Prepared for:
**The BNSF Railway Company**
**Seattle, Washington**

# Levee Zone Interim Action for Cleanup 2007 and 2008 – As-Built Completion Report

## Former Maintenance and Fueling Facility
## Skykomish, Washington

AECOM, Inc.
February 2009
**Document No.: 01140-144-230**

AECOM

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Prepared by Sarah Albano, P.E..

Reviewed by Michael G. Byers, P.E., Project Manager



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AECOM

# Contents

**1.0 Introduction ........ 1-1**
1.1 Report Organization ........ 1-1

**2.0 Project Management and Organization ........ 2-1**

**3.0 Description of Remedial Action ........ 3-1**
3.1 Levee Removal and Uplands Excavation ........ 3-1
3.2 Reconstruction and Restoration ........ 3-1

**4.0 Permitting ........ 4-1**
4.1 NPDES Waste Discharge ........ 4-1
4.2 Substantive Requirements for Town of Skykomish ........ 4-1
4.3 Permit to Discharge Industrial Wastewater to Groundwater – Exhibit J of Agreed Order DE-2379 ........ 4-1
4.4 King County Special Use Permit S-64-06 ........ 4-1

**5.0 Remediation Activities ........ 5-1**
5.1 Water Treatment and Discharge ........ 5-1
5.2 Waste Disposal ........ 5-1
5.3 Soil Loading Pad Decontamination ........ 5-1

**6.0 Restoration ........ 6-3**
6.1 Levee Restoration ........ 6-3
6.1.1 Levee Design Process ........ 6-3
6.1.2 Overlook and Walkway ........ 6-3
6.1.3 Landscaping ........ 6-3
6.1.4 Railing ........ 6-3
6.2 Residential Restoration ........ 6-3
6.2.1 Utilities ........ 6-3
6.2.2 Flatwork ........ 6-3
6.2.3 Landscaping ........ 6-3
6.3 School Restoration ........ 6-3
6.3.1 Fencing ........ 6-3
6.3.2 Flatwork ........ 6-3
6.3.3 Shed Location ........ 6-3
6.3.4 Playground Equipment ........ 6-3
6.3.5 School Structural Survey ........ 6-3

6.3.6 Landscaping ........ 6-3
6.4 Public Infrastructure ........ 6-3
6.5 Quality Assurance ........ 6-3

**7.0 Compliance Monitoring ........ 7-3**
7.1 Groundwater Monitoring Wells ........ 7-3
7.2 Groundwater Monitoring ........ 7-3

**8.0 Summary and Conclusions ........ 8-3**

**9.0 References ........ 9-3**

# List of Appendices

*Please note: Appendices A through E are provided on the attached CD-ROM*

Appendix A Agreed Order and Consent Decree Extensions

Appendix B RETEC Weekly Reports

Appendix C Construction Daily Reports

Appendix D Construction Photographs

Appendix E Discharge Monitoring Reports

Appendix F January 25, 2008 Skykomish Levee Memo

Appendix G Levee Retaining Wall Design/Viewing Platforms Design

Appendix H Levee Erosion Protection and Planting Plan

Appendix I Skykomish Levee Remediation Project Plant Installation As-Built Report

Appendix J Levee Railing Drawings

Appendix K Topsoil Specification and Approval

Appendix L School Structural Survey Memo

Appendix M Levee Remediation Sidewalk Stamp

Appendix N Well Completion Logs

# List of Tables

Table 5-1 Waste Streams and Disposal ........................................................ 5-3

# List of Figures

Figure 1-1 Site Location Map

Figure 3-1 Construction Layout Plan

Figure 6-1 Final Site Utility Layout with Surface Features

Figure 7-1 Monitoring Well Locations

# Professional Certification

**Construction Completion Report**
**Levee Zone Interim Action for Cleanup**
**Skykomish Washington**

Based on direct observation made by AECOM Environment (previously ENSR Corporation [dba The RETEC Group, Inc. {RETEC}]), of personnel, materials testing, laboratory testing and other construction documentation described in this report, it is the opinion of the undersigned that the portion of the Levee Zone cleanup action for the Skykomish Site that was completed in 2007 and 2008 and described in this report has been constructed in substantial compliance with the scope of work presented in the Agreed Order No. DE3279 and the intended design presented in the *Engineering Design Report – Levee Zone Interim Action for Cleanup* (RETEC, 2006a) and *Plans and Specifications for Skykomish Levee Remediation* (RETEC, 2006b). The 2007 and 2008 portion of the cleanup described herein was completed, and the material and data in this report were prepared, under supervision and direction of the undersigned.

