Historic District, archaeological site 45KT2784 is an eligible industrial archaeological site. Altering the archaeological site as called for by the Suncadia MPD will require mitigation. Mitigation can take two forms –

Data Recovery and *Interpretation*. Data recovery entails conducting controlled archaeological excavations near significant features in sensitive areas as well as the in-place preservation of surface and near subsurface artifacts and archaeological features.

If the property and archaeological site are to be developed, a Cultural Resource Management Plan (CRMP) should be available to help guide its progression and ensure protection of the historic integrity of 45KT2784 (Appendix G). CWAS also advocates some mechanism for updating the CRMP. As per discussions between Suncadia, the City of Roslyn, DAHP, the Yakama Nation and CWU, the following areas of recommendation are outlined for industrial archaeological site 45KT2784:

I. Complete deep trenching at 45KT2784 to evaluate the potential for buried Native American cultural deposits.

II. Conduct data recovery for historic deposits, features and artifacts in all graded and excavated areas.

III. Monitor all subsurface disturbance related to below ground historic industrial infrastructure.

IV. Complete a National Register of Historic Places Registration form for archaeological site 45KT2784 and update the Roslyn Historic District Nomination Form (Lenz 1977).

V. Interpretation of mining complex in central facility (i.e. replica Wash House or Warehouse).

VI. Interpretation of replica structures and significant features on location and in place (i.e. the No. 4 Mine shafts, tipple structures, power plant).

VII. Develop a repository facility, managed in partnership with the Roslyn Museum, for archaeological materials recovered from 45KT2784 and the City/Suncadia, LLC property.

7.4.1 Site Preparation

The ICE (2006) geotechnical report for outlines a site preparation plan for the construction of residential and commercial structures and modern infrastructure across the "Section 17" project area and industrial archaeological site 45KT2784. The following is a rendition of the ICE geotechnical report, tailored to both the preservation of identified archaeological features and artifact concentrations and to mitigation of potential adverse affects.

CWAS recommends that sod and topsoil be stripped from building areas and all areas that may receive structural fill. It is anticipated that the required depth of stripping will typically be on the order of three to 12 inches. Stripped material should be wasted off-site or used for landscaping purposes. We recommend that existing historic foundations, slabs or pavements be removed, as they could interfere with new construction. Existing voids (i.e., the No. 4 Mine shafts, the Bore Hole, abandoned utilities, manholes, vaults, etc.) or new Icicle Creek Engineers depressions created during site preparation should be cleaned of loose soil or debris, and backfilled with structural fill.

Soils and near surface sediments at the site are moisture-sensitive and will be difficult to work on or compact during wet weather. It will be preferable to schedule site preparation and earthwork during periods of extended dry weather when these sediments will be less susceptible to disturbance and provide better support for construction equipment. Areas that are stripped or excavated to design sub-grade elevations, or are to receive structural fill, should be proof rolled with heavy, rubber-tired construction equipment. Soft, loose or otherwise unsuitable areas identified during proof-rolling should be compacted, if practical, or removed and replaced with structural fill. We recommend this procedure not be performed during wet weather. During wet weather, systematic probing should be used to evaluate the sub-grade.

7.4.1.1 Fill Pad Area Southwest of the Coal Mines Trail

ICE (2006:) and CWAS recommend that a structural fill pad be placed over the entire area southwest of the Coal Mines Trail. This purpose of the structural fill pad will be to provide relatively consistent support for roads and utilities. Depending on the thickness of the fill pad, it may also be used to provide support for structure foundations. As previously discussed, this area is underlain by a variably thick layer of loose fill which is underlain by soft, compressible soil. Removing the loose fill is not a practical option given the shallow ground water table and the volume of material. The fill pad will act as a diaphragm and provide more consistent support conditions across this area.

We recommend that the structural fill pad be at least four feet thick. The fill pad thickness could be reduced to two feet, but this would require over-excavation and replacement of loose fill and/or soft alluvium with compacted structural fill below foundations. The advantage of a minimum four foot thick structural fill pad is that:

1) Over-excavation for foundations will not be necessary for most foundations embedded 2 feet or less.

2) Construction of underground utilities that are less than 4-feet deep would be easier and less costly.

3) The project site and houses would have increased protection with respect to flooding

4) The structural fill pad would provide a diaphragm, as discussed later in this report, to reduce damage to structures during earthquakes.

The disadvantage of the four foot thick fill pad is the amount and availability of material required. However, material that meets the specifications for General Borrow (Section 9-03.14(1)) in the 2006 WSDOT Standard Specifications would be satisfactory for use. A fill pad is not necessary for the area northeast of the Coal Miners Trail, except for a relatively small area in the north corner of this area.

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9. APPENDIX A – PROJECT AIR PHOTO IMAGE



10. APPENDIX B

10.1 CWAS PERSONNEL AND PARTICIPANTS

Dr. Steven Hackenberger, Principal Investigator, CWU Anthropology Department

Dr. Morris Uebelacker, CWU Geography and Land Studies Department

Tucker Orvald, M.S., Field Director, CWU Anthropology Department

Shane Scott. M.S., CWAS Staff Archaeologist

CWAS Technical Personnel

Corrine Camuso, B.A. CWU Anthropology

Matt Breidenthal, B.A., CWU Anthropology

Steven Greenawalt, B.A. CWU Anthropology, field supervisor and mapper

James McLean II, B.A. North Carolina State Anthropology

Noah Oliver, B.A. CWU Geography and Land Studies

Brandon Sybrowsky, CWU Resource Management graduate student

CWU Students

C. J. Anderson, B.A., CWU Anthropology, Resource Management graduate student

Colin Lamb, CWU Anthropology undergraduate student

Daniel Magana, CWU Anthropology undergraduate student

Christian Nauer, B.A., CWU Resource Management graduate student

Jake Shapley, B.A., CWU Resource Management graduate student

Daniel Magana, CWU Anthropology undergraduate student

Sarah Vickers, B.A., CWU Anthropology

11. APPENDIX C

11.1 ARCHAEOLOGICAL EXCAVATION PERMIT ATTACHMENT

1. Nature and Extent of Work Proposed.

Introduction: Central Washington Anthropological Survey (CWAS) requests an Archaeological Excavation Permit for the purpose of conducting excavations within the identified site, The Number 4 Mine Complex that exists within the industrial open space area of the Roslyn Historic District. It has been identified that these lands are to be developed by Suncadia, LLC.

The property covered by the permit includes portions of Township 20, Range 15, Section 17, that is within and adjacent to the City of Roslyn in Kittitas County, Washington (see map in attached site record, Appendix B). Excavations for which the permit is requested are of three main types: (1) limited test excavations to support determinations of eligibility for known unevaluated archaeological features and unspecified archaeological sites yet to be discovered, (2) limited test excavations of proposed areas of impact within the known Roslyn National Register Historic District for the purpose of determining if the impact area is contributing to the site significance, and (3) limited data recovery excavations of eligible archaeological sites (following consultation, when other forms of mitigation are not practical).

Project Area: The study area, located in the Ceded Land of the Confederated Tribes and Bands of the Yakama Nation, is known to contain archaeological evidence of historic mining and may contain buried evidence representing Native American occupations. Suncadia, LLC, and CWAS are currently conducting a cultural resource inventory within the City of Roslyn in and around the vicinity of the No.4 coal mine complexes. The proposed scope of work, as reviewed by the Roslyn Historical Commission and DAHP, includes shovel probing, testing of select areas associated with mining activities as well as deeper trenching to evaluate the potential for precontact occupations associated with buried stream terraces.

Archaeological testing in the areas that are not within the boundaries of known archaeological and historic sites, or the Roslyn Historic District, that do not encounter archaeological material would not require an excavation permit. However, when cultural materials are encountered during archaeological probing within the Roslyn Historic District or known archaeological sites, then this permit applies.

The Roslyn Historic District is defined by the boundary of the City of Roslyn. The district nomination lists the open industrial area (approximately 58 acres) of the No. 4 Mine as a contributing element. Although all associated buildings have been demolished the existence of the Roslyn Foundry combined with remaining evidence of the No. 4 Mine (such as foundations, tipple piles, two sets of

rail lines and the No. 4 shaft entrance, etc.) are cited as important features of the district. The area also served mines number 1, 2, 6 and 8, located east of the project site**.** A geotechnical testing project within this area has already revealed locations with buried historic artifact deposits and building debris.

The Roslyn area was homesteaded starting in 1883 and the town site was platted in 1886. A mining camp was established in this vicinity during the winter or 1886-1887. The nature and location of building remains and debris associated with the Roslyn No. 1 Mine remain to be determined. In 1892, 45 miners were killed in No. 1 Mine, the worst coal mine disaster in Washington state history. In 1909 the No. 4 Mine gas explosion killed ten men and ignited the head frame, tipple structure, and other buildings. The large brick powerhouse near the mine entrance was demolished mid-century.

***Project Development*:** In 2006, Suncadia conveyed approximately 330 acres of land, including the subject site, to the City for open space and trails. Suncadia retained an option to re-acquire the No. 4 Mine District site for development. In 2007, the City amended the Comprehensive Plan, zoning code and zoning map to establish procedures for Master Planned Developments (MPD). The MPD ordinance identified sites which were considered Unique Community Assets, including the No. 4 Mine area site, and applied an MPD zoning overlay. It also established development standards and procedures applicable to MPD designated sites (Chapter 12.10 Roslyn Municipal Code). The process includes public participation requirements (notice and multiple public hearings), and identifies the roles of the City's Planning Commission and Historic Preservation Commission. Development standards address traffic impacts, sewer and water service, water rights, historic preservation, storm water management, and environmentally sensitive areas. On August 14, 2007, the City approved an agreement that establishes procedures and roles and responsibilities for the environmental review process for the No. 4 Mine District. It includes reimbursement of City costs by the applicant and a Public Participation Process.

Proposed Project Development: The proposed project would redevelop the site for a mix of residential, commercial, interpretive/historic and open space uses over an approximate 5 year period. It will include approximately 200 dwelling units in a combination of attached and detached styles, including single family homes, cottages, duplexes, carriage houses, lofts, and apartments and approximately 118,000 square feet of commercial and small retail space (shops, restaurants/cafes, professional services, and artist work studios/galleries).

Several historic structures may be redeveloped for cultural and/or commercial uses. The Wash House may be redeveloped as an interpretive facility or used for commercial purposes. The Power House may be redeveloped as a commercial/restaurant use. The hoist-way over the No. 4 mine shaft would be reconstructed as a commemorative element. All of these elements would occupy open spaces which would include interpretive elements. The storage building at the northern portion of the property is planned as a flexible community pavilion, part of the open space surrounding the Wash House. The two 'beer houses,' small masonry storage buildings, located close to the Wash House may also be

rebuilt for park or commercial purposes. Open space would comprise approximately 12 acres of the total site area. Open space would be located in the southern portion of the site, containing the wetland, the tailings pile and connections to the Coal Mines Trail. A greenbelt (approximately 4 acres) would be maintained on the western portion of the site. Open space would also surround the redeveloped historic buildings.

Environment: The project area has been substantially altered by mining activities and some areas are buried under mining debris and construction fill. The project setting includes forested hillsides and the valley floor of a tributary stream. The majority of the No. 4 Project site is underlain by an extensive alluvial fan that developed at the base of the steep drainages entering the valley from the East. Buildings and other mining structures were constructed on this higher more gentle sloping land. Portions of the original surface of this alluvial fan remain exposed south of the No. 4 Mine Tipple Pile and these sediments exhibit considerable amounts of historic artifact debris. A sequence of buried terraces probably exists along the original stream channel located on the western margin of the project area. Preliminary geotechnical testing in the project area reveals substratum with varying depth of historic fill, fine grain strata, gravel and cobble strata, underlain by blue silt and clay layers attributed to glacial streams and ponds. Bore holes confirm that these deepest layers (located from 2-3 meters of deep) are saturated by groundwater. If original surface of the fan remain in tact and/or stream terrace can be identified, then evidence of multiple periods of precontact occupation seems highly probable (8,000-200 B.P.).

Project Scope: It is anticipated that CWAS will be conducting additional testing and construction monitoring for Suncadia, LLC construction projects proposed as part of a larger community development plan. In order to support development planning archaeological investigations will include: shovel probes, test units and backhoe trenches will be excavated. The protocols for site recording, site testing and data recovery follow. A series of separate reports will be prepared to document this work, including brief interim reports submitted within 30 days of completion of a task and draft technical reports submitted within 60 days of the completion of project. The reports may describe small discrete work units or bundle together multiple work units.

Site Recording Protocol: It is expected that new cultural resources may be encountered during cultural resource investigations and construction monitoring, and these may require testing. Prior to any testing, the cultural resources will first be recorded and appropriate forms submitted to the Department of Archaeology and Historic Preservation (DAHP). The recording protocol will be different for surface/near surface discoveries than for deeply buried discoveries, as described below:
(1) New surface or near-surface archaeological sites may be encountered during surface survey, shovel probing, and/or trench monitoring. As such new sites are encountered; CWAS will first delineate boundaries, including the excavation of shovel probes as necessary for this purpose. If the discovery is made during construction monitoring, construction will bypass the site vicinity by ceasing activity within 150 feet to allow for archaeological shovel probing investigation. Each new site will be recorded, and a form submitted to the DAHP. If testing is deemed necessary, CWAS will first notify

the Assistant State Archaeologist. Upon DAHP review of the site form and assignment of a site number, testing may be undertaken by representatives of CWAS.

(2) New, more deeply buried archaeological sites may also be encountered during research and construction trenching. These situations call for a slightly different protocol, since site boundaries cannot be determined by surface survey or shovel probing. In these cases, the exposed portions of the site will be recorded and a form submitted to the DAHP based only on this exposed portion. CWAS will notify the Assistant State Archaeologist of the discovery and upcoming investigations. Upon DAHP review of the forms and assignment of a site number, site boundary delineation and testing may be undertaken simultaneously by representatives of CWU and YNCRP. In the meantime, construction will bypass the site vicinity by ceasing activity within 150 feet.

Site Testing and Data Recovery Protocol: Archaeological site testing efforts will be limited in scale and will employ standard excavation techniques. Testing will be conducted through excavation of at least $2m^2$ of test units per site, each unit being 0.5m x 0.5m or 1m x 1m, and units being clustered or distributed based on site artifact distribution and geomorphology. The number of test units to be dug at a site will be determined using the protocol listed below, with the caveat that excavation will be terminated as soon as adequate information for a determination of eligibility recommendation for the site or portion to be impacted is achieved. In any case, a maximum of $16m^2$ will be excavated during the testing phase for single site. Excavations will be conducted using 10 cm arbitrary levels, subdivided by natural or cultural stratigraphy as observed, and all sediment will be screened with 1/8" hardware cloth. Sample recovery will include artifacts and faunal remains, with specialized samples (sediments, macrobotanical, radiocarbon) as appropriate. Fire-cracked rocks will be described and discarded in the field, except in cases where more detailed analysis of this material is integral to evaluation and documentation of the site. Once excavations are completed, the exposed depositional strata will be described, drawn, and photographed, and the pits will be backfilled at the completion of field work. A plan map of excavations will be prepared, and excavation unit locations will be plotted with a global positioning system (GPS) unit.

While this work is not intended for research in human remains and we hope that none are exposed during testing efforts, if human remains are encountered, a human remains protocol will guide further actions (see Appendix A).

In the event Suncadia, LLC construction plans would impact a contributing portion of a significant archaeological site, a decision about how to proceed will be made after consultation with the affected parties. If the site cannot be avoided or adequately protected (e.g., by placement of protective overburden) then data recovery excavations will be necessary. Decisions to undertake data recovery will be made by CWAS in consultation with Suncadia, LLC and the DAHP. Except in the case of the discovery of human remains, the scale of data recovery operations will be guided by the following protocol until all parties agree that sufficient data recovery is achieved. In the event human remains are discovered the human remains protocol will guide all parties.

Testing and Data Recovery Protocol for Shovel Probing Discoveries Pertaining to Historic Properties:

(1) In areas of high artifact yield (> 10 per Shovel Test Probe) or intact historic features, a minimum of one 1x1 meter unit will be excavated to a maximum practical depth.

Testing and Data Recovery Protocol for Shovel Probing Discoveries Pertaining to Pre-Contact Properties:

(1) For every positive shovel probe (artifacts present), one 1x1 meter unit will be excavated to maximum practical depth

(2) For every 1x1 meter unit with 100 or more artifacts and/or one feature, 10 1x1 meter units will be excavated. Identified features will be excavated as completely as practical.

Testing and Data Recovery Protocol for Shovel Probing Discoveries Pertaining to Pre-Contact Properties Identified During Trenching Activities:

(1) For every artifact discovery, 0.125m^3 (i.e., a 50x50x50 cm area or equivalent) of *in situ* matrix will be excavated by hand from the identified cultural layer/deposit identified in the trench wall.

(2) For every two 0.125m^3 samples that contain artifacts, a 1x1 meter unit will be excavated in the line established for trench excavation (where necessary CWU facility backhoes will be used to clear overburden under the direction of an archaeologist). 1x1 meter units will be combined to achieve greatest practical depth).

(3) For every 1x1 meter unit with 100 or more artifacts and/or one feature, 10 1x1 meter units will be excavated in advance of trench excavation. Where features are identified, excavations will extend beyond the line of the construction trench so that 100% of the impacted feature will be recovered.

2. Artifact Inventory Plan.

It is anticipated that the quantities of cultural materials to be recovered will vary depending on the type of site being investigated, but in no case do we expect to collect a large amount of materials. This expectation is based on the view that the total volume to be sampled at each site will be relatively small. All collected materials will be inventoried, recorded with reference to their excavation provenience, and stored in a manner consistent with professional standards (Secretary of Interior Standards [36CFR79] or better as required by the curation facility). In the field, all collected materials and samples will be inventoried and bagged by lot, each lot representing a distinct provenience.

Collected materials will be returned to the laboratory for processing and analysis, and a catalog will be created for each site. Fragmentary artifactual materials and faunal remains will be washed, dried, sorted into functional categories, and placed by category and provenience into sealed plastic bags with acid-free paper labels. Any sediment or macrobotanical samples will be placed unmodified into two sealed plastic bags with an intermediate acid-free paper slip labeled with provenience. Any

radiocarbon samples will be placed into sealed foil bags and thence into sealed plastic bags with acid-free paper labels. Catalogues of all collected artifacts will be included in all relevant reports.

3. Research Design.

Historical Background: Coal production in the eastern Cascades is intimately linked to the efforts of railroad companies to construct transportation linkages across the Cascades in the second half of the nineteenth century. Though early settlers likely were aware of the presence of coal in the upper Yakima watershed as early as 1871, commercial coal extraction only began with the rumored arrival of railroads in the area in the 1880s. Although a team from the Union Pacific Railroad failed in 1883 to discover any workable coal seams, limited coal production began in the first half of the decade, with local shipments to Ellensburg. However, the catalyst for the large-scale development of the field was in 1886, when the Northern Pacific Railroad (N.P.R) sent a survey crew to establish the parameters of what would become known as the Roslyn-Cle Elum field. Construction of a rail link and the arrival of ever-increasing numbers of settlers led to the platting of both Cle Elum and Roslyn later that same year; ultimately, the N.P.R was responsible for much of the settlement and development of upper Kittitas County in the late 19th and early 20th centuries.

The main companies producing coal in the Roslyn-Cle Elum coalfield included the Northern Pacific Coal Company, the Roslyn-Cascade Coal Company, and the Roslyn Fuel Company. Of these three, the most important would prove to be the Northern Pacific Coal Company, which was subsequently converted to the Northwestern Improvement Company (N.W.I.). The N.W.I. opened its first mines, the Nos. 1 and 2, in August 1886, north of present day Roslyn. The N.W.I. eventually opened ten different mines between 1886 and 1944; the No. 4 mine was opened in 1893 and was in production for approximately 34 years, a time when the N.W.I. was the primary property owner in the Roslyn-Cle Elum field as well as the largest producer of coal in the state of Washington. The Roslyn-Cle Elum field itself was the most valuable in the state, reaching peak production of 1,837,937 tons in 1920. During the 1920s, several mines - including the No. 4 - were closed in response to decreased supply of clean coal, increasing costs, competition from other sources of energy, and the gradual introduction of machinery into the mines themselves. Mining continued in the Roslyn-Cle Elum field until 1963, when the successor to the N.W.I., the Coal Division of the Northern Pacific Railway Company, permanently closed the No. 9 mine.

Field Objectives: The goal of any particular testing effort will be to gain basic insights into the character and significance of the cultural deposits. While research design questions may vary on a case-by-case basis, we anticipate addressing four basic questions:

1) Are subsurface cultural deposits present?
2) Are structural remains and/or other types of *in situ* features present?
3) What is the basic depositional or geomorphic history?
4) Taking into account #3 and other data, do the cultural deposits have integrity?

The majority of artifacts and features will relate to historical mining activities. Therefore our purpose will be to evaluate the potential for these discoveries to yield information about domestic routines and/or corporate activities. Discoveries of domestic refuse will allow special attention to be given to expressions of ethnic identities and economic status. Finds related to work places within the mine complex will be assessed as they relate to the material culture and organization of industrial activities. Structural evidence will be documented and interpreted using historical maps of the mine complex with special focus on the history of explosion and demolition at the No. 4 Mine.

1) Do artifacts represent any particular patterns in behavior that reflect differences in gender, ethnicity, and or social status?
2) Are there any distinct archaeological signatures of yards or work areas such as debris, remains of clothing and footwear, and tools or tool parts?
3) Is their sufficient evidence of the mapped mine infrastructure, or other un-mapped developments, to warrant in place historical interpretation?

Assuming that intact precontact cultural deposits are present, our research will also focus on basic aspects of early settlement and subsistence activities that characterize major chronological periods of regional Native American societies (Table 1). Evidence for the precontact use of tributaries of the Cle Elum River is sparse.

Table 1. Major Chronological Phases/Periods of Regional Native American Society (years ago).

12,000+ to 10,500: Paleoindian-Clovis. Characterized by small, mobile bands of hunter/gatherers exploiting a wide range of subsistence resources. Sites are small, exhibit low artifact densities.

10,500 to 8,000: Windust Phase. Characterized by small, mobile bands of foragers exploiting a range of resources using a seasonal settlement system. Sites are generally small and exhibit low artifact densities. Large shouldered or basal notched lanceolate projectile points are diagnostic.

8,000 to 4,500: Cascade Phase. Characterized by mobile opportunistic foragers primarily adapted to Riverine environments. Increasing reliance on fish. Sites are located along alluvial margins and projectile points are typically leaf-shaped and large side-notched. Millingstones indicate increased reliance on plant resources.

4,500 to 2,500: Tucannon Phase. Semi-subterranean houses and more specialized camps for hunting, root collecting, and plant processing characterize this period. Several types of contracting stemmed and split-stemmed, corner-removed points dominate.

2,500 to 250: Cayuse Phase. Population concentrated in large, nucleated winter villages. People dispersed in spring to gather roots and in the fall and winter to hunt. The seasonal round became increasingly diverse and well organized over time. Use of highland areas greatly increased during this period. Trade with coastal and interior groups also became increasingly common.

250 to 50: Historic Period. Introduction of the horse, non-indigenous diseases, and Euroamerican technology lead to major cultural change. Settlement patterns changed due to the need to pasture horses and the ability horses provided for long-distance transportation. Diseases brought about significant population collapse. Euro-Americans migrate into the region.

Surface finds within the upper Yakima River basin, and from more local terraces of the Cle Elum River, include very early artifacts (Clovis, Windust, Cascade points) as well as a wide variety artifacts from assemblages know to date from 5,000 to 500 years ago. Two sites with possible winter home occupations have been identified on the local stretch of Cle Elum River. Our work on the Point Site (45KT1368) and sites within the Suncadia Resort suggest extensive and relatively diffuse seasonal encampments on upper river terraces, benches, ridges and meadows. These sites include cooking features and both flaked and ground stone tools that served for purposes of hunting, plant processing and wood working.

Specifically, for precontact archaeological deposits we propose to address questions such as:

1) What types of economic and technological activities are represented?
2) What types of animals (salmon and ungulates) and plants (pine nuts, berries, roots) were used?
3) What do the animal and plant assemblages tell us about what resources and places were important to site occupants?
4) What do these assemblages tell us about the time(s) of year when the site was occupied?
5) How old and how long is the period represented by site deposits?
6) What do the site sediments tell us about the local ecology and landscape history?
7) What types of stone tool technologies were developed?
8) How were household activities patterned and how do these related to overall community organization?
9) Are household and community patterns similar or different from those described in historical and ethnographic accounts?
10) How does this site compare to other excavated sites in the study area and to sites in the general vicinity?

4. Persons responsible for conducting the work.

Dr. Steven Hackenberger (CWU) is the project Principal Investigator, and will be responsible for supervision of all fieldwork, analysis, and report preparation for all sites tested under this permit. Day-to-day field operations will be under the supervision of Tucker Orvald, M.S. (CWAS), and/or Shane Scott, M.S. (CWAS). At least one M.S. or Ph.D.-level supervisor will be in the field at all times during all field investigations.

5. Person responsible for carrying out the terms of this permit.

Dr. Steven Hackenberger (CWU) and Shane Scott, M.S. (CWAS) will be responsible for administering the proposed work.

6. Financial Evidence.

The work will be completed through Central Washington University, which has always had the financial capability of internally funding projects to completion, while awaiting reimbursement from federal agencies and contract clients. In this case, Suncadia, LLC has signed a contract with CWU

wherein it agrees to sponsor the proposed work. A budget number has already been assigned to the project by CWU accountants. The applicants anticipate no difficulties in funding the initiation, conduct, and completion of the project. Additionally, there is excellent logistical support from CWU, and appropriate laboratory facilities in the Department of Anthropology (P.I. Hackenberger).

7. Site Restoration Plan.

Excavations conducted under this permit will be backfilled at the close of each effort by CWAS and/or Suncadia, LLC. The areas potentially subject to excavation are within a large development being undertaken by Suncadia, LLC. Decisions about the ultimate development and use of any particular site area will be made, in consultation with the affected parties, once archaeological investigations have been completed.

8: Evidence of agreement with the proposed work from the agency with management responsibility over the land.

The project area is located on lands owned by Suncadia, LLC. Suncadia, LLC has contracted with CWAS to implement the cultural resource activities required pursuant to development.

9. Site Security Plan.

The areas to be addressed under this permit are located on Suncadia, LLC lands, and access to these lands by the general public is only permitted by arrangement with Suncadia, LLC.

10. Public Participation Plan.

The project is located within an area of public use. Central Washington University students may participate in aspects of project area testing under direct supervision of faculty and staff. Representatives of the Yakama Nation and/or other affected parties, who have received safety training, will be invited to participate and/or observe the work, but active project areas will otherwise be closed to the general public. At the present time there are no plans to have the public participate in any excavations, either as volunteers or as observers. At their discretion, Suncadia, LLC and the Yakama Nation and/or other affected parties may choose to publicly reveal some or all of the results of this effort, after the fact.

11. Environmental Checklist.

The work covered under this permit is that called for under the prior SEPA review and county permit requirements as described in these documents.

12. Evidence of Abandonment.

Not applicable.

13. Curation of materials from public lands.

At the conclusion of the archaeological analyses, the archaeological collections affiliated with Native American peoples and associated documentation will be donated to the Yakama Nation Museum

(YNM) for curation. A one-time collection processing fee, or possible loan agreements, will be negotiated with the YNM. In the event the YNM declines the Native American archaeological collections the Suncadia, LLC and/or the City or Roslyn may, at their discretion, contract with CWU or other appropriate artifact repositories, and would consult with the DAHP on their selection. Suncadia, LLC and/or the City or Roslyn may retain and curate Euro-American historical artifact collections, for their own interpretive purposes, or may at their discretion contract with CWU or other appropriate artifact repositories, and would consult with the DAHP on their selection. If Suncadia, LLC and/or the City or Roslyn elects to retain any collections, then a copy of the associated documentary record (catalogue, all notes, photographs of artifacts, etc.) will be curated with the YNM or other appropriate facility as described above.

14. Curation of materials from private lands.
At the conclusion of the archaeological analyses, the archaeological collections affiliated with Native American peoples and associated documentation will be donated to the Yakama Nation Museum (YNM) for curation. A one-time collection processing fee, or possible loan agreements, will be negotiated with the YNM. In the event the YNM declines the Native American archaeological collections the Suncadia, LLC may, at their discretion, contract with CWU or other appropriate artifact repositories, and would consult with the DAHP on their selection. Suncadia, LLC may retain and curate Euro-American historical artifact collections, for their own interpretive purposes, or may at their discretion contract with CWU or other appropriate artifact repositories, and would consult with the DAHP on their selection. If Suncadia elects to retain any collections, then a copy of the associated documentary record (catalogue, all notes, photographs of artifacts, etc.) will be curated with the YNM or other appropriate facility as described above.

15. Curation of historic aircraft materials. Not applicable.

Appendix A. Human Remains Protocol.

In the event that human remains are discovered in the course of activities covered under this permit, the following protocol will guide actions taken thereupon.

1) Upon initial discovery, all excavations in the vicinity (archaeological hand excavations and/or construction excavations within 150 feet) will immediately cease. Excavations may not resume until permission is given by the Kittitas County Coroner (law enforcement cases) or forensic anthropologist (other cases).
2) Project archaeologist or representative will note the date, time, and locality of the discovery.
3) Project archaeologist or representative will contact appropriate authorities immediately:
    a) Kittitas County Coroner
    b) Kittitas County Sheriff
    c) Suncadia, LLC
    d) Forensic anthropologist

4) Further action will await the permission of the coroner (and/or forensic anthropologist if approved by the coroner). In the meantime, the discovery will be kept confidential. If there will be a significant time delay before arrival of the coroner or forensic anthropologist, the location will be secured to prevent disturbance of remains and associated material. Methods to protect a find could include fencing or covering the remains with a protective material and culturally sterile sediment or plywood. If vandalism is considered a threat, a 24-hour site security monitor will be established.
5) If the discovery is determined by the coroner (and/or forensic anthropologist if approved by coroner) to be the remains of a Native American person, the following notifications will be made:

a) Department of Archaeology and Historic Preservation
b) The Confederated Tribes and Bands of the Yakama Nation
c) Confederated Tribes of the Colville Reservation (If the find is made in the Northwestern half of the resort):
d) Wanapum (If directed to do so by the Yakama Nation tribal representative)

6) Decisions about the treatment of the remains (non-law enforcement cases) will be made by consultation with affected parties in accordance with the wishes of the most likely descendants of the remains.

Appendix B. Site Record.
Not included with this report appendix.

12. APPENDIX D

12.1 SHOVEL PROBING ARTIFACT INVENTORY

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
Wash House	April 18, 19 & 21 - 2008				
SP 1	38	49	41	7	135
SP 2	23	11	29	0	63
SP 3	3	3	6	0	12
SP 4	1	0	0	0	1
SP 5	16	16	21	2	55
SP 6	6	6	5	0	17
SP 7	0	0	0	0	0
SP 8	3	2	1	0	6
SP 9	2	2	4	0	8
SP 10	5	15	17	0	37
SP 11	15	7	3	4	29
SP 12	0	4	0	0	4
SP 13*	12	13	28	4	57
SP 14	1	0	0	0	1
SP 15	0	25	25	0	50
SP 16	0	2	0	0	2
SP 17	0	1	0	0	1
SP 18	0	1	1	0	2
SP 19	0	0	0	0	no artifact bag
SP 20	0	0	0	0	no artifact bag
SP 21	0	0	0	0	no artifact bag
SP 22	0	0	0	0	no artifact bag
SP 23	1	0	0	0	1
SP 24	0	2	2	0	4
SP 25	0	0	0	0	0

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
SP 26	0	0	0	0	0
SP 27	0	2	2	0	4
SP 28	0	1	1	0	2
SP 29					no artifact bag
SP 30	0	6	5	1	12
SP 31	0	2	2	0	4
SP 32	0	1	1	0	2
SP 33					no artifact bag
SP 34A	1	0	0	0	1
SP 34B	1	0	1	0	2
SP 35	0	0	0	0	no artifact bag
SP 36	0	0	0	0	no artifact bag
SP 37	0	0	0	0	no artifact bag
SP 38	0	1	0	0	1
SP 39	4	1	1	0	6
SP 40	0	0	0	0	no artifact bag
SP 41	0		0	0	0
SP 42	0	2	2	0	4
SP 43	0	0	0	0	no artifact bag
SP 44	0	0	0	0	
SP 45	0	1	0	0	1
SP 46	0	0	0	0	no artifact bag
SP 47	0	0	0	0	no artifact bag
SP 48	1	0	0	0	1
SP 49	8	2	7	2	19
SP 50	0	0	0	0	no artifact bag
SP 51	0	0	0	0	no artifact bag
SP 52	0	0	0	0	no artifact bag

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
SP 53	0	0	0	0	no artifact bag
SP 54	0	0	0	0	no artifact bag
W.H. Totals	141	178	205	20	544
Stables	**26-Apr-08**				
SP 55	4	1	1		6
SP 56	4	4	4	0	12
SP 57	0	1	0	1	2
SP 58	6	4	3	1	14
SP 59	10	10	12	2	34
SP 60	0	4	4	0	8
SP 61	37	19	41	1	98
SP 62	20	18	29	6	73
SP 63	19	8	20	7	54
SP 64	21	11	21	2	55
SP 65	0	0	0	0	no artifact bag
SP 66	0	0	0	0	no artifact bag
Stables Totals	121	80	135	20	356
Transformer	26-Apr-08				
SP 67	0	0	0	0	no artifact bag
SP 68	0	0	0	0	no artifact bag
SP 69	1	1	0	0	2
SP 70	0	1	0	0	1
SP 71	0	0	0	0	no artifact bag
SP 72	1	1	0	0	2
SP 73	3	0	0	0	3
SP 74	0	0	0	0	0
SP 75	0	0	0	0	no artifact bag

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
SP 76	3	0	0	0	3
SP 77	11	0	0	0	11
SP 78	1	0	0	0	1
SP 79	0	0	0	0	0
SP 80	0	0	0	0	0
SP 81	2	0	1	0	3
SP 82	3	0	0	0	3
SP 83	0	3	3	0	6
SP 84	3	9	7	2	21
SP 85	1	2	2	0	5
SP 86	1	1	0	1	3
Transformer Totals	30	18	13	3	64
Horse Pasture	July 9,10,11, 2008				
SP 87	0	1	1	0	2
SP 88	0	0	0	0	no artifact bag
SP 89	0	0	0	0	no artifact bag
SP 90	0	0	0	0	no artifact bag
SP 91	0	0	0	0	no artifact bag
SP 92	6	4	7	2	19
SP 93	0	1	1	0	2
SP 94	0	1	1	0	2
SP 95	3	0	0	0	3
Pasture Totals	9	7	10	2	28
Concentration 4	**25-Apr-08**				
SPX 1	6	8	5	1	20
SPX 2	2	0	2	0	4
SPX 3	1	8	7	0	16

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
SPX 4	3	13	6	3	25
SPX 5	18	16	28	1	63
SPX 6 (1/5)	41	102	116	4	263
SPX 6 (2/5)	89	144	128	32	393
SPX 6 (3/5)	107	94	65	26	292
SPX 6 (4/5)		1	1	0	2
SPX 6 (5/5)	204	161	106	7	478
SPX 7	24	11	29	5	69
SPX 8	120	4	74	17	215
SPX 9	60	40	78	3	181
SPX 10	0	8	8	0	16
SPX 11	0	0	0	0	no artifact bag
SPX 12	16	9	17	2	44
SPX 13	21	30	28	9	88
SPX 14	2	0	2	0	4
SPX 15	3	8	8	1	20
SPX 16	4	3	6	0	13
SPX 17	1	5	6	0	12
SPX 18	0	2	1	0	3
SPX 19	1	2	0	0	3
SPX 20	0	0	0	0	no artifact bag
SPX 21	0	0	0	0	no artifact bag
SPX 22	0	0	0	0	no artifact bag
SPX 23	0	3	3	0	6
SPX 24					no artifact bag

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic	Total Artifact Count
SPX 25	0	4	3	0	7
SPX 26	3	15	8	8	34
SPX 27	1	1	2	0	4
C4 Totals	727	692	737	119	2275

13. APPENDIX E

13.1 PROBES WITH DIAGNOSTIC ARTIFACTS

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic
Wash House	**April 18, 19, 21, 2008**			
SP 1	SP1-CD-1 SP1-CD-2 SP1-CD-3 SP1-CD-4 SP1-CD-5 SP1-CD-6 SP1-CD-7	SP1-DD-1		
SP 5	SP5-CD-1		SP5-G-1	
SP 6	SP6-CD-1 SP6-CD-2			
SP 10			SP10-G-1	
SP 12			SP12-G-1	
SP 15			SP15-G-1	
SP 17		SP17-DD-1		
SP 24			SP24-G-1	
SP 39	SP39-CD-1			
SP 45		SP45-DD-1		
Stables	**26-Apr-08**			
SP 62				SP62-C-1 SP62-C-2
SP 63				SP63-C-1
SP 64	SP64-CD-1 SP64-CD-2			
Transformer	**26-Apr-08**			
SP 70		SP70-DD-1		
SP 76	SP76-CD-1			

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic
SP 77	SP77-CD-1			
SP 83			SP83-G-1	
Concentration 4	**25-Apr-08**			
SPX 3		SPX3-DD-1	SPX3-G-1	
SPX 4		SPX4-DD-1 SPX4-DD-2	SPX4-G-1 SPX4-G-2	SPX4-C-1
SPX 6 (1/5)	SPX6-CD-1 SPX6-CD-2 SPX6-CD-3	SPX6-DD-1 SPX6-DD-2 SPX6-DD-3 SPX6-DD-4 SPX6-DD-5	SPX6-G-1	SPX6-C-1
SPX 6 (2/5)		SPX6-DD-6 SPX6-DD-7 SPX6-DD-8 SPX6-DD-9 SPX6-DD-10	SPX6-G-2 SPX6-G-3 SPX6-G-4 SPX6-G-5	SPX6-C-2 SPX6-C-3
SPX 6 (3/5)	SPX6-CD-4 SPX6-CD-5 SPX6-CD-6	SPX6-DD-11		
SPX 6 (4/5)			SPX6-G-6	
SPX 6 (5/5)		SPX6-DD-12	SPX6-G-7 SPX6-G-8	SPX6-C-4 SPX6-C-5
SPX 7			SPX7-G-1	
SPX 8	SPX8-CD-1 SPX8-CD-2 SPX8-CD-3			
SPX 9	SPX9-CD-1			
SPX 10			SPX10-G-1	
SPX 13		SPX13-DD-1 SPX13-DD-2		SPX13-C-1 SPX13-C-2
SPX 15				SPX15-C-1

Shovel Probe #	Construction Debris	Domestic Debris	Glass	Ceramic
SPX 25		SPX25-DD-1		
SPX 26	SPX26-CD-1			

14. APPENDIX F

14.1 DEEP TRENCHING FOR ARTIFACT BEARING DEPOSITS

By Dr. Steven Hackenberger

14.1.1 Summary

Four three meter long trenches were excavated by backhoe. Each trench was placed in the vicinity of a test pit previously excavated by Icicle Creek Engineers (ICE 2006). Samples of dry sediments were collected from backhoe buckets and screened with ¼ inch hardware cloth. Sediment stratigraphy within each trench was recorded in notes and with photographs for comparison with previous test pits excavated by ICE. Selected layers of wetter sediments were also collected and water screened. No buried soils or surfaces were discovered below the top levels of historic fill that would likely contain evidence of precontact occupation. Apart from the coal and clinker within the historic fill, few historic artifacts were observed and no precontact artifacts were recovered.

14.1.2 Background

Subsurface explorations for precontact archaeological deposits were proposed for the No. 4 Mine area for two reasons. First, some of the area is deeply buried with historic fill and deep backhoe trenches are necessary to expose any original surface or possible earlier living surfaces. Second, a stream system and related alluvial fans and terraces once existed in this area and CWU wished to identify these features and ascertain the probability of intact archaeological deposits.

Currently, there are two streams that flow toward the site from the east and north and both are now diverted along the northeast side of the raised N.P. branch line rail bed converted into the Coal Mines Trail. No defined stream is obvious in the mining area west of the trail; however a stream once flowed through this area and was purposefully filled. Low areas in the landscape probably still mark the original stream.

In 2005, Icicle Creek Engineers excavated 25 test pits (Test Pits TP-71 through TP-95) using a track-mounted excavator. Details of the subsurface exploration program, along with the test pit logs, are presented in their geotechnical report in Appendix B (ICE 2006). Test pits TP-71 through TP-93 were completed across the area southwest of the Coal Mines Trail at the locations shown on Figure 1. Subsurface conditions are relative uniform; typically with a

varying thickness of fill overlying alluvium. Test pits revealed zero to one foot of sod underlain by fill with an average thickness of three to four feet. Test Pits TP-75, TP-81, TP-83 and TP-86 did not encounter fill. The test pits reveled very soft to medium stiff sandy silt (alluvium – typically soft) underlying the fill to the completion depths of the test pits, which ranged from eight to 13 feet below the ground surface. Ground water was located at an average depth of four feet.

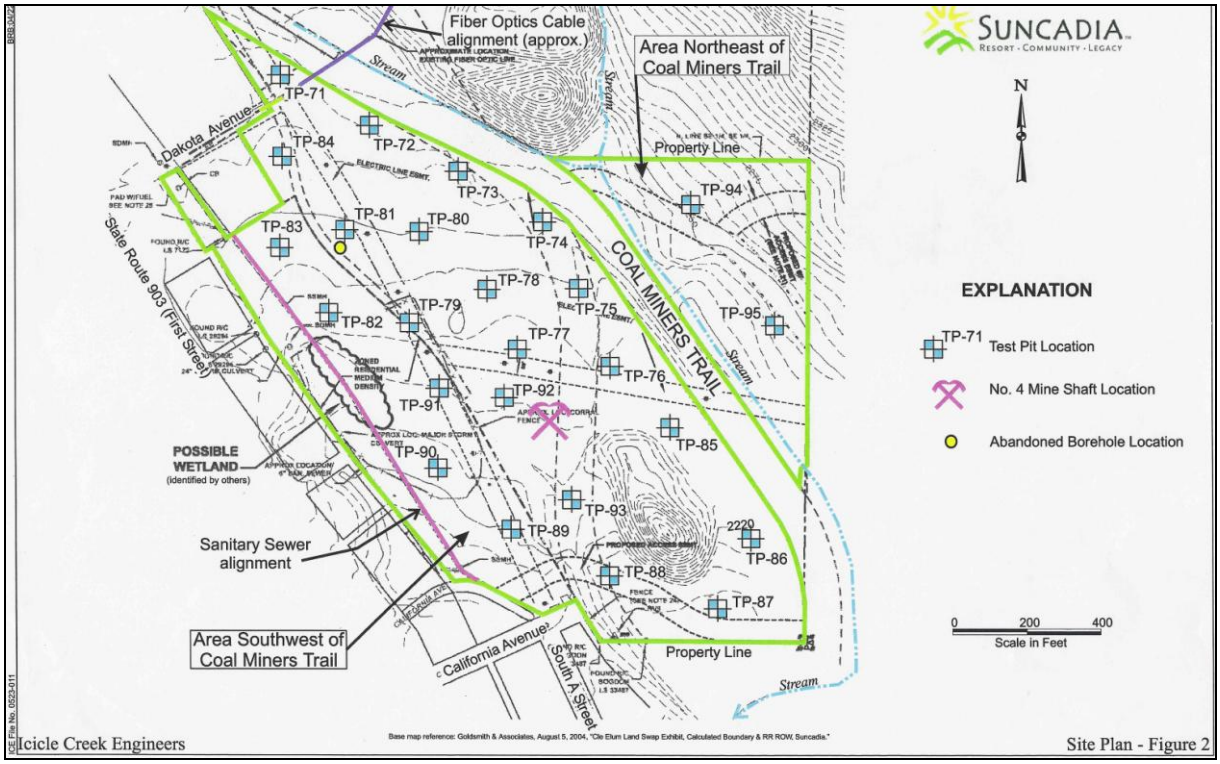


Figure 1. Location of ICE test pits (ICE 2006).