AECOM Environment

MICHAEL G. BYERS
STATE OF WASHINGTON
30698
REGISTERED
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2/10/09

EXPIRES 12/11/2010

Michael G. Byers, P.E.
Project Manager

# 1.0 Introduction

This document presents the *2007 and 2008 As-Built Report for the Levee Zone Interim Action for Cleanup* for the BNSF Railway Company's Former Maintenance and Fueling Facility located in Skykomish, Washington. The Levee Zone includes parts of the South Fork Skykomish River, the levee, and a portion of the uplands "Northwest Developed Zone." These areas encompass the "Project Area" used throughout this document. Figure 1-1 shows the project area location.

This work was performed by the BNSF Railway Company (BNSF) at Washington State Department of Ecology's (Ecology) direction pursuant to Agreed Order No. DE3279 (AO). On October 19, 2007, BNSF and Ecology entered into a Consent Decree (CD; State of Washington v. BNSF Railway Company, King County Case No. 07-2-33672-9SEA) to complete the cleanup action site-wide. Section VIA of the CD incorporated all outstanding obligations under the AO by reference. Once the CD was entered, the AO no longer had any force or effect. The Agreed Order and CD deadlines were modified several times by Ecology to accommodate field conditions and construction delays encountered by BNSF's contractors (Appendix A).

The purpose of this as-built report is to document cleanup activities completed as part of the Interim Action for Cleanup in 2007 and 2008. The construction activities described herein were performed from January 1, 2007 through December 31, 2008.

Work completed in 2007 and 2008 was a continuation of work initiated in 2006 for the remedial actions described in the *2006 Levee Zone Interim Action for 2006 – As-Built Completion Report* (2006 As-Built Report; RETEC, 2007). The 2006 work included temporary relocation of five residences, excavation of the levee, underlying soils and sediments along the south bank of the South Fork Skykomish River, reconstruction of the levee, and partial restoration of natural resources, private property and public infrastructure that were disturbed by the remedial action. The majority of restoration work was completed in 2007 and included residential sidewalks and driveways, sidewalks, curbs, and final paving of streets, irrigation along the planters on the levee, topsoil placement on the levee and residential properties, and installation of the retaining wall, railing, ramps, overlook, and steps at the levee. Work completed in 2008 included the landscaping, installation of the lights, and the installation of the permanent handrail on the levee.

## 1.1 Report Organization

This report is organized into nine sections and eighteen appendices as follows:

- *Section 1* – Introduction
- *Section 2* – Project Management and Organization
- *Section 3* – Description of the Remedial Action
- *Section 4* – Permitting
- *Section 5* – Remediation Activities
- *Section 6* – Restoration
- *Section 7* – Compliance Monitoring
- *Section 8* – Summary and Conclusions
- *Section 9* – References.

Appendices to this completion report include the following:

- *Appendix A* – Agreed Order and Consent Decree Extensions
- *Appendix B* – RETEC Weekly Reports
- *Appendix C* – Construction Daily Reports
- *Appendix D* – Construction Photographs
- *Appendix E* – Discharge Monitoring Reports
- *Appendix F* – Levee Erosion Protection and Planting Plan
- *Appendix G* – Levee Railing Drawings
- *Appendix H* – Topsoil Specification and Approval
- *Appendix I* – School Structural Survey Memo
- *Appendix J* – Well Completion Logs
- *Appendix K* – Levee Retaining Wall/Viewing Platform Design.

# 2.0 Project Management and Organization

AECOM Environment (previously ENSR Corporation and The RETEC Group, Inc.[RETEC]) was retained by BNSF as the Engineer for the project. RETEC prepared the construction documents, oversaw the remediation activities, and served as a liaison between BNSF, subcontractors, the Town, and local stakeholders. Ecology provided regulatory oversight. A brief description of each contractor's role is described below.