14.1.3 Methods

Based on the depth of fill estimated by Icicle Creek Engineers and our own predictions of where the original creek may have been filled; we selected four areas for our archaeological trenching program:

- Trench I was placed in on edge of an area with relatively deep fill, in a location we might expect a higher and drier landform such as a high bench or gently sloping fan. This trench was near ICI Test Pits 72 and 80.

- Trench II was placed in a low area with less fill, in a location we might expect to have found a low creek terrace or channel. This trench was near ICI Test Pits 73 and 74.

- Trench III was placed in a high area with less fill, in a location we might expect a higher and drier landform such as a high bench or gently sloping fan. This trench was near ICE Test Pit 75.

- Trench IV was placed in a low area with less fill, in a lower wetter area, where we might expect a lower bench or terrace of the stream to be buried. This trench was near ICE test Pit 90.

All four trenches were excavated by backhoe operated by a Suncadia, LLC employee (Figure 2). Dr. Hackenberger directed the operation and was assisted by two technicians (Daniel Magana and Andrew Soltz). The backhoe excavations progressed through 25 to 50 cm levels throughout the length of each three meter trench. Buckets of sediments were laid adjacent to the trench in the sequence they were excavated. Samples of dry sediments were recovered from buckets and screened through ¼ inch hardware cloth on site. Samples of wetter sediments were collected in large plastic paint buckets and water screened through ¼ inch mesh back in Ellensburg at CWU. Sediment profiles were sketched and photographed as best as possible from outside the trenches.



Figure 2. Excavating Trench 1, view east.

14.1.4 Results

Trench 1: This trench (3m long by 2.5m deep) was located just south of the No. 6 and No. 8 mines tipple footings. As anticipated, this area is characterized by fill to a depth of nearly two meters. The fill is composed mainly of clinker and coal and includes layers of orange sand and gravel. The backhoe also uncovered a 10 cm (four inch) diameter metal pipe in the

middle of the trench at 1.2 meters below ground surface and another similar pipe at 2.5 meters deep. Tan sandy-silt overlays a black layer, which transitions into green-gray, silty-clay between 2.5 and 3 meters. Nearby ICI Test Pit 72 exhibits a similar profile (ICE 2006 log, Figure 3). Upslope Test Pit 72 exhibits a deep tan-sandy layer and the lower darker clays were not encountered in the top three meters.

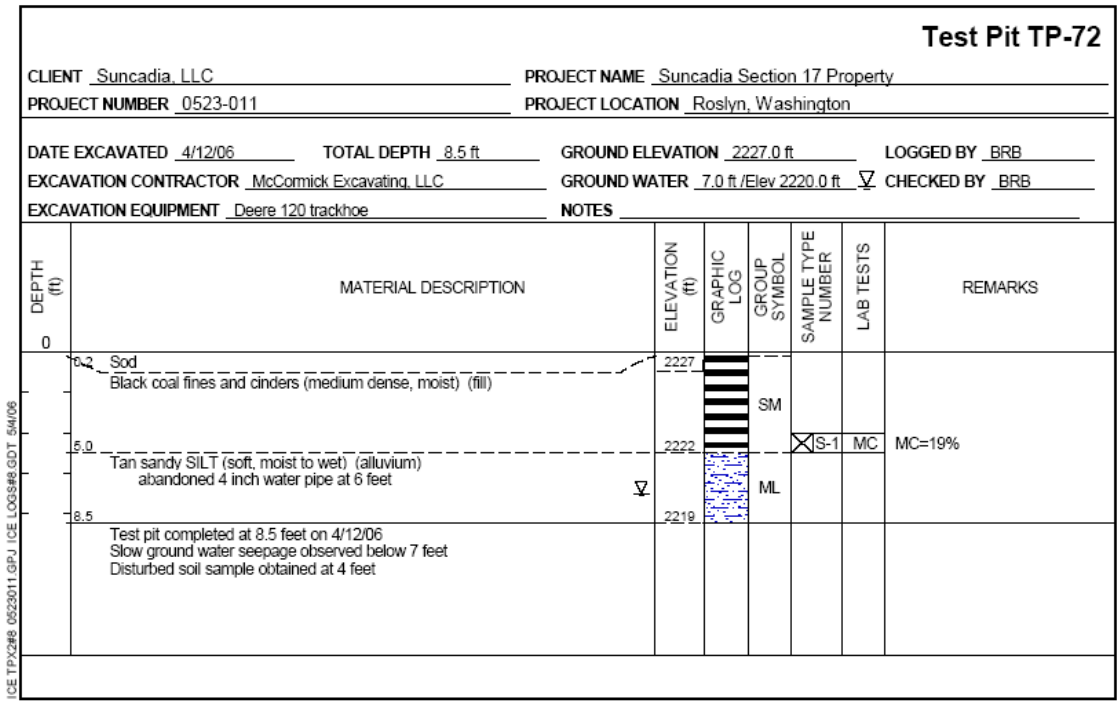


Figure 3. ICI Log for Test Pit 72, note break between fill and sandy silt at five feet.

As anticipated, the subsurface in this area exhibits groundwater at approximately 2.75 m (nine feet) below the ground surface; however the relatively shallow sandy-silts and underlying clay substratum was unexpected. This stratigraphy suggests relatively rapid sheet wash of sands and gravel over an earlier wetland. This process might represent deforestation and erosion during a brief period of time just prior to mining activities; or it may represent a few centuries of time during the late Holocene.

Trench 2: This trench (3m long by 2.1m deep) was located in the dip adjacent to the Coal Mines Trail just north of the deeper tree filled gully that probably once served as a creek channel (Figure 4). As anticipated, this area is characterized by fill to a depth of only 0.5-0.6 meters. The fill is composed mainly of clinker and coal and includes a few fragments of historic glass, ceramics, and brick. A buried historic soil horizon exhibits a B horizon of light brown silty sand. The water table was found at 2.1 meters below the ground surface. The nearby ICI Test Pit 74 exhibits a similar profile (ICE 2006 log, Figure 5). As anticipated, the subsurface in this lower area exhibits groundwater at about two meters below ground surface.

This stratigraphy suggests a relatively recent period of soil development (devoid of precontact artifacts) over deeper sands and gravel deposited by stream waters.



Figure 4. Location of Trench 2, view west toward adjacent Coal Mines Trail.

Test Pit TP-74

CLIENT Suncadia, LLC
PROJECT NAME Suncadia Section 17 Property
PROJECT NUMBER 0523-011
PROJECT LOCATION Roslyn, Washington

DATE EXCAVATED 4/12/06
TOTAL DEPTH 8.0 ft
GROUND ELEVATION 2225.0 ft
LOGGED BY BRB
EXCAVATION CONTRACTOR McCormick Excavating, LLC
GROUND WATER 4.0 ft /Elev 2221.0 ft
CHECKED BY BRB
EXCAVATION EQUIPMENT Deere 120 trackhoe
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	SAMPLE TYPE NUMBER	LAB TESTS	REMARKS
0							
0.2	Sod	2225		SM			
1.0	Black coal fines, cinders and brick fragments (very loose, moist) (fill)	2224					
	Light brown sandy SILT (very soft, moist to wet) (alluvium)			ML	S-1	MC	MC=24%
	grades to wet at 4 feet ▽						
	grades to soft at 6 feet						
8.0		2217					
	Test pit completed at 8.0 feet on 4/12/06 due to severe caving of test pit walls Rapid ground water seepage observed below 4 feet Disturbed soil sample obtained at 3 feet						

ICE TPX2#8 0523011.GPJ ICE LOGS#8.GDT 5/4/06

Figure 5. ICI Log for test Pit 74, note break between fill and sandy silt at one foot.

Trench 3: This trench **(**3m long by 1.8m deep) was located just west of the Y-junction in the dirt road that heads south to the No. 4 Mine Tipple Pile (Figure 6). As anticipated, this area is characterized by fill to a depth of only 0.15 meters. The fill includes a few fragments of historic glass, ceramics, and brick and a length of three inch steel cable. A shallow historic soil horizon exhibits a B horizon of light brown silty sand. At 1.5 meters, a compact C horizon is composed of silt that may be cemented by calcium carbonate and/or may include a buried volcanic ash. Between 1.5 and 2.5 meters, several layers of sediments include rounded pebbles and intermediate layers of sand, with fragments of burned wood. Wet orange sands with black lenses are found at a depth of 2.5 meters.



Figure 6. Location of Trench 3, view east from Y-junction.

This stratigraphy suggests a relatively older sequence of soil development (devoid of precontact artifacts) over deeper sands and gravel deposited by stream waters. Radiocarbon assays of a sample of this charcoal would help ascertain the age of the buried land form. However, given the relative large size of water born sediments and pebbles, it seems unlikely that these sediments would also include intact archaeological deposits. The water table was found at 2.5 meters below ground surface. The nearby ICI Test Pit 75 (located within the edge of a stream cut) exhibits a similar profile but slow water seepage was found between three and six feet deep (ICE 2006 log, Figure 7).

Test Pit TP-75

CLIENT Suncadia, LLC — PROJECT NAME Suncadia Section 17 Property
PROJECT NUMBER 0523-011 — PROJECT LOCATION Roslyn, Washington

DATE EXCAVATED 4/12/06 — TOTAL DEPTH 8.0 ft — GROUND ELEVATION 2224.0 ft — LOGGED BY BRB
EXCAVATION CONTRACTOR McCormick Excavating, LLC — GROUND WATER 3.0 ft /Elev 2221.0 ft ▽ — CHECKED BY BRB
EXCAVATION EQUIPMENT Deere 120 trackhoe — NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	SAMPLE TYPE NUMBER	LAB TESTS	REMARKS
0							
1.0	Sod	2223					
	Brown sandy SILT (very soft, moist to wet) (alluvium) ▽						
	grades to wet at 3 feet abandoned water line at 4 feet			ML	S-1	MC	MC=20%
	grades to soft at 6 feet						
8.0		2216					
	Test pit completed at 8.0 feet on 4/12/06 due to severe caving of test pit walls Slow ground water seepage observed at 3 feet Disturbed soil sample obtained at 3.5 feet						

Figure 7. ICI Log for Test Pit 75, note shallow buried soil.



Figure 8.

Trench 4: Trench 4 (3m long by 1m deep) was placed in the flat just west of the dirt road that passes by the stone foundation of the powerhouse (Figure 8). The moist and organic top soil in this location was developed over coal and gravel fills. Between 0.5 and 1.0 meter deep, an orange silty sand deposit is mottled with gray-green clay. Two perpendicular 2-3 inch diameter pipes were joined within the trench at a depth of 0.25 to 0.3 meters. Excavation was ceased at 1.0 to 1.2 meters below the ground surface due to the obstruction caused by the pipes and the shallow water table. The nearby ICI Test Pit 90 (located closer to the power house foundations) exhibits a similar profile but the historic fill in Test Pit 90 was closer to one 1.2 meters deep (four feet) and

rapid water seepage was found closer to 2.13 m (seven feet) deep (ICE 2006 log, Figure 9). No buried bench or terrace could be located in this area, and ground water conditions make it unlikely that the landform would have been used for precontact occupation.

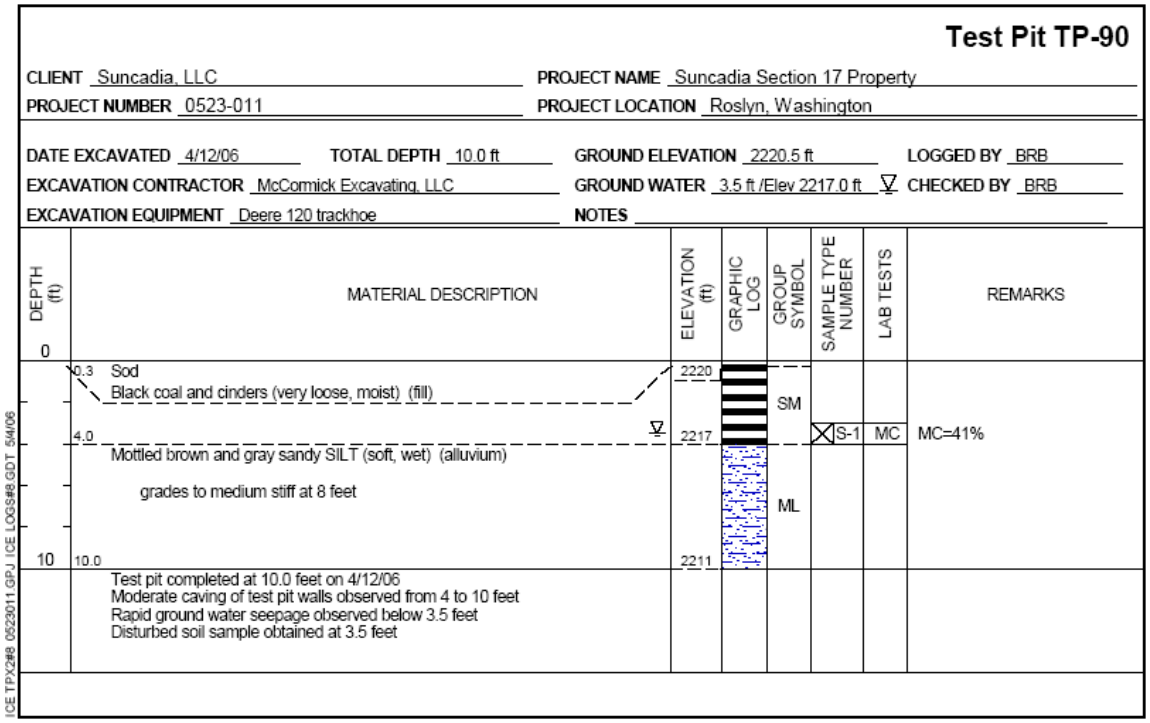


Figure 9. ICI Log for Test Pit 90, note gray sands at four feet.

15. APPENDIX G

15.1 45KT2784 CULTURAL RESOURCE MANAGEMENT PLAN

Suncadia, LLC proposes a plan to commemorate, enhance, and help preserve the coal mining heritage of Roslyn and the Northwestern Improvement (N.W.I.) Company as represented by the remnant features of the No. 4 Mine (45KT2784). This area is classified as industrial space and contains the vertical portal for the No. 4 N.W.I. Co. mine, substantial tailing piles and a number of intact foundations and small structures associated with mining activity. These remnants of what was once a large scale coal mining operation gives rise to the opportunity to create a new interpretive setting to be incorporated into planned developments. The plan for this area includes preservation of features and artifacts of the former No. 4 Mine complex with interpretive exhibits and an interpretive center. This plan proposes preservation and enhancement for the majority of the significant features such that they would be made safe and accessible for visitors. The existing layout of the features within the site creates the opportunity to create a system of interpretive displays designed to explain in detail the former structures, the operational details of the mining process, and the lives of the miners.

15.2 RECOMMENDATIONS FOR 45KT2784 MANAGEMENT

1. This archaeological site is significant and possesses the historic integrity necessary to be nominated to the National Register of Historic Places as an individual entity. As a contributing element of the Roslyn Historic District, it is already listed on the National Register. Archaeological site documentation for 45KT2784 should be appended to the Roslyn Historic District nomination form, and this step should be taken prior to actions at the property, which could result in adverse effect.

2. Generate a digital, engineer-quality site map for all known archaeological features at 45KT2748, using a geodetic total station, sub-meter GPS (Global Positioning System), and GIS (Geographic Information System) technology, essentially creating a *Virtual Site*. CWAS staff archaeologists for have initiated data sharing with Suncadia's engineer, Hugh G. Goldsmith and Associates, Inc. and Rick Kilpatrick of Sandpoil Surveying in an attempt to efficiently and economically gather spatial data for on the known features of 45KT2784.

3. Employ a soft approach to 45KT2784 features. That is, evaluate and document historic properties potentially affected by Suncadia Master Plan Development. Cover or avoid known archaeological features, as opposed to removing them. When feasible, seamlessly incorporate

No. 4 Mine features into the developing modern landscape, thereby, preserving some of the significance and integrity aspects of the 45KT2784 features (e.g., the planned incorporation of the tailings pile into the development and the potential recreation of the Power House and the Wash House).

4. In situations where it is necessary to remove substantial amounts of debris or features themselves, such as the wall debris around the Hoist House (feature 6), an archaeologist should be present to monitor the removal process in case previously unknown significant historic properties are revealed or unearthed. Consultation with the Department of Archaeology and Historic Preservation must also take place prior to the removal of any features. Archaeologists will be present and supervisory to all work on and around the known features. An archaeologist will monitor all work that has the potential to lead to the discovery or disturbance of historic resources within the known site area and its 150-foot buffer.

5. Continue with plans and funding to create a coal mine interpretive center. This could potentially be completed through the reconstruction of a structure or structures on the property. A structure with good potential to reconstruct would be the Wash House (feature 14). Mitigation of the feature would have to be completed prior to construction.

6. Develop signage for the covered or removed features with an accompanying site map and flow chart that reconstructs the No. 4 Mine Industrial Open Space when it was a functioning entity.

7. Nine features at 45KT2784 should be highlighted for feature scale interpretation. These features include the Bore Hole (feature 12), the Coal Miners Trail (feature 18), the No. 4 Powerhouse (feature 1), No. 4 Hoist House (feature 2), No. 4 Boiler House (feature 3), No.4 Tipple Footings (feature 4), No.4 Mine Shaft (feature 5) and the No.4 Mine Tipple Pile (feature 6).

The Bore Hole is representative of the early industrial action at the property. The Coal Miners Trails is already utilized in an interpretive sense and this could be expanded. The features surrounding the No.4 Mine Shaft (features 1-6), in addition to the shaft itself, are the central components to this mining operation.

8. Any future development that affects 45KT2784 beyond the limited scope of this report should be preceded by surface and possibly subsurface archaeological reconnaissance to ensure the historic site retains its integrity to the extent possible. This recommendation is being accomplished through a formal archaeological excavation permit and consultation with DAHP and Suncadia.

15.3 SUMMARY

A goal of the Suncadia development is the conservation and enhancement of the cultural resources constituting 45KT2784. Development of the No. 4 Mine Industrial Open Space will increase visibility and interpretation by incorporation of this valuable resource into landscape design and development. This is a challenging undertaking underscored by the massive landscape changes that have occurred in the Roslyn area over a relative short period of time.

In view of this reality, integrity of location is being combined with historic maps, photographs, written material, oral history, and artistic interpretations to establish experiential connections between the historical place and the lifeways it represents and the new visitors and occupants of this emerging landscape. 45KT2784 is currently a significant historic archaeological site that possesses aspects of integrity. It is significant because it was the last functioning mine in the Roslyn coalfield and it represents a system of features sufficiently intact to allow detailed reconstruction of past mining activity at the site. 45KT2784 has scientifically significant data potential and represents an important piece of Roslyn's cultural heritage. Individual features may not be significant in their own right, but as components of the archaeological system at 45KT2784, they will be treated in such a way as to minimize negative effects on their integrity.

15.3.1 45KT2784 Cultural Resource Outcomes by Feature

The feature based cultural resources outcomes were developed on previous research, local knowledge, pedestrian resurvey, accurate feature scaled site mapping, site boundary mapping and a series of meetings. These meetings focused on the goals and requirements of the development and the possible ways to preserve and enhance the known cultural resources. Suncadia staff and design architects Jim Dawson and Marcia Hadley met with CWU staff including Steven Hackenberger, Morris Uebelacker, Tucker Orvald and Shane Scott, as the landscape planning for the project area unfolded.

Development landscape elements were adjusted to avoid impacts to the known features and creating a workable landscape design that captured the opportunity to create an interpretive park and center. The analysis and design focused on feature and site spatial scales. Features were described, mapped when appropriate, digitally imaged, and proposed actions were established leading to specific cultural resource outcomes. Site scale analysis of the features allowed comparison and adjustment of proposed resort landscape elements.

Each feature was evaluated to determine if it posed a safety hazard within the context of the emerging No. 4 Mine District MPD landscape. Seven of the 38 features do not pose a significant safety hazard to future resort visitors. Given this, a major requirement of

preservation and enhancement became the elimination of safety hazards. Although it would be possible to fence or remove these areas effectively locking them up, these options precluded the goal of directly connecting people to place and forfeited multiple interpretive benefits. *Preservation in Place* is the major goal of planning and design and a number of strategies applied in various combinations resulted in leaving all but three features in place. In all 38 cases, preservation in place is still an option that should be pursued. Twenty-six features may be covered with structural fill during the construction. All 38 features are included on the site scale interpretive exhibits, and descriptions, maps, and digital photographs will be available in the interpretive center. Nine features will be stabilized, cleaned, and contain interpretive exhibits. Importantly all of these will be made safe and accessible to the public by a network of roads and trails. These features constitute the major elements of the interpretive park and allow safe public access, and allow current and future occupants to connect with the experience of the past. Table 8 summarizes cultural resource outcomes by feature across archaeological site 45KT2784.

Table 8. 45KT2784 Cultural Resource Outcomes by Feature.

Feature Number and Name	Safety Hazard	Preservation in Place	Feature Covered	Stabilize and Clean	Interpret at Feature	Interpret at Site Scale	Public Access	Removal
1. No.4 Power House	X	X		X	X	X	X	
2. No.4 Hoist House	X	X		X	X	X	X	
3. No.4 Boiler House	X	X		X	X	X	X	
4. No.4 Tipple Footings	X	X		X	X	X	X	
5. No.4 Shafts	X	X		X	X	X	X	
6. No.4 Tipple Pile	X	X		X	X	X	X	
7. Transformer Foundation	X	X	X			X		
8. Lumber Shed Footings	X	X	X			X		
9. 8" Steel Pipe	X	X	X			X		
10. Foundry Foundation	X	X	X			X		
11. Vertical Pipe	X	X	X			X		
12. Bore Hole	X	X		X	X	X	X	
13. Heating Plant	X	X	X			X		
14. Wash House Remains & Location	X	X		X	X	X	X	
15. No.6/No.8 Tipple Footings	X	X	X			X		
16. No.6/No.8 Sand House	X	X	X			X		
17. No.6/No.8 Tipple Piles	X	X	X			X		
18. Coal Miner's Trail (RR grade)		X		X	X	X	X	
19. Pond	X	X	X			X		
20. Sawmill Foundation	X	X	X			X		
21. Displaced Footings	X	X	X					
22. Wire		X						X
23. No.4 Railroad Spur		X	X			X		
24. Klinker Deposit		X	X			X		

Feature Number and Name	Safety Hazard	Preservation in Place	Feature Covered	Stabilize and Clean	Interpret at Feature	Interpret at Site Scale	Public Access	Removal
25. Sandstone Rock Deposit		X	X			X		
26. City of Roslyn 4" Pipe	X	X	X			X		
27. No.6/No.8 Sand House	X	X	X			X		
28. No.6 Rail Foundation	X	X	X			X		
29. 1896 USGS Survey Monument		X	X			X		
30. Coal Cart Trestle Berm & Braces						X		X
31. Power Line & Poles						X		X
32. Cooling Pond	X	X	X			X		
33. Vegetation Signature & 3" Pipe	X	X	X			X		
34. 3" Metal Pipe in Pit	X	X	X			X		
35. Depression	X	X	X			X		
36. Depression	X	X	X			X		
37. Drainage Ditch	X	X	X			X		
38. Klinker Berm		X	X			X		

We still will need to add in rows for the four artifact concentrations (C1-C4) around the No. 4 Mine Tipple Pile

September 18, 2006

Mr. Cape Powers
Suncadia, LLC
P.O. Box 887
109 South First Street
Roslyn, Washington 98941

Re: Additional Environmental Assessment
Section 17
Roslyn, Washington
17084-01

Dear Mr. Powers:

This letter report presents the results of our Additional Environmental Assessment at the Section 17 property located in Roslyn, Washington (Figure 1). The project scope of work was completed in general accordance with our scope of services dated September 27, 2005. The assessment includes two components:

- An additional soils assessment to supplement limited surface soil sampling and analysis completed in 2004 on the westernmost, approximate 23-acre parcel. Results from the 2004 effort were reported in the Preliminary Phase I and Limited Phase II Environmental Assessment for Section 17, June 30, 2004.

- Site historical background review and site reconnaissance for an approximate 5-acre parcel identified as Parcel C on Figure 1.

We understand that Suncadia is involved with a land transaction to acquire the subject property, comprising the larger, approximate 23-acre parcel, and adjacent Parcel C. Future site development efforts may include redevelopment with placement of additional fill material for site grading purposes. The 23-acre parcel is currently vacant but formerly was the location a variety of historical operations, including a foundry, power house, auto maintenance areas, and at least one underground coal mine. The Parcel C area remains undeveloped. Our Additional Environmental Assessment provides information on the current soil conditions for the 23-acre parcel, and summarizes the previous soil sampling and analysis work to further assess potential impacts related to the historical use of the property. Our work also includes evaluating the potential for adverse

1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530

environmental impacts to the Parcel C area based on results of our historical background review and site reconnaissance.

Our report begins with a Summary of Findings and Recommendations, which is followed by our:

- Scope of Work;
- Subject Property Description;
- Geology and Hydrogeology;
- Parcel C Historical Background Review and Site Reconnaissance
- 23-Acre Parcel Soil Sampling and Analysis Results; and
- Limitations.

A summary of the previous and current soil sample analyses completed for the 23-acre parcel are summarized in Table 1. Tables 2 through 6 present analytical results for the soil samples for the 23-acre parcel by various areas on the parcel, including the slag pile area, foundry area, vehicle maintenance area, transformer area, and power house area, respectively. Figure 1 is a Vicinity Map showing the location of the subject property. Figure 2 is a Site and Exploration Plan showing features and sampling locations for the 23-acre parcel. Appendix A presents the field exploration procedures and copies of the exploratory test pit logs. Appendix B presents the chemical data quality review and the Advanced Analytical laboratory certificates of analysis.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

During field work for the current effort in July 2006, fourteen test pit explorations (TP-1 through TP-14) were excavated on the 23-acre parcel area of the Section 17 property (Figure 2). The test pit depths were approximately 8 to 10 feet below the ground surface, with the exception of test pit TP-8 that was completed to a depth of 3 feet due to the presence of a concrete foundation. For the current work, 54 soil samples were collected from the test pits. This soil sampling supplements our sampling work completed in 2004 where nine soil samples were collected, along with grab samples of slag and tailings.

Subsurface Conditions

Site soils encountered during exploration typically consisted of sandy and silty fill to depths of about 10 feet below ground surface. Fill was observed to overlie native soils with silt and local interbedded sand layers. No obvious signs of contamination were observed, such as odors or staining. Groundwater was not encountered in the test pits advanced in July 2006. However, Icicle Creek Engineers observed groundwater at an average depth of 4 feet below ground surface in tests pits completed for geotechnical characterization in April 2006.

Analytical Testing Results

Eighteen soil samples were selected for chemical analyses from the 2004 and 2006 sampling events. The soil sample results were compared to the following Washington State Model Toxics Control Act (MTCA - Chapter 173-340 WAC) cleanup criteria:

- Method B direct contact, unrestricted land use;
- Method A/B groundwater protection; and
- Ecological Indicator Soil Concentrations for the Protection of Terrestrial Plants and Animals (WAC 173-340-900, Table 749-3).

It should be noted that these MTCA cleanup levels and soil concentrations are provided for screening and comparison purposes only. Exceedances of these screening criteria do not imply that a release or potential exposure has occurred on the subject property that would create a risk to human health or the environment.

Analytical results are presented in Tables 2 through 6 for the slag pile, foundry, vehicle maintenance, transformer, and power house areas, respectively. In each of these areas, metals were detected in soil from 0 to 2 feet below ground surface at concentrations exceeding MTCA screening levels for ecological protection or groundwater protection. None of the metals concentrations exceeded the MTCA Method B direct contact cleanup levels. Deeper samples were not submitted for analysis, and the distribution and depth extent of the metals exceeding MTCA cleanup screening criteria is not currently defined.

Metals exceedances include the following:

- Arsenic in one sample collected within the foundation used for vehicle maintenance. Depending on speciation of the arsenic, possible exceedances of the ecological protection soil concentration are indicated for samples from the foundry and power house areas.
- Cadmium in five samples from the slag pile, foundry, foundation used for vehicle maintenance, and transformer areas.
- Chromium in two samples from the slag pile area.
- Copper in three samples, one each from the slag pile, foundry, and transformer areas.

- Lead detections in eight samples from the slag pile, foundry, vehicle maintenance, transformer, and power house areas.
- Mercury detections in six samples from the slag pile, foundry, vehicle maintenance, transformer, and power house areas.
- Nickel concentrations in three samples from the slag pile area and one sample from the foundry area.
- Zinc in two samples from the foundry area.

One sample from the transformer area had polycyclic aromatic hydrocarbons (PAHs) detected; however, concentrations were below the MTCA Method B direct contact cleanup levels and the groundwater protection cleanup levels. The two soil samples from the power house area had detections of heavy-oil range total petroleum hydrocarbons (TPH). Analysis of gasoline-range TPH, polychlorinated biphenyls (PCBs), and volatile organic compounds (VOCs) on select soil samples were non-detect.

Parcel C Historical Background Review and Site Reconnaissance

Results of the historical background review and site reconnaissance did not disclose environmental conditions of concern on Parcel C. No additional actions are currently identified.

Recommendations – 23-Acre Parcel Portion of Subject Property

Based on the elevated metals concentrations detected in near-surface soil samples collected at each of the five site areas, additional soil sampling and chemical analyses are needed to characterize the horizontal extent of impacted soils and determine what actions, if any, may be needed. Sampling should include sufficient near-surface samples to determine whether soil impacts are limited to the areas identified, or may extend beyond these locations. If elevated metals concentrations are detected in near-surface soils (i.e., approximate upper 1 foot), subsurface samples from the same locations should be tested, including samples from the July 2006 test pits. Following wet weather, we also recommend collecting a surface water sample from the depression area located southeast of the foundry and slag pile areas to verify the chemical quality of seasonally ponded water. Results of soil and surface water testing should be evaluated to determine whether further testing of seasonal groundwater is warranted. As part of the latter effort, well locations and possible consumptive uses of groundwater in the vicinity of the site should be identified.

SCOPE OF WORK

Our Additional Environmental Assessment included:

- Observing subsurface conditions in 14 test pit explorations completed under contract to Suncadia at select locations on the 23-acre portion of the subject property;
- Collecting surface and subsurface soil samples from the 14 test pit explorations;
- Chemically analyzing selected soil samples and evaluating the chemical analytical results;
- Completing an historical background review and site reconnaissance for the 5-acre portion fo the subject property known as Parcel C; and
- Preparing this letter report presenting the findings of our work.

As presented earlier, the purpose of the assessment was to obtain additional information to further determine whether potential impacts exist on the 23-acre portion of the subject property that are related to the historical use of the property as a foundry, power house, auto maintenance areas, and an underground coal mine. Our work also evaluated the potential for adverse environmental impacts to the Parcel C area based on our historical background review and site reconnaissance.

SUBJECT PROPERTY DESCRIPTION

The 23-acre portion of the subject property is located southeast of the intersection of South First Street (State Route 903) and East Dakota Avenue in Rosyln, Washington (Figure 1). This parcel is currently vacant, undeveloped land. The majority of the parcel is covered with sparse grass and shrubs. There is also a wetland located on the western portion of the parcel, seen as the area with the densest concentrations of trees and shrubs on an aerial photograph (Figure 2). The eastern portion of the parcel contains a forested area with primarily fir and pine trees. Two dirt and gravel road run generally north-south through the parcel. Historical building foundations and other evidence of prior activities (i.e., slag piles and tailings piles) are present. The parcel formerly contained a variety of operations including a coal mine, a foundry that remained active through the mid-1970s, a power house and large transformers, and a small building foundation that was reportedly used as a pad by the townspeople to change oil and conduct vehicle maintenance. The approximate locations of these various operations are presented on Figure 2.

Our 2004 Preliminary Phase I and Limited Phase II Environmental Assessment identified several potential environmental issues on the 23-acre parcel, including:

- Concentrations of lead in shallow soil samples exceeding the MTCA Method A cleanup level from the vicinity of the former foundry and the building foundation reportedly used for informal, non-commercial vehicle repair;
- The presence of a large coal mine tailings pile;
- The former presences of large electrical power transformers; and
- The potential proximity of historical site activities and possible shallow, seasonal groundwater.

It was recommended in our 2004 report that an additional subsurface investigation would be needed to more fully evaluate the nature and extent of affected soil. The areas of concern included the former foundry and associated slag, the foundation formerly used as a vehicle maintenance area, the coal tailings pile, the former transformer area, and the former power house.

The Parcel C portion of the subject property consists of an approximate 5-acre wooded area that is currently undeveloped except for a gravel road bisecting the parcel from northwest to southeast. There is also a new addition to this road toward the northeast. In addition, a small dirt road, and several trails were observed on the northwestern area of the parcel. A small seasonal creek (dry at the time of the reconnaissance) is located along the western parcel boundary near the Coal Mines Trail.

GEOLOGY AND HYDROGEOLOGY

According to the United States Geological Survey (USGS) Map of the Snoqualmie Pass Quadrangle, Washington (Tabor el al. 2000), the main, 23-acre parcel of the subject property is predominantly underlain by unconsolidated deposits consisting of dense, glacially overridden material of alternating till (very dense sand and gravel), outwash (dense sand and gravel), and lacustrine (hard silt and sand) deposits. A Preliminary Coal Mine Hazard Assessment and Preliminary Geotechnical Evaluation report prepared by Icicle Creek Engineers on May 25, 2006, reports that the southwestern portion of the parcel was mapped by the Washington State Department of Natural Resources, Division of Geology and Earth Resources (DGER) as "alluvium," which consists of silt, sand, and gravel. In the northeastern portion of the 23-acre parcel and on Parcel C, the DGER mapped the Roslyn formation bedrock consisting of siltstone, sandstone, and coal, with typically greater than 5 feet of weathered bedrock overlying the unweathered bedrock. This bedrock underlies the alluvium in the southwestern portion of the 23-acre parcel at depths of generally greater than 10 feet.

The topography of the 23-acre portion of the subject property is generally flat, possibly sloping slightly downward to the south or southeast toward Dakota Avenue East. Based on surrounding area topography, groundwater flow in the western portion of the parcel is likely to be to the south, toward Crystal Creek, located over 500 feet to the east and southeast. A seasonal stream is located

between the two parcels and flows south along the base of the hill near the parcel boundaries and the Coal Mines Trail.

Soils encountered during the additional subsurface assessment work on the 23-acre parcel were typically fill with depths ranging from 2 to 10 feet overlying native soils. The fill was typically loose to medium dense sand or soft sandy silt. Materials occasionally observed in the fill, depending on the location of the exploration on the parcel, included slag, coal rubble, wood, bricks, metal debris, and automotive debris. The native material beneath the fill was generally soft to medium stiff sandy silt and silt, occasionally interbedded with sand layers. Test pit logs are included in Appendix A.

Groundwater was not encountered in any of the test pit excavations, completed to a depth of up to 10 feet. However, the interbedded sand layers encountered in several of the excavations were typically wet, but did not seep water. These layers were generally only a couple of inches thick and are likely discontinuous layers. However, Icicle Creek Engineers observed groundwater at an average depth of 4 feet below ground surface in tests pits completed for geotechnical characterization in April 2006, indicating the presence of seasonal shallow groundwater.

PARCEL C HISTORICAL BACKGROUND REVIEW AND SITE RECONNAISSANCE

Hart Crowser reviewed available historical background information for Parcel C of the subject property. Our review used existing information obtained during our 2004 Phase I and other additional sources including:

- Aerial photographs (provided by the Kittitas County Public Works Department) for the years 1964, 1969, 1977, 1993, and 2001;
- Topographic Maps (USGS Cle Elum 7.5 Minute Quad 1984);
- Interview with site representatives Nick Henderson (native resident, city historian, and public relations representative for Suncadia), and interviews with John Farrel and Connie Owens (city residents);
- Sanborn Fire Insurance maps (1888, 1890, 1891, 1899, 1912, 1925, and 1935); and
- Kittitas County Assessor's Office (tax assessments, building permits, property appraisals, and deed histories).

Pertinent city street atlases were not available from the regional and local public sources and the City of Roslyn.

Interviews with local residents and Suncadia representatives indicated that with the exception of the gravel road, which provides access to adjacent sites, the parcel has been undeveloped and mostly forested with limited previous clearing. Historical records from the Kittitas County Public Works Department and the Kittitas County Assessor's Office, and historical accounts from employees at the Cle Elum Library, the Roslyn Historical Museum, and the Cle Elum Historical Society also indicated the parcel has been undeveloped except for road construction activities. The trails are used by local residents for recreation purposes.

On June 30, 2006, Sonia Fernández of Hart Crowser conducted a site reconnaissance to observe Parcel C and surrounding area. Nick Henderson of Suncadia escorted Ms. Fernández during the site reconnaissance. No environmental concerns were noted.

23-ACRE PARCEL SOIL SAMPLING AND ANALYSIS RESULTS

On July 27 and 28, 2006, Hart Crowser observed the excavation of 14 test pits (TP-1through TP-14) by a Suncadia operator at the six areas identified on Figure 2. Test pit logs are included in Appendix A. Test pits TP-1 and TP-2 were excavated on two sides of the slag pile located near the former foundry. Test pits TP-3, TP-4, and TP-5 were excavated at the foundry location. Test pits TP-6 and TP-7 were excavated on two sides of the large tailings pile. Test pit TP-8 was excavated within the foundation reportedly used for auto maintenance activities in the past, and test pits TP-9 and TP-10 were excavated on two sides of this foundation. Test pits TP-11 and TP-12 were excavated on the edges of the concrete slab where the former power transformers were located. Test pits TP-13 and TP-14 were excavated within the former power house footprint. Hart Crowser observed the test pit explorations to depths between about 8 and 10 feet below grade, with the exception of TP-8 that was only completed to a depth of 3 feet because of the presence of a concrete foundation.

The top 6 feet of soil in test pit TP-1, near the slag pile, contained slag, brick fragments, wood, and metal debris. Slag was also encountered to a depth of 3 feet in test pit TP-2. Test pits TP-6 and TP-7, located adjacent to the tailings pile, contained mined rock and coal rubble to depths of 8 and 10 feet, respectively. Soil located inside the foundation used historically for vehicle maintenance, test pit TP-8, contained numerous brick fragments and wood, along with a muffler and shock absorber. Soil from two sides of this foundation, test pits TP-9 and TP-10, contained brick fragments and wood to depths of approximately 2 feet below ground surface. Test pits TP-11 and TP-12, located near the former transformers, had brick and coal fragments observed to depths of 3 and 4 feet, respectively. The surface soil from TP-11 also contained concrete fragments. Test pit TP-13, located within the former power house footprint, had soil in the upper 2.5 feet containing brick and coal fragments. The soil from test pit TP-14, also located within the former power house footprint, contained brick fragments, wood, and metal debris, to a depth of 2 feet.

Soil samples were collected at 2-foot depth intervals in each excavation up to a depth of 10 feet, with the exception of TP-6 and TP-7, located next to the tailings pile, where only physical observations were made. In total, 54 samples were collected from the test pits. A photoionization detector (PID) was used to screen the soil samples for VOCs indicative of potential petroleum hydrocarbons and/or VOCs. No measurable PID measurements above ambient background were encountered in the soil samples collected, with the exception of one sample collected from test pit TP-9 that had a very low detection of VOCs. No odors or staining was observed in the test pits.

Soil samples were temporarily stored in Hart Crowser's locked refrigerators and were submitted to the Advanced Analytical chemical laboratory in Redmond, Washington, for chemical analysis. Twelve soil samples were selected for analyses and the remaining samples were placed on hold for analysis pending the results of the initial samples. The twelve soil samples selected were submitted for analysis for one or more of the following:

- Total metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel, and zinc) by EPA Method 6000/7000 Series;
- Gasoline-range TPH by Ecology Method NWTPH-Gx;
- Diesel- and heavy oil-range TPH by Ecology Method NWTPH-Dx;
- PAHs by EPA Method 8270 SIM;
- PCBs by EPA Method 8082; and
- VOCs by EPA Method 8260B.

Table 1 provides a list of the analyses completed on each of the twelve samples.

The uppermost soil samples (S-1) from test pits TP-1 through TP-5 and TP-8 through TP-14 were selected for analysis as these were the most likely to reflect impacts to soil from surface activities. No soil samples were collected for chemical analysis from test pits TP-6 and TP-7, located next to the tailings pile.

Previous Soil Sampling and Analysis

Previous soil sampling conducted by Hart Crowser included the collection of nine surface soil samples from hand-auger soil borings on April 14, 2004. Grab samples of slag and tailings were also collected. Boring HB-1 was located near the bottom of the foundation used for conducting vehicle maintenance. Borings HB-2 and HB-3 were located near the reported entry of the former foundry, and in the vicinity of the former furnace within the foundry, respectively. Two borings, HB-4 and HB-5, were located near the toe of the slag pile. Three borings, HB-6 through HB-8, were located in the vicinity of the former power transformers. Boring HB-9 was located in the vicinity of a former railroad trestle on the southern portion of the parcel. The locations of these borings are

included on Figure 2. The hand-auger borings were completed to depths of 0.5 to 1.0 feet below grade. Exploration logs are included in Appendix D of our 2004 environmental assessment report. No odors or PID measurements greater than ambient levels were encountered in the soil samples collected.

Five of the soil samples collected and the slag grab sample were submitted for analysis by Advanced Analytical. The samples were submitted for analysis for one or more of the following:

- Total metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel, and zinc) by EPA Method 6000/7000 Series;
- Diesel- and heavy oil-range TPH by Ecology Method NWTPH-Dx;
- PAHs by EPA Method 8270 SIM; and
- PCBs by EPA Method 8082.

Table 1 provides a list of the analyses completed on each of the six samples.

Analytical Results

The analytical results for the current and previous soil samples from the slag pile area, the foundry area, the vehicle maintenance area, the transformer area, and the power house area are summarized in Tables 2 through 6, respectively. Analytical results are compared with the MTCA Method B direct contact, unrestricted land use cleanup levels, MTCA Method A and B protection of groundwater cleanup levels, and the MTCA Ecological Indicator Soil Concentrations for the Protection of Terrestrial Plants and Animals (WAC 173-340-900, Table 749-3). These MTCA cleanup levels and soil concentrations are provided for screening and comparison purposes only and do not imply that a release or potential exposure has occurred on the parcel that would create a risk to human health or the environment. Laboratory analytical reports are presented in Appendix B for the current soil samples. For the laboratory analytical report for the previous soil samples collected refer to the 2004 environmental assessment report.

Metals

Arsenic was detected in nine of the soil samples analyzed with concentrations ranging from 2.1 to 150 mg/kg. The highest concentration was detected in soil sample TP-8 S-1, located within the foundation used for vehicle maintenance. The MTCA Method A soil cleanup level for arsenic is 20 mg/kg, based on natural background concentration. Soil in sample TP-8 S-1 exceeded this screening level. The ecological protection soil concentration for arsenic III is 7 mg/kg and for arsenic V is 10 mg/kg. The source of arsenic in the soil is unknown, and the sample analysis did not provide arsenic speciation data. However, concentrations of arsenic in TP-8 S-1 and HB-1 S-1, both collected within the foundation used for vehicle maintenance, had arsenic concentrations above 10 mg/kg, at 150

and 11 mg/kg, respectively. Depending on the speciation, arsenic may also be above the ecological protection soil concentration in sample HB-3 S-1 from the foundry area and in sample TP-13 S-1 from the power house area.

Five of the soil samples analyzed had cadmium detections. Concentrations ranged from 1.1 to 8.6 mg/kg. The highest concentration measured was from sample TP-8 S-1, located within the foundation used for vehicle maintenance. This was the only detection that exceeded the ecological protection soil concentration for cadmium of 4 mg/kg. The five detections exceeded the MTCA Method B groundwater protection cleanup level of 0.69 mg/kg. No detections exceeded the MTCA Method B direct contact cleanup level for cadmium of 80 mg/kg.

Chromium was detected in the 17 soil samples analyzed with concentrations ranging from 2.9 to 100 mg/kg. The highest concentration measured was in sample TP-2 S-1, located by the slag pile. Only two chromium detections in soil samples TP-1 S-1 and TP-2 S-1, collected by the slag pile, exceeded the ecological protection soil concentration. Depending on the chromium speciation, samples TP-1 S-1 and TP-2 S-1 may exceed the MTCA Method B groundwater protection cleanup level for chromium VI. Sample analysis did not provide speciation data. None of the detections exceeded the MTCA Method B direct contact cleanup level for chromium.

Copper was detected in the six soil samples analyzed with concentrations ranging from 3.9 to 170 mg/kg. Three of the detections were above the ecological protection soil concentration of 50 mg/kg and soils with exceedances were from the slag pile area, the foundry area, and the transformer area. None of the detections exceeded the MTCA Method B direct contact cleanup level or the groundwater protection cleanup level for copper.

Lead was detected in the 17 soil samples analyzed with concentrations ranging from 5.6 to 620 mg/kg. The ecological protection soil concentration is 50 mg/kg. Lead detections in eight of the soil samples exceeded the ecological protection soil concentration. These exceedances were measured in soils from the slag pile area, the foundry area, the vehicle maintenance area, the transformer area, and the power house area. The highest concentration was measured sample HB-3 S-1, located in the foundry area. None of the detections exceeded the MTCA Method B groundwater protection cleanup level for lead.

Mercury detections in six of the samples were above the ecological protection soil concentration of 0.1 mg/kg. Four of these detections were also above the MTCA Method B groundwater protection cleanup level for mercury of 2.1 mg/kg. Detections ranged from 0.54 to 8 mg/kg. Mercury was detected in soil near the slag pile, by the foundry, within the vehicle maintenance foundation, in the transformer area, and in the power house area. The highest concentration of 8 mg/kg was detected in soil sample TP-12 S-1, located in the transformer area. Other soil samples collected in the transformer area were non-detect for mercury.

Fourteen of the soil sample had nickel detections. Concentrations ranged from 5.8 to 160 mg/kg. The ecological protection soil concentration is 30 mg/kg. Three soil samples had concentrations exceeding the ecological protection soil concentration. Two of the samples were from the slag pile area (TP-1 S-1 and TP-2 S-2), and one sample was from the foundry area (HB-2 S-1). Two of the samples TP-2 S-1 and HB3-S1 also exceeded the MTCA Method B groundwater protection cleanup level.

Zinc was detected in the 17 soil samples analyzed with concentrations ranging from 2.2 to 180 mg/kg. Two zinc concentrations from samples collected in the foundry area (samples TP-5 S-1 and HB-3 S-1) were above the ecological protection soil concentration of 86 mg/kg. None of the detections exceeded the MTCA Method B direct contact cleanup level and the groundwater protection cleanup level for zinc.

Gasoline-Range TPH

The three surface samples (0 to 2 feet) collected from test pits TP-8, TP-9, and TP-10, located near the former vehicle maintenance area, were non-detect for gasoline-range TPH.

Diesel- and Heavy Oil-Range TPH

Soil samples from the foundry area, vehicle maintenance area, transformer area, and power house area were analyzed for diesel- and heavy oil-range TPH. No detections were noted in these samples, with the exception of the two samples analyzed from the power house area. Soil samples TP-13 S-1 and TP-14 S-1, from the power house area, contained heavy oil-range TPH at concentrations of 2,100 and 210 mg/kg, respectively.

PAHs

Sample TP-12 S-1, from the transformer area, had several PAHs detected. Detections included phenanthrene, fluroanthene, pyrene, benzo(a)anthracene, and chrysene. These detections were below the MTCA Method B direct contact cleanup levels and the groundwater protection cleanup levels. The two other soil samples from the transformer area analyzed for PAHs were non-detect for all analytes. PAHs were also not detected in samples analyzed from the slag pile area, the foundry area, the vehicle maintenance area, and the power house area.

PCBs

PCBs analysis was conducted on soil samples from the transformer area and power house area. No PCBs were detected in the soil samples analyzed.

VOCs

One soil sample TP-8 S-1, collected from inside the foundation used for vehicle maintenance, was analyzed for VOCs and was non-detect for all analytes.

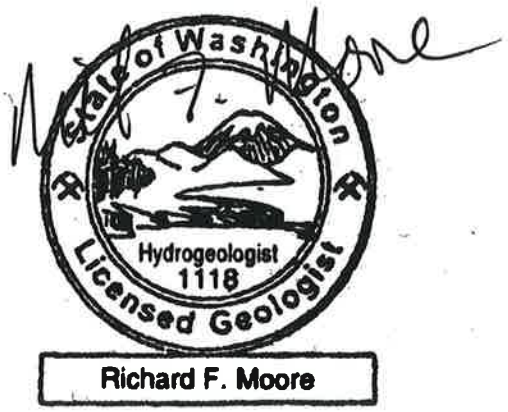
LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Suncadia, for specific application to the subject property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

Sincerely,

HART CROWSER, INC.



RICHARD F. MOORE, L.H.G.
Manager, Water Resources
rick.moore@hartcrowser.com

Attachments:
Table 1 - Summary of Soil Sample Analyses
Table 2 - Analytical Results for Slag Pile Area Soil Samples
Table 3 - Analytical Results for Foundry Area Soil Samples
Table 4 - Analytical Results for Vehicle Maintenance Area Soil Samples
Table 5 - Analytical Results for Transformer Area Soil Samples
Table 6 - Analytical Results for Power House Area Soil Samples
Figure 1 - Vicinity Map
Figure 2 - Site and Exploration Plan
Appendix A - Field Exploration Methods and Analysis
Appendix B - Chemical Data Quality Review and Certificates of Analysis

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Table 1 - Summary of Soil Sample Analyses

Sample Location and Number	Sampling Date	Depth in Feet	Chemical Analyses					
			Metals (a) EPA 7010/7471	PAHs EPA 8270C	PCBs EPA 8082	NWTPH-Dx	NWTPH-G	VOCs EPA 8260B
Slag Pile Area								
TP-1 S-1	7/27/2006	0 to 2	X	X				
TP-1 S-2	7/27/2006	2 to 4						
TP-1 S-3	7/27/2006	4 to 6						
TP-1 S-4	7/27/2006	6 to 8						
TP-2 S-1	7/27/2006	0 to 2	X	X				
TP-2 S-2	7/27/2006	2 to 4						
TP-2 S-3	7/27/2006	4 to 6						
TP-2 S-4	7/27/2006	6 to 8						
HB-4 S-1	*6/14/2004*	*0.5 to 1.0*						
HB-5 S-1	*6/14/2004*	*0.3 to 0.5*	*X*	*X*				
Slag	*6/14/2004*	--	*X*	*X*				
Foundry Area								
TP-3 S-1	7/27/2006	0 to 2	X	X		X		
TP-3 S-2	7/27/2006	2 to 4						
TP-3 S-3	7/27/2006	4 to 6						
TP-3 S-4	7/27/2006	6 to 8						
TP-3 S-5	7/27/2006	8 to 10						
TP-4 S-1	7/27/2006	0 to 2	X	X		X		
TP-4 S-2	7/27/2006	2 to 4						
TP-4 S-3	7/27/2006	4 to 6						
TP-4 S-4	7/27/2006	6 to 8						
TP-4 S-5	7/27/2006	8 to 10						
TP-5 S-1	7/27/2006	0 to 2	X	X		X		
TP-5 S-2	7/27/2006	2 to 4						
TP-5 S-3	7/27/2006	4 to 6						
TP-5 S-4	7/27/2006	6 to 8						
TP-5 S-5	7/27/2006	8 to 10						
HB-2 S-1	*6/14/2004*	*0.5 to 0.6*						
HB-3 S-1	*6/14/2004*	*0.4 to 0.5*	*X*	*X*		*X*		

Table 1 - Summary of Soil Sample Analyses

Sample Location and Number	Sampling Date	Depth in Feet	Chemical Analyses					
			Metals (a) EPA 7010/7471	PAHs EPA 8270C	PCBs EPA 8082	NWTPH-Dx	NWTPH-G	VOCs EPA 8260B
Tailings Pile Area								
TP-6 S-1	7/27/2006	0 to 2						
TP-6 S-2	7/27/2006	2 to 4						
TP-6 S-3	7/27/2006	4 to 6						
TP-6 S-4	7/27/2006	6 to 8						
TP-6 S-5	7/27/2006	8 to 10						
TP-7S-1	7/27/2006	0 to 2						
TP-7S-2	7/27/2006	2 to 4						
TP-7S-3	7/27/2006	4 to 6						
TP-7S-4	7/27/2006	6 to 8						
TP-7S-5	7/27/2006	8 to 10						
Tailings	*6/14/2004*	--						
Vehicle Maintenance Area								
TP-8 S-1	7/28/2006	0 to 3	X	X		X	X	X
TP-9 S-1	7/28/2006	0 to 2	X	X		X	X	
TP-9 S-2	7/28/2006	2 to 4						
TP-9 S-3	7/28/2006	4 to 6						
TP-9 S-4	7/28/2006	6 to 8						
TP-9 S-5	7/28/2006	8 to 10						
TP-10 S-1	7/28/2006	0 to 2	X	X		X	X	
TP-10 S-2	7/28/2006	2 to 4						
TP-10 S-3	7/28/2006	4 to 6						
TP-10 S-4	7/28/2006	6 to 8						
TP-10 S-5	7/28/2006	8 to 10						
HB-1 S-1	*6/14/2004*	*0.0 to 0.5*	*X*	*X*		*X*		

Table 1 - Summary of Soil Sample Analyses

Sample Location and Number	Sampling Date	Depth in Feet	Chemical Analyses					
			Metals (a) EPA 7010/7471	PAHs EPA 8270C	PCBs EPA 8082	NWTPH-Dx	NWTPH-G	VOCs EPA 8260B
Transfomer Area								
TP-11 S-1	7/28/2006	0 to 2	X	X	X	X		
TP-11 S-2	7/28/2006	2 to 4						
TP-11 S-3	7/28/2006	4 to 6						
TP-11 S-4	7/28/2006	6 to 8						
TP-11 S-5	7/28/2006	8 to 10						
TP-12 S-1	7/28/2006	0 to 2	X	X	X	X		
TP-12 S-2	7/28/2006	2 to 4						
TP-12 S-3	7/28/2006	4 to 6						
TP-12 S-4	7/28/2006	6 to 8						
TP-12 S-5	7/28/2006	8 to 10						
HB-6 S-1	*6/14/2004*	*0.5 to 1.0*			*X*	*X*		
HB-7 S-1	*6/14/2004*	*0.5 to 1.0*						
HB-8 S-1	*6/14/2004*	*0.5 to 1.0*	*X*	*X*	*X*	*X*		
Power House Area								
TP-13 S-1	7/28/2006	0 to 2	X	X	X	X		
TP-13 S-2	7/28/2006	2 to 4						
TP-13 S-3	7/28/2006	4 to 6						
TP-13 S-4	7/28/2006	6 to 8						
TP-13 S-5	7/28/2006	8 to 10						
TP-14 S-1	7/28/2006	0 to 2	X	X	X	X		
TP-14 S-2	7/28/2006	2 to 4						
TP-14 S-3	7/28/2006	4 to 6						
TP-14 S-4	7/28/2006	6 to 8						
TP-14 S-5	7/28/2006	8 to 10						

Italics indicates samples were collected and analyzed as part of the Preliminary Phase I and Limited Phase II Environmental Assessment (Hart Crowser 2004).

(a) = arsenic, cadmium, copper, chromium, lead, mercury, nickel, and zinc.
PAHs = Polycyclic Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
NWTPH-Dx = Diesel- and oil-range petroleum hydrocarbons
NWTPH-G = Gasoline-range petroluem hydrocarbons
VOCs = Volatile Organic Compounds

Table 2 - Analytical Results for Slag Pile Area Soil Samples

Sample ID Sampling Date	Direct Contact Screening Level [a]	Ecological Protection Screening Level [b]	Groundwater Protection Screening Level [f]	TP-1 S-1 7/27/2006	TP-2 S-1 7/27/2006	HB-5 S-1 6/14/2006	Slag Pile 6/14/2006
Metals in mg/kg							
Arsenic	20 (c)	7/10 (d)	20 (c)	4.8	6.9	2.0 U	2.0 U
Cadmium	80	4	0.69	1.2	1.0 U	1.0 U	1.0 U
Chromium	240/120,000 (e)	42	19/2,000 (g)	45	100	12	5.2
Copper	3,000	50	260	1.0 U	1.0 U	59	18
Lead	--	50	3,000	290	200	32	36
Mercury	24	0.1	2.1	5.2	4.9	0.5 U	0.5 U
Nickel	1,600	30	130	88	140	0.5 U	0.5 U
Zinc	24,000	86	6,000	19	58	2.2	2.8

PAHs were not detected in the four samples from this area.

U = Not detected at indicated detection limit.

MTCA Method B and Ecological Protection levels are included for sample screening and comparison purposes only.

Concentrations that exceed the screening criteria are boxed.

(a) MTCA Method B direct contact, unrestricted land use cleanup level.

(b) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.

(c) MTCA Method A, unrestricted land use (based on background concentration).

(d) Ecological Protection screening level for Arsenic III is 7 mg/kg. Ecological Protection screening level for Arsenic V is 10 mg/kg.

(e) MTCA Method B direct contact cleanup level for Chromium III is 120,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 240 mg/kg.

(f) MTCA Method B groundwater protection, unrestricted land use cleanup level.

(g) MTCA Method B groundwater protection cleanup level for Chromium III is 2,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 19 mg/kg.

Table 3 - Analytical Results for Foundry Area Soil Samples

Sample ID Sampling Date	Direct Contact Screening Criteria "	Ecological Protection Screening Level "	Groundwater Protection Screening Level '	TP-3 S-1 7/27/2006	TP-4 S-1 7/27/2006	TP-5 S-1 7/27/2006	HB-3 S-1 6/14/2006
Metals in mg/kg							
Arsenic	20 (c)	7/10 (d)	20 (c)	3.7	2.0 U	2.0 U	7.6
Cadmium	80	4	0.69	1.0 U	1.0 U	1.0 U	1.1
Chromium	240/120,000 (e)	42	19/2,000 (g)	11	7.6	5.3	8.9
Copper	3,000	50	260	1.0 U	3.9	1.0 U	170
Lead	--	50	3,000	84	13	7.9	620
Mercury	24	0.1	2.1	1.2	0.5 U	0.5 U	0.5 U
Nickel	1,600	30	130	18	21	7.8	160
Zinc	24,000	86	6,000	53	48	93	180

PAHs and diesel- and oil-range petroleum hydrocarbons were not detected in the four samples analyzed from this area.

U = Not detected at indicated detection limit.

MTCA Method B and Ecological Protection levels are included for sample screening and comparison purposes only.

Concentrations that exceed the screening criteria are boxed.

(a) MTCA Method B direct contact, unrestricted land use cleanup level.

(b) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.

(c) MTCA Method A, unrestricted land use (based on background concentration).

(d) Ecological Protection screening level for Arsenic III is 7 mg/kg. Ecological Protection screening level for Arsenic V is 10 mg/kg.

(e) MTCA Method B cleanup level for Chromium III is 120,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 240 mg/kg.

(f) MTCA Method B groundwater protection, unrestricted land use cleanup level.

(g) MTCA Method B groundwater protection cleanup level for Chromium III is 2,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 19 mg/kg.

Table 4 - Analytical Results for Vehicle Maintenance Area Soil Samples

Sample ID Sampling Date	Direct Contact Screening Criteria [a]	Ecological Protection Screening Level [b]	Groundwater Protection Screening Level [f]	TP-8 S-1 7/28/2006	TP-9 S-1 7/28/2006	TP-10 S-1 7/28/2006	HB-1 S-1 6/14/2006
Metals in mg/kg							
Arsenic	20 (c)	7/10 (d)	20 (c)	150	4.1	2.0 U	11
Cadmium	80	4	0.69	8.6	1.0 U	1.0 U	2.7
Chromium	240/120,000 (e)	42	19/2,000 (g)	5.1	2.9	9.3	4.4
Copper	3,000	50	260	1.0 U	1.0 U	1.0 U	50
Lead	—	50	3,000	110	24	130	250
Mercury	24	0.1	2.1	0.54	0.5 U	0.5 U	0.5 U
Nickel	1,600	30	130	14	6.4	12	21
Zinc	24,000	86	6,000	7.8	5.1	12	25

PAHs and diesel- and oil-range petroleum hydrocarbons were not detected in the four samples analyzed from this area.

Gasoline-range petroleum hydrocarbons were not detected in 2006 soil samples analyzed from this area.

VOCs were not detected in sample TP-8 S-1.

U = Not detected at indicated detection limit.

MTCA Method B and Ecological Protection levels are included for sample screening and comparison purposes only.

Concentrations that exceed the screening criteria are boxed.

(a) MTCA Method B direct contact, unrestricted land use cleanup level.

(b) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.

(c) MTCA Method A, unrestricted land use (based on background concentration).

(d) Ecological Protection screening level for Arsenic III is 7 mg/kg. Ecological Protection screening level for Arsenic V is 10 mg/kg.

(e) MTCA Method B cleanup level for Chromium III is 120,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 240 mg/kg.

(f) MTCA Method B groundwater protection, unrestricted land use cleanup level.

(g) MTCA Method B groundwater protection cleanup level for Chromium III is 2,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 19 mg/kg.

Table 5 - Analytical Results for Transformer Area Soil Samples

Sample ID Sampling Date	Direct Contact Screening Criteria [a]	Ecological Protection Screening Level [b]	Groundwater Protection Screening Level [f]	TP-11 S-1 7/28/2006	TP-12 S-1 7/28/2006	HB-6 S-1 6/14/2006	HB-8 S-1 6/14/2006
Metals in mg/kg							
Arsenic	20 (c)	7/10 (d)	20 (c)	2.0 U	2.1		2.0 U
Cadmium	80	4	0.69	1.0 U	2.0		1.0 U
Chromium	240/120,000 (e)	42	19/2,000 (g)	11	6.1		12
Copper	3,000	50	260	1.0 U	1.0 U		160
Lead	--	50	3,000	7.3	50		30
Mercury	24	0.1	2.1	0.5 U	8.0		0.5 U
Nickel	1,600	30	130	8.9	7.5		0.5 U
Zinc	24,000	86	6,000	80	35		3.3
PAHs in mg/kg							
Phenanthrene	--	--	--	0.05 U	0.09		0.1 U
Fluoranthene	3,200	--	--	0.05 U	0.11		0.1 U
Pyrene	2,400	--	--	0.05 U	0.13		0.1 U
Benzo(a)anthracene	0.137	--	0.086	0.05 U	0.07		0.1 U
Chrysene	0.137	--	0.1	0.05 U	0.06		0.1 U

PCBs and diesel- and oil-range petroleum hydrocarbons were not detected in the four samples analyzed from this area.

Additional PAHs were not detected in samples TP-11 S-1, TP-12 S-1, and HB-8 S-1.

Blank indicates no MTCA criteria available or sample not analyzed for specific analyte.

U = Not detected at indicated detection limit.

MTCA Method B and Ecological Protection levels are included for sample screening and comparison purposes only.

Concentrations that exceed the screening criteria are boxed.

(a) MTCA Method B direct contact, unrestricted land use cleanup level.

(b) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.

(c) MTCA Method A, unrestricted land use (based on background concentration).

(d) Ecological Protection screening level for Arsenic III is 7 mg/kg. Ecological Protection screening level for Arsenic V is 10 mg/kg.

(e) MTCA Method B cleanup level for Chromium III is 120,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 240 mg/kg.

(f) MTCA Method B groundwater protection, unrestricted land use cleanup level.

(g) MTCA Method B groundwater protection cleanup level for Chromium III is 2,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 19 mg/kg.

Table 6 - Analytical Results for Power House Area Soil Samples

Sample ID Sampling Date	Direct Contact Screening Criteria [a]	Ecological Protection Screening Level [b]	Groundwater Protection Screening Level [f]	TP-13 S-1 7/28/2006	TP-14 S-1 7/28/2006
Metals in mg/kg					
Arsenic	20 (c)	7/10 (d)	20 (c)	9.2	2.0 U
Cadmium	80	4	0.69	1.0 U	1.0 U
Chromium	240/120,000 (e)	42	19/2,000 (g)	8.0	5.9
Copper	3,000	50	260	1.0 U	1.0 U
Lead	--	50	3,000	68	5.6
Mercury	24	0.1	2.1	4.0	0.5 U
Nickel	1,600	30	130	20	5.8
Zinc	24,000	86	6,000	31	11
TPH in mg/kg					
6/14/2004	--	--	--	20 U	20 U
Diesel/Fuel Oil	2,000 (h)	200	--	20 U	20 U
Heavy Oil	2,000 (h)	--	--	2,100	210

PCBs and PAHs were not detected in the two samples analyzed from this area.

Blank indicates no MTCA criteria available.

U = Not detected at indicated detection limit.

MTCA Method B and Ecological Protection levels are included for sample screening and comparison purposes only.

Concentrations that exceed the screening criteria are boxed.

(a) MTCA Method B direct contact, unrestricted land use cleanup level.

(b) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.

(c) MTCA Method A, unrestricted land use (based on background concentration).

(d) Ecological Protection screening level for Arsenic III is 7 mg/kg. Ecological Protection screening level for Arsenic V is 10 mg/kg.

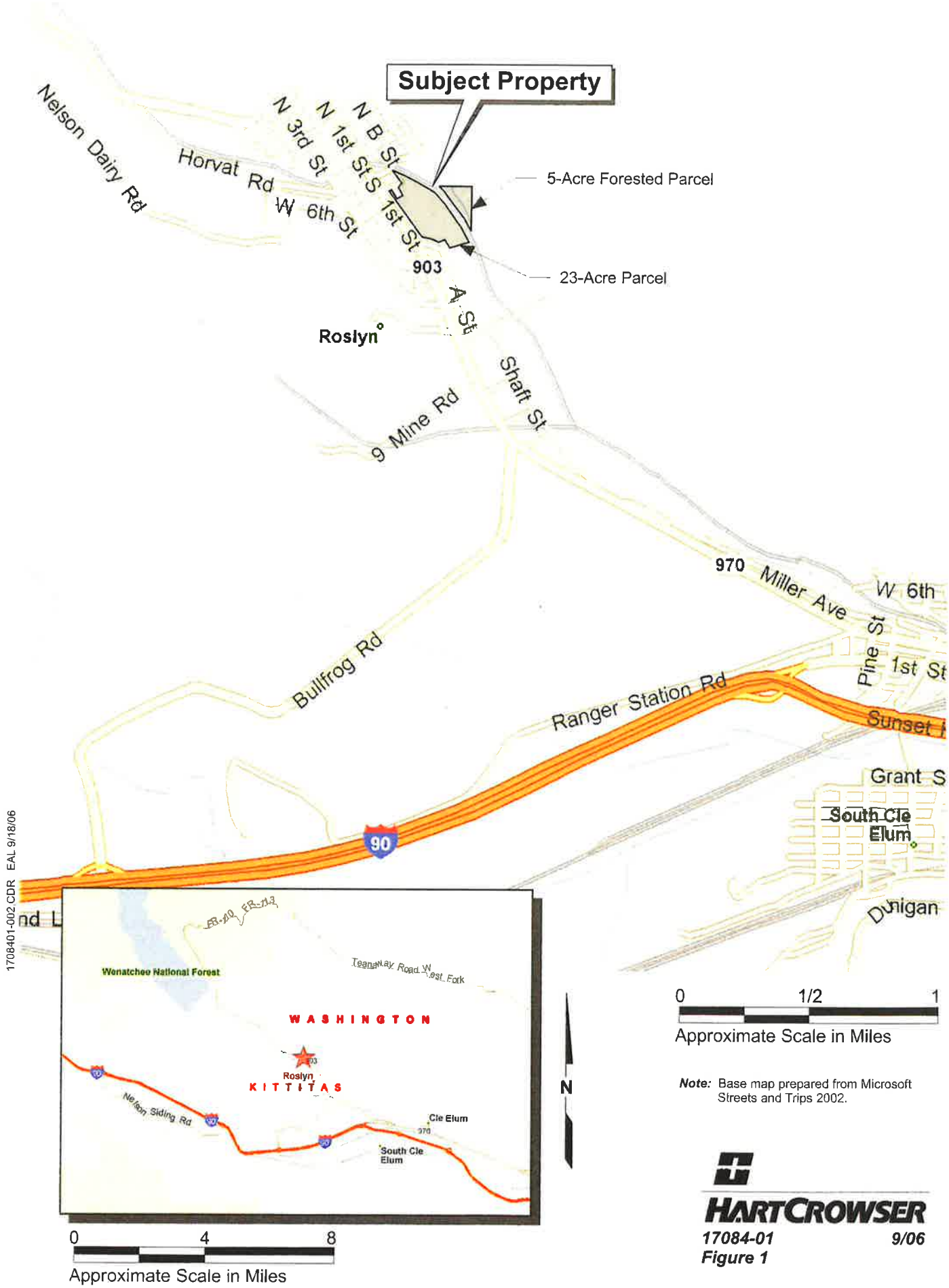
(e) MTCA Method B cleanup level for Chromium III is 120,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 240 mg/kg.

(f) MTCA Method B groundwater protection, unrestricted land use cleanup level.

(g) MTCA Method B groundwater protection cleanup level for Chromium III is 2,000 mg/kg. MTCA Method B cleanup level for Chromium VI is 19 mg/kg.

(h) MTCA Method A, unrestricted land use.

Vicinity Map



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Note: Base map prepared from Microsoft Streets and Trips 2002.

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Figure 1

Site and Exploration Plan



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Source: Base map prepared from aerial photo and survey information provided by Goldsmith & Associates.

- Approximate Extent of Wetland Area
- Approximate Former Buildings/Structures Location
- Approximate Unknown Bulding Shown on Historical Map
- Tailing/Slag Pile Location
- Inferred Groundwater Flow Direction
- HB-1 — Hand-Auger Boring Location and Number (June 2004)
- SLAG — Grab Sample Location and Designation (June 2004)
- TP-1 — Test Pit Location and Number (July 2006)

N

0 200 400

Scale in Feet

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Figure 2

APPENDIX A
FIELD EXPLORATION METHODS AND ANALYSIS

This appendix documents the processes Hart Crowser used in determining the nature of the soil underlying the 23-acre parcel addressed by this report. The discussion includes information on the following subjects:

- Test Pit Explorations and Their Locations;
- Sample Collection and Handling; and
- Soil Classification.

Test Pit Explorations and Their Locations

On July 27 and 28, 2006, 14 test pits (TP-1 through TP-14) were excavated under contract to Suncadia using a backhoe. Test pits were completed to depths ranging from approximately 8 to 10 feet below ground surface, with the exception of TP-8 that was only completed to a depth of 3 feet because of a concrete foundation present. The test pit exploration logs within this appendix show our interpretation of the subsurface conditions and observations noted. The logs indicate the depth where the soils change. Note that the change may be gradual. In the field, samples taken from the explorations were classified by a Hart Crowser Field Representative according to the methods presented on Figure A-1 - Key to Exploration Logs and as discussed below. Figure A-1 also provides a legend explaining the symbols and abbreviations used in the logs.

Location of Explorations. Figure 2 shows the location of explorations, located by hand taping or pacing from existing physical features.

Sample Collection and Handling

After excavating, Hart Crowser collected test pit soil samples by placing soil directly from the middle of the backhoe bucket from a desired depth into pre-cleaned, labeled, 4-ounce glass sample jars. Each sample jar was wiped clean and capped with a Teflon-lined lid, and then placed in an insulated ice chest with ice for transfer to Hart Crowser's refrigerated storage locker. The Hart Crowser project manager selected samples for chemical analysis at representative locations to assess soil quality based on field observations and the potential for contamination. Samples were then transferred to Advanced Analytical Laboratory in Redmond, Washington, for chemical analysis. Sample custody forms accompanied the samples to the laboratory. The samples were received at the laboratory in good condition.

A portion of each soil sample collected was placed in a clean Ziploc platic bag and sealed for organic vapor headspace measurements using a portable MultiRae photoionization detector (PID). These measurements are recorded on the test pit logs.

Soil Classification

The Hart Crowser field representative visually classified the soil samples in general accordance with ASTM Method D 2488, prepared a log of soils encountered in the exploration, and recorded pertinent observations regarding conditions, types of soils encountered, and the depth to water. Soil descriptions include the following properties: relative density of sands and gravels/ consistency of silts and clays, moisture, color, minor constituents, and major constituents. The density/consistency of the soils (as presented parenthetically on the test pit logs to indicate their having been estimated) is based on visual observation only. The presence of non-soil substances (e.g., debris etc.) and odors or visual observations such as sheen that may indicate contamination were also noted.

Attachments:
Figure A-1 - Key to Exploration Logs
Test Pit Logs TP-1 through TP-14

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance(N) In Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends

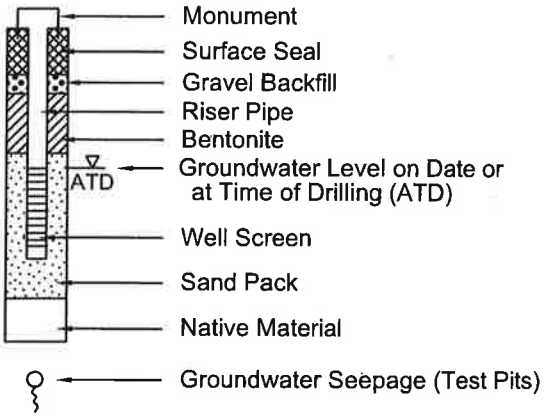
Sampling Test Symbols

Boring Samples		Test Pit Samples	
⊠	Split Spoon	⊠	Grab (Jar)
▧	Shelby Tube	▨	Bag
▥	Cuttings	▧	Shelby Tube
◫	Core Run		
*	No Sample Recovery		
P	Tube Pushed, Not Driven		

Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Water Content in Percent Liquid Limit Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	*In Situ* Density Test

Groundwater Observation Wells



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17084-01 9/06

Figure A-1

Log of Test Pit TP-1

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 1.0	<0.1	CA	Slag.
S-2	2.0 to 4.0	1.0 to 5.5	<0.1		(Loose to medium dense), moist, reddish gray, gravelly SAND with slag, wood, bricks, and metal debris.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0	5.5 to 8.0	<0.1		(Dense to medium stiff), moist, gray and reddish brown, silty SAND to sandy SILT.

Bottom of Test Pit at 8.0 Feet.
Completed 7/27/06.

Log of Test Pit TP-2

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 3.0	<0.1	CA	(Loose to medium dense), moist, reddish gray, gravelly SAND with slag.
S-2	2.0 to 4.0	3.0 to 8.0	<0.1		(Medium stiff), moist, gray and tan, sandy SILT. Grading to gray at 6.0 feet.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		

Bottom of Test Pit at 8.0 Feet.
Completed 7/27/06.

Log of Test Pit TP-3

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 5.0	<0.1	CA	(Loose), moist, gray, gravelly SAND.
S-2	2.0 to 4.0		<0.1		
S-3	4.0 to 6.0	5.0 to 10.0	<0.1		(Soft to medium stiff), moist, brown SILT.
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/27/06.

Note: Encountered wood plank at a depth of about 4.5 feet.

Log of Test Pit TP-4

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 2.0	<0.1	CA	(Soft), moist, dark gray, sandy SILT.
S-2	2.0 to 4.0	2.0 to 10.0	<0.1		(Soft to medium stiff), moist, brown and gray SILT.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/27/06.

Log of Test Pit TP-5

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 10.0	<0.1	CA	(Soft to medium stiff), moist, gray and dark gray, sandy SILT to SILT.
S-2	2.0 to 4.0		<0.1		
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/27/06.

Note: Encountered burnt wood at depth of 1 to 2 feet.

Log of Test Pit TP-6

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
		0.0 to 8.0			(Loose to medium dense), moist, dark gray, gravelly SAND. Material composed of mined rock and coal rubble.
		8.0 - 10.0			(Soft to medium stiff), moist to wet, brown SILT.

Bottom of Test Pit at 10.0 Feet.
Completed 7/27/06.

Log of Test Pit TP-7

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
		0.0 to 10.0			(Loose (top) to dense), moist, gray and dark gray, gravelly SAND to sandy GRAVEL with cobbles and boulders. Material composed of mined rock and coal rubble.

Bottom of Test Pit at 10.0 Feet.
Completed 7/27/06.

Log of Test Pit TP-8

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 3.0	0.0 to 1.0	<0.1	CA	(Loose), moist, gray SAND with numerous brick fragments, wood, and a muffler and shock absorber.
		1.0 to 3.0			(Very loose to very soft), wet, reddish tan, silty SAND to sandy SILT.

Bottom of Test Pit at 3.0 Feet.
Completed 7/28/06.

Note: Encountered concrete bottom of foundation at 3.0 feet.

Log of Test Pit TP-9

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 2.0	<0.1	CA	(Medium dense to medium stiff), moist, tan, silty SAND to sandy SILT with brick fragments and wood.
S-2	2.0 to 4.0	2.0 to 10.0	1.1		(Medium stiff), moist, tan SILT with interbedded wet Sand layers.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

Log of Test Pit TP-10

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 2.0	<0.1	CA	(Medium dense to medium stiff), moist, tan, silty SAND to sandy SILT with brick fragments and wood.
S-2	2.0 to 4.0	2.0 to 10.0	<0.1		(Medium stiff), moist, tan SILT with interbedded wet Sand layers.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

Log of Test Pit TP-11

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 3.0	<0.1	CA	(Loose), moist, gray SAND with numerous brick, coal, and concrete fragments.
S-2	2.0 to 4.0	3.0 to 10.0	<0.1		(Medium stiff), moist, tan sandy SILT to SILT with interbedded (loose), wet, gray, silty Sand layers.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

Log of Test Pit TP-12

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 4.0	<0.1	CA	(Loose), moist, dark gray SAND with brick and coal fragments.
S-2	2.0 to 4.0		<0.1		
S-3	4.0 to 6.0	4.0 to 10.0	<0.1		(Medium stiff), moist, tan, sandy SILT to SILT with interbedded (loose), wet, gray, silty Sand layers.
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

Log of Test Pit TP-13

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 2.5	<0.1	CA	(Medium dense), moist, dark gray SAND with brick and coal fragments.
S-2	2.0 to 4.0	2.5 to 10.0	<0.1		(Soft to medium stiff), moist, tan, sandy SILT to SILT with interbedded, wet, gray, sandy Silt layers.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

Log of Test Pit TP-14

Sample Number	Sample Depth in Feet	Stratum Depth in Feet	PID	Lab Test	Soil Description
S-1	0 to 2.0	0.0 to 2.0	<0.1	CA	(Medium dense), moist, dark gray SAND with brick fragments, wood, and metal debris.
S-2	2.0 to 4.0	2.0 to 10.0	<0.1		(Medium stiff), moist, tan sandy SILT to SILT.
S-3	4.0 to 6.0		<0.1		
S-4	6.0 to 8.0		<0.1		
S-5	8.0 to 10.0		<0.1		

Bottom of Test Pit at 10.0 Feet.
Completed 7/28/06.

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Twelve soil samples, collected on July 27 and 28, 2006, were submitted to Advanced Analytical Laboratory of Redmond, WA for analysis of one or more of the following:

- Total Metals – Arsenic, Cadmium, Copper, Chromium, Lead, Mercury, Nickel, and Zinc by EPA Method 6000/7000 series;
- Gasoline-range Petroleum by Ecology Method NWTPH-Gx;
- Diesel- and Oil-range Petroleum by Ecology Method NWTPH-Dx;
- Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270 SIM;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082; and
- Volatile Organic Compounds (VOCs) by EPA Method 8260B.

The following criteria were evaluated in the standard data quality review process for the results:

- Holding Times;
- Method Blanks;
- Surrogate Recoveries;
- Laboratory Control Sample (LCS) Recoveries;
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries and Relative Percent Differences (RPDs); and
- Laboratory Duplicate RPDs.

Total Metals. The required holding times were met. No method blank contamination was detected. LCS recoveries were within laboratory control limits. Laboratory duplicate RPDs were acceptable.

NWTPH-Gx. The required holding times were met. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. Analytes were not detected in the laboratory duplicate measurements.

NWTPH-Dx. The required holding times were met. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. The laboratory duplicate RPD for heavy oil was 40 percent. This elevated RPD was likely due to heterogeneity within the sample. No action was taken.

PAHs. The required holding times were met. No method blank contamination was detected. Surrogate, LCS, and MS/MSD recoveries were within laboratory control limits. MS/MSD RPDs were acceptable.

PCBs. The required holding times were met. No method blank contamination was detected. Surrogate and LCS recoveries were within laboratory control limits. Analytes were not detected in the laboratory duplicate measurements.

VOCs. The required holding times were met. No method blank contamination was detected. Surrogate and LCS recoveries were within laboratory control limits.

The soil data are acceptable for use without qualification.

CERTIFICATES OF ANALYSIS
ADVANCED ANALYTICAL LABORATORY

ADVANCED ANALYTICAL

Environmental Testing Laboratory

August 20, 2006

Erin Breckel
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102

Dear Ms. Breckel:

Please find enclosed the analytical data report for the *Suncadia Section 17, 17084* ***(A60801-2)*** Project.

Samples were received on *August 01, 2006*. The results of the analyses are presented in the attached tables. Applicable reporting limits, QA/QC data and data qualifiers are included. A copy of the chain-of-custody and an invoice for the work is also enclosed.

ADVANCED ANALYTICAL LABORATORY appreciates the opportunity to provide analytical services for this project. Should there be any questions regarding this report, please contact me at (425) 497-0110.

It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,

V. Ivanov

Val G. Ivanov, Ph.D.
Laboratory Manager

Overlake Business Center ■ 2821 152 Avenue NE ■ Redmond, WA 98052
ph 425.497.0110 fax 425.497.8089
E-mail: aachemlab@yahoo.com

This report is issued solely for the use of the person or company to whom it is addressed.
Any use, copying or disclosure other than by the intended recipient is unauthorized.