- **Granite Construction (previously Wilder Construction Company; Wilder) –** General contractor completing excavation, backfill and grading of excavation and topsoil, loading of excavated materials for disposal, water treatment, and infrastructure reconstruction
- **D.B. Davis, LLC –** House moving, residential restoration, and septic system reconstruction
- **AAA Drainfield Designs –** Replacement septic system and drainfield design and permitting
- **Rabanco/Allied Waste –** Waste disposal
- **KPG –** Civil engineering and landscape architecture firm assisted the Town in levee feature selection
- **Glasswater Media –** Videography of school structural survey
- **EnviroIssues –** Public outreach for overall project
- **Test America –** Water analytical testing using fixed base laboratory
- **Bush Roed and Hitchings, Inc. (BRH) –** Surveying
- **Grette and Associates –** Biological consultants assisting with permitting, fish recovery, levee habitat design, and landscaping oversight.
- **Dr. Saad Moustafa, P.E. –** Structural engineer for school structural survey
- **Securitas –** 24-hour security for house storage
- **Shelterbelt –** Levee landscaping maintenance.

In addition, BNSF transported excavation spoils to Rabanco via rail for disposal.

As the general contractor, Wilder retained the following subcontractors:

- **Best Parking Lot Cleaning –** Periodic sweeping services
- **CCI Analytical Laboratories –** Water analytical testing
- Conoco Pumping – Subcontractor for telebelt used to place topsoil on the levee
- **Mayes Testing Engineers –** Compaction testing of backfilled material
- **Milba-Pita –** Geotechnical engineering and retaining wall design
- **Marine Vacuum –** Waste fluid disposal
- **SAPA –** Design and construction of hand railing on levee.
- **True Green –** Landscaping.

# 3.0 Description of Remedial Action

The remedial design was implemented in accordance with the Washington Administration Code (WAC) 173-340-430 – Interim Actions. The remedial action consisted of relocating several residences, excavating soil and sediment from the Levee Zone within the South Fork Skykomish River and a portion of the uplands in the Northwest Developed Zone, and restoring public and private property in accordance with access agreements and the *Engineering Design Report* (EDR, RETEC, 2006a). Excavation included the removal of soil and sediment exceeding site-specific cleanup levels and remediation levels, at the locations for which they apply as detailed in the *2006 As-Built Report* (RETEC, 2007). Figure 3-1 shows the construction layout plans.

In accordance with the Agreed Order and CD, BNSF provided weekly reports to Ecology (Appendix B). When RETEC field staff members were on-site, daily construction reports were completed (Appendix C). Construction photographs document the site activities (Appendix D).

## 3.1 Levee Removal and Uplands Excavation

The excavation area extended west from the 5$^{th}$ Street Bridge by approximately 750 feet, and included the levee and sediments along the levee, and soils approximately 135 feet landward of the levee. This excavation removed parts of the existing stormwater sewer system of West River Road, 5$^{th}$ Street and 6$^{th}$ Street as well as the existing septic systems serving four of the residences in the cleanup area. The excavation extended up to 16 feet below the pre-excavation ground surface. Details of the excavation can be found in the *2006 As-Built Report* (RETEC, 2007). Five buildings were relocated prior to the excavation activities and subsequently replaced upon completion of the cleanup. The affected residents were relocated while cleanup was ongoing. In addition to the septic systems and stormwater system, the area also contains utilities, roads, and sidewalks. The entire afore-mentioned infrastructure was removed or relocated during excavation and was restored following completion of cleanup activities.

## 3.2 Reconstruction and Restoration

Upon completion of excavation, reconstruction and restoration included backfilling excavation areas, reconstructing the levee, replacing the stormwater system, rebuilding foundations, garages, outbuildings, septic systems and drainfields, moving the buildings back to their original locations and restoring and reconnecting the utilities. Additional enhancements were made to West River Road so that it meets King County Road Standards, which have been adopted by the Town of Skykomish.

Restoration activities completed in 2007 and 2008 included:

- Residential sidewalks and driveways
- Sidewalks, curbs, and final paving of streets
- Topsoil placement and landscaping on the levee
- Topsoil placement on residential properties
- Installation of the retaining wall, railing, ramps, overlook, planters, irrigation, sitting areas and steps at the levee.