Sample Custody Record

Pg 1 of 5

A60801-2 (1)

Samples Shipped to: Advanced Analytical

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-01 LAB NUMBER

PROJECT NAME Suncadia Section 17

HART CROWSER CONTACT Erin Breckel

SAMPLED BY: KAH

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Total Metals * (6000/7000 series)	PAHs (8270 C)	PCBs (8082)	VOCs (8260B)	NWTPH-DX	NWTPH-G	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	TP-1 S-1		7/27/06		soil	X	X					1	
	TP-1 S-2											1	
	TP-1 S-3											1	
	TP-1 S-4											1	
	TP-2 S-1					X	X					1	
	TP-2 S-2											1	
	TP-2 S-3											1	
	TP-2 S-4											1	
	TP-3 S-1					X	X			X		1	
	TP-3 S-2											1	
	TP-3 S-3											1	
	TP-3 S-4											1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Erin Breckel (SIGNATURE)	7/31/06	(SIGNATURE)	8/1/6
Erin Breckel (PRINT NAME)	TIME	(PRINT NAME)	TIME
Hart Crowser (COMPANY)	4 pm	(COMPANY)	12:00
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

* Arsenic, cadmium, copper, chromium, lead, mercury, nickel, zinc

12/54 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS X STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

Pg 2 of 5

Samples Shipped to: Advanced Analytical

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-01 LAB NUMBER

PROJECT NAME Suncadia Section 17

HART CROWSER CONTACT Erin Breckel

SAMPLED BY: RAH

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	REQUESTED ANALYSIS: Total Metals* (6000/7000 Series)	PAHs (8270C)	PCBs (8082)	VOCs (8260B)	NWTPH-Dx	NWTPH-G	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	TP-3 S-5		7/27/06		Soil							1	
	TP-4 S-1					X	X			X		1	
	TP-1 S-2											1	
	TP-4 S-3											1	
	TP-4 S-4											1	
	TP-4 S-5											1	
	TP-5 S-1					X	X			X		1	
	TP-5 S-2											1	
	TP-5 S-3											1	
	TP-5 S-4											1	
	TP-5 S-5											1	
	TP-8 S-1		7/28/06			X	X		X	X	X	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Erin Breckel	7/31/06		
SIGNATURE	TIME	SIGNATURE	TIME
Erin Breckel	4pm		
PRINT NAME		PRINT NAME	
Hart Crowser			
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

* Arsenic, cadmium, copper, chromium, lead, mercury, nickel, zinc

12/S-1 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

Page 3 of 5

A60801-2 (3)

Samples Shipped to: Advanced Analytical

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-01 LAB NUMBER

PROJECT NAME Suncadia Section 17

HART CROWSER CONTACT Erin Breckel

SAMPLED BY: RAH

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Total Metals* (6000/7000 series)	PAHs (8270C)	PCBs (8082)	VOCs (8260B)	NWTPH-DX	NWTPH-G	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	TP-9 S-1		7/28/06		Soil	X	X			X	X	1	
	TP-9 S-2											1	
	TP-9 S-3											1	
	TP-9 S-4											1	
	TP-9 S-5											1	
	TP-10 S-1					X	X			X	X	1	
	TP-10 S-2											1	
	TP-10 S-3											1	
	TP-10 S-4											1	
	TP-10 S-5											1	
	TP-11 S-1					X	X	X		X		1	
	TP-11 S-2											1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Erin Breckel	7/31/06	V. Vaun	8/1/6
SIGNATURE	TIME	SIGNATURE	TIME
Erin Breckel		Val Shaw	
PRINT NAME	4pm	PRINT NAME	12:00
Hart Crowser		HC	
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

12/54 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record page 4 of 5

A60801-2

Samples Shipped to: Advanced Analytical

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-01 LAB NUMBER

PROJECT NAME Suncadia Section 17

HART CROWSER CONTACT Erin Brackel

SAMPLED BY: RAH

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Total Metals * (6000/7000 series)	PAHs (8270C)	PCBs (8082)	VOCs (8260B)	NWTPH-Dx	NWTPH-G	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	TP-11 S-3		7/28/06		Soil							1	
	TP-11 S-4											1	
	TP-11 S-5											1	
	TP-12 S-1					X	X	X		X		1	
	TP-12 S-2											1	
	TP-12 S-3											1	
	TP-12 S-4											1	
	TP-12 S-5											1	
	TP-13 S-1					X	X	X		X		1	
	TP-13 S-2											1	
	TP-13 S-3											1	
	TP-13 S-4											1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Erin Brackel	7/31/06	V Walker	8/1/6
SIGNATURE	TIME	VAL WARD	TIME
Erin Brackel	4pm	PRINT NAME	1200
PRINT NAME		HAL	
Hart Crowser		COMPANY	
COMPANY			

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

12/14 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

page 5 of 5

Samples Shipped to: Advanced Analytical

A60801-2

(5)

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-01 LAB NUMBER

PROJECT NAME Suncadia Section 17

HART CROWSER CONTACT Erin Breckel

SAMPLED BY: RAH

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Total Metals* (6000/7000 series)	PAHs (8270C)	PCBs (8082)	VOCs (8260B)	NWTPH-Dx	NWTPH-G	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	TP-13 S-5		7/28/06		Soil							1	
	TP-14 S-1		"		"	X	X	X		X		1	
	TP-14 S-2											1	
	TP-14 S-3											1	
	TP-14 S-4											1	
	TP-14 S-5											1	

REQUESTED ANALYSIS

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Erin Breckel	7/31/06	[illegible]	8/1/6
SIGNATURE	TIME	SIGNATURE	TIME
Erin Breckel		[illegible]	
PRINT NAME		PRINT NAME	
Hart Crowser	4pm	BAL	12:00
COMPANY		COMPANY	
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

6/54 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

8260B, µg/kg		MTH BLK	LCS	TP8-S1
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/02/06	08/02/06	08/02/06
Date analyzed	Limits	08/02/06	08/02/06	08/02/06
Dichlorodifluoromethane	50	nd		nd
Chloromethane	50	nd		nd
Vinyl chloride	50	nd		nd
Bromomethane	50	nd		nd
Chloroethane	50	nd		nd
Trichlorofluoromethane	50	nd		nd
1,1-Dichloroethene	50	nd	82%	nd
Methylene chloride	20	nd		nd
trans-1,2-Dichloroethene	50	nd		nd
1,1-Dichloroethane	50	nd		nd
2,2-Dichloropropane	50	nd		nd
cis-1,2-Dichloroethene	50	nd		nd
Chloroform	50	nd		nd
1,1,1-Trichloroethane	50	nd		nd
Carbontetrachloride	50	nd		nd
1,1-Dichloropropene	50	nd		nd
Benzene	50	nd	101%	nd
1,2-Dichloroethane(EDC)	20	nd		nd
Trichloroethene	20	nd	94%	nd
1,2-Dichloropropane	50	nd		nd
Dibromomethane	50	nd		nd
Bromodichloromethane	50	nd		nd
cis-1,3-Dichloropropene	50	nd		nd
Toluene	50	nd	93%	nd
trans-1,3-Dichloropropene	50	nd		nd
1,1,2-Trichloroethane	50	nd		nd
Tetrachloroethene	50	nd		nd
1,3-Dichloropropane	50	nd		nd
Dibromochloromethane	20	nd		nd
1,2-Dibromoethane (EDB)*	5	nd		nd
Chlorobenzene	50	nd	102%	nd
1,1,1,2-Tetrachloroethane	50	nd		nd
Ethylbenzene	50	nd		nd
Xylenes	50	nd		nd
Styrene	50	nd		nd
Bromoform	50	nd		nd

Advanced Analytical Laboratory
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AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

8260B, µg/kg		MTH BLK	LCS	TP8-S1
Matrix	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/02/06	08/02/06	08/02/06
Date analyzed	Limits	08/02/06	08/02/06	08/02/06
Isopropylbenzene	50	nd		nd
1,2,3-Trichloropropane	50	nd		nd
Bromobenzene	50	nd		nd
1,1,2,2-Tetrachloroethane	50	nd		nd
n-Propylbenzene	50	nd		nd
2-Chlorotoluene	50	nd		nd
4-Chlorotoluene	50	nd		nd
1,3,5-Trimethylbenzene	50	nd		nd
tert-Butylbenzene	50	nd		nd
1,2,4-Trimethylbenzene	50	nd		nd
sec-Butylbenzene	50	nd		nd
1,3-Dichlorobenzene	50	nd		nd
Isopropyltoluene	50	nd		nd
1,4-Dichlorobenzene	50	nd		nd
1,2-Dichlorobenzene	50	nd		nd
n-Butylbenzene	50	nd		nd
1,2-Dibromo-3-Chloropropane	50	nd		nd
1,2,4-Trichlorobenzene	50	nd		nd
Hexachloro-1,3-butadiene	50	nd		nd
Naphthalene	50	nd		nd
1,2,3-Trichlorobenzene	50	nd		nd
*-instrument detection limits				
Surrogate recoveries				
Dibromofluoromethane		99%	100%	99%
Toluene-d8		103%	99%	106%
1,2-Dichloroethane-d4		95%	92%	93%
4-Bromofluorobenzene		109%	103%	99%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number: A60801-2
Client: Hart Crowser, Inc.
Project Manager: Erin Breckel
Client Project Name: Suncadia Section 17
Client Project Number: 17084
Date received: 08/01/06

Analytical Results

NWTPH-Dx, mg/kg		MTH BLK	TP3-S1	TP4-S1	TP5-S1	TP8-S1	TP9-S1	TP10-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
Date analyzed	Limits	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
Kerosene/Jet fuel	20	nd	nd	nd	nd	nd	nd	nd
Diesel/Fuel oil	20	nd	nd	nd	nd	nd	nd	nd
Heavy oil	50	nd	nd	nd	nd	nd	nd	nd
Surrogate recoveries:								
Fluorobiphenyl		82%	100%	98%	93%	98%	85%	85%
o-Terphenyl		98%	80%	89%	88%	88%	83%	84%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number: A60801-2
Client: Hart Crowser, Inc.
Project Manager: Erin Breckel
Client Project Name: Suncadia Section 17
Client Project Number: 17084
Date received: 08/01/06

Analytical Results

NWTPH-Dx, mg/kg		MTH BLK	TP11-S1	TP12-S1	TP13-S1	TP14-S1	TP14-S1 Dupl
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
Date analyzed	Limits	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
Kerosene/Jet fuel	20	nd	nd	nd	nd	nd	nd
Diesel/Fuel oil	20	nd	nd	nd	nd	nd	nd
Heavy oil	50	nd	nd	nd	2,100	210	140
Surrogate recoveries:							
Fluorobiphenyl		82%	82%	87%	102%	98%	108%
o-Terphenyl		98%	84%	88%	88%	88%	92%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

NWTPH-Gx		MTH BLK	TP8-S1	TP9-S1	TP10-S1	TP10-S1 Dupl
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/04/06	08/04/06	08/04/06	08/04/06	08/04/06
Date analyzed	Limits	08/04/06	08/04/06	08/04/06	08/04/06	08/04/06
NWTPH-Gx, mg/kg		nd	nd	nd	nd	nd
Mineral spirits/Stoddard	5.0	nd	nd	nd	nd	nd
Gasoline	5.0	nd	nd	nd	nd	nd
Surrogate recoveries:						
Trifluorotoluene		102%	115%	97%	94%	95%
Bromofluorobenzene		98%	110%	96%	97%	97%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

Metals (7010/7471), mg/kg		MTH BLK	LCS	TP1-S1	TP2-S1	TP3-S1	TP4-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Date analyzed	Limits	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Lead (Pb)	1.0	nd	96%	290	200	84	13
Chromium (Cr)	2.0	nd	114%	45	100	11	7.6
Cadmium (Cd)	1.0	nd	88%	1.2	nd	nd	nd
Copper (Cu)	1.0	nd	76%	nd	nd	nd	3.9
Nickel (Ni)	2.0	nd	110%	88	140	18	21
Arsenic (As)	2.0	nd	88%	4.8	6.9	3.7	nd
Zinc (Zn)	1.0	nd	73%	19	58	53	48
Mercury (Hg) (7471)	0.5	nd	109%	5.2	4.9	1.2	nd

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

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Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

Metals (7010/7471), mg/kg		MTH BLK	TP5-S1	TP8-S1	TP9-S1	TP10-S1	TP11-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Date analyzed	Limits	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Lead (Pb)	1.0	nd	7.9	110	24	130	7.3
Chromium (Cr)	2.0	nd	5.3	5.1	2.9	9.3	11
Cadmium (Cd)	1.0	nd	nd	8.6	nd	nd	nd
Copper (Cu)	1.0	nd	nd	nd	nd	nd	nd
Nickel (Ni)	2.0	nd	7.8	14	6.4	12	8.9
Arsenic (As)	2.0	nd	nd	150	4.1	nd	nd
Zinc (Zn)	1.0	nd	93	7.8	5.1	12	80
Mercury (Hg) (7471)	0.5	nd	nd	0.54	nd	nd	nd

Data Qualifiers and Analytical Comments

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J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

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AAL Job Number: A60801-2
Client: Hart Crowser, Inc.
Project Manager: Erin Breckel
Client Project Name: Suncadia Section 17
Client Project Number: 17084
Date received: 08/01/06

Analytical Results

Metals (7010/7471), mg/kg		MTH BLK	TP12-S1	TP13-S1	TP14-S1	TP14-S1 Dupl	TP14-S1 RPD
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Date analyzed	Limits	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06	08/07/06
Lead (Pb)	1.0	nd	50	68	5.6	5.2	9%
Chromium (Cr)	2.0	nd	6.1	8.0	5.9	7.5	25%
Cadmium (Cd)	1.0	nd	2.0	nd	nd	nd	
Copper (Cu)	1.0	nd	nd	nd	nd	nd	
Nickel (Ni)	2.0	nd	7.5	20	5.8	6.0	4%
Arsenic (As)	2.0	nd	2.1	9.2	nd	nd	
Zinc (Zn)	1.0	nd	35	31	11	11	0%
Mercury (Hg) (7471)	0.5	nd	8.0	4.0	nd	nd	

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

PAH (8270sim), mg/kg		MTH BLK	LCS	TP1-S1	TP2-S1	TP3-S1	TP4-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Date analyzed	Limits	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Naphthalene	0.05	nd		nd	nd	nd	nd
Acenaphthylene	0.05	nd		nd	nd	nd	nd
Acenaphthene	0.05	nd	99%	nd	nd	nd	nd
Fluorene	0.05	nd		nd	nd	nd	nd
Phenanthrene	0.05	nd		nd	nd	nd	nd
Anthracene	0.05	nd		nd	nd	nd	nd
Fluoranthene	0.05	nd	97%	nd	nd	nd	nd
Pyrene	0.05	nd		nd	nd	nd	nd
Benzo(a)anthracene	0.05	nd		nd	nd	nd	nd
Chrysene	0.05	nd		nd	nd	nd	nd
Benzo(b)fluoranthene	0.05	nd		nd	nd	nd	nd
Benzo(k)fluoranthene	0.05	nd		nd	nd	nd	nd
Benzo(a)pyrene	0.05	nd	107%	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene	0.05	nd		nd	nd	nd	nd
Dibenzo(ah)anthracene	0.05	nd		nd	nd	nd	nd
Benzo(ghi)perylene	0.05	nd		nd	nd	nd	nd
Surrogate recoveries:							
Fluorobiphenyl		98%	117%	104%	102%	110%	98%
o-Terphenyl		108%	125%	119%	121%	113%	104%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks

Advanced Analytical Laboratory
(425) 497-0110, fax (425) 497-8089

AAL Job Number: A60801-2
Client: Hart Crowser, Inc.
Project Manager: Erin Breckel
Client Project Name: Suncadia Section 17
Client Project Number: 17084
Date received: 08/01/06

Analytical Results

PAH (8270sim), mg/kg		MTH BLK	TP5-S1	TP8-S1	TP9-S1	TP10-S1	TP11-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Date analyzed	Limits	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Naphthalene	0.05	nd	nd	nd	nd	nd	nd
Acenaphthylene	0.05	nd	nd	nd	nd	nd	nd
Acenaphthene	0.05	nd	nd	nd	nd	nd	nd
Fluorene	0.05	nd	nd	nd	nd	nd	nd
Phenanthrene	0.05	nd	nd	nd	nd	nd	nd
Anthracene	0.05	nd	nd	nd	nd	nd	nd
Fluoranthene	0.05	nd	nd	nd	nd	nd	nd
Pyrene	0.05	nd	nd	nd	nd	nd	nd
Benzo(a)anthracene	0.05	nd	nd	nd	nd	nd	nd
Chrysene	0.05	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene	0.05	nd	nd	nd	nd	nd	nd
Benzo(k)fluoranthene	0.05	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene	0.05	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene	0.05	nd	nd	nd	nd	nd	nd
Dibenzo(ah)anthracene	0.05	nd	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.05	nd	nd	nd	nd	nd	nd
Surrogate recoveries:							
Fluorobiphenyl		98%	115%	98%	94%	104%	98%
o-Terphenyl		108%	123%	110%	102%	110%	100%

Data Qualifiers and Analytical Comments
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AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
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Date received:	08/01/06

Analytical Results

PAH (8270sim), mg/kg		MTH BLK	TP12-S1	TP13-S1	TP14-S1	TP14-S1 MS	TP14-S1 MSD
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Date analyzed	Limits	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06	08/03/06
Naphthalene	0.05	nd	nd	nd	nd		
Acenaphthylene	0.05	nd	nd	nd	nd		
Acenaphthene	0.05	nd	nd	nd	nd	98%	99%
Fluorene	0.05	nd	nd	nd	nd		
Phenanthrene	0.05	nd	0.09	nd	nd		
Anthracene	0.05	nd	nd	nd	nd		
Fluoranthene	0.05	nd	0.11	nd	nd		
Pyrene	0.05	nd	0.13	nd	nd	103%	103%
Benzo(a)anthracene	0.05	nd	0.07	nd	nd		
Chrysene	0.05	nd	0.06	nd	nd		
Benzo(b)fluoranthene	0.05	nd	nd	nd	nd		
Benzo(k)fluoranthene	0.05	nd	nd	nd	nd		
Benzo(a)pyrene	0.05	nd	nd	nd	nd	104%	104%
Indeno(1,2,3-cd)pyrene	0.05	nd	nd	nd	nd		
Dibenzo(ah)anthracene	0.05	nd	nd	nd	nd		
Benzo(ghi)perylene	0.05	nd	nd	nd	nd		
Surrogate recoveries:							
Fluorobiphenyl		98%	99%	102%	121%	101%	101%
o-Terphenyl		108%	113%	102%	123%	106%	106%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks

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(425) 497-0110, fax (425) 497-8089

AAL Job Number:	A60801-2
Client:	Hart Crowser, Inc.
Project Manager:	Erin Breckel
Client Project Name:	Suncadia Section 17
Client Project Number:	17084
Date received:	08/01/06

Analytical Results

PAH (8270sim), mg/kg		MTH BLK	TP14-S1	RPD
Matrix	Soil	Soil	Soil	
Date extracted	Reporting	08/03/06	08/03/06	
Date analyzed	Limits	08/03/06	08/03/06	
Naphthalene	0.05	nd		
Acenaphthylene	0.05	nd		
Acenaphthene	0.05	nd		2%
Fluorene	0.05	nd		
Phenanthrene	0.05	nd		
Anthracene	0.05	nd		
Fluoranthene	0.05	nd		
Pyrene	0.05	nd		0%
Benzo(a)anthracene	0.05	nd		
Chrysene	0.05	nd		
Benzo(b)fluoranthene	0.05	nd		
Benzo(k)fluoranthene	0.05	nd		
Benzo(a)pyrene	0.05	nd		0%
Indeno(1,2,3-cd)pyrene	0.05	nd		
Dibenzo(ah)anthracene	0.05	nd		
Benzo(ghi)perylene	0.05	nd		

Surrogate recoveries:	
Fluorobiphenyl	98%
o-Terphenyl	108%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks

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AAL Job Number: A60801-2
Client: Hart Crowser, Inc.
Project Manager: Erin Breckel
Client Project Name: Suncadia Section 17
Client Project Number: 17084
Date received: 08/01/06

Analytical Results

8082(PCBs), mg/kg		MTH BLK	LCS	TP11-S1	TP12-S1	TP13-S1	TP14-S1	TP14-S1 Dupl
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
Date analyzed	Limits	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06	08/02/06
A1221	0.20	nd		nd	nd	nd	nd	nd
A1232	0.20	nd		nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd		nd	nd	nd	nd	nd
A1248	0.20	nd		nd	nd	nd	nd	nd
A1254	0.20	nd		nd	nd	nd	nd	nd
A1260	0.20	nd	79%	nd	nd	nd	nd	nd
Surrogate recoveries:								
Tetrachloro-m-xylene		91%	129%	94%	97%	98%	89%	94%
Decachlorobiphenyl		109%	103%	109%	110%	115%	110%	104%

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

October 2, 2007

Mr. Paul Eisenburg
Suncadia, LLC
P.O. Box 887
109 South First Street
Roslyn, Washington 98941

Re: Phase II Environmental Site Assessment
Section 17/No. 4 Mine Area
Roslyn, Washington
17084-02

Dear Mr. Eisenburg:

This letter report presents the results of the Phase II Environmental Site Assessment at the Section 17 property located in Roslyn, Washington (Figure 1). The project scope of work was completed in general accordance with our scope of services dated May 1, 2007.

Based on the elevated metals concentrations detected in near-surface soil samples previously collected at four site areas (Hart Crowser 2006), additional soil sampling and chemical analyses were recommended to determine whether soil impacts are limited to the areas previously identified. Subsurface samples from the same areas were also tested to determine whether elevated metal concentrations are limited to the near-surface soils. In addition, four mini-wells were installed and sampled, and the groundwater samples analyzed to determine whether there are potential impacts to groundwater. The following tasks as described in Hart Crowser's proposal were completed:

- Surface and subsurface soil samples were collected from the former auto maintenance area, the former foundry and slag pile area, and the former power house area. Samples were analyzed for metals and three samples from the power house area were also analyzed for petroleum hydrocarbons;

- Three surface soil/sediment samples were collected from seasonally wet areas and analyzed for metals; and

- Four mini-wells were installed and perched groundwater samples were collected and submitted for metals analysis.

1700 Westlake Avenue North, Suite 200
Seattle, Washington 98109-3056
Fax 206.328.5581
Tel 206.324.9530

SUMMARY OF FINDINGS

Surface soil samples were collected from areas where the July 2006 sampling detected metals concentrations exceeding Washington State Model Toxics Control Act (MTCA – Chapter 173-340 WAC) screening levels. Results of the current (August 2007) sampling and analysis event indicated that areas with elevated metals concentrations are generally localized. With the exception of arsenic and mercury in one sample, soil metals concentrations did not exceed MTCA Method A unrestricted use or Method B screening levels. Arsenic concentrations may reflect regional background levels since the area historically has been mined for coal, and arsenic is associated with coal deposits. Cadmium, mercury, and nickel concentrations in five samples exceeded Method B groundwater protection screening levels. However, concentrations of these metals in subsurface soil and groundwater samples collected at the site were below screening levels.

Subsurface soil metals concentrations were below MTCA screening levels based on direct contact (ingestion) and protection of groundwater.

Except for arsenic and lead, which slightly exceeded screening criteria, shallow perched groundwater total (unfiltered) metals concentrations were below MTCA Method B drinking water screening levels. It should be noted that shallow perched groundwater is only observed seasonally and is not a potential source of drinking water since groundwater is not present in sufficient quantity on a sustained basis.

With the exception of one sample, one or more metals concentrations in surface and subsurface soil exceed terrestrial ecological screening levels. It should be noted that several of these ecological-based screening levels are within the expected range of regional soil background concentrations. Applicability of ecological screening levels may depend on future site development plans.

SUBJECT PROPERTY DESCRIPTION

The 30-acre portion of the subject property is located southeast of the intersection of South First Street (State Route 903) and East Dakota Avenue in Roslyn, Washington (Figure 1). This parcel is currently vacant, undeveloped land. The majority of the parcel is covered with sparse grass and shrubs. There is also a seasonally wet area located on the western portion of the parcel, seen as the area with the densest concentrations of trees and shrubs on an aerial photograph (Figure 2). The eastern portion of the parcel contains a forested area with primarily fir and pine trees. Two dirt and gravel roads run generally north-south through the parcel. Historical building foundations and other evidence of prior activities (i.e., slag piles and tailings piles) are present. The parcel formerly contained a variety of operations including a coal mine, a foundry that remained active through the

mid-1970s, a power house and large transformers, and a small building foundation that was reportedly used as a pad by the townspeople to change oil and conduct vehicle maintenance. The approximate locations of these various features are presented on Figure 2.

Soil Conditions

Site soils encountered during exploration typically consisted of sandy and silty fill. No obvious signs of contamination were observed, such as odors or staining. Soil boring logs are presented in Appendix A.

Geology and Hydrogeology

According to the United States Geological Survey (USGS) Map of the Snoqualmie Pass Quadrangle, Washington (Tabor el al. 2000), the main 30-acre parcel of the subject property is predominantly underlain by unconsolidated deposits consisting of dense, glacially overridden material of alternating till (very dense sand and gravel), outwash (dense sand and gravel), and lacustrine (hard silt and sand) deposits. A Preliminary Coal Mine Hazard Assessment and Preliminary Geotechnical Evaluation report prepared by Icicle Creek Engineers on May 25, 2006, reports that the southwestern portion of the parcel was mapped by the Washington State Department of Natural Resources, Division of Geology and Earth Resources (DGER) as "alluvium," which consists of silt, sand, and gravel. In the northeastern portion of the 30-acre parcel and on Parcel C, the DGER mapped the Roslyn formation bedrock consisting of siltstone, sandstone, and coal, with typically greater than 5 feet of weathered bedrock overlying the unweathered bedrock. This bedrock underlies the alluvium in the southwestern portion of the 30-acre parcel at depths of generally greater than 10 feet.

The topography of the 30-acre portion of the subject property is generally flat, possibly sloping slightly downward to the south or southeast toward Dakota Avenue East. Based on surrounding area topography, groundwater flow in the western portion of the parcel is likely to be to the south, toward Crystal Creek, located over 500 feet to the east and southeast. A seasonal stream is located along the northeast property boundary of the subject property and flows south along the base of the hill near the parcel boundary and the Coal Mines Trail.

Review of Ecology documents did not identify any well logs or evidence of domestic drinking water wells within a mile of the subject property.

FIELD PROCEDURES

Soil Sample Collection

Surface soil samples were collected by digging a shallow hole (0 to 6 inches) with a clean decontaminated shovel. Soil samples were collected from the side wall of the hole using a clean stainless steel spoon or spatula and placed directly into pre-cleaned, labeled, glass sample jars.

Subsurface soil samples were collected at each probe from depths of approximately 1 to 4 feet below ground surface and 4 to 8 feet using a direct push rig. The push probe was lined with a 4-foot acetate liner. Once the probe was completed, the liner was removed, cut open, and a composite sample was collected over the length of the recovered sample. Soil probe logs are presented in Appendix A.

Current and historical sample locations are presented on Figure 1.

Mini-Well Installation and Groundwater Sample Collection

Mini-wells were installed in four push probes and were completed using 5-foot-long pre-packed well screens or a 10-foot-long 10-slot PVC screen, as shown on the logs in Appendix A. Depth to water varied between 4.59 and 11.9 feet. Construction details are presented in Appendix A. The mini-wells were developed by pumping and went dry during development. Groundwater sampling was performed approximately 24 hours after the mini-wells were developed. The mini-wells were purged until monitoring parameters stabilized or were purged dry. Groundwater was then sampled using a peristaltic pump and pre-preserved containers. Groundwater sampling forms are presented in Appendix A.

Sample Handling Procedures

Each sample jar was wiped clean and capped with a Teflon-lined lid, and then placed in an insulated ice chest with ice for transfer to Hart Crowser's refrigerated storage locker. Samples were then transferred to Analytical Resources, Inc. (ARI) Laboratory in Tukwila, Washington, for chemical analysis. Sample custody forms accompanied the samples to the laboratory. The samples were received at the laboratory in good condition.

ANALYTICAL TESTING RESULTS

Twenty-six soil and four water samples were submitted for chemical analyses. The soil sample results were compared to the July 2006 sampling results and the following MTCA screening levels:

- Method A unrestricted use;
- Method B direct contact based on ingestion;
- Method B groundwater protection; and
- Ecological screening criteria for plants, soil biota, and wildlife.

Water results were compared to MTCA Method A and Method B drinking water screening levels.

It should be noted that these MTCA cleanup levels are provided for screening and comparison purposes only. Exceedances of these screening criteria do not imply that a release or potential exposure has occurred on the subject property that would create a risk to human health or the environment.

Laboratory analytical reports are presented in Appendix B for the current soil and groundwater samples. For the laboratory analytical report for the previous soil samples collected, refer to the 2006 Section 17 Additional Environmental Assessment Report (Hart Crowser 2006).

Surface Soil

Analytical results for surface soil samples are summarized in Table 1. In general, exceedances of human health screening criteria were isolated and no general trends or "hot spot" areas could be discerned suggesting that screening level exceedances reported in the Section 17 Additional Environmental Assessment (Hart Crowser 2006) were isolated.

All surface soil samples exceeded one or more ecological screening values for metals. Applicability of ecological screening levels may depend on future site development plans.

Power House Area

Diesel- and Heavy Oil-Range TPH

Three samples from the power house area were analyzed for diesel- and oil-range petroleum hydrocarbons to delineate the slight MTCA Method A exceedance (2,100 mg/kg) reported for Test Pit-13 (TP-13) in the July 2006 sampling event. None of the recent (2007) samples collected near the location of TP-13 exceeded the MTCA screening level for petroleum hydrocarbons indicating that the area of impacted soil was limited.

Metals

Arsenic exceeded its MTCA Method A unrestricted and MTCA Method B direct contact (ingestion) screening levels screening level in two samples (HC-SS-1 and HC-SS-3) collected from the former power house area. Previous nearby test pit sampling in this area did not indicate elevated arsenic concentrations. Arsenic concentrations may reflect regional background levels since the area historically has been mined for coal, and arsenic is associated with coal deposits.

Mercury concentrations in two samples (TP-12 and TP-13) previously collected from the power house area exceeded MTCA soil screening levels for protection of groundwater. Mercury exceeded its MTCA Method A screening level in one current sample (HC-SS-5) collected from the power house area. However, the concentrations were below the MTCA Method B unrestricted direct contact (ingestion) screening level. The Method A screening level is based on protection of groundwater though, as discussed in the following groundwater section, mercury concentrations in soil samples were less than MTCA screening levels. Mercury concentrations may reflect regional background levels since the area historically has been mined for coal, and mercury is associated with coal deposits.

Foundry and Slag Pile Area

Arsenic exceeded its MTCA Method A unrestricted and MTCA Method B direct contact screening levels in one sample (HC-SS-12). Previous nearby test pit sampling in this area did not indicate elevated arsenic concentrations. Arsenic concentrations may reflect regional background levels since the area historically has been mined for coal, and arsenic is associated with coal deposits.

Mercury concentrations in two samples (TP-1 and TP-2) previously collected from the foundry and slag pile area exceeded MTCA soil screening levels for protection of groundwater. Mercury concentrations in five samples (HC-SS-7 through HC-SS-10 and HC-SB-7) collected adjacent to these locations were below MTCA screening criteria indicating the previous detections were isolated.

Lead exceeded its MTCA Method A screening level in samples TP-1 and HB-3 collected in 2006. Lead concentrations in five samples (HC-SS-7 through HC-SS-10 and HC-SB-7) collected adjacent to these locations were below MTCA screening criteria indicating the previous detections were also isolated.

Previous sampling and analysis indicated nickel exceeded its MTCA soil screening level for protection of groundwater in two samples (TP-1 and HB-3) collected from the slag pile and former foundry area, respectively. During the current sampling event, nickel exceeded its MTCA Method B screening level for protection of groundwater in only two samples (HC-SS-11 and HC-SS-12) collected from the vicinity of HB-3. However, the concentration was less than the MTCA Method B

unrestricted direct contact (ingestion) screening level. As discussed in the following sections, nickel concentrations in soil samples and in shallow perched groundwater samples were less than MTCA screening levels.

Auto Maintenance Area

Arsenic exceeded its MTCA Method A unrestricted and MTCA Method B direct contact screening levels screening level in one sample (HC-SS-15). Previous nearby test pit sampling (TP-8) in this area also identified elevated arsenic concentrations. Cadmium exceeded its MTCA Method A screening level in one sample (HC-SS-15) collected from the former auto maintenance area. Previous samples from two nearby locations (TP-8 and HB-1) also had cadmium concentrations above the MTCA Method A screening level. However, the concentrations were less than the MTCA Method B unrestricted direct contact screening level. The Method A screening level is based on protection of groundwater though, as discussed in the following sections, cadmium was not detected in subsurface soil or shallow perched groundwater samples.

Lead was previously detected in one sample (HB-2) at a concentration equal to the MTCA Method A unrestricted screening value (250 mg/kg). Sample HC-SS-15 collected during this sampling event did not contain lead at a concentration exceeding human health screening levels.

Mercury exceeded its MTCA Method A screening level in sample HC-SS-14 collected from the auto maintenance area. However, concentrations in both samples HC-SS-14 and HC-SS-15 were below MTCA Method B direct contact screening levels. The Method A screening levels are based on protection of groundwater though, as discussed in the following groundwater section, mercury was not detected in shallow perched groundwater samples.

Seasonally Wet Areas

Arsenic was detected in one sample (HC-WS-2) collected from a seasonally wet area at a concentration of 30 mg/kg, slightly over its Method A screening level of 20 mg/kg. This arsenic concentration may be within the range of regional background concentrations.

Subsurface Soil

Analytical results for subsurface soil samples are summarized in Table 2. None of the metals concentrations exceeded MTCA Method A, MTCA Method B direct contact, or Method B groundwater protection screening levels indicating that metals identified in surface soil are immobile and are unlikely to impact groundwater.

As shown in Table 2, several subsurface soil samples exceeded one or more ecological screening values for metals. Applicability of ecological screening levels may depend on future site development plans.

Perched Groundwater

Analytical results for shallow perched groundwater samples are summarized in Table 3. Only total (unfiltered) arsenic and lead exceeded MTCA drinking water screening levels. Observed metal concentrations may be a result of suspended solids since water samples were turbid (350 to 400 normal turbidity units). It should be noted that shallow perched groundwater is only observed seasonally and is not a potential source of drinking water since groundwater is not present in sufficient quantity on a sustained basis as specified in WAC 173-340-720 (2)(b)(i). All four mini-wells went dry when purged and sampled using low flow methods. Review of Ecology documents did not identify any well logs or evidence of domestic drinking water wells within a mile of the subject property.

Arsenic slightly exceeded the MTCA Method B screening level in samples HC-MW-3 and HC-MW-4. As discussed in the ***Surface Soil*** section, arsenic may be associated with naturally occurring coal deposits.

Lead exceeded the MTCA Method B drinking water screening level in samples HC-MW-1 and HC-MW-3.

CONCLUSIONS AND RECOMMENDATIONS

Arsenic and mercury are the only metals detected during this sampling and analysis event with soil concentrations exceeding MTCA human health criteria. Cadmium, mercury and nickel exceed MTCA soil screening levels for protection of groundwater in only five samples analyzed. With the exception of arsenic, soil exceedances of MTCA screening criteria appear to be very localized and limited to surface soil. Subsurface soil metal concentrations are below both MTCA human health and groundwater protection screening levels. Arsenic and mercury concentrations may reflect regional background levels associated with coal deposits.

Shallow perched groundwater slightly exceeded MTCA screening criteria for arsenic and lead; however, water is only observed seasonally and is not a potential source of drinking water based on low available yields.

A limited surface soil removal may be required in the former foundry area to remediate soil previously identified as containing lead at concentrations above MTCA Method A. In addition,

depending on future site development plans, a simplified terrestrial ecological evaluation (TEE) or a site-specific ecological evaluation may be required.

It is recommended that mini-wells be decommissioned by a licensed driller in accordance with Washington State regulations.

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Suncadia, for specific application to the subject property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

Sincerely,

HART CROWSER, INC.

Roger McGinnis

ROGER MCGINNIS, PHD
Environmental Chemist

Attachments:
Table 1 - Analytical Results for Surface Soil Samples
Table 2 - Analytical Results for Subsurface Soil Samples
Table 3 - Analytical Results for Groundwater Samples
Figure 1 - Vicinity Map
Figure 2 - Site and Exploration Plan
Appendix A - Exploration Logs
Appendix B - Chemical Data Quality Review and Certificates of Analysis

Tables

Table 1 - Analytical Results for Surface Soil Samples

Sample ID Sampling Date	MTCA Method A Unrestricted	MTCA Method B (Direct Contact)	MTCA Groundwater Protection	Ecological Protection Screening Level (a)	HC-SS-1 8/10/2007	HC-SS-2 8/10/2007	HC-SS-3 8/10/2007	HC-SS-4 8/10/2007	HC-SS-5 8/10/2007	HC-SS-6 8/10/2007	HC-SS-7 8/10/2007
Metals in mg/kg											
Arsenic	20 (c)	20 (c)	20 (c)	10	***58***	9	***26***	5 U	6	8	10 U
Cadmium	2 (b)	80	2 (b)	4	1.8	0.4	0.8	0.2 U	0.5	0.4	0.5 U
Chromium	2,000 (b)	120,000	2,000 (b)	42	33.7	18.9	26.5	16.6	23.8	20.9	36
Copper		3,000	260	50	*123*	42.1	*85.6*	10.9	*169*	49.1	49.5
Lead	250			50	*57*	28	*68*	15	*61*	*65*	*62*
Mercury	2 (b)	24	2 (b)	0.1	*0.83* J	0.06 J	*0.16* J	*0.19* J	***3.04*** J	*0.32* J	0.05 J
Nickel		1,600	130	30	*55*	21	*33*	16	*39*	27	41
Zinc		24,000	6,000	86	*252*	*95*	*147*	36.4	*122*	*114*	*229*
TPH in mg/kg											
Diesel-Range	2,000			200	190		*240*		180		
Motor Oil-Range	2,000			200	*320*		*380*		*410*		

Sample ID Sampling Date	MTCA Method A Unrestricted	MTCA Method B (Direct Contact)	MTCA Groundwater Protection	Ecological Protection Screening Level (a)	HC-SS-8 8/10/2007	HC-SS-9 8/10/2007	HC-SS-10 8/10/2007	HC-SS-11 8/10/2007	HC-SS-12 8/10/2007	HC-SS-13 8/10/2007	HC-SS-14 8/10/2007
Metals in mg/kg											
Arsenic	20 (c)	20 (c)	20 (c)	10	10 U	10 U	10 U	*20*	***40***	10	10
Cadmium	2 (b)	80	2 (b)	4	0.7	0.5 U	0.5 U	0.5 U	0.5 U	0.6	0.7
Chromium	2,000 (b)	120,000	2,000 (b)	42	36	39	38	35	33	22.8	34.8
Copper		3,000	260	50	*54.3*	48.6	35.5	*81.2*	*88.2*	*81.3* J	*106* J
Lead	250			50	*101*	*54*	27	*149*	*130*	*83*	*152*
Mercury	2 (b)	24	2 (b)	0.1	0.08 J	0.05 J	0.05 J	0.07 J	0.06 J	0.09	***22.9***
Nickel		1,600	130	30	*53*	*39*	*34*	***503***	***601***	*44*	*52*
Zinc		24,000	6,000	86	*277*	*90*	81	*239*	*324*	*164* J	*210* J

Table 1 - Analytical Results for Surface Soil Samples

Sample ID Sampling Date	MTCA Method A Unrestricted	MTCA Method B (Direct Contact)	MTCA Groundwater Protection	Ecological Protection Screening Level (a)	HC-SS-15 8/10/2007	HC-WS-1 8/10/2007	HC-WS-2 8/10/2007	HC-WS-3 8/10/2007
Metals in mg/kg								
Arsenic	20 (c)	20 (c)	20 (c)	10	**_90_**	8 U	**_30_**	7
Cadmium	2 (b)	80	2 (b)	4	**_5.8_**	0.6	0.8	0.2 U
Chromium	2,000 (b)	120,000	2,000 (b)	42	*46*	19.4	*46*	26
Copper		3,000	260	50	*184* J	*56.7* J	*118* J	*60.3* J
Lead	250			50	*153*	47	33	15
Mercury	2 (b)	24	2 (b)	0.1	*0.13*	*0.19*	0.05	*0.19*
Nickel		1,600	130	30	*77*	*32*	*92*	*42*
Zinc		24,000	6,000	86	*392* J	*161* J	*87* J	49 J

Concentrations that exceed MTCA Method A unrestricted use or Method B direct contact screening levels are boxed.
Bold indicates concentration exceeds MTCA groundwater protection screening level.
Italics indicates concentration exceeds ecological protection screening level per MTCA Table 749-3.
U = Not detected at detection limit indicated.
J = Estimated concentration; may have a high bias.
(a) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.
(b) MTCA Method A criterion based on groundwater protection.
(c) MTCA Method A criterion based on direct contact and protection of groundwater quality adjusted for natural background.

Table 2 - Analytical Results for Subsurface Soil Samples

Sample ID Sampling Date Depth in Feet	MTCA Method A Unrestricted	MTCA Method B (Direct Contact)	MTCA Groundwater Protection	Ecological Protection Screening Level (a)	HC-SB-5-S1 8/9/2007 0 to 4	HC-SB-5-S2 8/9/2007 4 to 8	HC-SB-6-S1 8/9/2007 0 to 4	HC-SB-6-S2 8/9/2007 4 to 8	HC-SB-7-S1 8/9/2007 0 to 4	HC-SB-7-S2 8/9/2007 4 to 8
Metals in mg/kg										
Arsenic	20 (c)	20 (c)	20 (c)	10	10 U	6 U	5	6 U	10 U	*20* U
Cadmium	2 (b)	80	2 (b)	4	0.6 U	0.2 U	0.2 U	0.2 U	0.5 U	0.6 U
Chromium	2,000 (b)	120,000	2,000 (b)	42	23	28.2	11.9	37.4	*52*	*52*
Copper		3,000	260	50	*76.1* J	17.6 J	41.1 J	20.6 J	32 J	36.5 J
Lead	250			50	11	4	27	5	9	8
Mercury	2 (b)	24	2 (b)	0.1	0.04	0.05 U	0.1	0.05 U	0.04 U	0.06
Nickel		1,600	130	30	*42*	25	15	25	*35*	*37*
Zinc		24,000	6,000	86	62 J	79 J	20 J	61 J	*87* J	74 J

Sample ID Sampling Date Depth in Feet	MTCA Method A Unrestricted	MTCA Method B (Direct Contact)	MTCA Groundwater Protection	Ecological Protection Screening Level (a)	HC-SB-8-S1 8/9/2007 0 to 4	HC-SB-8-S2 8/9/2007 4 to 8
Metals in mg/kg						
Arsenic	20 (c)	20 (c)	20 (c)	10	6 U	*20* U
Cadmium	2 (b)	80	2 (b)	4	0.3 U	0.6 U
Chromium	2,000 (b)	120,000	2,000 (b)	42	21.1	*56*
Copper		3,000	260	50	46.1 J	34.1 J
Lead	250			50	8	8
Mercury	2 (b)	24	2 (b)	0.1	0.05 U	0.06
Nickel		1,600	130	30	*31*	*46*
Zinc		24,000	6,000	86	58 J	81 J

Italics indicates concentration exceeds ecological protection screening level per MTCA Table 749-3.
U = Not detected at detection limit indicated.
J = Estimated concentration; may have a high bias.
(a) WAC 173-340-900 (Table 749-3) Lowest of plants, soil biota, and wildlife criteria.
(b) MTCA Method A criterion based on groundwater protection.
(c) MTCA Method A criterion based on direct contact and protection of groundwater quality adjusted for natural background.

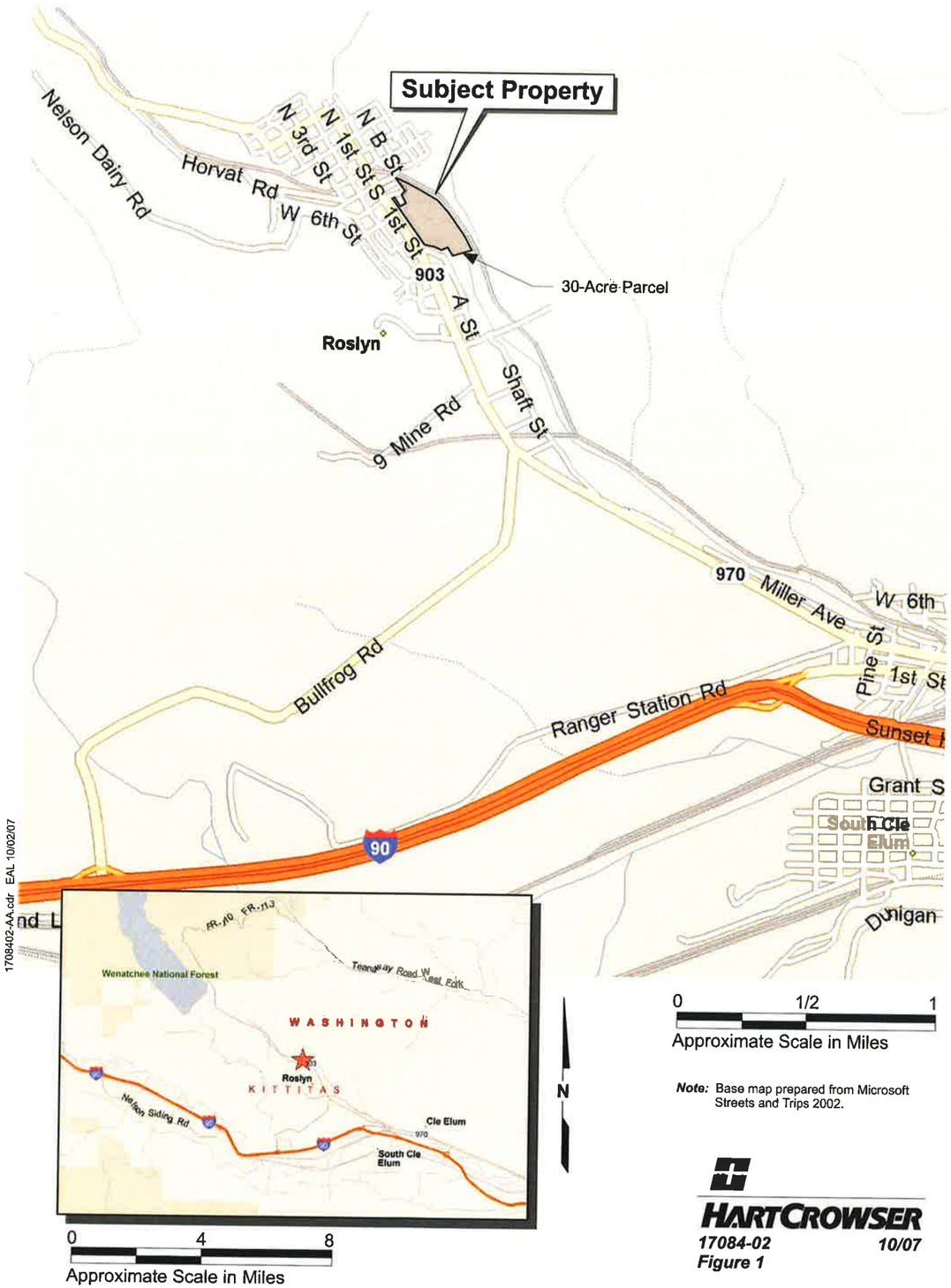
Table 3 - Analytical Results for Perched Groundwater Samples

Sample ID	MTCA	HC-MW-1	HC-MW-2	HC-MW-3	HC-MW-4
Sampling Date	Method B	8/10/2007	8/10/2007	8/10/2007	8/10/2007
Total Metals (Unfiltered) in mg/L					
Arsenic	0.005 (a)	0.0038	0.0008	**0.0102**	**0.0127**
Cadmium	0.005 (a)	0.002 U	0.002 U	0.002 U	0.002 U
Chromium	0.05 (a)	0.038	0.048	0.094	0.044
Copper	0.59	0.04	0.036	0.102	0.055
Lead	0.015 (a)	**0.022**	0.005	**0.037**	0.007
Mercury	0.002 (a)	0.0001 U	0.0001 U	0.0002	0.0001 U
Nickel	0.32	0.04	0.04	0.08	0.09
Zinc	4.8	0.28	0.1	0.58	0.19

U = Not detected at detection limit indicated.
Bold indicates concentration exceeds MTCA Method B screening level.
(a) Based on MTCA method A drinking water criterion.