# 4.0 Permitting

Permits required for the interim action are detailed in the 2006 As-Built Report. This section discusses the substantive requirements for the Town of Skykomish, Permit to Discharge Industrial Wastewater to Groundwater – Exhibit J of Agreed Order DE-2379, and King County Special Use Permit S-64-06 which pertained to the 2007 work.

## 4.1 NPDES Waste Discharge

Ecology issued a permit under the National Pollutant Discharge Elimination System (NPDES) program on May 4, 2006 to regulate the discharge of potential pollutants into the state's surface waters. As detailed in the EDR (RETEC, 2006a), the levee interim action required discharge of treated wastewater into the South Fork Skykomish River and, therefore, required an Individual NPDES permit. Ecology issued NPDES Permit No. WA-003212-3 to BNSF on May 4, 2006 after public comment and amended it on August 15, 2006. A second amendment was issued as part of the 2008 cleanup. A copy of the permit, which expires in May 2011, is included in Appendix D of the 2006 As-Built Report.

No water was discharged into the South Fork Skykomish River in 2007. BNSF submitted monthly Discharge Monitoring Reports to Ecology (Appendix E) in compliance with the permit.

## 4.2 Substantive Requirements for Town of Skykomish

The Town of Skykomish provided a list of substantive requirements that were required to be met by the project per the AO and CD to comply with their Land Clearing permit, Right of Way Use permit, and grading permit. Roadways were designed using King County, Washington Road Standards, which were adopted by the Town. New residential structure work was completed in accordance with the International Residential Building Code.

## 4.3 Permit to Discharge Industrial Wastewater to Groundwater – Exhibit J of Agreed Order DE-2379

BNSF submitted an informational permit application to Ecology on October 24, 2006 to discharge industrial wastewater to groundwater on some portions of the rail yard. This permit allowed for the NPDES permitted wastewater treatment system used at the South Fork Skykomish River to be moved to the railyard and used specifically for treating stormwater runoff from contaminated soil stockpiles. On November 22, 2006, Ecology issued the substantive requirements of this permit as a minor modification (Exhibit J) to the AO.

## 4.4 King County Special Use Permit S-64-06

BNSF submitted an informational permit application to King County on April 5, 2006 to satisfy the substantive requirements for a Special Use Permit for the Levee Cleanup Project. King County issued a draft Special Use Permit S-64-06 to perform contamination cleanup activities on July 18, 2006. A copy of this draft permit is included in Appendix C of the 2006 As-Built Report. BNSF met with the county on October 10, 2007 and believes that we have satisfied all substantive and/or procedural requirements of a special use permit as discussed in our January 25, 2008 memo (Appendix F).

# 5.0 Remediation Activities

Remediation activities were substantially complete on December 31, 2006. Two remediation activities continued into 2007: water treatment and discharge and waste disposal.

## 5.1 Water Treatment and Discharge

A treatment system was operated during 2007 at the soil stockpile area on the railyard to control stormwater runoff. The treatment train for this 300-gpm system consisted of gravity separation, chitosan-enhanced sand filtration, activated carbon adsorption, and pH adjustment. Activated bentonite and chitosan-enhanced bag filters were later added to remove fines. After treatment, storm-water was discharged to the ground as authorized by Exhibit J of the AO.

Discharge monitoring results were submitted each month to Ecology Water Quality Program in the form of Discharge Monitoring Reports (DMRs). Discharge under Exhibit J of the AO occurred through April 4, 2007. DMRs for water treatment facility operations beginning in January 2007 through April 2007 are included in Appendix E.

BNSF notified Ecology of noncompliance with Exhibit J on January 3 and January 8, 2007 in a letter dated January 25, 2007. Discharge sample data collected on January 3 and 8, 2007 indicated that Total Petroleum Hydrocarbons (TPH) and individual polynuclear aromatic hydrocarbons (PAH) exceeded effluent limitations for stockpile runoff and pH may have exceeded the effluent limit on January 3, 2007. The poor treatment system performance was related to extremely cold weather experienced in Skykomish in January. Cold air and water temperatures caused ice to form inside the steel carbon vessels and sand filters resulting in “rat-holing” of water through a small diameter of the vessels.

As detailed in a follow-up letter from RETEC to Ecology dated February 7, 2007, approximately 190,000 gallons of treated stormwater were discharged over four days, from January 3 through 9, 2007. Surface soil sampling is planned as part of the next phase of cleanup for the stormwater discharge area to confirm that this area does not exceed remediation levels or other applicable standards.

The water treatment system was shut down on January 10, 2007 and Wilder implemented winterization measures by adding heated containment around the carbon vessels and sand filters. Water treatment operations were changed from continuous flow/discharge to batch treatment where water was tested and analytical results were provided to Ecology for approval prior to discharge. Water treatment was resumed in March 2007 and final discharge of all stormwater was performed on April 4, 2007.

The treatment system was demobilized in April, 2007. Final cleanup of the system included removal of all remaining water and sludge using a vacuum truck, and transport of the material to Marine Vac Services.

## 5.2 Waste Disposal

There were numerous waste streams resulting from site remediation activities. Sources of waste and final disposition of the waste for 2007 are detailed in Table 5-1. Impacted soil and sediment continued to be removed from the site by rail through mid-January.

## 5.3 Soil Loading Pad Decontamination

Original plans called for total removal of the soil handling area asphalt pad and underlying liner. However, once the impacted material had been removed, it was determined that the pad and handling area could be utilized in a future phase of the work. Decontamination of the pad included fully scraping the pad with the bucket of a loader to remove as much soil as possible. The pad was then cleaned with a pressure sprayer using clean, heated water. Water and sediment that was generated during cleaning of the pad was collected, and treated in the water collection and treatment system. Decontamination of the cleaned pad was documented with pictures, and a visual observation was completed. This information was sent to DOE, and the pad decontamination was approved by DOE on March 29, 2007. The berms that surround the northern edge of the stockpile area were breached in a couple of areas in order to allow stormwater to drain off the pad.

**Table 5-1 Waste Streams and Disposal**

| Waste Stream | Source | Disposal Methods |
|---|---|---|
| Excavated soils and sediments | Excavation of Skykomish levee, river bed, and upland soil 135 feet up-gradient of Skykomish levee | Material was taken to Rabanco disposal facility |
| Granular activated carbon | Water treatment system | Material was taken to Rabanco disposal facility |
| Sand from sand filters | Water treatment system | Material was taken to Rabanco disposal facility |
| Construction debris including building foundations, well casings, well tubing | Excavation in residential areas, well decommissioning | Impacted material was taken to Rabanco disposal facility; unimpacted material to a construction debris landfill |
| Booms and sorbent pads | Sheen control | Material was taken to Rabanco disposal facility |
| Personal protective equipment including Tyvek suits, chemical-resistant gloves. | Worker protection | Impacted material was taken to Rabanco disposal facility |
| Sampling equipment including resealable bags | Soil, sediment, and water sampling | Impacted material was taken to Rabanco disposal facility |
| HDPE and PVC liner | Coffer dam liner, liner for stockpile area | Impacted material was taken to Rabanco disposal facility |
| Polyethylene sheeting | Stockpile covers, dust control | Impacted material was taken to Rabanco disposal facility |
| Asphalt | Current and temporary road demolition | Asphalt recycling |
| Tank sludge and solids | Water treatment facility | Material was taken to Rabanco disposal facility |
| Flexible Intermediate Bulk Container Bags | Cofferdam | Material was taken to Rabanco disposal facility |
| Silt fencing, orange safety fence, catch basin socks | Temporary Erosion and Sediment Control Measures | Impacted material was taken to Rabanco disposal facility, unimpacted material to a licensed solid waste facility |
| Non-aqueous Phase Liquid (NAPL) | Skimming operations | Recovered NAPL was taken to an off-site licensed disposal or recycling facility |
| Septic Tank and Septage | Septic tank abandonment | Septage was removed by a county-approved pumper and treated in accordance with applicable regulations; empty tanks were taken to Rabanco disposal facility |

# 6.0 Restoration

Restoration activities during 2007 and 2008 included restoration of the levee, residential areas, the school property, and public property as detailed in the following sections.

## 6.1 Levee Restoration

### 6.1.1 Levee Design Process

The levee was originally specified in the plans and specifications (RETEC, 2006b) with a mechanically stabilized earth retaining wall. It was understood that the town would have substantial input on the aesthetics of the wall and the design elements such as stairways, access ramps and lighting. The mayor of the Town selected a group of individuals to work with KPG (a civil engineering and landscape architectural firm provided by BNSF) to evaluate different wall types and choose how the overlook, walkways, plantings on the top and the south side of the levee would ultimately look. The committee detailed the type of wall, and decided to add lighting, irrigation on the top of the levee, a kayak access on the west side of the levee, and sitting rocks along the top of the levee.