Figures

Vicinity Map



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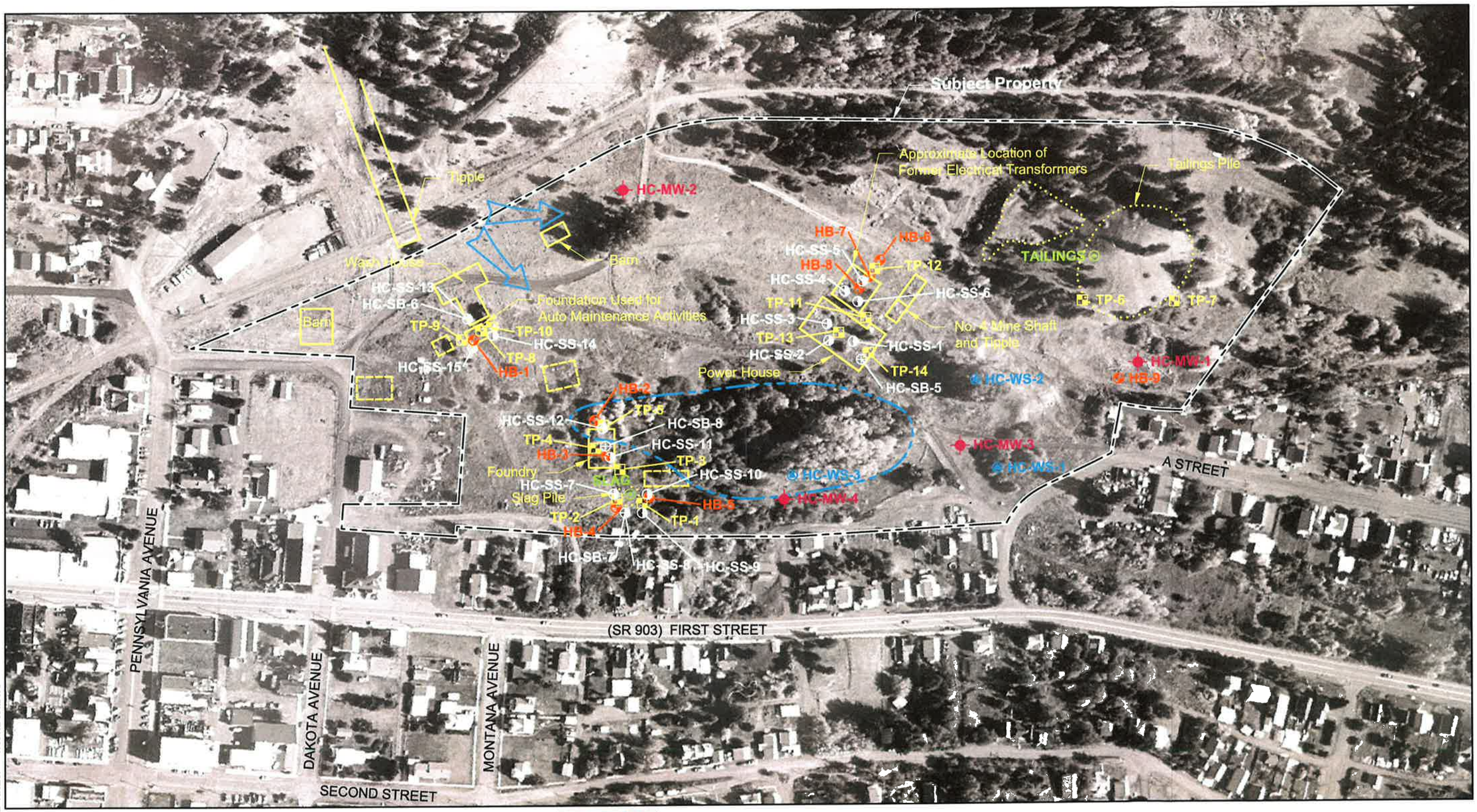
Note: Base map prepared from Microsoft Streets and Trips 2002.

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Figure 1

Site and Exploration Plan



EAL 10/02/07 17084402-001.DWG

Source: Base map prepared from aerial photo and survey information provided by Goldsmith & Associates.

- Approximate Extent of Wetland Area
- Approximate Former Buildings/Structures Location
- Approximate Unknown Bulding Shown on Historical Map
- Tailing/Slag Pile Location
- Inferred Groundwater Flow Direction

- HC-WS-1 — Wetland Surface Sample Location and Number (August 2007)
- HC-SB-8 — Push Probe Location and Number (August 2007)
- HC-SS-1 — Soil and Sediment Sampling Location and Number (August 2007)
- HC-MW-1 — Mini-Well Location and Number (August 2007)
- HB-1 — Hand-Auger Boring Location and Number (June 2004)
- SLAG — Grab Sample Location and Designation (June 2004)
- TP-1 — Test Pit Location and Number (July 2006)

N

0 200 400

Scale in Feet

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Figure 2

Appendix A

APPENDIX A
EXPLORATION LOGS

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

☒	Split Spoon	▨	Grab (Jar)
◧	Shelby Tube (Pushed)	◪	Bag
▥	Cuttings	▮	Core Run

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents	Estimated Percentage
Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Laboratory Test Symbols

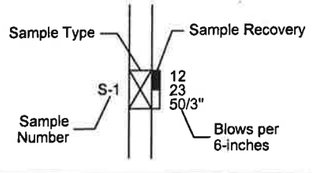
GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits Water Content in Percent Liquid Limit Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF

Groundwater Indicators

Groundwater Level on Date or (ATD) At Time of Drilling

Groundwater Seepage (Test Pits)

Sample Key



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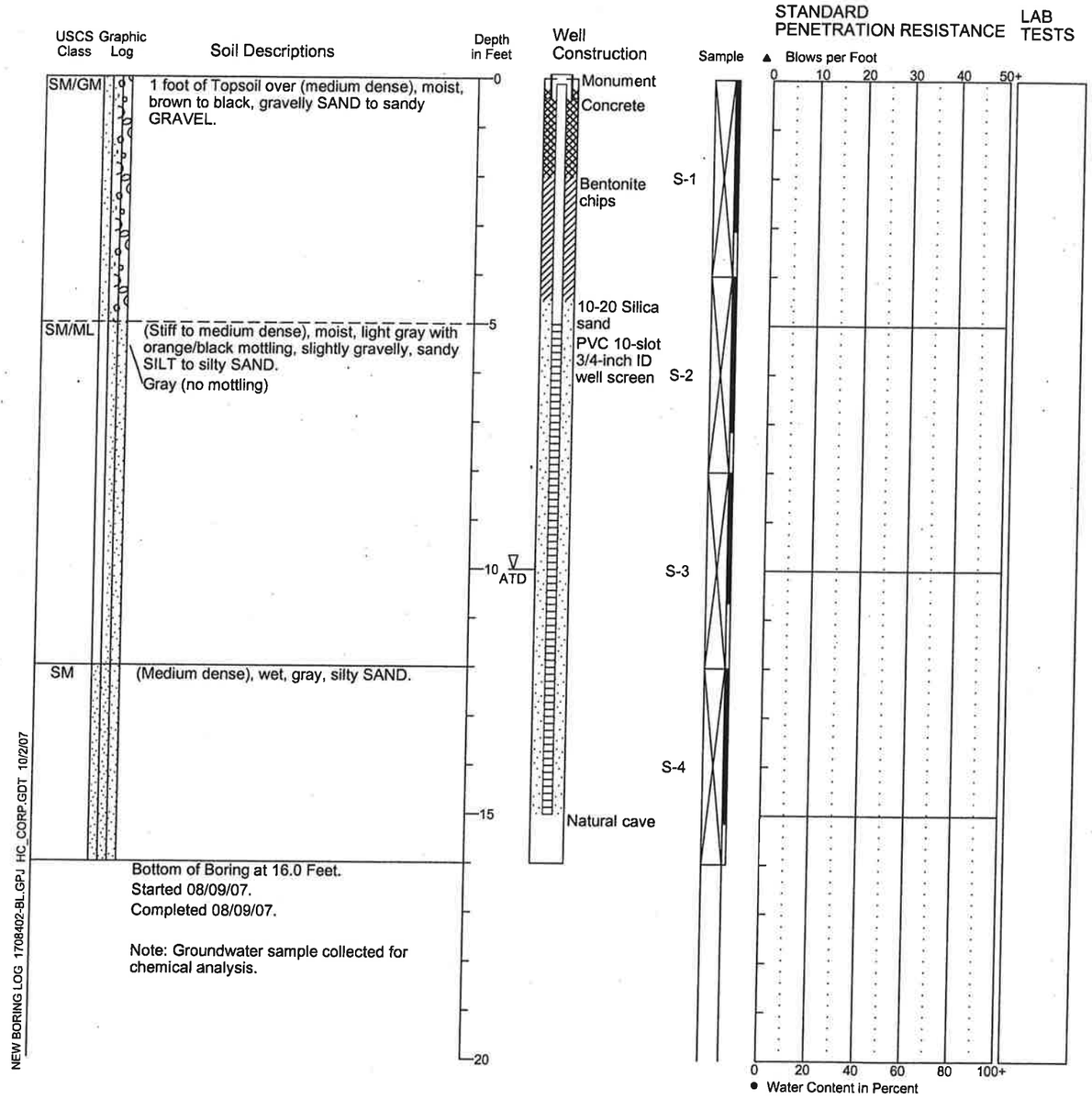
Figure A-1

KEY SHEET 1708402-BL.GPJ HC_CORP.GDT 10/2/07

Push Probe Log/Mini-Well Construction Details for HC-MW-1

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Power Probe 9500 PTO
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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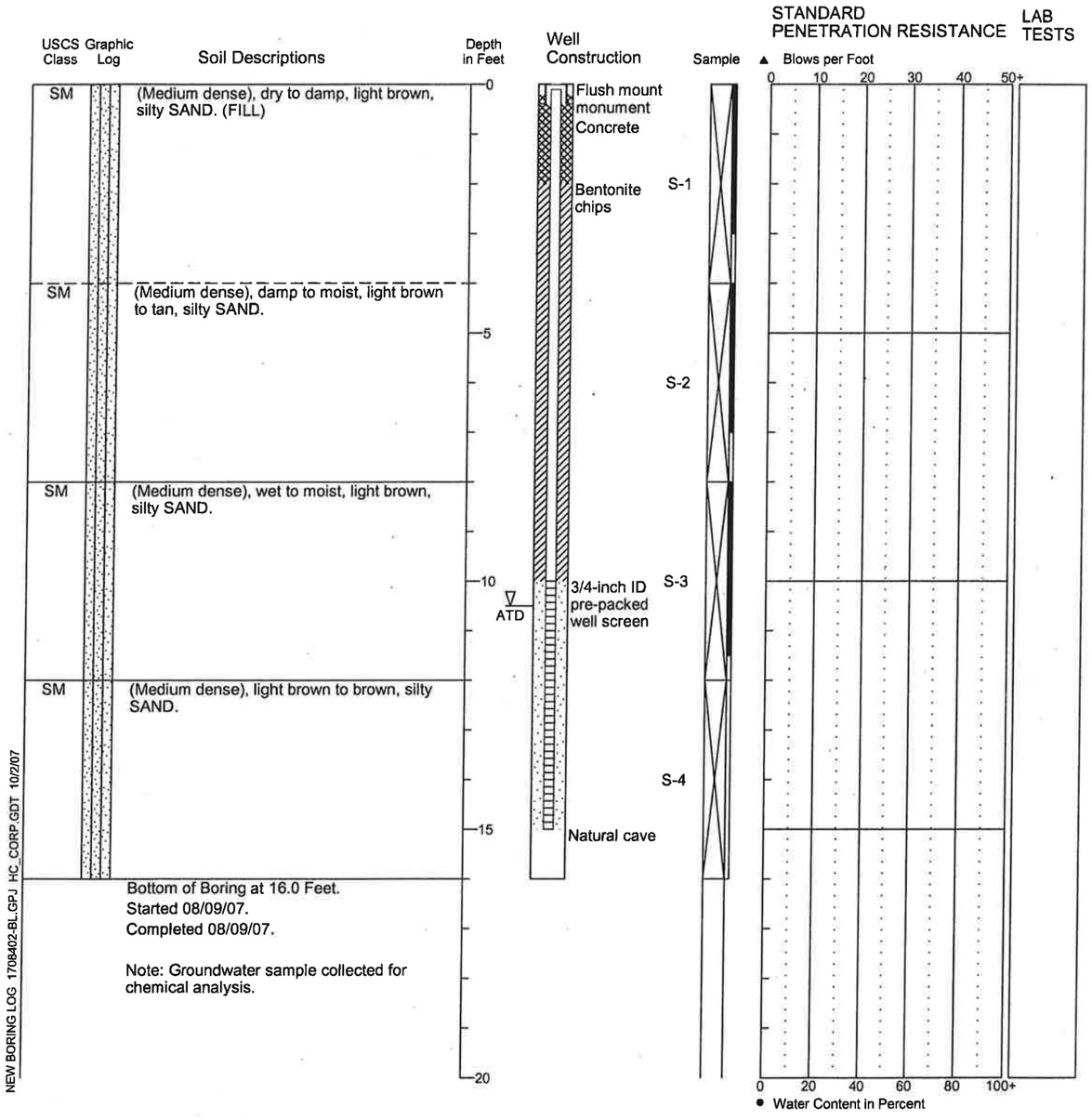
17084-02 *8/07*

Figure A-2

Push Probe Log/Mini-Well Construction Details for HC-MW-2

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Power Probe 9500 PTO
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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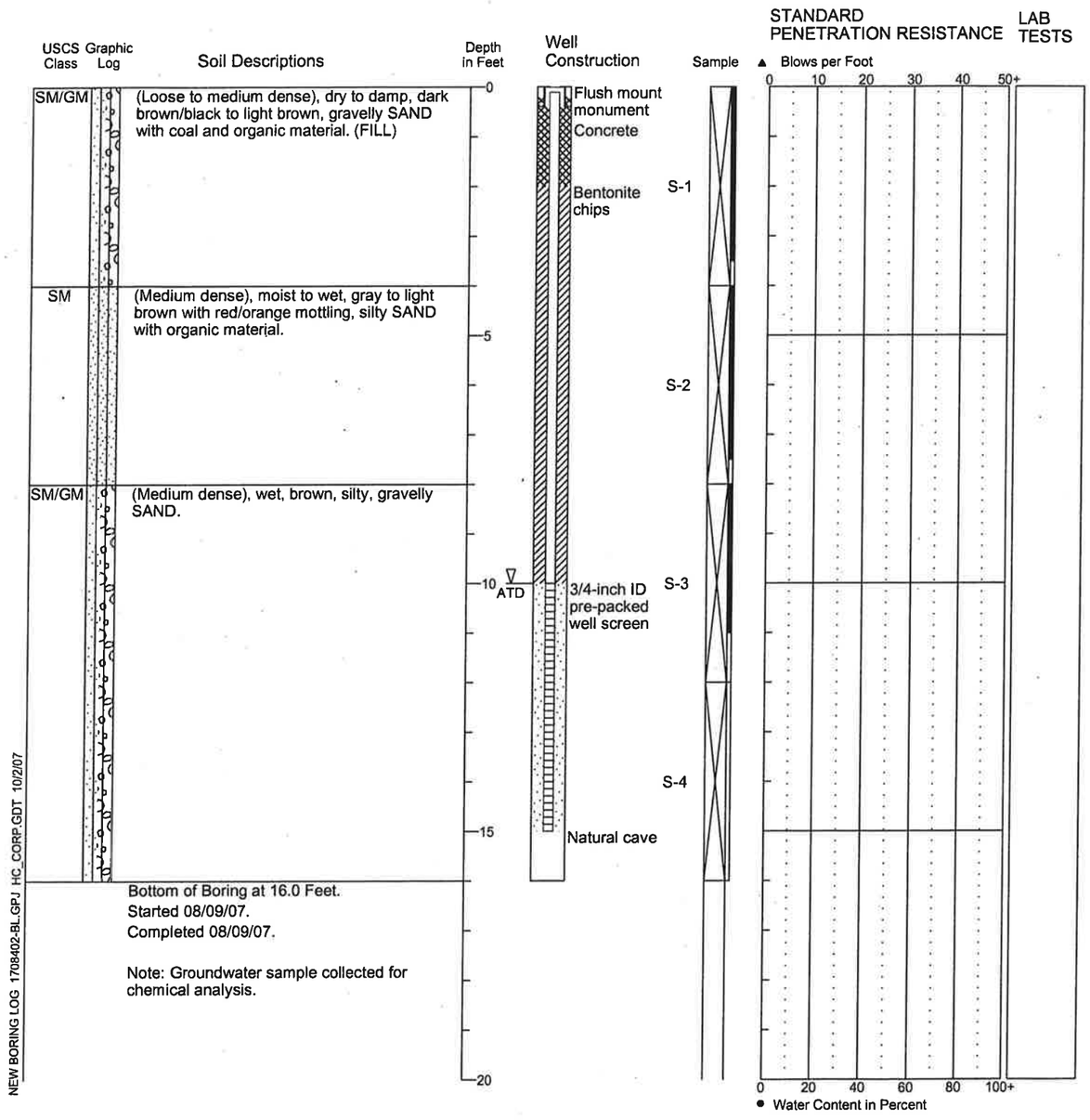
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Figure A-3

Push Probe Log/Mini-Well Construction Details for HC-MW-3

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Power Probe 9500 PTO
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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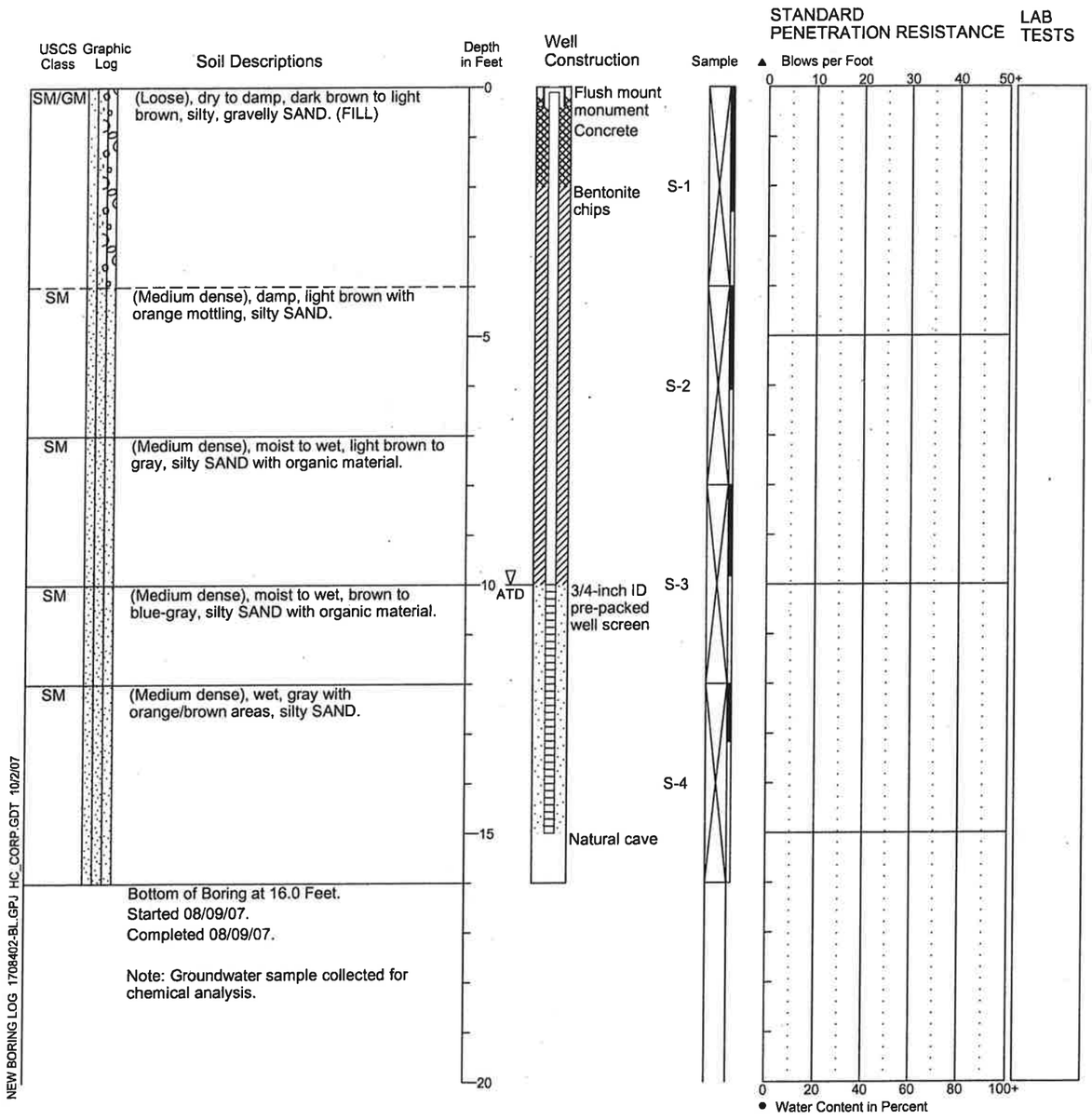
17084-02 *8/07*

Figure A-4

Push Probe Log/Mini-Well Construction Details for HC-MW-4

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Power Probe 9500 PTO
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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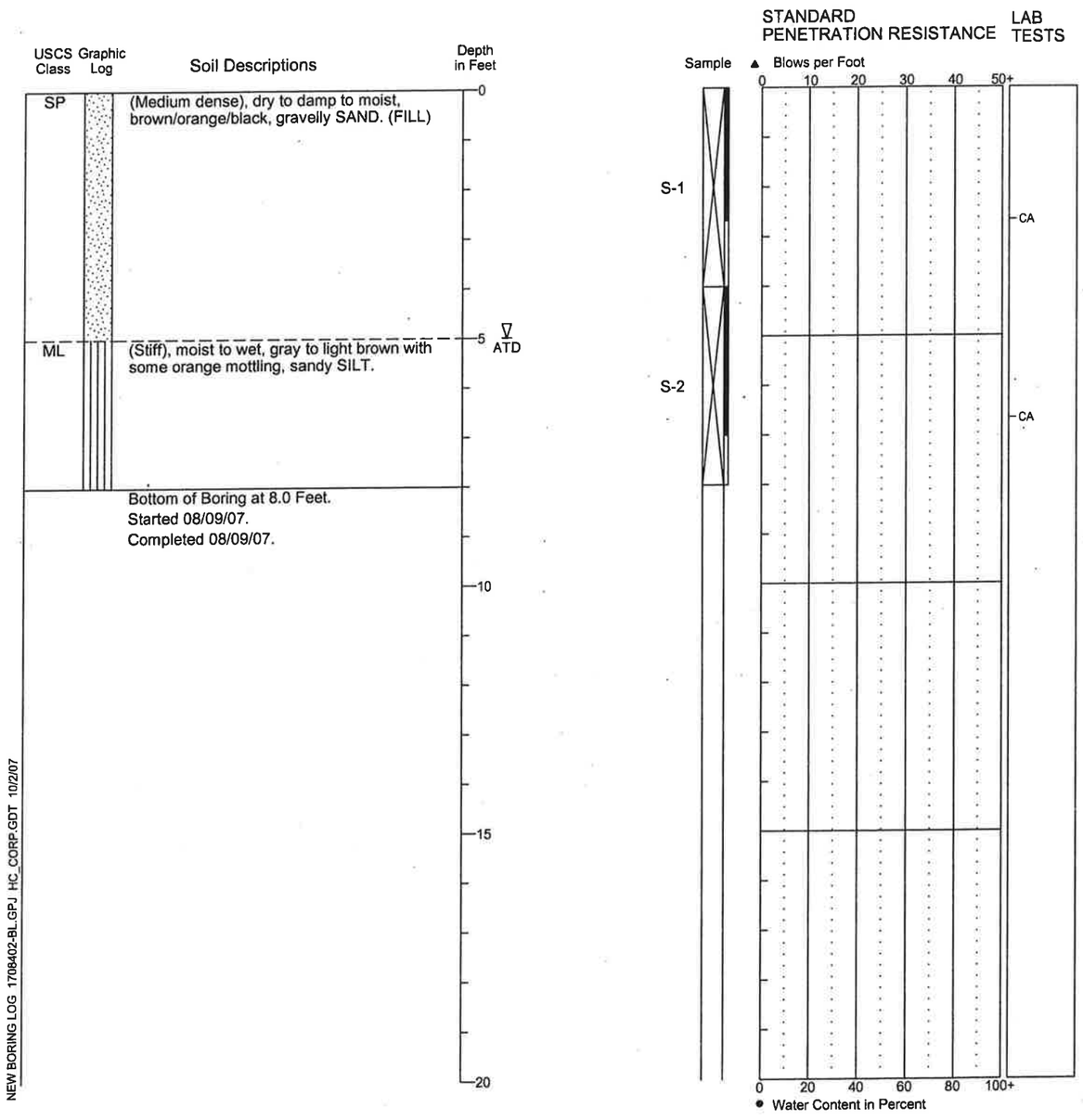
17084-02 *8/07*

Figure A-5

Push Probe Log HC-SB-5

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Push Probe
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

17084-02 *8/07*

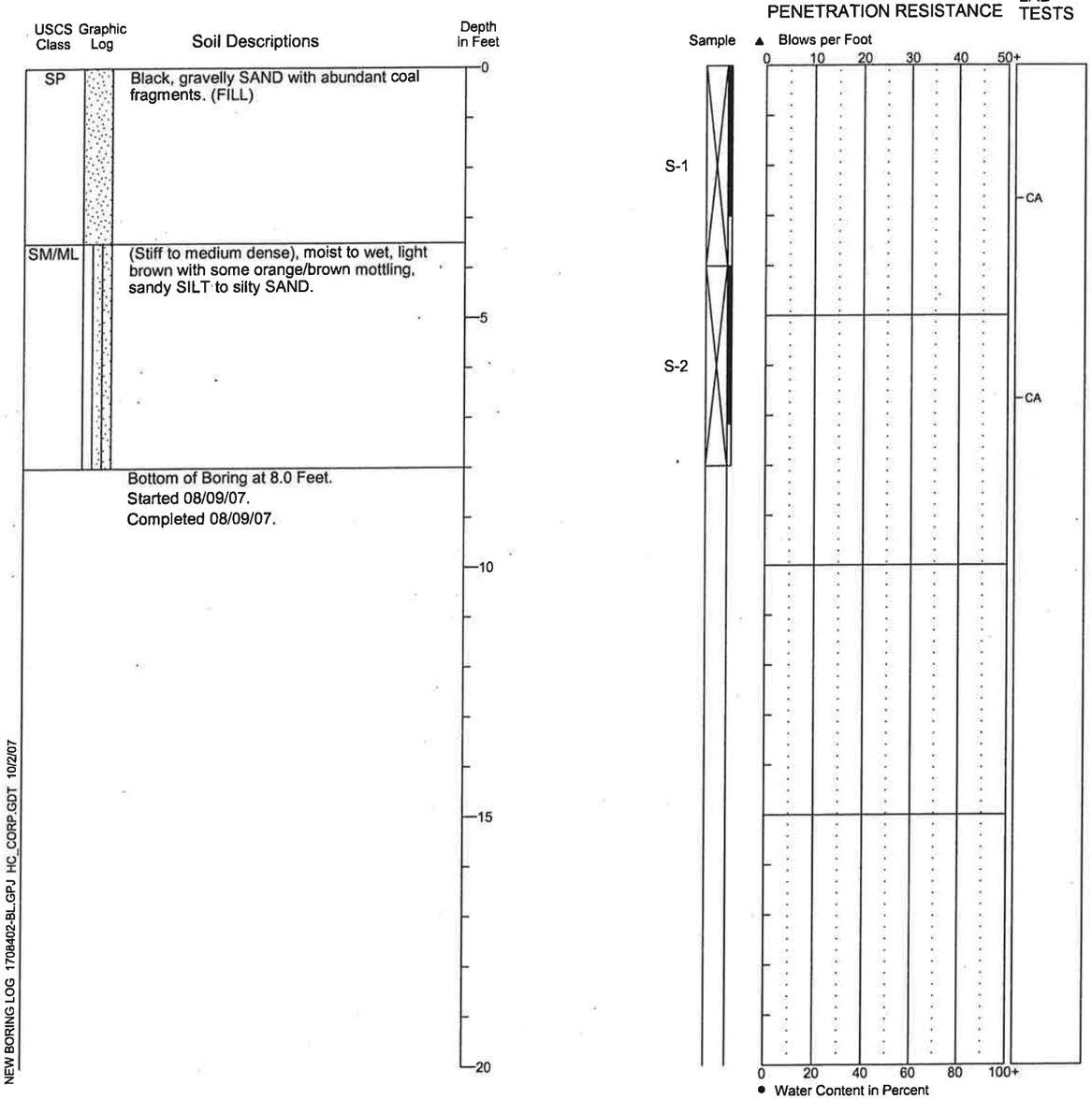
Figure A-6

NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

Push Probe Log HC-SB-6

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Push Probe
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

17084-02 *8/07*

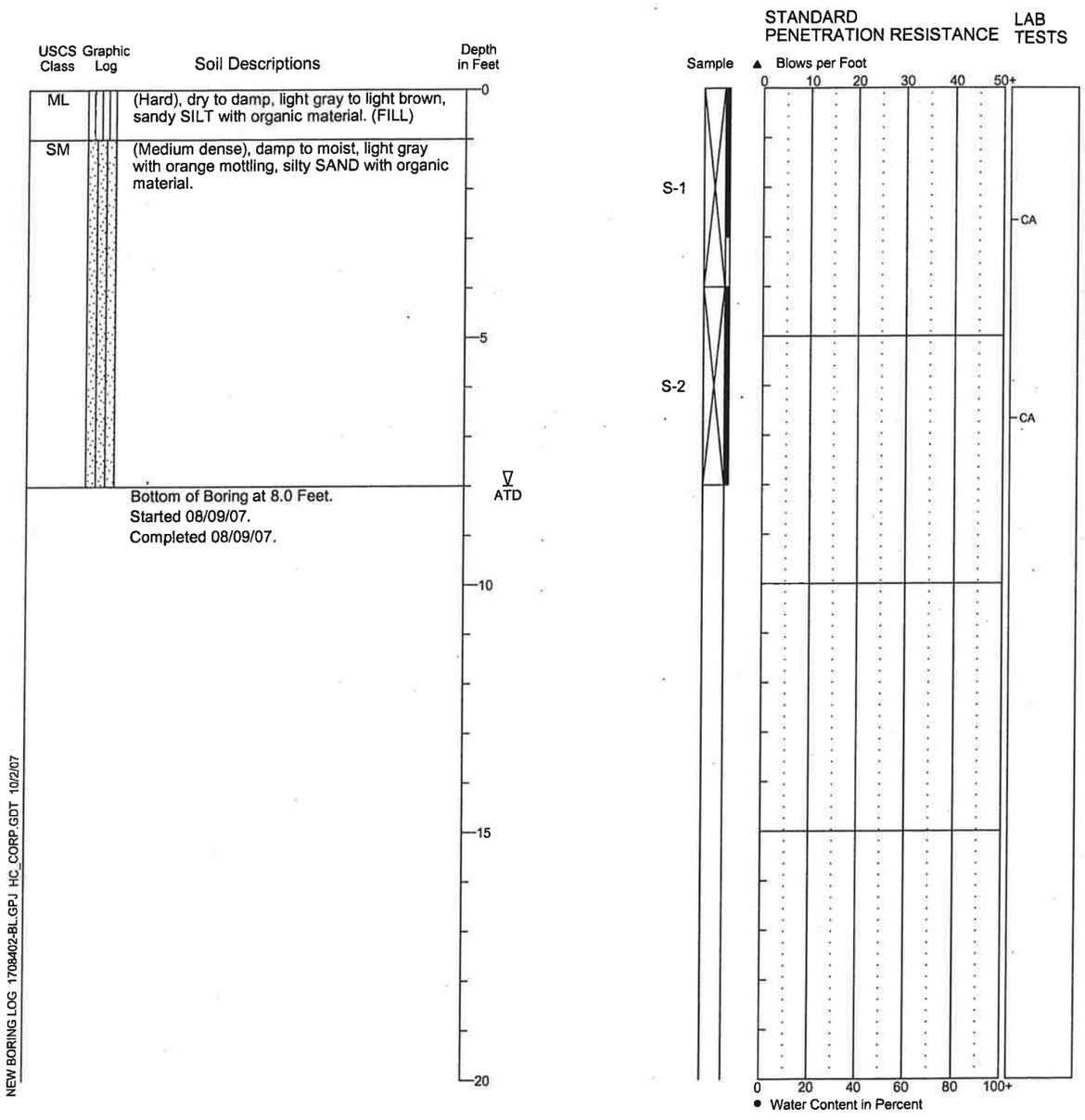
Figure A-7

NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

Push Probe Log HC-SB-7

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Push Probe
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

17084-02 *8/07*

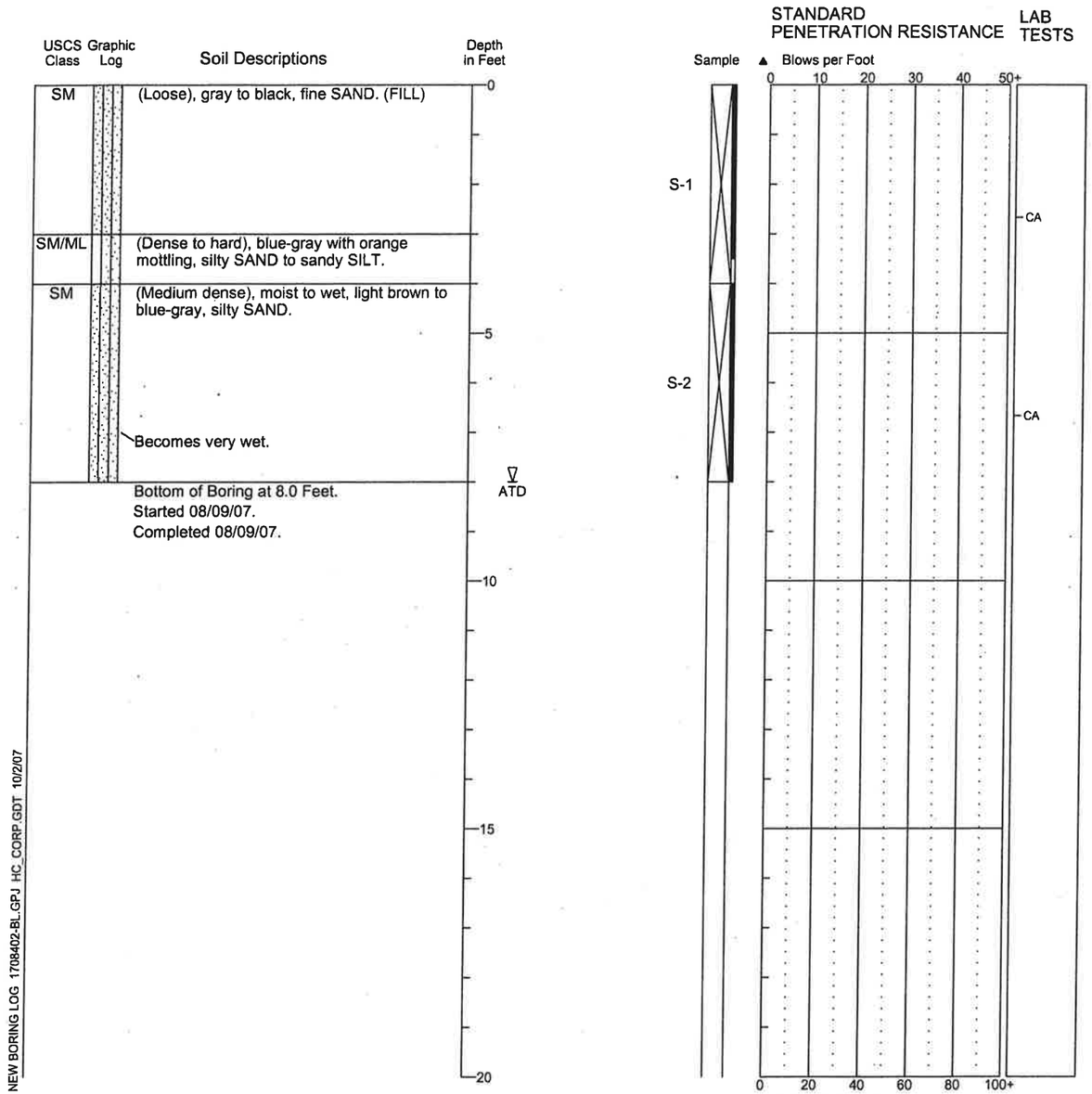
Figure A-8

NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

Push Probe Log HC-SB-8

Location: See Figure 2.
Approximate Ground Surface Elevation: Feet
Horizontal Datum:
Vertical Datum:

Drill Equipment: Push Probe
Hammer Type:
Hole Diameter: inches
Logged By: P. Cordell Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

17084-02 *8/07*

Figure A-9

NEW BORING LOG 1708402-BL.GPJ HC_CORP.GDT 10/2/07

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Four groundwater and 26 soil samples were collected from the Suncadia Section 17 property in Rosalyn, Washington, on August 9 and 10, 2007. The samples were submitted to Analytical Resources, Inc. for analysis. Samples were analyzed for total metals and three samples from the former power house area were also analyzed for diesel- and motor oil-range hydrocarbons. The laboratory reported results as Sample Delivery Group (SDG) LKW90 and LK91.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Inorganic Data Review (EPA 2004) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Blank spike/blank spike duplicate (BS/BSD) and laboratory control sample (LCS) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs); and
- Reporting limits.

The data were determined to be acceptable for use, with qualifiers. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

Diesel- and Motor Oil-Range Hydrocarbons

Analytical Methods

The soil samples were prepared using EPA method 3550B, sonication. The samples were analyzed by gas chromatography with a flame ionization detector by the NWTPH-Dx method

Sample Holding Times

The samples were prepared and analyzed within holding time limits of 14 days.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

Blank Contamination

No target analytes were detected in laboratory blanks.

Surrogate Recovery

Surrogate compound recoveries were within QC limits.

Matrix Spike (MS) Compound Recovery

Matrix spike and MS duplicate recoveries were within QC limits. The RPD between duplicate analyses was within QC limits.

Laboratory Control Sample Recovery

Laboratory control sample (blank spike) and laboratory control sample duplicate (blank spike duplicate) recoveries were within QC limits. The Relative Percent Difference (RPD) between duplicate measurements was within QC criteria.

Total Metals

Analytical Methods

Samples for mercury analysis were prepared using the EPA CLP SOW 4.0 method. Sediment samples for the other metals analyses were prepared using EPA Method 3050B, acid digestion. Mercury was analyzed by EPA Method 7471A, cold vapor AA. All other metals were determined by ICP using EPA Method 6010B.

Sample Holding Times

The samples were prepared and analyzed within holding time limits of 6 months (28 days for mercury).

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

Blank Contamination

No target analytes were detected in laboratory blanks.

Matrix Spike Analysis

Matrix spike recoveries for Batch LK90 met QC limits of 75 to 125 percent except for mercury and zinc. Zinc control limits were not applicable due to the high concentration in the sample. Mercury results for associated samples in Batch LK90 are qualified as estimated (J) and may have a slightly high bias. Soil matrix spike recoveries for Batch LK91 met QC limits of 75 to 125 percent except for copper and zinc. Results for associated soil samples in Batch LK91 are qualified as estimated (J) and may have a high bias. Water matrix spike recoveries for Batch LK91 met QC limits.

Laboratory Control Sample Recovery

Laboratory control sample (blank spike) recoveries were within QC limits of 80 to 120 percent.

Laboratory Duplicate Sample Analysis

The relative percent differences between duplicate measurements for Batch LK90 were outside laboratory control limits of 20 percent but did meet EPA limits of 35 percent. Therefore, the data were not qualified.

J:\jobs\1708402\Sect17 Draft Report ELH.doc

LABORATORY CERTIFICATES OF ANALYSIS
ANALYTICAL RESOURCES, INCORPORATED

Analytical Resources, Incorporated
Analytical Chemists and Consultants

August 28, 2007

Mr. Roger McGinnis
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102

RE: Project: Suncadia
ARI Job No: LK90

Dear Mr. McGinnis:

Please find enclosed the original chain of custody documentation and the analytical results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted twelve soil samples on August 13, 2007. The samples were received in good condition at 10.0°C. There were no discrepancies between the sample containers' labels and the COC. The samples from COC pages 2-3 were logged under ARI SDG LK91.

The samples were analyzed for Total Metals and NWTPH-Dx, as requested on the COC.

The total metals matrix spike for mercury is out of control high and out of control low for zinc with wide RPDs for Cadmium, lead and zinc. All other QC was in control, therefore no further corrective action was taken.

There were no other anomalies associated with the samples.