### 6.1.2 Overlook and Walkway

The overlook was designed to provide pedestrians with a place to look out over the levee at the South Fork of the Skykomish River (Appendix G). The overlook is located at the north end of 6th Street and is made of reinforced concrete that was cast in place.

The overlook is accessed either by steps on either side of 6th Street, or by the walkway that runs along the top of the levee (see Figure 6-1). The walkway is accessed at either end of the levee by ramps. The ramp on the eastern end of the levee is paved, and has a railing to aid wheelchair users. The ramp on the western end of the levee is a continuation of the walkway along the top of the levee. Groups of sitting rocks were placed at the City's request at intervals along the top of the levee. Planters with an irrigation system were placed on the south side of the walkway at the request of the Town. These planters will be planted and maintained by the Town. Pedestals for street lights have been placed along the south side of the walkway. The Town is working with PSE to install lights along the top of the levee.

### 6.1.3 Landscaping

Landscaping activities on the Levee in 2007 and 2008 included placement of topsoil, erosion control matting, hydroseeding, planting, and maintenance.

Topsoil placed on the levee met the criteria specified in the specifications (RETEC, 2006b). Material was placed using a telebelt and was then blown using a forced air wand into interstitial spaces in the armor rocks. Material was placed approximately 1 foot thick as specified in the specifications. Topsoil was placed starting on June 5, 2007 and was inspected by RETEC field personnel to ensure that material was being placed to the correct thickness.

Erosion control matting was installed to prevent erosion of the soil prior to planting. Planting was delayed until the fall based on recommendations from Grette and Associates.

Planting on the levee followed the Levee Planting Plan and Monitoring Program (Grette and Associates, 2005, Appendix H) which was submitted to the United States Army Corps of Engineers as part of the Biological Evaluation addendum. A biologist from Grette and Associates inspected the plant stock and confirmed the plant placement with the planting subcontractor.

Planting on the levee took place October 22-24, 2007 (levee zone), June 5, 2008 (salmonberry in the shoreline zone), July 17, 2008 (Pacific ninebark in the shoreline zone) and October 10, 2008 (live stakes) as detailed in Appendix I (Skykomish Levee Remediation Project Plant Inspection As-Built Report, Grette, 2008).

### 6.1.4 Railing

The Town chose aluminum railing designed by SAPA. Shop drawings of the railing are included in Appendix J. In addition to the railing, hand holds along the ADA ramp were manufactured. The Town elected not to install the handholds at this time. Wilder installed a temporary wooden railing that was in place from June 2007through the installation of the permanent railing. The majority of the railing was installed in October 2008 with the last panel of the railing being installed on December 9, 2008.

## 6.2 Residential Restoration

Residential buildings were returned to their specified locations in December 2006. Buildings were prepared for residents to return to their homes in January with all residents moved into their homes by January 31, 2007. Electrical boxes were upgraded to meet current building codes, replacement flatwork was completed, and topsoil was placed.

### 6.2.1 Utilities

Utilities in the interim action area were replaced underground. Underground utilities require utility pedestals to allow hook-up and maintenance. These pedestals resulted in easements between residential owners and the Town. Electrical power boxes at each of the residential buildings were upgraded to comply with current building codes.

### 6.2.2 Flatwork

Flatwork on residential property included walkways from the sidewalk to the residences, driveways, and, in the case of the Mitchell East residence, replacement steps. Walkways were replaced in-kind with poured concrete walkways. The Moore driveway was finished with an acid wash to mimic the finish on the pre-existing driveway.

### 6.2.3 Landscaping

#### 6.2.3.1 Topsoil

Topsoil in residential areas met the criteria specified by Ecology (Appendix K) and was approved for use by Ecology (Appendix K). Topsoil was placed approximately 1 foot thick and was hand rolled for compaction. Topsoil was placed around residences and was graded to blend with sidewalk grades and house foundations. The final grades at the site are smoother than the pre-existing grades.

#### 6.2.3.2 Vegetation and Landscaping

BNSF prepared landscaping plans and cost estimates for each property. Property owners were then offered the option of accepting monetary compensation in lieu of BNSF completing the landscape plans in 2007. Each property owner agreed to accept the monetary compensation and they will be completing all of the landscaping on their respective properties.

## 6.3 School Restoration

### 6.3.1 Fencing

Fencing along the edge of the school playfield which was in the excavation area was replaced with 6-foot tall chain-link fence (along the northern edge of the school field), 5-foot tall chain-link fence along the northeastern edge of the playfield, and 15-foot tall fence on wooden posts along the north-western edge of the playfield.

The School Board opted to accept monetary compensation and replacement fencing in lieu of a replacement backstop. Fencing was placed to maximize school playfield space. A vacuum truck was used to evacuate the fence post holes since the fence was placed above the joint utility trench. At the request of the School, additional posts for a gate on the northern edge of the play field were placed.

### 6.3.2 Flatwork

In addition to the replacement concrete front walkway at the Teacherage, the School Board paid to have an asphalt parking slab and driveway installed west of the Teacherage.

### 6.3.3 Shed Location

The school shed located west of the Teacherage was relocated to an area specified by the School.

### 6.3.4 Playground Equipment

Playground equipment was removed during the installation of the temporary school access road west of the School. During removal the playground equipment was damaged. The School and the contractor reached an agreement on the value of the equipment. The School selected a replacement piece of equipment that was installed by the contractor.

### 6.3.5 School Structural Survey

Two school structural surveys were completed by Dr. Saad Moustafa, P.E. (Appendix L). The first survey, completed on August 23, 2006 was conducted to determine the existing condition of the school. The second survey was completed on June 27, 2007 after all construction in the area to determine if the removal and replacement of contaminated soil adjacent to the school had any effects on the school's structural condition. A comparison of the school before and after excavation indicates that the construction activities that took place between August 23, 2006 and June 27, 2007 did not cause any structural distress to the school building.

### 6.3.6 Landscaping

BNSF prepared landscaping plans and cost estimates for the School property. The School Board was then offered the option of accepting monetary compensation in lieu of BNSF completing the landscape plans in 2007. The School board opted to accept monetary compensation and will be completing all of the landscaping on their property. Topsoil was placed in the Teacherage yard, along the north end of the school yard in the excavation area, and in the school park.

The temporary school access road west of the school and the emergency pathway between 5$^{th}$ and 6$^{th}$ Streets were removed. Topsoil was placed on the pathways and the areas will be hydroseeded when the levee hydroseeding takes place.

## 6.4 Public Infrastructure

Public infrastructure restoration included sidewalks, curbs, and improvements to West River Road to comply with King County Road Standards (Figure 6-1). The Town chose to stamp the replacement sidewalks (Appendix M) and to place sidewalks around the Teacherage where no sidewalk had previously existed. Curbs complying with King County Road Standards were poured and wheelchair ramps for sidewalk access were placed at the corner of 6th Street. The roads in the interim action area were paved in June 2007. Figure 6-1 shows the locations of the water system, storm sewer conveyance system, electrical system, and telecommunications system. It should be noted that the as-built utility plans shown on Figure 6-1 are as accurate as possible. However, they should be considered approximate from the standpoint of future excavations in the area. Any future underground excavation work in the area should follow Washington State regulations, including performing a utility locate prior to excavation.

## 6.5 Quality Assurance

Quality assurance included compliance with health and safety requirements and performance standards outlined in the Skykomish Levee EDR and general contractor specifications. All aspects of construction were performed under the oversight of a RETEC professional engineer registered in the State of Washington.

# 7.0 Compliance Monitoring

Compliance monitoring is required under Section VII.5 of the Agreed Order. As outlined in WAC 173-340-410, compliance monitoring consists of protection, performance, and confirmational monitoring. Confirmational monitoring is conducted to “confirm the long-term effectiveness of the interim action or cleanup action once cleanup standards and, if appropriate, remediation levels or other performance standards have been attained.”