An electronic copy of these reports and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Project Manager
kellyb@arilabs.com
206/695-6211

Enclosures

Sample Custody Record

1 of 3 10°

Samples Shipped to: ARI LK90

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-02 LAB NUMBER

PROJECT NAME Suncadia

HART CROWSER CONTACT Roger McGinnis

SAMPLED BY: P. Cordell / M. Michalsen

REQUESTED ANALYSIS

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Dx	Total Metals EPA 6000/7000	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	HC-SS-1		8/10/07	0920	SOIL	X	X	1	
	HC-SS-2			0930				1	
	HC-SS-3			0930		X		1	
	HC-SS-4			0950				1	
	HC-SS-5			1000		X		1	
	HC-SS-6			1010				1	
	HC-SS-7			1059				1	
	HC-SS-8			1049				1	
	HC-SS-9			1115				1	
	HC-SS-10			1055				1	
	HC-SS-11			1130				1	
	HC-SS-12			1135				1	

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE P.J. Cordell	8/10/07	SIGNATURE R. McGinnis	8/10
PRINT NAME P.J. Cordell	TIME	PRINT NAME R. McGinnis	TIME
COMPANY Hart Crowser	1900	COMPANY HC	19:00
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE R. McGinnis	10/13	SIGNATURE Bob Congleton	8/13/07
PRINT NAME R. McGinnis	TIME	PRINT NAME Bob Congleton	TIME
COMPANY HC	11:30	COMPANY ARI	1137

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

metals: Cd, Cr, Cu, Pb
As, Ni, Zn
Hg

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS:
☐YES ☐NO ☐N/A
GOOD CONDITION
☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND
☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Hart Crowser | Project Name: Suncadia

COC No: — | Delivered by: Hand

Assigned ARI Job No: LK9D | Tracking No: —

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	0° °C	

Cooler Accepted by: BnG Cong Date: 8/13/07 Time: 1130

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	—	
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	YES	(NO)
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: BnG Cong Date: 8/13/07 Time: 1205

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Page 1 of 1
Matrix: Soil

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Received: 08/13/07

Data Release Authorized:
Reported: 08/22/07

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
LK90A	HC-SS-1	08/17/07	08/20/07	1.00	**Diesel**	**5.2**	**190**
07-16522	HC ID: **DRO/MOTOR OIL**		FID3A	1.0	**Motor Oil**	**10**	**320**
					o-Terphenyl		75.8%
MB-081707	Method Blank	08/17/07	08/20/07	1.00	Diesel	5.0	< 5.0 U
07-16524	HC ID: ---		FID3A	1.0	Motor Oil	10	< 10 U
					o-Terphenyl		103%
LK90C	HC-SS-3	08/17/07	08/20/07	1.00	**Diesel**	**5.2**	**240**
07-16524	HC ID: **DRO/MOTOR OIL**		FID3A	1.0	**Motor Oil**	**10**	**380**
					o-Terphenyl		93.1%
LK90E	HC-SS-5	08/17/07	08/20/07	1.00	**Diesel**	**5.2**	**180**
07-16526	HC ID: **DRO/MOTOR OIL**		FID3A	1.0	**Motor Oil**	**10**	**410**
					o-Terphenyl		103%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02

Client ID	OTER	TOT OUT
HC-SS-1	75.8%	0
081707MBS	103%	0
081707LCS	104%	0
081707LCSD	109%	0
HC-SS-3	93.1%	0
HC-SS-3 MS	75.8%	0
HC-SS-3 MSD	86.9%	0
HC-SS-5	103%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-116)	(49-109)

Prep Method: SW3550B
Log Number Range: 07-16522 to 07-16526

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: HC-SS-3
MS/MSD

Lab Sample ID: LK90C
LIMS ID: 07-16524
Matrix: Soil
Data Release Authorized:
Reported: 08/22/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Date Extracted MS/MSD: 08/17/07

Date Analyzed MS: 08/20/07 20:01
MSD: 08/20/07 20:16
Instrument/Analyst MS: FID3A/JGR
MSD: FID3A/JGR

Sample Amount MS: 9.73 g-dry-wt
MSD: 9.79 g-dry-wt
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00
Percent Moisture: 2.9%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	245	391	154	94.8%	440	153	127%	11.8%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	75.8%	86.9%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-081707
LCS/LCSD

Lab Sample ID: LCS-081707
LIMS ID: 07-16524
Matrix: Soil
Data Release Authorized:
Reported: 08/22/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 08/17/07

Date Analyzed LCS: 08/20/07 10:27
LCSD: 08/20/07 10:43
Instrument/Analyst LCS: FID3A/JGR
LCSD: FID3A/JGR

Sample Amount LCS: 10.0 g
LCSD: 10.0 g
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	115	150	76.7%	121	150	80.7%	5.1%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	104%	109%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: LK90
Project: Suncadia
17084-02

Matrix: Soil
Date Received: 08/13/07

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
07-16522-LK90A	HC-SS-1	9.59 g	1.00 mL	D	08/17/07
07-16524-081707MB1	Method Blank	10.0 g	1.00 mL	-	08/17/07
07-16524-081707LCS1	Lab Control	10.0 g	1.00 mL	-	08/17/07
07-16524-081707LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	08/17/07
07-16524-LK90C	HC-SS-3	9.71 g	1.00 mL	D	08/17/07
07-16524-LK90CMS	HC-SS-3	9.73 g	1.00 mL	D	08/17/07
07-16524-LK90CMSD	HC-SS-3	9.79 g	1.00 mL	D	08/17/07
07-16526-LK90E	HC-SS-5	9.57 g	1.00 mL	D	08/17/07

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-1
SAMPLE

Lab Sample ID: LK90A
LIMS ID: 07-16522
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 94.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	**7440-38-2**	**Arsenic**	5	**58**	
3050B	08/21/07	6010B	08/24/07	**7440-43-9**	**Cadmium**	0.2	**1.8**	
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	0.5	**33.7**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.2	**123**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	2	**57**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.83**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	1	**55**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	1	**252**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-1
DUPLICATE

Lab Sample ID: LK90A
LIMS ID: 07-16522
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	58	61	5.0%	+/- 20%	
Cadmium	6010B	1.8	1.3	32.3%	+/- 20%	*
Chromium	6010B	33.7	34.3	1.8%	+/- 20%	
Copper	6010B	123	124	0.8%	+/- 20%	
Lead	6010B	57	80	33.6%	+/- 20%	*
Mercury	7471A	0.83	1.01	19.6%	+/- 20%	
Nickel	6010B	55	56	1.8%	+/- 20%	
Zinc	6010B	252	193	26.5%	+/- 20%	*

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-1
MATRIX SPIKE

Lab Sample ID: LK90A
LIMS ID: 07-16522
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	58	228	199	85.4%	
Cadmium	6010B	1.8	44.4	49.8	85.5%	
Chromium	6010B	33.7	77.8	49.8	88.6%	
Copper	6010B	123	162	49.8	78.3%	
Lead	6010B	57	215	199	79.4%	
Mercury	7471A	0.83	1.31	0.363	132%	N
Nickel	6010B	55	97	49.8	84.3%	
Zinc	6010B	252	236	49.8	-32.1%	H

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-2
SAMPLE

Lab Sample ID: LK90B
LIMS ID: 07-16523
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 98.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	**7440-38-2**	**Arsenic**	5	**9**	
3050B	08/21/07	6010B	08/23/07	**7440-43-9**	**Cadmium**	0.2	**0.4**	
3050B	08/21/07	6010B	08/23/07	**7440-47-3**	**Chromium**	0.5	**18.9**	
3050B	08/21/07	6010B	08/23/07	**7440-50-8**	**Copper**	0.2	**42.1**	
3050B	08/21/07	6010B	08/23/07	**7439-92-1**	**Lead**	2	**28**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.06**	J
3050B	08/21/07	6010B	08/23/07	**7440-02-0**	**Nickel**	1	**21**	
3050B	08/21/07	6010B	08/23/07	**7440-66-6**	**Zinc**	1	**95**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/17/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-3
SAMPLE

Lab Sample ID: LK90C
LIMS ID: 07-16524
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 97.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	**7440-38-2**	**Arsenic**	5	**26**	
3050B	08/21/07	6010B	08/23/07	**7440-43-9**	**Cadmium**	0.2	**0.8**	
3050B	08/21/07	6010B	08/23/07	**7440-47-3**	**Chromium**	0.5	**26.5**	
3050B	08/21/07	6010B	08/23/07	**7440-50-8**	**Copper**	0.2	**85.6**	
3050B	08/21/07	6010B	08/23/07	**7439-92-1**	**Lead**	2	**68**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.16**	J
3050B	08/21/07	6010B	08/23/07	**7440-02-0**	**Nickel**	1	**33**	
3050B	08/21/07	6010B	08/23/07	**7440-66-6**	**Zinc**	1	**147**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-4
SAMPLE

Lab Sample ID: LK90D
LIMS ID: 07-16525
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 98.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	7440-38-2	Arsenic	5	5	U
3050B	08/21/07	6010B	08/23/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/21/07	6010B	08/23/07	**7440-47-3**	**Chromium**	0.5	**16.6**	
3050B	08/21/07	6010B	08/23/07	**7440-50-8**	**Copper**	0.2	**10.9**	
3050B	08/21/07	6010B	08/23/07	**7439-92-1**	**Lead**	2	**15**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.19**	J
3050B	08/21/07	6010B	08/23/07	**7440-02-0**	**Nickel**	0.9	**16.0**	
3050B	08/21/07	6010B	08/23/07	**7440-66-6**	**Zinc**	0.9	**36.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-5
SAMPLE

Lab Sample ID: LK90E
LIMS ID: 07-16526
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 95.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	**7440-38-2**	**Arsenic**	5	**6**	
3050B	08/21/07	6010B	08/23/07	**7440-43-9**	**Cadmium**	0.2	**0.5**	
3050B	08/21/07	6010B	08/23/07	**7440-47-3**	**Chromium**	0.5	**23.8**	
3050B	08/21/07	6010B	08/23/07	**7440-50-8**	**Copper**	0.2	**169**	
3050B	08/21/07	6010B	08/23/07	**7439-92-1**	**Lead**	2	**61**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**3.04**	J
3050B	08/21/07	6010B	08/23/07	**7440-02-0**	**Nickel**	1	**39**	
3050B	08/21/07	6010B	08/23/07	**7440-66-6**	**Zinc**	1	**122**	

U-Analyte undetected at given RL
RL-Reporting Limit

Jenn
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-6
SAMPLE

Lab Sample ID: LK90F
LIMS ID: 07-16527
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 95.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	**7440-38-2**	**Arsenic**	5	**8**	
3050B	08/21/07	6010B	08/23/07	**7440-43-9**	**Cadmium**	0.2	**0.4**	
3050B	08/21/07	6010B	08/23/07	**7440-47-3**	**Chromium**	0.5	**20.9**	
3050B	08/21/07	6010B	08/23/07	**7440-50-8**	**Copper**	0.2	**49.1**	
3050B	08/21/07	6010B	08/23/07	**7439-92-1**	**Lead**	2	**65**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.32**	J
3050B	08/21/07	6010B	08/23/07	**7440-02-0**	**Nickel**	1	**27**	
3050B	08/21/07	6010B	08/23/07	**7440-66-6**	**Zinc**	1	**114**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-7
SAMPLE

Lab Sample ID: LK90G
LIMS ID: 07-16528
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 90.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	7440-38-2	Arsenic	10	10	U
3050B	08/21/07	6010B	08/24/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**36**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**49.5**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**62**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.05**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	3	**41**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	3	**229**	

U-Analyte undetected at given RL
RL-Reporting Limit

RMM
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-8
SAMPLE

Lab Sample ID: LK90H
LIMS ID: 07-16529
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 89.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	7440-38-2	Arsenic	10	10	U
3050B	08/21/07	6010B	08/24/07	**7440-43-9**	**Cadmium**	0.5	**0.7**	
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**36**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**54.3**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**101**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.08**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	3	**53**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	3	**277**	

U-Analyte undetected at given RL
RL-Reporting Limit

JKHM
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
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Sample ID: HC-SS-9
SAMPLE

Lab Sample ID: LK90I
LIMS ID: 07-16530
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 92.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	7440-38-2	Arsenic	10	10	U
3050B	08/21/07	6010B	08/24/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**39**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**48.6**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**54**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.05**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	3	**39**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	3	**90**	

U-Analyte undetected at given RL
RL-Reporting Limit

RMM
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-10
SAMPLE

Lab Sample ID: LK90J
LIMS ID: 07-16531
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 90.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	7440-38-2	Arsenic	10	10	U
3050B	08/21/07	6010B	08/24/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**38**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**35.5**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**27**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.05**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	3	**34**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	3	**81**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-11
SAMPLE

Lab Sample ID: LK90K
LIMS ID: 07-16532
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 95.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	**7440-38-2**	**Arsenic**	10	**20**	
3050B	08/21/07	6010B	08/24/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**35**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**81.2**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**149**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.07**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	3	**503**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	3	**239**	

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SS-12
SAMPLE

Lab Sample ID: LK90L
LIMS ID: 07-16533
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 96.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/24/07	**7440-38-2**	**Arsenic**	10	**40**	
3050B	08/21/07	6010B	08/24/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/21/07	6010B	08/24/07	**7440-47-3**	**Chromium**	1	**33**	
3050B	08/21/07	6010B	08/24/07	**7440-50-8**	**Copper**	0.5	**88.2**	
3050B	08/21/07	6010B	08/24/07	**7439-92-1**	**Lead**	5	**130**	
CLP	08/21/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.06**	J
3050B	08/21/07	6010B	08/24/07	**7440-02-0**	**Nickel**	2	**601**	
3050B	08/21/07	6010B	08/24/07	**7440-66-6**	**Zinc**	2	**324**	

U-Analyte undetected at given RL
RL-Reporting Limit

TRMM
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: LK90MB
LIMS ID: 07-16523
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/21/07	6010B	08/23/07	7440-38-2	Arsenic	5	5	U
3050B	08/21/07	6010B	08/23/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/21/07	6010B	08/23/07	7440-47-3	Chromium	0.5	0.5	U
3050B	08/21/07	6010B	08/23/07	7440-50-8	Copper	0.2	0.2	U
3050B	08/21/07	6010B	08/23/07	7439-92-1	Lead	2	2	U
CLP	08/21/07	7471A	08/27/07	7439-97-6	Mercury	0.05	0.05	U
3050B	08/21/07	6010B	08/23/07	7440-02-0	Nickel	1	1	U
3050B	08/21/07	6010B	08/23/07	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: LK90LCS
LIMS ID: 07-16523
Matrix: Soil
Data Release Authorized:
Reported: 08/28/07

QC Report No: LK90-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	185	200	92.5%	
Cadmium	6010B	47.8	50.0	95.6%	
Chromium	6010B	45.5	50.0	91.0%	
Copper	6010B	46.9	50.0	93.8%	
Lead	6010B	181	200	90.5%	
Mercury	7471A	1.07	1.00	107%	
Nickel	6010B	44	50	88.0%	
Zinc	6010B	45	50	90.0%	

Reported in mg/kg-dry

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

August 29, 2007

Mr. Roger McGinnis
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102

RE: Project: Suncadia
ARI Job No: LK91

Dear Mr. McGinnis:

Please find enclosed the original chain of custody documentation and the analytical results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted fourteen soil samples and four water samples on August 13, 2007. The samples were received in good condition at 10.0°C. There were no discrepancies between the sample containers' labels and the COC. The samples from COC page 1 were logged under ARI SDG LK90.

The samples were analyzed for Total Metals, as requested on the COC.

The total metals matrix spike for copper and zinc is out of control high on sample **HC-SS-13.** All other QC was in control; therefore no further corrective action was taken.

There were no other anomalies associated with the samples.

An electronic copy of these reports and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Project Manager
kellyb@arilabs.com
206/695-6211

Enclosures

Sample Custody Record

Samples Shipped to: ARI

2 of 3

6000/7000

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-02 LAB NUMBER LK91

PROJECT NAME Suncadia

HART CROWSER CONTACT Roger McGinnis

SAMPLED BY: P. Cordell / M. Michalsen

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Dx	Total Metals ERA	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	HC-SS-13		8/10/07	1110	SOIL	X	X		
	HC-SS-14			1145					
	HC-SS-15			1150					
	HC-WS-1			1424					
	HC-WS-2			1430					
	HC-WS-3			1600					
	HC-SB-5-S1		8/9/07	1125					
	HC-SB-5-S2			1135					
	HC-SB-6-S1			1147					
	HC-SB-6-S2			1155					
	HC-SB-7-S1			1225					
	HC-SB-7-S2		↓	1230	↓	↓	↓		

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: Phil Cordell	8/10/07	SIGNATURE: R. McGinnis	8/10/07
PRINT NAME: Phil Cordell	TIME	PRINT NAME: R. McGinnis	TIME
COMPANY: Hart Crowser	1900	COMPANY: HC	19:00
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: R. McGinnis	10/13/07	SIGNATURE: Bob Engleton	8/13/07
PRINT NAME: R. McGinnis	TIME	PRINT NAME: Bob Engleton	TIME
COMPANY: HC	11:30	COMPANY: ARI	1137

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

Metals: Cd, Cr, Cu, Pb
As, Ni, Zn
Hg

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐ YES ☐ NO ☐ N/A
GOOD CONDITION: ☐ YES ☐ NO
TEMPERATURE
SHIPMENT METHOD: ☐ HAND ☐ COURIER ☐ OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☐ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

Samples Shipped to: ARI

3 of 3

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17084-02 LAB NUMBER

PROJECT NAME Suncadia

HART CROWSER CONTACT Roger McGinnis

SAMPLED BY: P. Lordell

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Dx	Total Metals EPA 6000/7000	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	HC-SB-8-S1		8/9/07	1335	SOIL		X		
	HC-SB-8-S2		8/9/07	1340	SOIL		X		
	HC-MW-1		8/10/07	1535	H_2O		X		Avoid sediment (solids in the samples. Only ~200 mL
	HC-MW-2		↓	1330	↓		X		
	HC-MW-3			1630			X		
	HC-MW-4		↓	1550	↓		X		

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE Phil Lordell		SIGNATURE R. McGinnis	8/10
PRINT NAME Hart Crowser	TIME	PRINT NAME HC	TIME 10:00
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE R. McGinnis	8/13	SIGNATURE Bob Congleton	8/13/07
PRINT NAME HC	TIME 11:30	PRINT NAME ARI	TIME 1130
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:
Metals: Cd, Cr, Cu, Pb, As, Ni, Zn Hg

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☐ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Hart Crowser — Project Name: Suncadia

COC No: — — Delivered by: Hand

Assigned ARI Job No: LIC91 — Tracking No: —

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	10 °C	

Cooler Accepted by: BG Complete — Date: 8/13/07 — Time: 1130

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?		
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	YES	(NO)
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	YES	(NO)

Samples Logged by: ae — Date: 8/13/07 — Time: 1730

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

COC sample time (1140) does not match bottle label sample time (1140). Limited volume, sample id HC-MW-3.

By: ae — Date: 8/13/07

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Sample ID: HC-SS-13
SAMPLE

Lab Sample ID: LK91A
LIMS ID: 07-16534
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 95.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	5	**10**	
3050B	08/24/07	6010B	08/28/07	**7440-43-9**	**Cadmium**	0.2	**0.6**	
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.5	**22.8**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**81.3**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**83**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.09**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**44**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**164**	J

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

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Sample ID: HC-SS-13
DUPLICATE

Lab Sample ID: LK91A
LIMS ID: 07-16534
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	10	10	0.0%	+/- 5	L
Cadmium	6010B	0.6	0.6	0.0%	+/- 0.2	L
Chromium	6010B	22.8	25.2	10.0%	+/- 20%	
Copper	6010B	81.3	84.5	3.9%	+/- 20%	
Lead	6010B	83	82	1.2%	+/- 20%	
Mercury	7471A	0.09	0.09	0.0%	+/- 0.05	L
Nickel	6010B	44	48	8.7%	+/- 20%	
Zinc	6010B	164	158	3.7%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

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Sample ID: HC-SS-13
MATRIX SPIKE

Lab Sample ID: LK91A
LIMS ID: 07-16534
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	10	182	199	86.4%	
Cadmium	6010B	0.6	44.9	49.8	89.0%	
Chromium	6010B	22.8	77.3	49.8	109%	
Copper	6010B	81.3	147	49.8	132%	N
Lead	6010B	83	272	199	95.0%	
Mercury	7471A	0.09	0.59	0.453	110%	
Nickel	6010B	44	105	49.8	122%	
Zinc	6010B	164	243	49.8	159%	N

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

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Sample ID: HC-SS-14
SAMPLE

Lab Sample ID: LK91B
LIMS ID: 07-16535
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 95.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	5	**10**	
3050B	08/24/07	6010B	08/28/07	**7440-43-9**	**Cadmium**	0.2	**0.7**	
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.5	**34.8**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**106**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**152**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.4	**22.9**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**52**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**210**	J

U-Analyte undetected at given RL
RL-Reporting Limit

RMM
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Sample ID: HC-SS-15
SAMPLE

Lab Sample ID: LK91C
LIMS ID: 07-16536
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 97.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	10	**90**	
3050B	08/24/07	6010B	08/28/07	**7440-43-9**	**Cadmium**	0.5	**5.8**	
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	1	**46**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.5	**184**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	5	**153**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.13**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	2	**77**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	2	**392**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-WS-1
SAMPLE

Lab Sample ID: LK91D
LIMS ID: 07-16537
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 53.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	7440-38-2	Arsenic	8	8	U
3050B	08/24/07	6010B	08/28/07	**7440-43-9**	**Cadmium**	0.3	**0.6**	
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.8	**19.4**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.3	**56.7**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	3	**47**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.08	**0.19**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	2	**32**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	2	**161**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-WS-2
SAMPLE

Lab Sample ID: LK91E
LIMS ID: 07-16538
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 89.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	10	**30**	
3050B	08/24/07	6010B	08/28/07	**7440-43-9**	**Cadmium**	0.6	**0.8**	
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	1	**46**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.6	**118**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	6	**33**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.05**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	3	**92**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	3	**87**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-WS-3
SAMPLE

Lab Sample ID: LK91F
LIMS ID: 07-16539
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Percent Total Solids: 90.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	5	**7**	
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.5	**26.0**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**60.3**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**15**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.19**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**42**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**49**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-5-S1
SAMPLE

Lab Sample ID: LK91G
LIMS ID: 07-16540
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 81.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/27/07	7440-38-2	Arsenic	10	10	U
3050B	08/24/07	6010B	08/27/07	7440-43-9	Cadmium	0.6	0.6	U
3050B	08/24/07	6010B	08/27/07	**7440-47-3**	**Chromium**	1	**23**	
3050B	08/24/07	6010B	08/27/07	**7440-50-8**	**Copper**	0.6	**76.1**	J
3050B	08/24/07	6010B	08/27/07	**7439-92-1**	**Lead**	6	**11**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.04**	
3050B	08/24/07	6010B	08/27/07	**7440-02-0**	**Nickel**	3	**42**	
3050B	08/24/07	6010B	08/27/07	**7440-66-6**	**Zinc**	3	**62**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-5-S2
SAMPLE

Lab Sample ID: LK91H
LIMS ID: 07-16541
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 81.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	7440-38-2	Arsenic	6	6	U
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.6	**28.2**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**17.6**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**4**	
CLP	08/24/07	7471A	08/27/07	7439-97-6	Mercury	0.05	0.05	U
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**25**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**79**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-6-S1
SAMPLE

Lab Sample ID: LK91I
LIMS ID: 07-16542
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 91.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	**7440-38-2**	**Arsenic**	5	**5**	
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.5	**11.9**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**41.1**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**27**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.10**	
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**15**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**20**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-6-S2
SAMPLE

Lab Sample ID: LK91J
LIMS ID: 07-16543
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 80.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	7440-38-2	Arsenic	6	6	U
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.6	**37.4**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.2	**20.6**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	2	**5**	
CLP	08/24/07	7471A	08/27/07	7439-97-6	Mercury	0.05	0.05	U
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**25**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**61**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-7-S1
SAMPLE

Lab Sample ID: LK91K
LIMS ID: 07-16544
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 87.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/27/07	7440-38-2	Arsenic	10	10	U
3050B	08/24/07	6010B	08/27/07	7440-43-9	Cadmium	0.5	0.5	U
3050B	08/24/07	6010B	08/27/07	**7440-47-3**	**Chromium**	1	**52**	
3050B	08/24/07	6010B	08/27/07	**7440-50-8**	**Copper**	0.5	**32.0**	J
3050B	08/24/07	6010B	08/27/07	**7439-92-1**	**Lead**	5	**9**	
CLP	08/24/07	7471A	08/27/07	7439-97-6	Mercury	0.04	0.04	U
3050B	08/24/07	6010B	08/27/07	**7440-02-0**	**Nickel**	3	**35**	
3050B	08/24/07	6010B	08/27/07	**7440-66-6**	**Zinc**	3	**87**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-7-S2
SAMPLE

Lab Sample ID: LK91L
LIMS ID: 07-16545
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 75.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/27/07	7440-38-2	Arsenic	20	20	U
3050B	08/24/07	6010B	08/27/07	7440-43-9	Cadmium	0.6	0.6	U
3050B	08/24/07	6010B	08/27/07	**7440-47-3**	**Chromium**	2	**52**	
3050B	08/24/07	6010B	08/27/07	**7440-50-8**	**Copper**	0.6	**36.5**	J
3050B	08/24/07	6010B	08/27/07	**7439-92-1**	**Lead**	6	**8**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.04	**0.06**	
3050B	08/24/07	6010B	08/27/07	**7440-02-0**	**Nickel**	3	**37**	
3050B	08/24/07	6010B	08/27/07	**7440-66-6**	**Zinc**	3	**74**	J

U-Analyte undetected at given RL
RL-Reporting Limit

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Sample ID: HC-SB-8-S1
SAMPLE

Lab Sample ID: LK91M
LIMS ID: 07-16546
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 77.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	7440-38-2	Arsenic	6	6	U
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.3	0.3	U
3050B	08/24/07	6010B	08/28/07	**7440-47-3**	**Chromium**	0.6	**21.1**	
3050B	08/24/07	6010B	08/28/07	**7440-50-8**	**Copper**	0.3	**46.1**	J
3050B	08/24/07	6010B	08/28/07	**7439-92-1**	**Lead**	3	**8**	
CLP	08/24/07	7471A	08/27/07	7439-97-6	Mercury	0.05	0.05	U
3050B	08/24/07	6010B	08/28/07	**7440-02-0**	**Nickel**	1	**31**	
3050B	08/24/07	6010B	08/28/07	**7440-66-6**	**Zinc**	1	**58**	J

U-Analyte undetected at given RL
RL-Reporting Limit

RMM
9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-SB-8-S2
SAMPLE

Lab Sample ID: LK91N
LIMS ID: 07-16547
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/09/07
Date Received: 08/13/07

Percent Total Solids: 77.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/27/07	7440-38-2	Arsenic	20	20	U
3050B	08/24/07	6010B	08/27/07	7440-43-9	Cadmium	0.6	0.6	U
3050B	08/24/07	6010B	08/27/07	**7440-47-3**	**Chromium**	2	**56**	
3050B	08/24/07	6010B	08/27/07	**7440-50-8**	**Copper**	0.6	**34.1**	J
3050B	08/24/07	6010B	08/27/07	**7439-92-1**	**Lead**	6	**8**	
CLP	08/24/07	7471A	08/27/07	**7439-97-6**	**Mercury**	0.05	**0.06**	
3050B	08/24/07	6010B	08/27/07	**7440-02-0**	**Nickel**	3	**46**	
3050B	08/24/07	6010B	08/27/07	**7440-66-6**	**Zinc**	3	**81**	J

U-Analyte undetected at given RL
RL-Reporting Limit

9/7/07

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: LK91MB
LIMS ID: 07-16535
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	08/24/07	6010B	08/28/07	7440-38-2	Arsenic	5	5	U
3050B	08/24/07	6010B	08/28/07	7440-43-9	Cadmium	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	7440-47-3	Chromium	0.5	0.5	U
3050B	08/24/07	6010B	08/28/07	7440-50-8	Copper	0.2	0.2	U
3050B	08/24/07	6010B	08/28/07	7439-92-1	Lead	2	2	U
CLP	08/24/07	7471A	08/27/07	7439-97-6	Mercury	0.05	0.05	U
3050B	08/24/07	6010B	08/28/07	7440-02-0	Nickel	1	1	U
3050B	08/24/07	6010B	08/28/07	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: LK91LCS
LIMS ID: 07-16535
Matrix: Soil
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	220	200	110%	
Cadmium	6010B	53.7	50.0	107%	
Chromium	6010B	53.1	50.0	106%	
Copper	6010B	53.1	50.0	106%	
Lead	6010B	212	200	106%	
Mercury	7471A	1.10	1.00	110%	
Nickel	6010B	53	50	106%	
Zinc	6010B	54	50	108%	

Reported in mg/kg-dry

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-MW-1
SAMPLE

Lab Sample ID: LK91O
LIMS ID: 07-16548
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/20/07	200.8	08/22/07	**7440-38-2**	**Arsenic**	0.2	**3.8**	
3010A	08/20/07	6010B	08/22/07	7440-43-9	Cadmium	2	2	U
3010A	08/20/07	6010B	08/22/07	**7440-47-3**	**Chromium**	5	**38**	
3010A	08/20/07	6010B	08/22/07	**7440-50-8**	**Copper**	2	**40**	
200.8	08/20/07	200.8	08/22/07	**7439-92-1**	**Lead**	1	**22**	
7470	08/20/07	7470A	08/20/07	7439-97-6	Mercury	0.1	0.1	U
3010A	08/20/07	6010B	08/22/07	**7440-02-0**	**Nickel**	10	**40**	
3010A	08/20/07	6010B	08/22/07	**7440-66-6**	**Zinc**	10	**280**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-MW-1
DUPLICATE

Lab Sample ID: LK910
LIMS ID: 07-16548
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	3.8	4.1	7.6%	+/- 20%	
Cadmium	6010B	2 U	2 U	0.0%	+/- 2	L
Chromium	6010B	38	40	5.1%	+/- 20%	
Copper	6010B	40	42	4.9%	+/- 20%	
Lead	200.8	22	22	0.0%	+/- 20%	
Mercury	7470A	0.1 U	0.1 U	0.0%	+/- 0.1	L
Nickel	6010B	40	40	0.0%	+/- 10	L
Zinc	6010B	280	280	0.0%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
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Sample ID: HC-MW-1
MATRIX SPIKE

Lab Sample ID: LK910
LIMS ID: 07-16548
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	3.85	28.0	25.0	96.6%	
Cadmium	6010B	2.00 U	482	500	96.4%	
Chromium	6010B	38.4	512	500	94.7%	
Copper	6010B	40.4	524	500	96.7%	
Lead	200.8	21.6	46.2	25.0	98.4%	
Mercury	7470A	0.100 U	1.25	1.00	125%	
Nickel	6010B	38.6	501	500	92.5%	
Zinc	6010B	278	738	500	92.0%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked
NR-Not Recovered

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-MW-2
SAMPLE

Lab Sample ID: LK91P
LIMS ID: 07-16549
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/20/07	200.8	08/22/07	**7440-38-2**	**Arsenic**	0.5	**0.8**	
3010A	08/20/07	6010B	08/22/07	7440-43-9	Cadmium	2	2	U
3010A	08/20/07	6010B	08/22/07	**7440-47-3**	**Chromium**	5	**48**	
3010A	08/20/07	6010B	08/22/07	**7440-50-8**	**Copper**	2	**36**	
200.8	08/20/07	200.8	08/22/07	**7439-92-1**	**Lead**	1	**5**	
7470	08/20/07	7470A	08/20/07	7439-97-6	Mercury	0.1	0.1	U
3010A	08/20/07	6010B	08/22/07	**7440-02-0**	**Nickel**	10	**40**	
3010A	08/20/07	6010B	08/22/07	**7440-66-6**	**Zinc**	10	**100**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-MW-3
SAMPLE

Lab Sample ID: LK91Q
LIMS ID: 07-16550
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/20/07	200.8	08/22/07	**7440-38-2**	**Arsenic**	0.2	**10.2**	
3010A	08/20/07	6010B	08/22/07	7440-43-9	Cadmium	2	2	U
3010A	08/20/07	6010B	08/22/07	**7440-47-3**	**Chromium**	5	**94**	
3010A	08/20/07	6010B	08/22/07	**7440-50-8**	**Copper**	2	**102**	
200.8	08/20/07	200.8	08/22/07	**7439-92-1**	**Lead**	1	**37**	
7470	08/20/07	7470A	08/20/07	**7439-97-6**	**Mercury**	0.1	**0.2**	
3010A	08/20/07	6010B	08/22/07	**7440-02-0**	**Nickel**	10	**80**	
3010A	08/20/07	6010B	08/22/07	**7440-66-6**	**Zinc**	10	**580**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: HC-MW-4
SAMPLE

Lab Sample ID: LK91R
LIMS ID: 07-16551
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: 08/10/07
Date Received: 08/13/07

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/20/07	200.8	08/22/07	**7440-38-2**	**Arsenic**	0.2	**12.7**	
3010A	08/20/07	6010B	08/22/07	7440-43-9	Cadmium	2	2	U
3010A	08/20/07	6010B	08/22/07	**7440-47-3**	**Chromium**	5	**44**	
3010A	08/20/07	6010B	08/22/07	**7440-50-8**	**Copper**	2	**55**	
200.8	08/20/07	200.8	08/22/07	**7439-92-1**	**Lead**	1	**7**	
7470	08/20/07	7470A	08/20/07	7439-97-6	Mercury	0.1	0.1	U
3010A	08/20/07	6010B	08/22/07	**7440-02-0**	**Nickel**	10	**90**	
3010A	08/20/07	6010B	08/22/07	**7440-66-6**	**Zinc**	10	**190**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
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Sample ID: METHOD BLANK

Lab Sample ID: LK91MB
LIMS ID: 07-16549
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/20/07	200.8	08/22/07	7440-38-2	Arsenic	0.2	0.2	U
3010A	08/20/07	6010B	08/22/07	7440-43-9	Cadmium	2	2	U
3010A	08/20/07	6010B	08/22/07	7440-47-3	Chromium	5	5	U
3010A	08/20/07	6010B	08/22/07	7440-50-8	Copper	2	2	U
200.8	08/20/07	200.8	08/22/07	7439-92-1	Lead	1	1	U
7470	08/20/07	7470A	08/20/07	7439-97-6	Mercury	0.1	0.1	U
3010A	08/20/07	6010B	08/22/07	7440-02-0	Nickel	10	10	U
3010A	08/20/07	6010B	08/22/07	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: LK91LCS
LIMS ID: 07-16549
Matrix: Water
Data Release Authorized:
Reported: 08/29/07

QC Report No: LK91-Hart Crowser, Inc.
Project: Suncadia
17084-02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	24.2	25.0	96.8%	
Cadmium	6010B	512	500	102%	
Chromium	6010B	504	500	101%	
Copper	6010B	506	500	101%	
Lead	200.8	25.2	25.0	101%	
Mercury	7470A	2.31	2.00	116%	
Nickel	6010B	503	500	101%	
Zinc	6010B	494	500	98.8%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ICICLECREEK ENGINEERS

Technical Memorandum

To: Dan Grausz, Senior Director of Strategic Projects, Forterra Roslyn LLC

From: Kathy Killman, LEG

Date: August 4, 2020

ICE File No: 1360-002

Subject: Environmental Consultation
Review of Environmental Assessment and Additional Testing
Forterra Roslyn Property
Kittitas County Parcel No. 456234
Roslyn, Washington

DRAFT

INTRODUCTION

This Technical Memorandum (TM) presents the results of Icicle Creek Engineers' (ICE's) environmental consultation regarding a review of previous environmental assessments, along with recent additional testing at the Forterra Roslyn Property. The approximate 31-acre Forterra Roslyn Property is located within Kittitas County Parcel No. 456234 in Roslyn, Washington, as shown on the Vicinity Map, Figure 1. The general layout of the Forterra Roslyn Property is shown on the Site Plan, Figure 2.

Our services were requested by Dan Grausz of Forterra Roslyn LLC (Forterra) and were provided in general accordance with our Confirming Agreement No. 2 dated May 11, 2020 and our Proposal dated June 24, 2020. These services were authorized in writing by Michelle Connor and Tobias Levey of Forterra on May 12 and July 8, 2020, respectively.

BACKGROUND INFORMATION

ICE previously completed geotechnical evaluations of the Forterra Roslyn Property (previously referred to as the Section 17 Property) for Suncadia (currently known as New Suncadia LLC), the current property owner; these reports are referenced as follows:

- ICE, May 25, 2006, *Report, Geological and Geotechnical Engineering Services, Preliminary Coal Mine Hazard Assessment and Preliminary Geotechnical Evaluation, Suncadia Section 17 Property, Roslyn, Washington*, prepared for Suncadia LLC, 48 pages.
- ICE, May 13, 2008, *Report, Geotechnical Engineering Services, Suncadia Section 17 Property, Roslyn, Washington*, prepared for Suncadia LLC, 32 pages.

These geotechnical reports were recently compiled and updated by ICE as summarized in our draft report prepared for Forterra dated June 12, 2020 (*Geological and Geotechnical Engineering Services, Coal Mine Hazard Assessment and Preliminary Geotechnical Evaluation, Forterra Roslyn Property, Kittitas County Parcel No. 456234, Roslyn, Washington*). This draft geotechnical report was updated following completion of additional test pits and related geotechnical testing; the updated draft geotechnical report is dated August 4, 2020.

Between 2004 and 2007, Suncadia had Phase I and Phase II Environmental Site Assessments (ESAs) completed by Hart Crowser for the Forterra Roslyn Property (Section 17 Property). These reports are referenced as follows:

- Hart Crowser, June 30, 2004, *Preliminary Phase I and Limited Phase II Environmental Site Assessment, Section 17, Roslyn, Washington*, prepared for MountainStar Resort Development, 89 pages.
- Hart Crowser, September 18, 2006, *Report, Additional Environmental Assessment, Section 17, Roslyn, Washington*, prepared for Suncadia LLC, 58 pages.

- Hart Crowser, October 2, 2007, *Phase II Environmental Site Assessment, Section 17/No. 4 Mine Area, Roslyn, Washington*, prepared for Suncadia LLC, 28 pages.

We understand that Forterra is considered acquiring this property with the intent of development for residential and possible light commercial use; we further understand that there are no development plans, conceptual or otherwise, available at this time. ICE's 2006 and 2008 reports included a relatively detailed review and classification of hazards related to an abandoned underground coal mine (the No. 4 Mine), and a preliminary evaluation of the subsurface geotechnical conditions of the Forterra Roslyn Property that included drilling four test borings and completing 25 test pits. As previously described, Hart Crowser (HC) completed Phase I and II ESAs for this property. We understand that Forterra has permission from New Suncadia LLC, the current property owner, to use ICE's 2006 and 2008 reports and HC's ESAs for the purpose of this consultation.

Mr. Grausz requested that ICE complete a review of the 2004, 2006 and 2007 HC reports and provide written recommendations for additional environmental study, as appropriate. These recommendations are the subject of this TM, along with a summary of the ESA findings. For detailed information, the HC reports should be reviewed in their entirety. Figure 2 from HC's 2007 report is included as Attachment A in this TM; Attachment A shows the location of site features described in HC's 2004, 2006 and 2007 reports, along with exploration and sample locations. The results of chemical analytical data as presented in the three HC reports has been compiled for the purpose of this TM, and is shown in Tables 1, 2 and 3.

ICE observed surface conditions at the Forterra Roslyn Property recently in support of our previously described draft geotechnical report dated June 12, 2020, and during the completion of eleven additional test pits as described later in this TM and in our updated draft geotechnical report dated August 4, 2020 (*Geological and Geotechnical Engineering Services, Coal Mine Hazard Assessment and Preliminary Geotechnical Evaluation*). No significant changes were observed by ICE in the surface condition of property since our 2006 and 2008 studies.

Forterra recently provided ICE with an undated, untitled site plan showing the extent of wetlands and related buffers, identified by others, at the Forterra Roslyn Property.

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SUMMARY OF HART CROWSER ENVIRONMENTAL ASSESSMENT

HC's review of historic site use as summarized in their 2004 report indicated that the Forterra Roslyn Property was the site of an underground coal mine, the No. 4 Mine, that was active from the 1880s until about 1909 when the mine was shut down following a mine explosion. Site features described by HC are primarily related to the historic coal mining, aside from an area of vehicle maintenance that was used by local residents. A Foundry and associated Slag Pile reportedly operated on site until the mid-1970s. No other site uses were identified by HC.

HC's 2004 Phase I and Limited Phase II ESA identified four areas to evaluate potential environmental impacts from past uses of the property that could affect future development. These areas of concern included the following:

- Former Foundry area and associated Slag Pile
- Building foundation area used by local residents for vehicle maintenance
- Former area of Power Transformers
- Mine tailings pile (referred to by ICE as a "Gob Pile") and surface Mine Rock Fill spread across the site (no samples submitted for chemical analysis)

As part of the 2004 study, HC completed nine shallow hand-auger soil borings (HB-1 through HB-9) in the areas noted above and obtained soil samples for field screening; they also collected grab samples of the slag. Selected samples were submitted for chemical analysis. Chemical analytical results for five soil samples and one slag sample obtained from depths of 0 to 1 foot or less are shown on Tables 1 and 2.

HC's 2006 Additional Environmental Assessment included further evaluation of potential subsurface contamination by the completion of 14 test pits (TP-1 through TP-14). These test pits were completed in the following areas of concern:

- Former Foundry area and associated Slag Pile

- Building foundation area used by local residents for vehicle maintenance
- Former area of Power Transformers and the Power House
- Mine tailings pile (referred to by ICE as a "Gob Pile") (no samples submitted for chemical analysis)

Selected soil samples from the 2006 test pits were submitted for chemical analysis. Chemical analytical results for twelve soil samples obtained from depths of 0 to 2 feet (one sample from 0 to 3 feet) are shown on Tables 1 and 2.

HC's 2007 Phase II ESA included further evaluation of potential surface, near surface, subsurface and perched ground water contamination by the completion of 15 near-surface sampling locations (HC-SS-1 through HC-SS-15) to depths of 0.5 feet, four push probes (HC-SB-5 to HC-SB-8) to depths of 8 feet, three surface sediment sample locations (HC-WS-1 through HC-WS-3), and four mini-wells (HC-MW-1 through HC-MW-4, perched ground water samples). These samples were obtained from the following areas of concern:

- Former Foundry and associated Slag Pile
- Building foundation area used by local residents for vehicle maintenance
- Former area of Power Transformers and the Power House
- Wet areas

Selected soil, sediment and ground water samples from HC'S 2007 sampling event were submitted for chemical analysis. Chemical analytical results for 15 near-surface soil samples (0 to 0.5 feet), three surface sediment samples, eight soil samples (0 to 4 feet and 4 to 8 feet), and four perched ground water samples are shown on Tables 1, 2 and 3.

Forty-three soil and sediment samples were analyzed for Total Metals by EPA Method 6000/7000 series (lead, chromium, cadmium, copper, nickel, arsenic, zinc and mercury); these samples were obtained from all of the identified areas of concern, with the exception of the Gob Pile and the Mine Rock Fill spread across the site. Samples from selected areas were also analyzed for Kerosene, Diesel- and Heavy Oil-Range Hydrocarbons by Washington State Department of Ecology (Ecology) Method NWTPH-Dx, Gasoline-Range Hydrocarbons by Ecology Method NWTPH-G, Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270 SIM, Polychlorinated Biphenyls (PCBs) by EPA Method 8082, and Volatile Organic Compounds (VOCs) by EPA Method 8260. The laboratory reports are included in HC's 2004, 2006 and 2007 reports.

DRAFT

SUMMARY OF HART CROWSER CHEMICAL ANALYTICAL RESULTS

General

For the purpose of our review and for preliminary screening, the chemical analytical results of the soil and sediment analysis was compared to Washington State Department of Ecology's (Ecology) Model Toxics Control Act (MTCA – Chapter 173-340 WAC) Method A Soil Cleanup Levels for Unrestricted Land Use (Table 740-1) or, if not available, to MTCA Method B Soil Cleanup Level for Unrestricted Land Use (Ecology's CLARC Tables – January 2020) as shown on Tables 1 and 2. The water samples were compared to MTCA Method A (Table 720-1) and B for Ground Water as shown on Table 3. Exceedances of these levels are summarized as follows:

Total Metals (43 samples analyzed, including soil, sediment and slag)

- Lead: Two samples exceeded MTCA Method A cleanup levels; these samples were obtained from the Foundry and Slag Pile areas.
- Chromium: Chromium was detected at variable concentrations in soil, sediment and slag samples. MTCA Method A and B indicate two different cleanup levels for Chromium III (trivalent chromium) and Chromium VI (hexavalent chromium). Although not shown on the lab reports, it appears that HC assumed the analytes as Chromium III and applied those cleanup levels in their 2007 report; we followed this methodology in our evaluation of data. As such, elevated concentrations of Chromium were detected in numerous samples at concentrations below the MTCA Method A cleanup levels for Chromium III. Additional testing completed by ICE as described later in this TM indicate that the Chromium present at the site is likely Chromium III.
- Cadmium: Three samples exceeded MTCA Method A cleanup levels; these samples were obtained from the Vehicle Maintenance area.

- Arsenic: Six samples exceeded MTCA Method A cleanup levels; these samples were obtained from the Vehicle Maintenance, Foundry, Power House and Wet Areas.
- Mercury: Six samples exceeded MTCA Method A cleanup levels; these samples were obtained from the Vehicle Maintenance, Foundry/Slag Pile, Power House and Transformer areas.
- Other Metals: Copper, nickel and zinc were either not detected above laboratory reporting limits or not detected above applicable MTCA Method A or Method B cleanup levels.
- Slag Pile Analysis: One sample was obtained and tested directly from the surface of the Slag Pile. Lead, chromium, copper and zinc were detected at concentrations below the MTCA Method A and Method B cleanup levels.

NWTPH-Dx (17 soil samples analyzed)

- Heavy Oil-Range Hydrocarbons were detected at a concentration slightly above the MTCA Method A cleanup level in one soil sample from the Power House area.
- Kerosene/Jet Fuel- and Diesel/Fuel Oil-Range Hydrocarbons were either not detected above laboratory reporting limits or not detected above MTCA Method A cleanup levels.

NWTPH-Gx (three soil samples analyzed)

- Gasoline-Range Hydrocarbons were not detected above the laboratory reporting limit.

PAHs (17 soil samples analyzed)

- PAHs were detected above the laboratory reporting limit in one soil sample obtained from the Transformer area at levels below the MTCA Method A cleanup levels for carcinogenic PAHs using Toxicity Equivalency methodology per MTCA.

PCBs (six soil samples analyzed)

- PCBs were not detected above the laboratory reporting limits.

VOCs (one soil sample analyzed)

- VOCs were not detected above the laboratory reporting limits.

Total Metals in Water (four perched ground water samples analyzed)

Lead (two samples), chromium (one sample) and arsenic (two samples) were detected at concentrations in excess of the MTCA Method A cleanup. We understand that these water samples were not filtered and may have contained sediment.

MTCA Cleanup and Screening Levels

HC used MTCA Method A and Method B cleanup levels along with other MTCA screening methodologies in their evaluation of the chemical analytical results in their 2004, 2006 and 2007 studies. These reports should be reviewed for information related to these other screening levels. These MTCA cleanup and screening levels are provided for screening and comparison purposes and are not intended to imply that a release or potential exposure has occurred on the Forterra Roslyn Property that creates a risk to human health and the environment, or that these values should be considered as cleanup levels.

ADDITIONAL TESTING IN GOB PILE AND SLAG PILE AREAS

General

Based on the results of our review of HC's 2004, 2006 and 2007 environmental assessments of the Forterra Roslyn Property, and subsequent discussions with Mr. Grausz and Elizabeth Eitan of Forterra, ICE was requested to obtain samples from the Gob Pile and Slag Pile areas (shown on Figure 2) for additional chemical analysis, as these areas had either not been assessed or had limited assessment by HC's previous studies. These samples were obtained by ICE from eleven test pits completed on July 15, 2020, including eight test pits in the Gob Pile area (Test Pits TP-96 through TP-103) and three test pits (Test Pits TP-104 through TP-106) in the Slag Pile area. The approximate extent of the Gob Pile and the Slag Pile is shown on Figure 2. The Gob Pile is approximately 75-feet high.

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Slag Pile Observations
Based on our field observations, the approximate dimensions of the Slag Pile are 80 feet north-south, 120 feet east-west, and up to about 5-feet thick. The aerial dimensions should be considered approximate as much of the Slag Pile is obscured by surface vegetation. The slag thickness is a rough estimate due to permit conditions for our test pit excavations in this area; permit restrictions required that our test pits not be excavated to a depth below the base of the slag.

A review of the undated, untitled site plan provided by Forterra showing the extent of wetlands and related buffers at the Forterra Roslyn Property indicates that the Slag Pile is located entirely within the mapped wetland and wetland buffer area as shown on Figure 2. In addition, the former Foundry area located adjacent to the Slag Pile is also located within the mapped wetland and wetland buffer area.

Gob Pile and Slag Pile Sampling and Testing
Details regarding the excavation, sampling and geotechnical testing of the eleven additional test pits are included in our draft geotechnical report dated August 4, 2020, including the test pit logs. The relative location of the eleven test pits are shown on Figure 2.

We submitted selected samples obtained from eleven test pits to OnSite Environmental of Redmond, Washington for chemical analysis. The laboratory reports are included as Attachment B. One sample from each of the test pits completed in the Gob Pile area (Test Pits TP-96 through TP-103) was submitted for chemical analysis of Diesel- and Heavy Oil-Range Hydrocarbons by Ecology Method NW-TPHDx and for Total Metals by EPA Method 6000/7000 series (lead, chromium, cadmium, copper, nickel, arsenic, zinc and mercury – the same suite of metals as analyzed in the HC ESAs). Two samples from each of the test pits (a total of six samples) completed in the Slag Pile area (Test Pits TP-104 through TP-106) were tested for the same suite of Total Metals. Six of the samples from both areas (Gob Pile and Slag Pile) were subsequently analyzed for hexavalent chromium (Chromium VI). The chemical analytical results are presented in Tables 1 and 2 of this TM.

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Gob Pile Chemical Testing Results
Test results for samples obtained from the Gob Pile test pits indicate that Diesel-Range Hydrocarbons concentrations ranged from not detected (below the laboratory reporting limit) to 370 milligrams per kilogram (mg/kg), and Heavy Oil-Range Hydrocarbons ranged from 69 to 860 mg/kg, below the MTCA Method A cleanup level of 2,000 mg/kg. Total Metals were either not detected or were detected at concentrations below the MTCA Method A or Method B cleanup levels. Additional testing for hexavalent chromium indicates that the chromium present in the samples is trivalent chromium (Chromium III)

Slag Pile Chemical Testing Results
Total Metals including lead, chromium, copper, nickel and zinc were detected at concentrations below the MTCA Method A or Method B cleanup levels. Mercury was not detected. Cadmium was detected at concentrations above the MTCA Method A cleanup level in four samples and arsenic was detected at concentrations above the MTCA Method A cleanup levels in two samples. Additional testing for Chromium VI (hexavalent chromium) indicates that the chromium present in the samples is Chromium III (trivalent chromium).

DISCUSSION OF THE TERRESTRIAL ECOLOGICAL EVALUATION PROCESS
We understand that in recent years, Ecology has typically required that the Terrestrial Ecological Evaluation (TEE) process as described in MTCA Chapter 173-340 WAC be implemented for assessing soil concentrations for use in the establishment of protective screening/cleanup levels at contaminated sites. Based on our preliminary evaluation, the Forterra Roslyn Property is not exempt from the TEE process; as a result we expect that a TEE will be required for the site. There are two types of TEE's as established by MTCA, including a Simplified TEE and a Site-Specific TEE. Based on the location the Slag Pile and the former Foundry area within the mapped wetland and wetland buffer area, it is possible that a Site-Specific TEE will be required, at least for a portion of the Forterra Roslyn Property.

For information purposes, Tables 1 and 2 of this TM include soil concentrations for TEE from MTCA's Table 749-2 (Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure) and Table 749-3 (Ecological Indicator Soil Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals, broken down into values for Plants, Soil Biota and Wildlife).

Numerous samples obtained by HC and ICE have Total Metals values that exceed soil concentrations noted in MTCA's Table 749-3 for protection of plants/soil biota/wildlife. The samples with exceedances of the protective values for plants relative to values shown in Table 749-3 are shaded in blue on Table 1.

We recommend that the TEE process for the Forterra Roslyn Property be further evaluated by a biologist or other appropriate professional that has experience with Site-Specific TEE.

SUMMARY DISCUSSION

General

The intended use of the Forterra Roslyn Property is not known at this time, although we assume it will be primarily developed for residential and light commercial use. As previously described, no development plans, conceptual or otherwise, were available at the time of this review. Based on our review of an undated, untitled plan provided by Forterra, wetlands and the associated wetland buffers are mapped across portions of the site, including the Slag Pile area and the Foundry area as shown on Figure 2. A summary of chemical testing of samples obtained by HC and more recently by ICE is presented in Tables 1, 2 and 3 of this TM. These tables indicate by color shading the samples that exceed MTCA Method A Cleanup Levels (yellow shading) and those that exceed indicator soil concentrations for protection of terrestrial plants by MTCA Table 749-3 (blue shading).

Due to the long history of site use and size of the 31-acre parcel, it is possible that other areas or other contaminants exist at the Forterra Roslyn Property that were not evaluated by HC during their 2004, 2006 and 2007 studies or during ICE's recent sampling and testing in the Gob Pile and Slag Pile areas.

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Hart Crowser ESAs

As previously described, the intent of our review of environmental site assessments completed by HC was to evaluate the need for additional chemical analytical testing for preliminary site screening. Based on our review of HC's 2004, 2006 and 2007 reports and as summarized in this TM, surface and subsurface exploration, sampling and chemical analytical testing has been completed in the areas of concern as identified by HC regarding potential contamination related to past and current site use; these uses are primarily related to the historic coal mining, along with a Foundry area and a more recent area of Vehicle Maintenance reported to be used by local residents. HC's most recent study in 2007 was completed 13 years ago; based on our field reviews of this property in 2006 and 2008 and in June and July 2020, there have been no significant changes in surface site conditions.

In HC's ESAs, Total Metals including lead, cadmium, arsenic and mercury were detected in soil at several localized areas at concentrations that exceed the MTCA Method A cleanup levels; these samples were obtained at depths of 0 to 3 feet. The metals include lead in the Foundry/Slag Pile area, cadmium in the Vehicle Maintenance area, arsenic in the Vehicle Maintenance, Power House, Foundry and Wet areas, and mercury in the Foundry/Slag Pile, Transformer, Power House and Vehicle Maintenance areas. Numerous other samples (a total of 43 samples were tested) that were tested in these general areas indicated the presence of these metals at lower concentrations or were not detected above the laboratory reporting limits, suggesting that metal concentrations are variable across the site. Samples obtained at depths of 4 to 8 feet did not detect metals at concentrations in excess of MTCA Method A or Method B cleanup levels, suggesting that metals are present at higher concentrations in the near-surface soil. The presence of arsenic and mercury at slightly elevated concentrations from several different areas of the site may reflect regional background levels of these metals in the area of the Forterra Roslyn Property, which is the site of an historic coal mine, as these metals can be associated with coal mine deposits. Lead concentrations above the MTCA Method A cleanup level are localized as they were only detected in two samples from the Foundry/Slag Pile area. Cadmium concentrations above the MTCA Method A cleanup level are also localized as they were only detected three samples obtained from the Vehicle Maintenance area. The regional background levels of these metals is not known. **In our opinion, based on the generic property development plan, further soil sampling and testing for metals at the**

Forterra Roslyn Property is not necessary for preliminary site screening purposes, with the exception of the Gob Pile and Slag Pile areas as described below. We concur with HC's 2007 conclusion that a "limited surface soil removal may be required in the former foundry area to remediate lead at concentrations above MTCA Method A." In our opinion, remediation may be required in other localized areas where Total Metals were detected at concentrations in excess of the MTCA Method A cleanup levels. HC also indicated "In addition, depending on future site development plans, a simplified terrestrial ecological evaluate (TEE) or a site-specific ecological evaluation may be required." We concur with this opinion as described further in this section.

Only one sample was obtained by HC from the Slag Pile area and analyzed for Total Metals; metals were not detected at concentrations above MTCA Method A or Method B cleanup levels. **Based on our discussions with Forterra, additional samples were subsequently obtained by ICE from the Slag Pile and tested for Total Metals as summarized below.**

Heavy Oil-Range Hydrocarbons were detected at a concentration slightly above the MTCA Method A cleanup level in one soil sample from the Power House area. **In our opinion, remediation may be required in this localized area**. Several other samples tested in this area detected lower concentrations of Diesel/Fuel Oil and Heavy Oil-Range Hydrocarbons, suggesting that the presence of Heavy Oil-Range Hydrocarbons is localized. **In our opinion, based on the generic development plan, further soil sampling and testing for Diesel- and Heavy Oil-Range Hydrocarbons at the Forterra Roslyn Property is not necessary for preliminary site screening purposes, with the exception of the Gob Pile Fill area in the event this material will be regraded or otherwise disturbed, or used as site fill. Based on our discussions with Forterra, additional samples of the Gob Pile Fill were obtained by ICE and tested for Diesel- and Heavy Oil-Range Hydrocarbons and Total Metals as summarized below.**

In our opinion, for the purpose of preliminary site screening, further soil sampling and testing for Gasoline-Range Hydrocarbons, PAHs, PCBs or VOCs is not necessary across the general site area.

Samples of perched ground water obtained from mini-wells installed in several areas of the site indicated the presence of one or more metals (lead, chromium and arsenic) at concentrations in excess of the MTCA Method A cleanup levels. According to HC, this perched ground water is only observed seasonally. The perched ground water likely dries up in the summer months. This shallow perched water is not a potential source of drinking water. We noted that the ground water samples were not filtered; sediment in the samples may have contributed to the metals concentrations detected. Also, arsenic can be associated with naturally occurring coal deposits. **In our opinion, additional sampling and testing of shallow ground water is not necessary for preliminary site screening. If not already completed, we recommend that the mini-wells installed by HC in 2007 be decommissioned in accordance with Ecology requirements prior to site development.**

Gob Pile Additional Testing

The results of additional testing of samples obtained by ICE in the Gob Pile area indicate the presence of Diesel- and Heavy Oil-Range Hydrocarbons at concentrations below the MTCA Method A cleanup level. Nickel and arsenic were detected at concentrations below MTCA Method A cleanup levels, but in excess of the protective values for plants from MTCA Table 749-3 (related to TEE). Other metals were either not detected or detected at levels below the MTCA Method A cleanup levels or the protective values for plants (Table 749-3). For preliminary screening purposes, we do not recommend any additional testing in the Gob Pile area at this time.

Slag Pile Additional Testing

The results of additional testing of samples obtained by ICE in the Slag Pile area indicate the presence of cadmium and arsenic at concentrations above the MTCA Method A cleanup levels. Lead, chromium, copper, nickel, arsenic and zinc were detected at concentrations in excess of the protective values for plants from MTCA Table 749-3 (related to TEE) in one or more samples from the Slag Pile area. Mercury was not detected in samples obtained from the Slag Pile area. For preliminary screening purposes, we do not recommend any additional testing in the Gob Pile area at this time.

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Terrestrial Ecological Evaluation

Based on our understanding of preliminary site development plans for the Forterra Roslyn Property, our review of chemical analytical data obtained by HC and our recent sampling and testing of the Gob Pile and Slag Pile areas, and the extent of wetland and wetland buffers at the site, we expect that Ecology will require that a TEE be completed for the site. It is possible that a Site-Specific TEE will be appropriate for this site. The TEE should be completed by a biologist or other appropriate professional experienced with this type of evaluation. **We expect that the extent and type of site remediation required at the Forterra Roslyn Property will be dependent upon site development plans, the results of the TEE and discussions with Ecology.**

USE OF THIS TECHNICAL MEMORANDUM

We have prepared this TM for use by Forterra Roslyn LLC. Our TM, conclusions and interpretations should not be construed as a warranty of the subsurface conditions. Our services consisted of a review of information and data provided by others. This TM is not meant to represent a legal opinion.

There are possible variations in subsurface conditions across the site and also with time. A contingency for unanticipated environmental conditions should be included in the budget and schedule.

Within the limitations of scope, schedule and budget, our services have been completed in accordance with generally accepted practices in this area at the time the TM was prepared. No warranties or other conditions express or implied should be understood.

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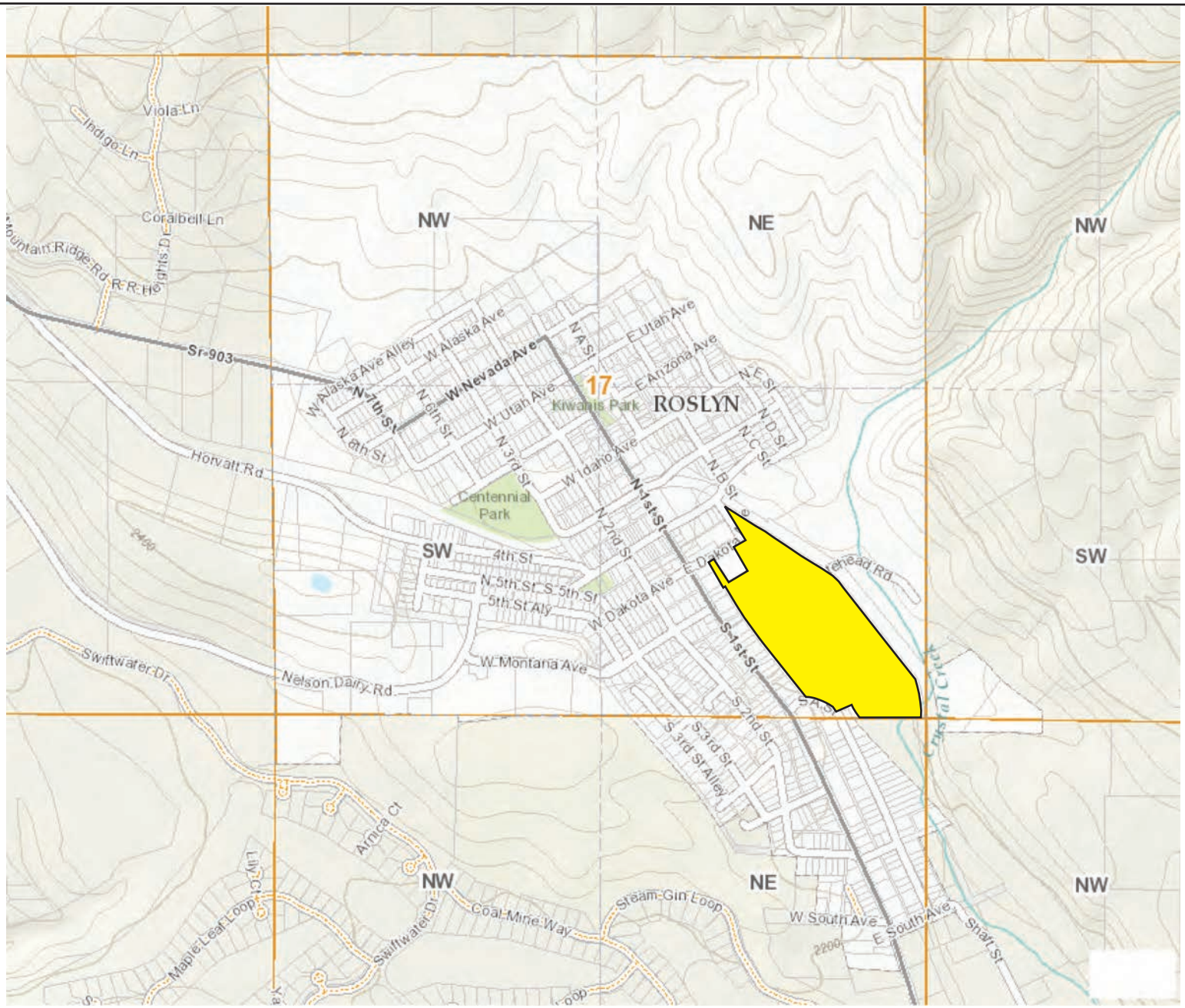
Document ID: 1360002.TechMemo

Attachments: Figure 1 - Vicinity Map
Figure 2 – Site Plan
Table 1 – Summary of Chemical Analytical Data – Total Metals - Soil
Table 2 – Summary of Chemical Analytical Data – NWTPH-Dx/G, PAHS, PCBs and VOCs - Soil
Table 3 – Summary of Chemical Analytical Data – Total Metals – Perched Ground Water
Attachment A - Site and Exploration Plan from Hart Crowser Report dated October 2, 2007 (Figure 2)
Attachment B - OnSite Environmental Laboratory Reports dated July 24 and 30, 2020

Submitted via email and surface mail (one original copy)

FIGURES

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Base map obtained from the Kittitas County COMPAS website (https://gis.co.kittitas.wa.us/compas/default.aspx)

0 1,000 2,000

Approximate Scale in Feet

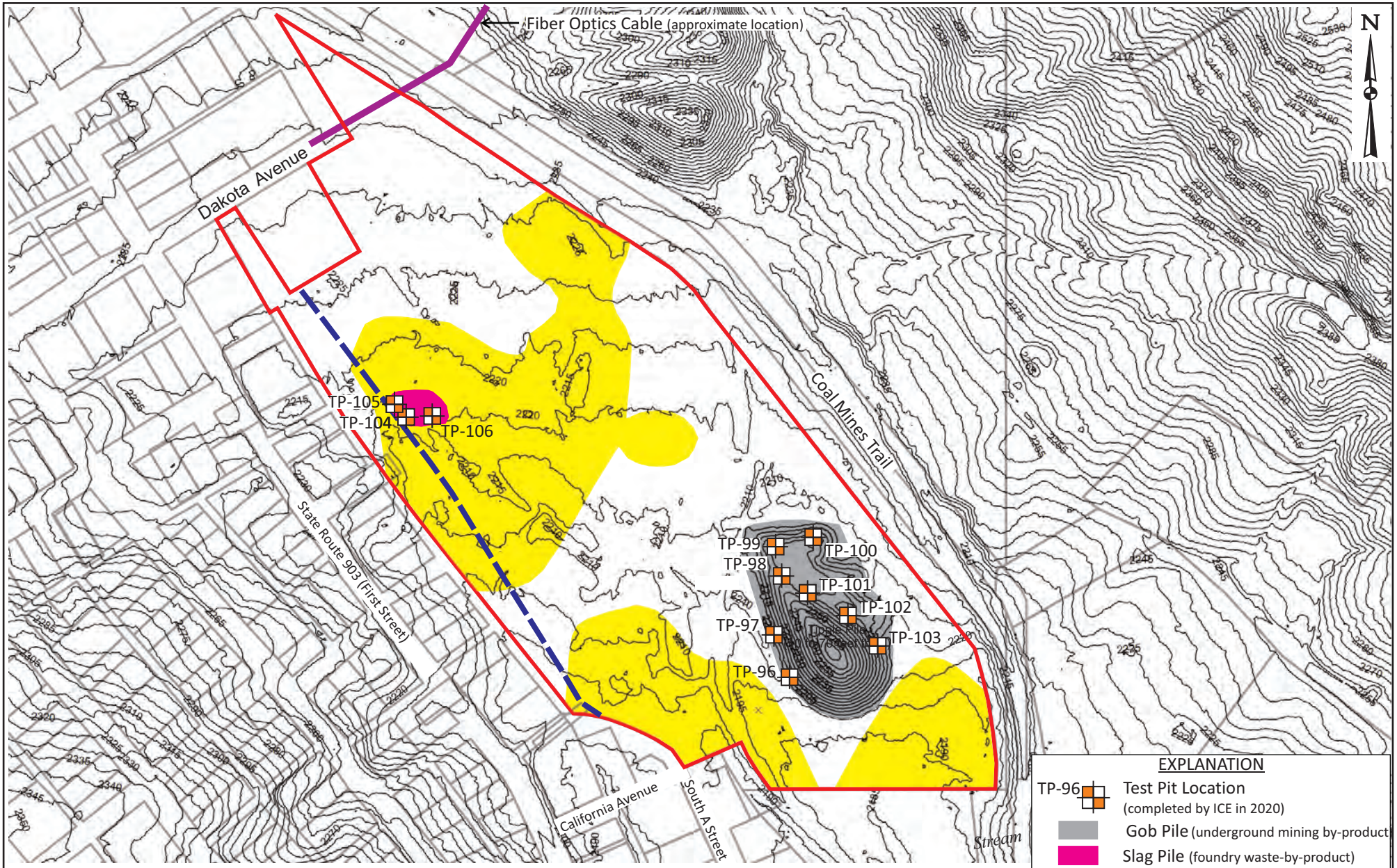
FORTERRA

VICINITY MAP

FORTERRA ROSLYN PROPERTY

ICICLE CREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: As Shown	ICE FILE NO.
DESIGNED: ---	1360-001
DRAWN: BRB	Figure
CHECKED: KSK	1
DATE: 08/04/20	



Notes: 1) Base map prepared using Light Detection and Ranging (LiDAR) Digital Terrain Model (DTM) data (Yakima 2014 acquisition) obtained from the Washington State Department of Natural Resources (DNR) , Washington LiDAR Portal; processed by ICE using Esri ArcGIS 10.6 for 5-foot topographic contours.
2) Parcel shapefile obtained from Kittitas County Geographic Systems (GIS) Open Data Portal (https://data-kitcogis.opendata.arcgis.com/).
3) Wetlands and buffer information based on untitled, undated aerial photograph provided to ICE by Forterra. The location shown for the location of the wetland and buffer is approximate; we observed inconsistencies with mapping registration points during our review of this information.

0 250 500
Approximate Scale in Feet

FORTERRA

SITE PLAN

FORTERRA ROSLYN PROPERTY

ICICLECREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: As Shown	ICE FILE NO.
DESIGNED: ---	1360-002
DRAWN: BRB/JMS	Figure
CHECKED: KSK	2
DATE: 08/04/20	

TABLES 1, 2 AND 3

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TABLE 1 (page 1)
SUMMARY OF CHEMICAL ANALYTICAL DATA - TOTAL METALS - SOIL
FORTERRA ROSLYN PROPERTY - ROSLYN, WASHINGTON

General Area	Exploration Number/Sample Number [1]	Date Sampled	Sample Depth (feet)	Total Metals by EPA Method 6000/7000 Series (mg/kg)								
				Lead	Chromium [2]	Chromium Hexavalent	Cadmium	Copper	Nickel	Arsenic	Zinc	Mercury
Samples Obtained by Hart Crowser in 2004, 2006 and 2007												
Vehicle Maintenance	HB1-S1	06/14/04	0.0-0.5	250	4.4	--	2.7	50	21	11	25	ND
Foundry	HB3-S1	06/14/04	0.4-0.5	620	8.9	--	1.1	170.0	160	7.6	180	ND
Slag Pile	HB5-S1	06/14/04	0.3-0.5	32	12	--	ND	59.0	ND	ND	2.2	ND
Transformer Area	HB8-S1	06/14/04	0.5-1.0	30	12	--	ND	160.0	ND	ND	3.3	ND
Slag Pile	Slag Pile	06/14/04	Surface	36	5.2	--	ND	18.0	ND	ND	2.8	ND
Foundry/Slag Pile Area	TP-1 S-1	07/27/06	0.0-2.0	290	45	--	1.2	ND	88	4.8	19	5.2
Foundry/Slag Pile Area	TP-2 S-1	07/27/06	0.0-2.0	200	100	--	ND	ND	140	6.9	58	4.9
Foundry	TP-3 S-1	07/27/06	0.0-2.0	84	11	--	ND	ND	18	3.7	53	1.2
Foundry	TP-4 S-1	07/27/06	0.0-2.0	13	7.6	--	ND	3.9	21	ND	48	ND
Foundry	TP-5 S-1	07/27/06	0.0-2.0	7.9	5.3	--	ND	ND	7.8	ND	93	ND
Vehicle Maintenance	TP-8 S-1	07/28/06	0.0-3.0	110	5.1	--	8.6	ND	14	150	7.8	0.54
Vehicle Maintenance	TP-9 S-1	07/28/06	0.0-2.0	24	2.9	--	ND	ND	6.4	4.1	5.1	ND
Vehicle Maintenance	TP-10 S-1	07/28/06	0.0-2.0	130	9.3	--	ND	ND	12	ND	12	ND
Transformer	TP-11 S-1	07/28/06	0.0-2.0	7.3	11	--	ND	ND	8.9	ND	80	ND
Transformer	TP-12 S-1	07/28/06	0.0-2.0	50	6.1	--	2.0	ND	7.5	2.1	35	8.0
Power House	TP-13 S-1	07/28/06	0.0-2.0	68	8.0	--	ND	ND	20	9.2	31	4.0
Power House	TP-14 S-1	07/28/06	0.0-2.0	5.6	5.9	--	ND	ND	5.8	ND	11	ND
Power House	HC-SS-1	08/10/07	0.0-0.5	57	33.7	--	1.8	123	55	58	252	0.83
Power House	HC-SS-2	08/10/07	0.0-0.5	28	18.9	--	0.4	42.1	21	9	95	0.06
Power House	HC-SS-3	08/10/07	0.0-0.5	68	26.5	--	0.8	85.6	33	26	147	0.16
Transformer	HC-SS-4	08/10/07	0.0-0.5	15	16.6	--	ND	10.9	16.0	ND	36.4	0.19
Transformer	HC-SS-5	08/10/07	0.0-0.5	61	23.8	--	0.5	169	39	6	122	3.04
Transformer	HC-SS-6	08/10/07	0.0-0.5	65	20.9	--	0.4	49.1	27	8	114	0.32
Slag Pile Area	HC-SS-7	08/10/07	0.0-0.5	62	36	--	ND	49.5	41	ND	229	0.05
Slag Pile Area	HC-SS-8	08/10/07	0.0-0.5	101	36	--	0.7	54.3	53	ND	277	0.08
Slag Pile Area	HC-SS-9	08/10/07	0.0-0.5	54	39	--	ND	48.6	39	ND	90	0.05
Slag Pile Area	HC-SS-10	08/10/07	0.0-0.5	27	38	--	ND	35.5	34	ND	81	0.08
Foundry	HC-SS-11	08/10/07	0.0-0.5	149	35	--	ND	81.2	503	20	239	0.07
Foundry	HC-SS-12	08/10/07	0.0-0.5	130	33	--	ND	88.2	601	40	324	0.06
Vehicle Maintenance	HC-SS-13	08/10/07	0.0-0.5	83	22.8	--	0.6	81.3	44	10	164	0.09
Vehicle Maintenance	HC-SS-14	08/10/07	0.0-0.5	152	34.8	--	0.7	106	52	10	210	22.9
Vehicle Maintenance	HC-SS-15	08/10/07	0.0-0.5	153	46	--	5.8	184	77	90	392	0.13
Wet Area	HC-WS-1	08/10/07	Surface	47	19.4	--	0.6	56.7	32	ND	161	0.19
Wet Area	HC-WS-2	08/10/07	Surface	33	46	--	0.8	118	92	30	87	0.05
Wet Area	HC-WS-3	08/10/07	Surface	15	26.0	--	ND	60.3	42	7	49	0.19
MTCA Table 740-1 Method A Soil Cleanup Level (Unrestricted Land Uses)				250	2,000	19	2	--	--	20	--	2
MTCA Method B Soil Cleanup Level Unrestricted Land Use (CLARC Tables Noncancer January 2020)				--	--	--	--	3,200	1,600	--	24,000	--
MTCA Table 749-2 TEE Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified TEE Procedure - Unrestricted Land Use				220	42	--	25	100	100	95	270	9
MTCA Table 749-3 Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (plants/soil biota/wildlife)				50/500/118	42/42/67	--	4/20/14	100/50/217	30/200/980	10/60/132	86/200/360	.3/.1/5.5

Notes:

(1) Locations for HC 2004, 2006 and 2007 are shown on Attachment A.

(2) Chromium is assumed to be Chromium III rather than Chromium VI based on test results for select samples obtained by ICE on 7/15/2020 and tested for total Chromium and Chromium VI.

mg/kg = milligrams per kilogram (parts per million); "--" = not measured or analyzed; "ND" = not detected at concentration in excess of the laboratory reporting limit.

Yellow shading indicates value in excess of MTCA Table 740-1 Method A Soil Cleanup Levels for Unrestricted Use.

Blue shading indicates value in excess of the MTCA Table 749-3 value for protection of terrestrial plants.

2004 to 2007 data taken from Hart Crowser Reports dated June 30, 2004, September 18, 2006 and October 2, 2007; see ICE Technical Memorandum for full reference.

TABLE 1 (page 2)
SUMMARY OF CHEMICAL ANALYTICAL DATA - TOTAL METALS - SOIL
FORTERRA ROSLYN PROPERTY - ROSLYN, WASHINGTON

General Area	Exploration Number/Sample Number [1]	Date Sampled	Sample Depth (feet)	Total Metals by EPA Method 6000/7000 Series (mg/kg)								
				Lead	Chromium [2]	Chromium Hexavalent	Cadmium	Copper	Nickel	Arsenic	Zinc	Mercury
Samples Obtained by Hart Crowser in 2004, 2006 and 2007												
Power House	HC-SB-5-S1	08/09/07	0.0-4.0	11	23	--	ND	76.1	42	ND	62	0.04
Power House	HC-SB-5-S2	08/09/07	4.0-8.0	4	28.2	--	ND	17.6	25	ND	79	ND
Vehicle Maintenance	HC-SB-6-S1	08/09/07	0.0-4.0	27	11.9	--	ND	41.1	15	5	20	0.10
Vehicle Maintenance	HC-SB-6-S2	08/09/07	4.0-8.0	5	37.4	--	ND	20.6	25	ND	61	ND
Foundry/Slag Pile Area	HC-SB-7-S1	08/09/07	0.0-4.0	9	52	--	ND	32.0	35	ND	87	ND
Foundry/Slag Pile Area	HC-SB-7-S2	08/09/07	4.0-8.0	8	52	--	ND	36.5	37	ND	74	0.06
Foundry	HC-SB-8-S1	08/09/07	0.0-4.0	8	21.1	--	ND	46.1	31	ND	58	ND
Foundry	HC-SB-8-S2	08/09/07	4.0-8.0	8	56	--	ND	34.1	46	ND	81	0.06
Samples Obtained by Icicle Creek Engineers in July 2020												
Gob Pile	Test Pit TP-96	07/15/20	3.0	8.1	37	ND	0.82	37	37	ND	73	ND
Gob Pile	Test Pit TP-97	07/15/20	3.0	7.8	38	--	0.78	36	38	ND	68	ND
Gob Pile	Test Pit TP-98	07/15/20	3.0	7.9	23	--	0.64	28	21	ND	51	ND
Gob Pile	Test Pit TP-99	07/15/20	3.0	5.4	9.7	--	ND	22	13	ND	36	ND
Gob Pile	Test Pit TP-100	07/15/20	3.0	12	28	ND	0.58	30	30	15	55	ND
Gob Pile	Test Pit TP-101	07/15/20	3.0	ND	20	--	ND	25	21	12	43	ND
Gob Pile	Test Pit TP-102	07/15/20	3.0	8.8	29	--	0.63	34	32	ND	68	ND
Gob Pile	Test Pit TP-103	07/15/20	3.0	9.8	36	ND	0.68	37	37	ND	69	ND
Slag Pile	Test Pit TP-104, S-1	07/15/20	1.5	100	530	--	4.1	430	200	22	130	ND
Slag Pile	Test Pit TP-104, S-2	07/15/20	3.0	74	570	ND	2.1	190	92	ND	77	ND
Slag Pile	Test Pit TP-105, S-1	07/15/20	1.5	45	600	ND	6.7	700	300	24	56	ND
Slag Pile	Test Pit TP-105, S-2	07/15/20	3.0	130	310	--	3	230	280	17	100	ND
Slag Pile	Test Pit TP-106, S-1	07/15/20	1.5	34	53	--	1.5	62	66	ND	59	ND
Slap Pile	Test Pit TP-106, S-2	07/15/20	3.0	31	56	ND	1.4	46	83	ND	52	ND
MTCA Table 740-1 Method A Soil Cleanup Level (Unrestricted Land Uses)				250	2,000	19	2	--	--	20	--	2
MTCA Method B Soil Cleanup Level Unrestricted Land Use (CLARC Tables Noncancer January 2020)				--	--	--	--	3,200	1,600	--	24,000	--
MTCA Table 749-2 TEE Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified TEE Procedure - Unrestricted Land Use				220	42	--	25	100	100	95	270	9
MTCA Table 749-3 Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (plants/soil biota/wildlife)				50/500/118	42/42/67	--	4/20/14	100/50/217	30/200/980	10/60/132	86/200/360	.3/.1/5.5

Notes:
(1) Locations for HC 2004, 2006 and 2007 are shown on Attachment A.

(2) Chromium is assumed to be Chromium III rather than Chromium VI based on test results for select samples obtained by ICE on 7/15/2020 and tested for total Chromium and Chromium VI.
mg/kg = milligrams per kilogram (parts per million); "--" = not measured or analyzed; "ND" = not detected at concentration in excess of the laboratory reporting limit.
Yellow shading indicates value in excess of MTCA Table 740-1 Method A Soil Cleanup Levels for Unrestricted Use.
Blue shading indicates value in excess of the MTCA Table 749-3 value for protection of terrestrial plants.
2004 to 2007 data taken from Hart Crowser Reports dated June 30, 2004, September 18, 2006 and October 2, 2007; see ICE Technical Memorandum for full reference.

TABLE 2

SUMMARY OF CHEMICAL ANALYTICAL DATA - NWTPH-Dx/G, PAHs, PCBs and VOCs - SOIL

FORTERRA ROSLYN PROPERTY - ROSLYN, WASHINGTON

General Area	Exploration Number/Sample Number [1]	Date Sampled	Sample Depth (feet)	NWTPH-Dx[3] mg/kg			NWTPH-Gx[3]	PAHs[3]	PBCs[3]	VOCs[3]
				Kerosene/ Jet Fuel	Diesel/Fuel Oil	Heavy Oil				
Samples Obtained by Hart Crowser in 2004, 2006 and 2007										
Vehicle Maintenance	HB1-S1	06/14/04	0.0-0.5	ND	ND	ND	--	ND	--	--
Foundry	HB3-S1	06/14/04	0.4-0.5	ND	ND	ND	--	ND	--	--
Slag Pile	HB5-S1	06/14/04	0.3-0.5	--	--	--	--	ND	--	--
Transformer	HB6-S1	06/14/04	0.5-1.0	ND	ND	ND	--	--	ND	--
Transformer	HB8-S1	06/14/04	0.5-1.0	ND	ND	ND	--	ND	ND	--
Slag Pile	Slag Pile	06/14/04	Surface	--	--	--	--	ND	--	--
Foundry/Slag Pile	TP-1 S-1	07/27/06	0.0-2.0	--	--	--	--	ND	--	--
Foundry/Slag Pile	TP-2 S-1	07/27/06	0.0-2.0	--	--	--	--	ND	--	--
Foundry	TP-3 S-1	07/27/06	0.0-2.0	ND	ND	ND	--	ND	--	--
Foundry	TP-4 S-1	07/27/06	0.0-2.0	ND	ND	ND	--	ND	--	--
Foundry	TP-5 S-1	07/27/06	0.0-2.0	ND	ND	ND	--	ND	--	--
Vehicle Maintenance	TP-8 S-1	07/28/06	0.0-3.0	ND	ND	ND	ND	ND	--	ND
Vehicle Maintenance	TP-9 S-1	07/28/06	0.0-2.0	ND	ND	ND	ND	ND	--	--
Vehicle Maintenance	TP-10 S-1	07/28/06	0.0-2.0	ND	ND	ND	ND	ND	--	--
Transformer	TP-11 S-1	07/28/06	0.0-2.0	ND	ND	ND	--	ND	ND	--
Transformer	TP-12 S-1	07/28/06	0.0-2.0	ND	ND	ND	--	yes[2]	ND	--
Power House	TP-13 S-1	07/28/06	0.0-2.0	ND	ND	2100	--	ND	ND	--
Power House	TP-14 S-1	07/28/06	0.0-2.0	ND	ND	210	--	ND	ND	--
Power House	HC-SS-1	08/10/07	0.0-0.5	--	190	320	--	--	--	--
Power House	HC-SS-3	08/10/07	0.0-0.5	--	240	380	--	--	--	--
Transformer	HC-SS-5	08/10/07	0.0-0.5	--	180	410	--	--	--	--
Samples Obtained by Icicle Creek Engineers in July 2020										
Gob Pile	Test Pit TP-96	07/15/20	3.0	--	ND	69	--	--	--	--
Gob Pile	Test Pit TP-97	07/15/20	3.0	--	29	69	--	--	--	--
Gob Pile	Test Pit TP-98	07/15/20	3.0	--	110	250	--	--	--	--
Gob Pile	Test Pit TP-99	07/15/20	3.0	--	370	860	--	--	--	--
Gob Pile	Test Pit TP-100	07/15/20	3.0	--	140	380	--	--	--	--
Gob Pile	Test Pit TP-101	07/15/20	3.0	--	42	110	--	--	--	--
Gob Pile	Test Pit TP-102	07/15/20	3.0	--	95	270	--	--	--	--
Gob Pile	Test Pit TP-103	07/15/20	3.0	--	65	170	--	--	--	--
MTCA Table 740-1 Method A Soil Cleanup Level (Unrestricted Land Uses)				2000	2000	2000	100	See Note 2	NA	NA
MTCA Table 749-2 TEE Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified TEE Procedure - Unrestricted Land Use				NA	460	460	NA	NA	NA	NA
MTCA Table 749-3 Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (plants/soil biota/wildlife)				NA	--/200/6000	--/200/6000	NA	NA	NA	NA

Notes:

(1) Locations for HC 2004, 2006 and 2007 samples are shown on Attachment A.

(2) Analytes detected include Phenanthrene (0.09 mg/kg), Fluoranthene (0.11 mg/kg), Pyrene (0.13 mg/kg), Benzo(a)anthracene (0.07 mg/kg) and Chrysene (0.06 mg/kg). Does not exceed MTCA Method A for carcinogenic PAHs using Toxicity Equivalency methodology.

(3) See ICE Technical Memorandum for description of test methods. NWTPH-Gx = gasoline-range hydrocarbons, PAHS = polycyclic aromatic hydrocarbons, PCBs = polychlorinated biphenyls, VOCs = volatile organic compounds.

mg/kg = milligrams per kilogram; "--" = not measured or analyzed.

NA = not applicable as none were detected.

ND = not detected at concentration in excess of the laboratory reporting limit.

Yellow shading indicates value in excess of the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses.

Data taken from Hart Crowser Reports dated June 30, 2004, September 18, 2006 and October 2, 2007; see ICE Technical Memorandum for full reference.

TABLE 3

SUMMARY OF CHEMICAL ANALYTICAL DATA - TOTAL METALS - PERCHED GROUND WATER

FORTERRA ROSLYN PROPERTY - ROSLYN, WASHINGTON

General Area	Exploration and Sample Number	Date Sampled	Total Metals by EPA Method 6000/7000 Series (ug/L)							
			Lead	Chromium	Cadmium	Copper	Nickel	Arsenic	Zinc	Mercury
Tipple Pile	HC-MW-1	08/10/07	22	38	ND	40	40	3.8	280	ND
Barn	HC-MW-2	08/10/07	5	48	ND	36	40	0.8	100	ND
Wet Area	HC-MW-3	08/10/07	37	94	ND	102	80	10.2	580	0.2
Wet Area/Slag	HC-MW-4	08/10/07	7	44	ND	55	90	12.7	190	ND
MTCA Method A Cleanup Levels for Ground Water			15	50	5	--	--	5	--	2
MTCA Method B Cleanup Levels for Ground Water (CLARC Tables Noncancer January 2020)			--	--	--	640	320	--	4,800	--

Notes:

(1) Mini-Well locations are shown on Attachment A.

ug/L = micrograms per liter (parts per billion)

ND = not detected at concentration in excess of the laboratory reporting limit.

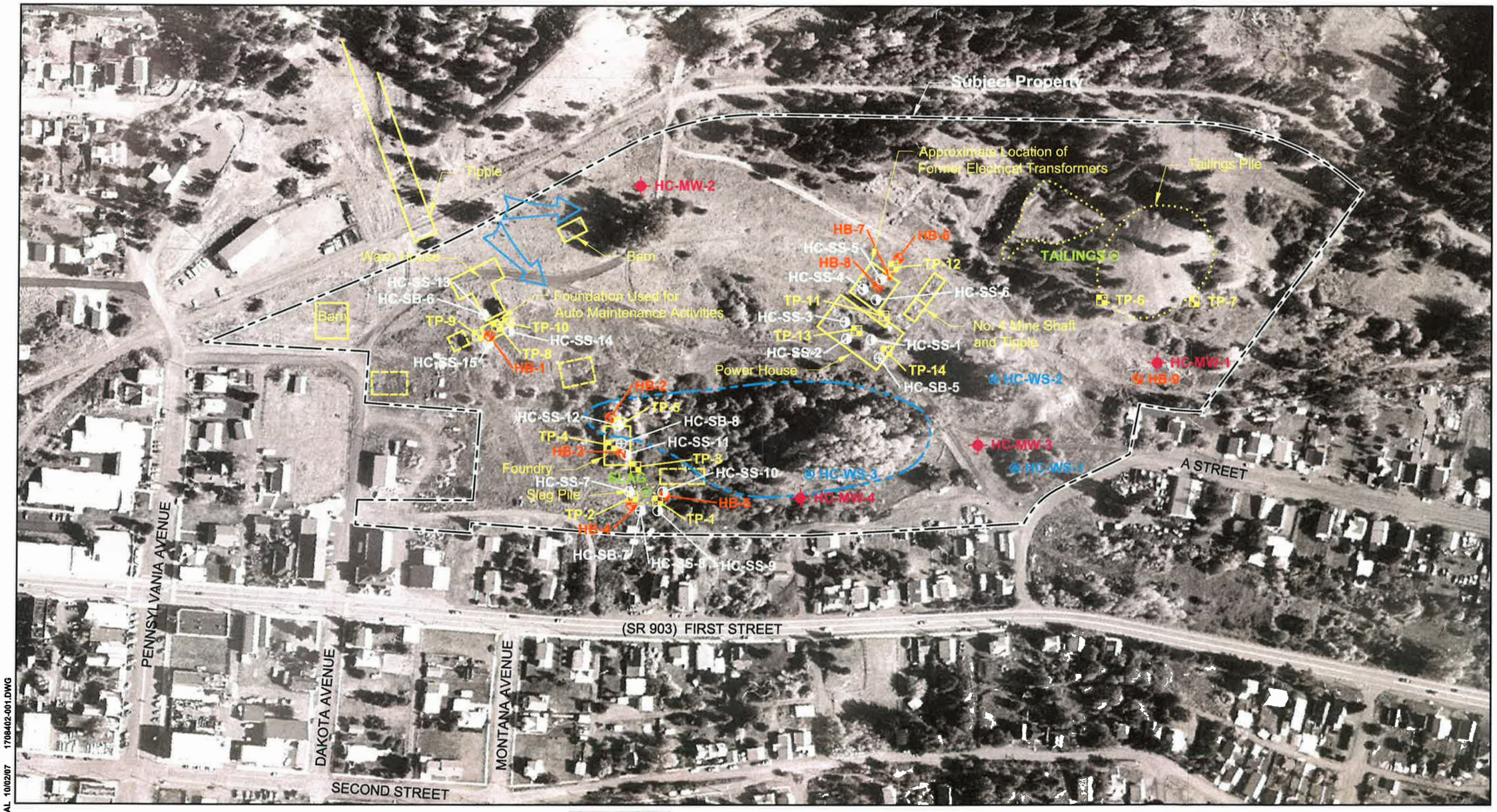
Yellow shading indicates value in excess of MTCA Method A Cleanup Levels for Groundwater.

Data taken from Hart Crowser Report dated October 2, 2007; see ICE Technical Memorandum for full reference.

ATTACHMENT A

SITE AND EXPLORATION PLAN FROM HART CROWSER REPORT DATED OCTOBER 2, 2007 (FIGURE 2)

DRAFT



EAL 10/02/07 1708402-001.DWG

Source: Base map prepared from aerial photo and survey information provided by Goldsmith & Associates.

- Approximate Extent of Wetland Area
- Approximate Former Buildings/Structures Location
- Approximate Unknown Bulding Shown on Historical Map
- Tailing/Slag Pile Location
- Inferred Groundwater Flow Direction

- HC-WS-1 — Wetland Surface Sample Location and Number (August 2007)
- HC-SB-8 — Push Probe Location and Number (August 2007)
- HC-SS-1 — Soil and Sediment Sampling Location and Number (August 2007)
- HC-MW-1 — Mini-Well Location and Number (August 2007)
- HB-1 — Hand-Auger Boring Location and Number (June 2004)
- SLAG — Grab Sample Location and Designation (June 2004)
- TP-1 — Test Pit Location and Number (July 2006)

N

0 200 400

Scale in Feet

HARTCROWSER

17084-02 ***10/07***

Figure 2

ATTACHMENT B

ONSITE ENVIRONMENTAL LABORATORY REPORTS
DATED JULY 24 AND JULY 30, 2020

DRAFT

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 24, 2020

Kathy Killman
Icicle Creek Engineers, Inc.
29335 NE 20th Street
Carnation, WA 98014-9632

Re: Analytical Data for Project 1360-001/002
Laboratory Reference No. 2007-162

Dear Kathy:

Enclosed are the analytical results and associated quality control data for samples submitted on July 16, 2020.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

Case Narrative

Samples were collected on July 15, 2020 and received by the laboratory on July 16, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-96**					
Laboratory ID:	07-162-01					
Diesel Range Organics	**ND**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**69**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*85*	*50-150*				
Client ID:	**TP-97**					
Laboratory ID:	07-162-02					
Diesel Range Organics	**29**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**69**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*103*	*50-150*				
Client ID:	**TP-98**					
Laboratory ID:	07-162-03					
Diesel Range Organics	**110**	26	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**250**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*106*	*50-150*				
Client ID:	**TP-99**					
Laboratory ID:	07-162-04					
Diesel Range Organics	**370**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**860**	54	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*112*	*50-150*				
Client ID:	**TP-100**					
Laboratory ID:	07-162-05					
Diesel Range Organics	**140**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**380**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				
Client ID:	**TP-101**					
Laboratory ID:	07-162-06					
Diesel Range Organics	**42**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**110**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-102**					
Laboratory ID:	07-162-07					
Diesel Range Organics	**95**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**270**	54	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*99*	*50-150*				
Client ID:	**TP-103**					
Laboratory ID:	07-162-08					
Diesel Range Organics	**65**	27	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**170**	53	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*98*	*50-150*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0717S1					
Diesel Range Organics	**ND**	25	NWTPH-Dx	7-17-20	7-17-20	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	7-17-20	7-17-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*88*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	07-121-02									
	ORIG	DUP								
Diesel Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Surrogate:										
o-Terphenyl						*94* *99*	*50-150*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-96**					
Laboratory ID:	07-162-01					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.82**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**37**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**37**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**8.1**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**37**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**73**	2.7	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-97**					
Laboratory ID:	07-162-02					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.78**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**38**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**36**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**7.8**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**38**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**68**	2.7	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-98**					
Laboratory ID:	07-162-03					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.64**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**23**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**28**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**7.9**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**21**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**51**	2.6	EPA 6010D	7-21-20	7-21-20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-99**					
Laboratory ID:	07-162-04					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**ND**	0.54	EPA 6010D	7-21-20	7-21-20	
Chromium	**9.7**	0.54	EPA 6010D	7-21-20	7-21-20	
Copper	**22**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**5.4**	5.4	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**13**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**36**	2.7	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-100**					
Laboratory ID:	07-162-05					
Arsenic	**15**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.58**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**28**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**30**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**12**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**30**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**55**	2.7	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-101**					
Laboratory ID:	07-162-06					
Arsenic	**12**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**ND**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**20**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**25**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**ND**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**21**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**43**	2.7	EPA 6010D	7-21-20	7-21-20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-102**					
Laboratory ID:	07-162-07					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.63**	0.54	EPA 6010D	7-21-20	7-21-20	
Chromium	**29**	0.54	EPA 6010D	7-21-20	7-21-20	
Copper	**34**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**8.8**	5.4	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**32**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**68**	2.7	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-103**					
Laboratory ID:	07-162-08					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**0.68**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**36**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**37**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**9.8**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.27	EPA 7471B	7-21-20	7-21-20	
Nickel	**37**	2.7	EPA 6010D	7-21-20	7-21-20	
Zinc	**69**	2.7	EPA 6010D	7-21-20	7-21-20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-104, S-1**					
Laboratory ID:	07-162-09					
Arsenic	**22**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**4.1**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**530**	2.6	EPA 6010D	7-21-20	7-21-20	
Copper	**430**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**100**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**200**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**130**	2.6	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-104, S-2**					
Laboratory ID:	07-162-10					
Arsenic	**ND**	10	EPA 6010D	7-21-20	7-21-20	
Cadmium	**2.1**	0.52	EPA 6010D	7-21-20	7-21-20	
Chromium	**570**	2.6	EPA 6010D	7-21-20	7-21-20	
Copper	**190**	1.0	EPA 6010D	7-21-20	7-21-20	
Lead	**74**	5.2	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**92**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**77**	2.6	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-105, S-1**					
Laboratory ID:	07-162-11					
Arsenic	**24**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**6.7**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**600**	2.6	EPA 6010D	7-21-20	7-21-20	
Copper	**700**	5.3	EPA 6010D	7-21-20	7-21-20	
Lead	**45**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**300**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**56**	2.6	EPA 6010D	7-21-20	7-21-20	

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Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-105, S-2**					
Laboratory ID:	07-162-12					
Arsenic	**17**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**3.0**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**310**	2.6	EPA 6010D	7-21-20	7-21-20	
Copper	**230**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**130**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**280**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**100**	2.6	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-106, S-1**					
Laboratory ID:	07-162-13					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**1.5**	0.56	EPA 6010D	7-21-20	7-21-20	
Chromium	**53**	0.56	EPA 6010D	7-21-20	7-21-20	
Copper	**62**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**34**	5.6	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.28	EPA 7471B	7-21-20	7-21-20	
Nickel	**66**	2.8	EPA 6010D	7-21-20	7-21-20	
Zinc	**59**	2.8	EPA 6010D	7-21-20	7-21-20	
Client ID:	**TP-106, S-2**					
Laboratory ID:	07-162-14					
Arsenic	**ND**	11	EPA 6010D	7-21-20	7-21-20	
Cadmium	**1.4**	0.53	EPA 6010D	7-21-20	7-21-20	
Chromium	**56**	0.53	EPA 6010D	7-21-20	7-21-20	
Copper	**46**	1.1	EPA 6010D	7-21-20	7-21-20	
Lead	**31**	5.3	EPA 6010D	7-21-20	7-21-20	
Mercury	**ND**	0.26	EPA 7471B	7-21-20	7-21-20	
Nickel	**83**	2.6	EPA 6010D	7-21-20	7-21-20	
Zinc	**52**	2.6	EPA 6010D	7-21-20	7-21-20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

TOTAL METALS
EPA 6010D/7471B
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0721SH1					
Arsenic	**ND**	10	EPA 6010D	7-21-20	7-21-20	
Cadmium	**ND**	0.50	EPA 6010D	7-21-20	7-21-20	
Chromium	**ND**	0.50	EPA 6010D	7-21-20	7-21-20	
Copper	**ND**	1.0	EPA 6010D	7-21-20	7-21-20	
Lead	**ND**	5.0	EPA 6010D	7-21-20	7-21-20	
Nickel	**ND**	2.5	EPA 6010D	7-21-20	7-21-20	
Zinc	**ND**	2.5	EPA 6010D	7-21-20	7-21-20	
Laboratory ID:	MB0721S1					
Mercury	**ND**	0.25	EPA 7471B	7-21-20	7-21-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	07-162-01									
	ORIG	DUP								
Arsenic	**ND**	**ND**	NA	NA		NA	NA	NA	20	
Cadmium	**0.770**	**0.780**	NA	NA		NA	NA	1	20	
Chromium	**34.8**	**34.2**	NA	NA		NA	NA	2	20	
Copper	**34.9**	**33.5**	NA	NA		NA	NA	4	20	
Lead	**7.55**	**7.15**	NA	NA		NA	NA	5	20	
Nickel	**34.5**	**34.7**	NA	NA		NA	NA	1	20	
Zinc	**68.2**	**61.8**	NA	NA		NA	NA	10	20	
Laboratory ID:	07-162-01									
Mercury	**ND**	**ND**	NA	NA		NA	NA	NA	20	

Analyte	MS	MSD	MS	MSD		MS	MSD			
MATRIX SPIKES										
Laboratory ID:	07-162-01									
Arsenic	**94.4**	**91.4**	100	100	ND	**94**	**91**	75-125	3	20
Cadmium	**42.3**	**41.2**	50.0	50.0	0.770	**83**	**81**	75-125	3	20
Chromium	**120**	**119**	100	100	34.8	**85**	**84**	75-125	0	20
Copper	**78.7**	**78.7**	50.0	50.0	34.9	**88**	**88**	75-125	0	20
Lead	**227**	**222**	250	250	7.55	**88**	**86**	75-125	2	20
Nickel	**118**	**120**	100	100	34.5	**84**	**85**	75-125	1	20
Zinc	**153**	**157**	100	100	68.2	**85**	**89**	75-125	3	20
Laboratory ID:	07-162-01									
Mercury	**0.560**	**0.631**	0.500	0.500	0.124	**87**	**101**	80-120	12	20

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Date of Report: July 24, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162
Project: 1360-001/002

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
TP-96	07-162-01	**6**	7-17-20
TP-97	07-162-02	**6**	7-17-20
TP-98	07-162-03	**5**	7-17-20
TP-99	07-162-04	**7**	7-17-20
TP-100	07-162-05	**6**	7-17-20
TP-101	07-162-06	**6**	7-17-20
TP-102	07-162-07	**7**	7-17-20
TP-103	07-162-08	**6**	7-17-20
TP-104, S-1	07-162-09	**6**	7-21-20
TP-104, S-2	07-162-10	**4**	7-21-20
TP-105, S-1	07-162-11	**6**	7-21-20
TP-105, S-2	07-162-12	**6**	7-21-20
TP-106, S-1	07-162-13	**10**	7-21-20
TP-106, S-2	07-162-14	**5**	7-21-20

This report pertains to the samples analyzed in accordance with the chain of custody,
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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Icicle Creek Engineers Inc
Project Number: 1360-001/002
Project Name: Forterra Roslyn Property
Project Manager: Kathy Killman
Sampled by: Shane Markus & Jeff Schwarte

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-162

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Total Metals*				% Moisture
1	TP-96	7/15/20	1400	Soil	2				X														X				X
2	TP-97		1430		2																						
3	TP-98		1130		2																						
4	TP-99		1000		2																						
5	TP-100		1100		2																						
6	TP-101		1200		2																						
7	TP-102		1300		2																						
8	TP-103		1330		2																						

	Signature	Company	Date	Time
Relinquished		Icicle Creek Engineers	7/16/20	10:39
Received		OSE	7/16/20	1039
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

*Total Metals:
Arsenic, Cadmium, Chromium
Copper, Lead, Mercury, Nickel,
Zinc

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Icicle Creek Engineers, Inc
Project Number: 1360-001/002
Project Name: Forterra Roslyn Property
Project Manager: Kathy Kilman
Sampled by: Shane Markus & Jeff Schwartz

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-162

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
9	TP-104, S-1	7/15/20	1600	Soil	1
10	TP-104, S-2		1600		1
11	TP-105, S-1		1630		1
12	TP-105, S-2		1630		1
13	TP-106, S-1		1730		1
14	TP-106, S-2		1730		1

NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	X Total Metals*				% Moisture
																	X				X

	Signature	Company	Date	Time
Relinquished		Icicle Creek Engineers	7/16/20	10:39
Received		OSE	7/16/20	1039
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 30, 2020

Kathy Killman
Icicle Creek Engineers, Inc.
29335 NE 20th Street
Carnation, WA 98014-9632

Re: Analytical Data for Project 1360-001/002
Laboratory Reference No. 2007-162B

Dear Kathy:

Enclosed are the analytical results and associated quality control data for samples submitted on July 16, 2020.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 30, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162B
Project: 1360-001/002

Case Narrative

Samples were collected on July 15, 2020 and received by the laboratory on July 16, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: July 30, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162B
Project: 1360-001/002

SOLUBLE HEXAVALENT CHROMIUM
WATER EXTRACTION
EPA 7196A

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TP-96**					
Laboratory ID:	07-162-01					
Hexavalent Chromium	**ND**	1.1	EPA 7196A mod.	7-29-20	7-29-20	
Client ID:	**TP-100**					
Laboratory ID:	07-162-05					
Hexavalent Chromium	**ND**	1.1	EPA 7196A mod.	7-29-20	7-29-20	
Client ID:	**TP-103**					
Laboratory ID:	07-162-08					
Hexavalent Chromium	**ND**	1.1	EPA 7196A mod.	7-29-20	7-29-20	
Client ID:	**TP-104, S-2**					
Laboratory ID:	07-162-10					
Hexavalent Chromium	**ND**	1.0	EPA 7196A mod.	7-29-20	7-29-20	
Client ID:	**TP-105, S-1**					
Laboratory ID:	07-162-11					
Hexavalent Chromium	**ND**	1.1	EPA 7196A mod.	7-29-20	7-29-20	
Client ID:	**TP-106, S-2**					
Laboratory ID:	07-162-14					
Hexavalent Chromium	**ND**	1.1	EPA 7196A mod.	7-29-20	7-29-20	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 30, 2020
Samples Submitted: July 16, 2020
Laboratory Reference: 2007-162B
Project: 1360-001/002

SOLUBLE HEXAVALENT CHROMIUM
WATER EXTRACTION
EPA 7196A
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0729SM2					
Hexavalent Chromium	**ND**	1.0	EPA 7196A mod.	7-29-20	7-29-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	07-162-01										
	ORIG	DUP									
Hexavalent Chromium	**ND**	**ND**	NA		NA	NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	07-162-01										
	MS	MSD	MS	MSD		MS	MSD				
Hexavalent Chromium	**5.16**	**4.58**	5.00	5.00	ND	103	92	75-125	12	20	
SPIKE BLANK											
Laboratory ID:	SB0729SM2										
	SB		SB			SB					
Hexavalent Chromium	**4.61**		5.00		NA	92		75-125	NA	NA	

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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Icicle Creek Engineers Inc
Project Number: 1360-001/002
Project Name: Forterra Roslyn Property
Project Manager: Kathy Killman
Sampled by: Shane Markus & Jeff Schwartz

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-162

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid/SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Total Metals*		Hexchrome		% Moisture
1	TP-96	7/15/20	1400	Soil	2				X														X		(X)		X
2	TP-97		1430		2																						
3	TP-98		1130		2																						
4	TP-99		1000		2																						
5	TP-100		1100		2																				(X)		
6	TP-101		1200		2																						
7	TP-102		1300		2																						
8	TP-103		1330		2																				(X)		

	Signature	Company	Date	Time
Relinquished	[signature]	Icicle Creek Engineers	7/16/20	10:39
Received	[signature]	OSE	7/16/20	1039
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

*Total Metals:
Arsenic, Cadmium, Chromium
Copper, Lead, Mercury, Nickel,
Zinc
(X) Added 7/28/2020 - DB (3 day TAT)

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: CideCreek Engineers, Inc
Project Number: 1360-001/002
Project Name: Forterra Roslyn Property
Project Manager: Kathy Kilman
Sampled by: Shane Markus & Jeff Schwartz

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-162

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Total Metals*		Hex chrome		% Moisture
9	TP-104, S-1	7/15/20	1600	Soil	1																		X				X
10	TP-104, S-2		1600		1																				⊗		
11	TP-105, S-1		1630		1																				⊗		
12	TP-105, S-2		1630		1																						
13	TP-106, S-1		1730		1																						
14	TP-106, S-2		1730		1																				⊗		

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		CideCreek Engineers	7/16/20	10:39	
Received		OSE	7/16/20	1039	
Relinquished					
Received					
Relinquished					
Received					Data Package: Standard ☐ Level III ☐ Level IV ☐
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Technical Memorandum

To:	Rebecca Bouchey, Forterra
From:	Adam Teepe and Duncan Griffin, HDR
Date:	August 5, 2020
Subject:	Forterra Roslyn Pre-Feasibility Analysis Results

1.0 Introduction

This memorandum outlines the preliminary findings from the HDR team's evaluation of a 30 acre site in the City of Roslyn ("City") for the Roslyn Center Project ("Project"). HDR evaluated site constraints in order to arrive at a developable site area and a preliminary site layout. In addition, HDR evaluated the infrastructure requirements and any associated challenges to meet the infrastructure requirements.

All costs presented are class 5 order of magnitude level estimates and should be re-evaluated with as the project is further defined and confirmation of all required improvements with the City of Roslyn staff.

2.0 Development Details

The proposed development would consist of fifty-two 936-SF residential units, fifty-five 1,872 SF residential units, and one 15,000 SF commercial building. Figures 1 to 5 show the proposed site layout.

Figure 1. Proposed Site Layout



Figure 2. Proposed Commercial and Residential Units



Figure 3. Proposed Green Areas



Figure 4. Proposed Paved Areas

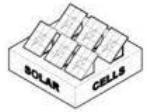
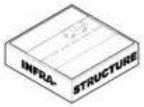


Figure 5. Proposed Parking Areas



2.1 Program Matrix

The following matrix shows the program distribution planned for the Roslyn development.

	Four Bedroom Home	Three Bedroom Home	Community & Retail Space
 Program	55 @ 1872 SF	52 @ 936 SF	15,000 SF
 Residential/Lot Footprint	2600 SF	2000 SF	8000 SF
 Renewable Roof Area	500 SF Solar Panels	200 SF Solar Panels	5900 SF Solar Panels
 Potable Municipal Water	150 Gallons per Day	150 Gallons per Day	92 G/D per 1000 SF Gallons per Day
 Area for Storm Absorption	1050 SF Area beyond Lot Coverage	250 SF Area beyond Lot Coverage	90 SF per 1000 SF Area beyond Lot Coverage

2.2 Developable Area

The overall site area is 1,352,233 square feet. The preserved wetland zone area is 165,241 sf and the Tipple Pile with surrounding developed wetland area is 418,592 sf. The remaining developable site area is 768,400 sf. Figure 6 shows the proposed developed area.

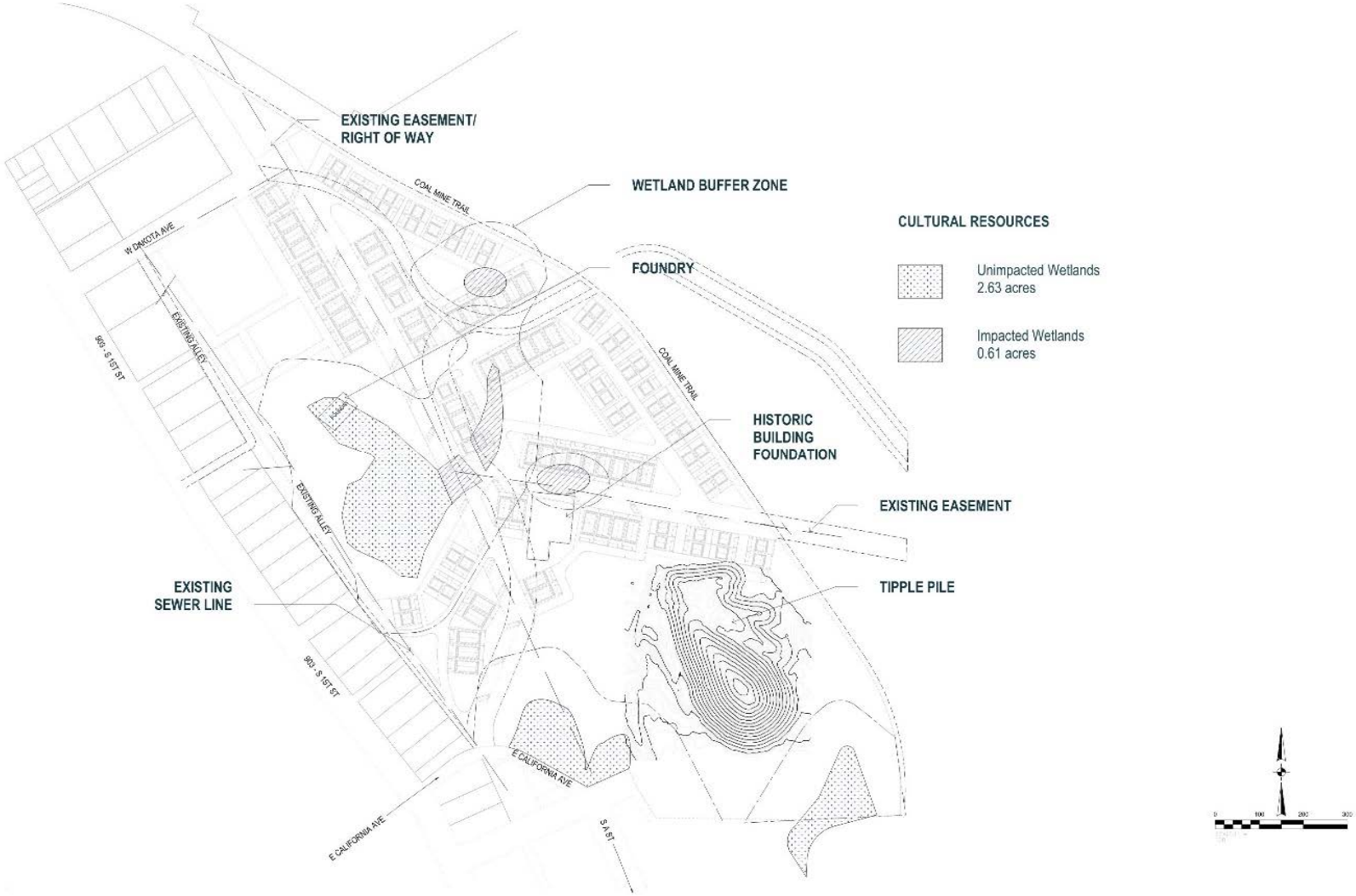
Figure 6. Proposed Developable Area



2.3 Site Constraints

Figure 7 shows the development constraints on the site, including utility easements, wetlands, cultural resources, and the tipple pile.

Figure 7. Site Constraints



3.0 Core Infrastructure Analysis

3.1 Potable Water

3.1.1 Approach

Based on the City's Capital Facilities Plan, the City get its water from Domerie Creek and treats it at its 700 gpm (~1,008,000 gpd) water treatment plant. The water is then stored in the City's 1,000,000 gallon reservoir that then supplies water to the City, approximately 754 customers. The facility plan does not list the City's average day, maximum day or peak hour day flows. The new development would tie into the existing water system via 8 inch ductile iron piping.

3.1.2 System Concerns

The following assumptions were made to determine the water demand for the new development:

- Water use was assumed to be 150 gpd per residential unit to determine the average day demand (ADD).
- Commercial building use was assumed to be 92 gallons per 1,000 SF of commercial space to determine the ADD.
- A peaking factor or 1.5 was assumed to calculate the maximum day demand (MDD).
- A peaking factor of 3.5 was assumed to calculate peak hour demand (PHD).

Table 1 provides an estimate on the potable water demands of the new development. This does not include irrigation.

Table 1. Potable Water Demand of New Development

Building Type	Number of Units	Total Average Day Demand (ADD) (gal/day)	Total Maximum Day Demand (MDD) (gal/day)	Peak Hour Demand (gal/hr)
Residential	107	16,050	24,075	56,175
Commercial	1	1,380	2,070	4,830
Total		17,430	26,145	61,005
+10% contingency		1,743	2,615	6,101
Total Potable Demand		19,173	28,760	67,106

The ADD of the new development will require approximately 1.7% of the City's current capacity and will likely be able to be supplied from the City's existing infrastructure (1 MG reservoir). However, the following items should be confirmed to ensure that peak hour and fire flow demands will be met with the new development during the summer season:

- Fire flow demand requirements
- Peaking factors
- Irrigation demands

Based on current assumption, the City may exceed their capacity and would require additional water sources or treatment capacity to meet the PHD or fire flow requirements. However, it looks like the City is planning to upgrade their treatment plant from 1 MGD to 1.5 MGD which would give them enough capacity.

Table 2 estimates the current development's potable water demands assuming the same assumptions for the City without the new development. This does not include all commercial water use.

Table 2. Estimate of Current City Potable Water Demand

Building Type	Number of Customers	Total ADD (gal/day)	Total MDD (gal/day)	Peak Hour Demand (gal/hr)
All	754	113,100	169,650	395,850

Based on the City's Annual Water Use Efficiency Report, the average consumption during peak irrigation season (July – August) was 451 gpd. Based on this assumption, the City's demand during irrigation season is shown in Table 3.

Table 3. Estimate of Current City's Summer Demand

Building Type	Number of Customers	Total ADD (gal/day)	Total MDD (gal/day)	Peak Hour Demand (gal/hr)
All	754	340,054	510,081	1,190,189

Based on the City's current summer demand and the assumed peaking factors, PHD demand or fire flow demands may exceed the City's current capacity.

3.1.3 Costs

Table 4 presents the preliminary estimated costs for the distribution piping for the new development.

Table 4. Cost Estimate for Water Distribution System Development

Item	Unit	Quantity	Unit Cost	Total Cost
8" Ductile Iron Piping	LF	7,000	$130	$910,000
Fire Hydrants*	EA	12	$8,325	$100,000
			Total	**$1,010,000**

*assumes fire hydrants were placed within 400 feet of each other.

3.2 Stormwater

3.2.1 Approach

Impervious area

Roof area: 107 residential units, weighted-average roof size 1,504 SF
1 commercial unit, 15000 SF

Other impervious area (road and parking lot): 315,976 SF (as measured of the concept plans)

Design Rainfall

According to NOAA Atlas 2, the design rainfall depth at Roslyn, WA (47.2235° N, 120.9931° W) for 2yr 24hour storm is 2.5 inches, and for 10yr 24hr storm is 3.5 inches.

Stormwater calculation

Stormwater quality and quantity calculations are based on the following City of Roslyn, WA standards:

> "Design calculations for peak flow and peak volume storage requirements shall be based on a design storm frequency of 10 years. Design calculations for treatment shall be based on 64 percent of the two-year recurrence interval, 24-hour storm runoff event;"

For each residential unit, the volume of water treatment shall be:

$$64\% * each\ roof\ area * 2yr\ 24\ hr\ rainfall\ depth = 0.64 * 1{,}250SF * 2.5in = 200.66\ CF$$

For the commercial unit, the volume of water treatment shall be:

$$64\% * commercial\ area * 2yr\ 24\ hr\ rainfall\ depth = 0.64 * 15{,}000SF * 2.5in = 2{,}000\ CF$$

For the parking lot and roads, the volume of water treatment shall be:

$$64\% * road\ and\ parking\ lot\ area * 2yr\ 24\ hr\ rainfall\ depth = 0.64 * 315{,}976SF * 2.5in = 42{,}130.13\ CF$$

Therefore the total water quality volume shall be

$$102 * 200.66 + 2{,}000 + 42130.13 = 64{,}597.45\ CF$$

For the water quality volume, we can use bio-retention ponds to store and treat the water. Bio-retention ponds typically hold 75% of the water quality volume, and typical bio-retention ponds have 1ft ponding depth, and 3ft of bio-materials with void ratio of 0.4. Thus the area needed for the bio-retention ponds shall be

$$\frac{64{,}597.45\ CF * 0.75}{1ft + 3ft * 0.4} = 22{,}021.9\ SF$$

For the 10yr, 24hr storm, the total volume of runoff is calculated as follows:

$$total\ impervious\ area * 10yr\ 24\ hr\ rainfall\ depth = (98 * 1{,}504SF + 15{,}000SF + 315{,}976SF) * 3.5in = 139{,}524CF$$

It is assumed that entire volume of 10 yr, 24 hr storm runoff off of site impervious area is stored. If using an infiltration/evapotranspiration/detention basin to address these flow and assuming the depth of the basin is 4ft, then the area of the detention basin should be about 33,066 SF (0.76 acre).

A stormwater collection system is proposed to convey the water to the detention pond. We propose 18''-24'' pipes, with a total length of 2,200ft. Inlet spacing is set to be 200ft, so a total of 22 inlets are needed. Also 3 manholes are proposed.

3.2.2 System Concerns

According to google map, a tributary of Crystal Creek passes by the south end of the proposed community. It appears that the design plans proposed some SF units right on the stream. We assume this stream is a dry ditch, and site grading will handle the conveyance of the flow through this ditch (i.e., grade a channel around the buildings). In addition, a culvert may be needed if the stream crosses the proposed road.

3.2.3 Costs

Table 5 presents a summary of the devices and costs proposed for the system.

Table 5. Cost Estimate for Stormwater System

Device	Unit	Quantity	Unit Cost	Total Cost
Bio-retention pond	SF	22000	$40	$880,000
Detention ponds	ACRE	0.8	$32,200	$26,000
Inlets	EACH	22	$5,000	$110,000
Pipes	LF	2200	$75	$165,000
Manholes	EACH	3	$5,000	$15,000
			Total	**$1,196,000**

3.3 Wastewater

3.3.1 Approach

The City of Roslyn, Washington wastewater collection system feeds an equalization basin at the southeast side of town (see figure). The equalization structure was built in 2006 as part of the centralization of wastewater treatment for the Cle Elum, Roslyn, Ronald and Suncadia. All wastewater is thus treated at the Cle Elum Wastewater Treatment Facility (WWTF).

Estimated wastewater flows from the proposed development are based on the Washington State Department of Ecology's *Criteria for Sewage Works Design*. A summary of the wastewater projected to be produced from the development is estimated at 31,250 gallons per day as summarized in Table 6.

Table 6. Estimated Wastewater Flows

Estimated Wastewater Flows			**Total**
Dwellings	100 gpcpd	2.5 Persons per Dwelling (107 dwellings)	26,750 gpd
Commercial Buildings	Assume 15,000 SF	300 gallons per 1,000 sqft floor space	4,500 gpd
		Total	**31,250 gpd**

The Cle Elum upgrades were completed in 2005 with a monthly average design flow of 3.6 million gallons per day (mgd). Current maximum monthly flows are less than 1.0 mgd. Thus, it appears the Cle Elum centralized treatment facility has available flow capacity for the roughly 102 new homes and commercial center.

It is assumed that the development would require a small package wastewater pump station; approximately 200 lineal feet of 8-inch diameter PVC pipe to connect the development to the existing city of Roslyn system; and about 7,000 lineal feet of 6 to 8 inch pipes along the development streets with about 50 lineal feet of 4 inch laterals connecting to each residential unit.

3.3.2 System Concerns

The City of Roslyn, Washington wastewater collection system main trunk line capacity should be confirmed with the City staff prior to completion of the report. It is assumed for the purposes of this estimate that the main trunk to the equalization basin has capacity. Flows from the City are equalized in the basin before being discharge to the sewer main that flows to the Cle Elum WWTF.

3.3.3 Costs

If the new development requires a small package wastewater pump station costs for this facility would be approximately $0.5MM dollars. Collection system tie-in gravity sewer piping assuming 8-inch diameter PVC pipe would be $250/LF and approximately 200 LF of pipe would be approximately $50,000 dollars. Within the development, 7,000 lineal feet of 8 inch pipe would be installed at a depth of up to 10 feet at an assumed cost of about $90 per lineal foot (total $630,000). The 4 inch laterals are assumed to cost about $80 per lineal foot (total $408,000). Total costs for the wastewater infrastructure would be between $1.0MM and $1.5MM dollars.

3.4 Transportation

3.4.1 Approach

The transportation infrastructure requirements for the development were estimated by assuming that the street right-of-ways and alleys in the development would be paved. This equates to a total of about 40,000 square yards of paved areas.

3.4.2 System Concerns

The primary access point for this development is intended to be from Pennsylvania Avenue, one block east of Highway 903, adjacent to the triangular portion of the site currently used for overflow parking. There do not appear to be any Streets improvements in the Roslyn 2016-21 CFP in this area. The local authority may want to see an off-site improvement there (and not necessarily a signal) to help accommodate this level of land development/traffic generation.

3.4.3 Costs

The costs for the proposed transportation infrastructure are presented in Table 8.

Table 7. Transportation Infrastructure Costs

Line Item	Unit	Quantity	Unit Cost	Total
Asphalt Pavement Streets	SY	40,242	$61	$2,454,762
Signage & Striping	Allow	1	$33,000	$33,000
			Total	$2,487,762

3.5 PSE Electric Line Burial

3.5.1 Feasibility

It should be feasible to bury the overhead power and communication lines that are located on the property. The distribution lines would need to be coordinated with Puget Sound Energy. There also appears to be a communication line co-located on the power poles. The owner of this line would need to be determined so coordination could occur. Finally, there may be luminaires that would need to be converted to an underground system if they are to be used for roadway lightning. Burial would be feasible in the right-of-way to facilitate co-location with any proposed roadways.

3.5.2 Costs

The unit cost for burial of the electric lines would likely be between $22 and $30 per lineal foot. The communication cable would likely be $10 per lineal foot. PSE would provide the final estimate, but these ranges are typical on similar projects in Washington. The total cost of communication and electric line burial assuming a combined cost of $40 per lineal foot would be about $93,000. The cost to convert any luminaire that are currently on the power poles would be between $6,000 and $7,000 for each pole. Assuming approximately 10 luminaires, the cost would be approximately $70,000.

3.6 Renewable Energy

Rooftop solar panels are planned for both types of residential units and the commercial building. Regarding site capacity for Energy, the intent is that each structure meets net zero energy needs using its own rooftop solar panels. Calculations for the Energy Use Intensity (EUI) which measures the annual energy use per square foot show how each residence and building can achieve this requirement, as shown in Figures 8, 9, and 10.

Figure 8. Energy Matrix: 936 SF Residential

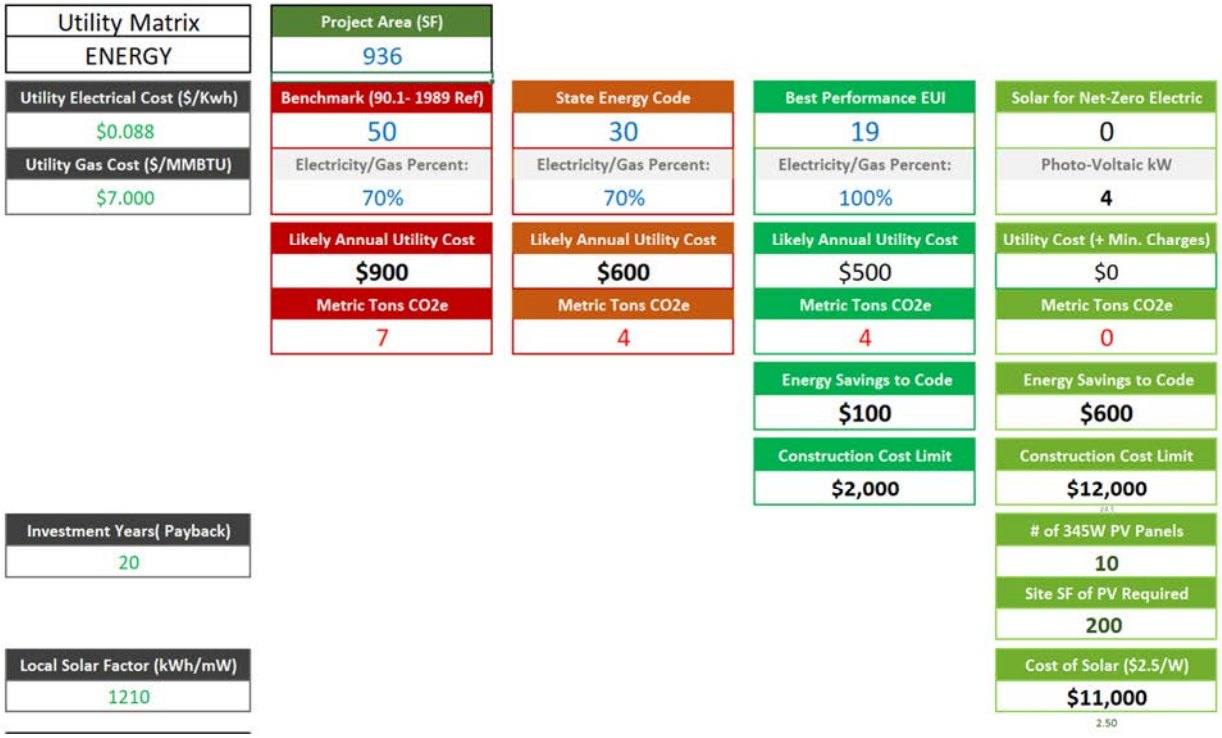


Figure 9. Energy Matrix: 1,872 SF Residential

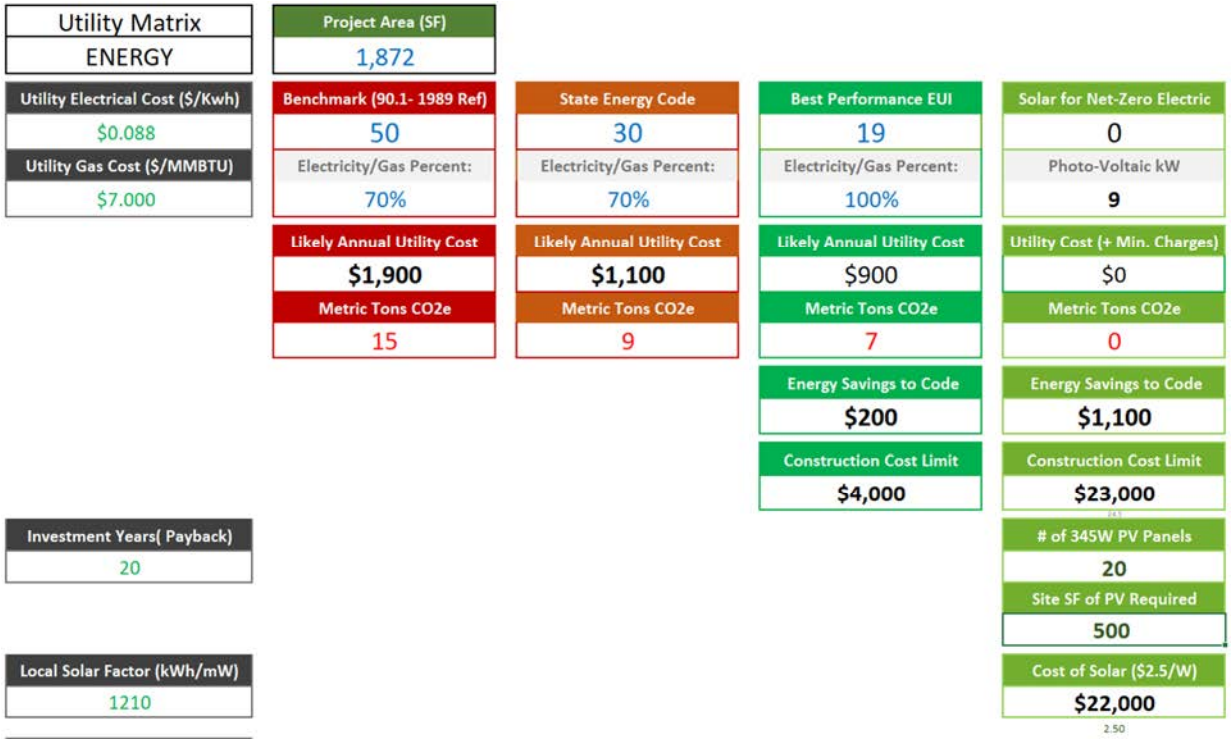
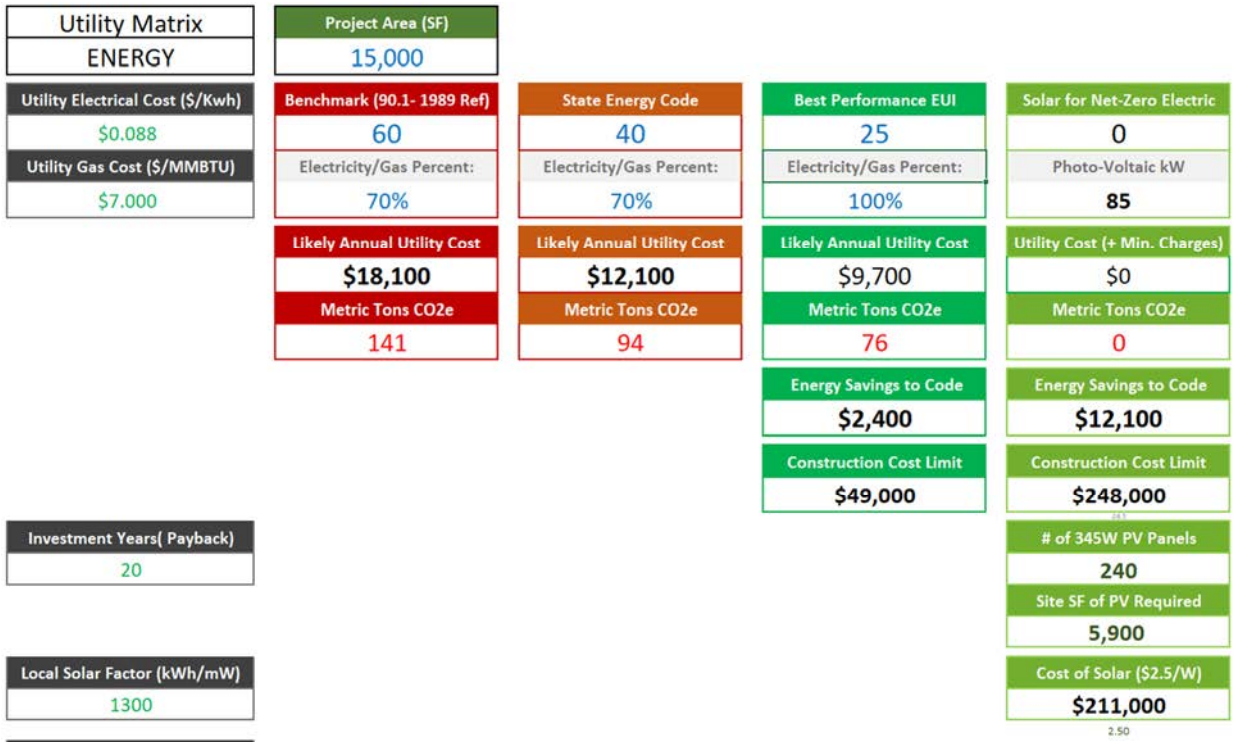


Figure 10. Energy Matrix: 15,000 SF Commercial



The total cost of installing solar panels would be $1,993,000 (Table 8).

Table 8. Solar Panel Installation Cost

Unit	Number of Units	Approximate Installation Costs
936 SF Residential	52	$572,000
1,872 SF Residential	55	$1,210,000
15,000 SF Commercial	1	$211,000
Total		**$1,993,000**

3.7 Opinion of Probable Infrastructure Cost

Table 9. Preliminary Infrastructure Cost Summary

Infrastructure	Approximate Installation Costs
Potable Water	$1 million
Stormwater	$1.2 million
Wastewater	$1 to 1.5 million
Transportation	$2.5 million
Existing Overhead Utility Burial	$70,000
Solar Panels	$1.99 million
Total	**$7,800,000 to $8,300,000**
Total Per Unit	**$72,900 to $77,600**
Contingency	**%30**
Total Per Unit with Contingency	**$94,800 to 100,900**

Note that there is no escalation, soft costs or sales tax applied to this opinion of probable infrastructure cost. These values are for use only at the feasibility stage. The unit costs omit the commercial structure from the per unit calculation.

4.0 Community vignettes

i. Four Bedroom 1872 SF House.



ii. Three Bedroom 936 SF House