## 7.1 Groundwater Monitoring Wells

Seven groundwater monitoring wells were installed in the 2006 Interim Action Area (Figure 7-1). Holt Drilling/Boart Longyear installed the wells in accordance with WAC 173-160. All of the wells are 2-inch diameter schedule 40 PV screen and casing. The well screens are 15-foot sections with 0.020-inch slots. The filter pack is 10-20 grade sand that was placed in the annular space around the screen. The sand extends one foot below the base of the screen and one foot above the top of the screen. A two feet bentonite seal was placed above the sand filter. Wells were finished with either a flush-mount water poof cap or a 4-inch diameter, 5-foot long steel guard pipe. All wells were fitted with lockable caps or tamper proof covers. Completion logs for these wells are in Appendix N.

## 7.2 Groundwater Monitoring

Groundwater monitoring is being conducted under the *Groundwater Monitoring Plan* (RETEC, 2007b) approved by Ecology. The first round of monitoring was completed the week of July 30, 2007. Groundwater monitoring results are being reported under separate cover.

# 8.0 Summary and Conclusions

From the period starting January 1, 2007 and ending December 31, 2008, The RETEC Group, Inc. oversaw remediation activities in the Levee Zone and part of the Northwest Developed Zone of the Former BNSF Maintenance and Fueling Facility on behalf of BNSF. The project was substantially complete in 2006, as described in the 2006 As-Built Report. Restoration activities were completed in 2008. All work originally required by the AO is complete except for groundwater monitoring which continues in accordance with the CD.

# 9.0 References

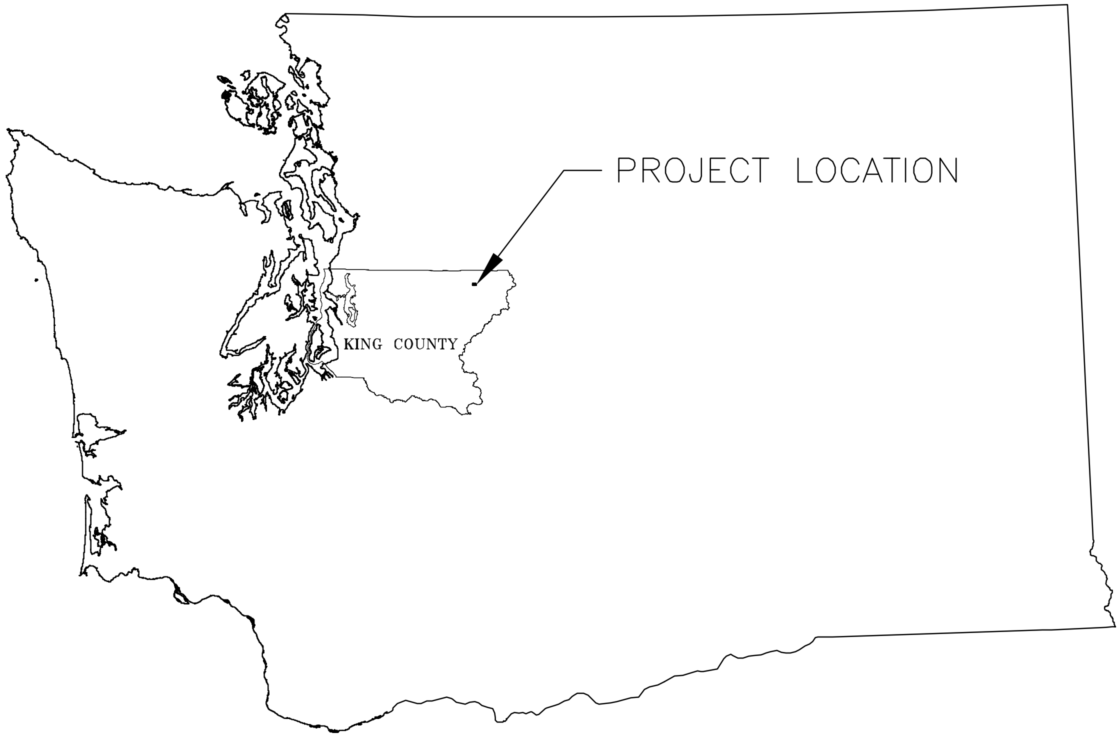
Grette and Associates, 2005. *Levee Planting Plan and Monitoring Program.* Prepared for the BNSF Railway Company, by Grette and Associates. Wenatchee, Washington. December, 2005.

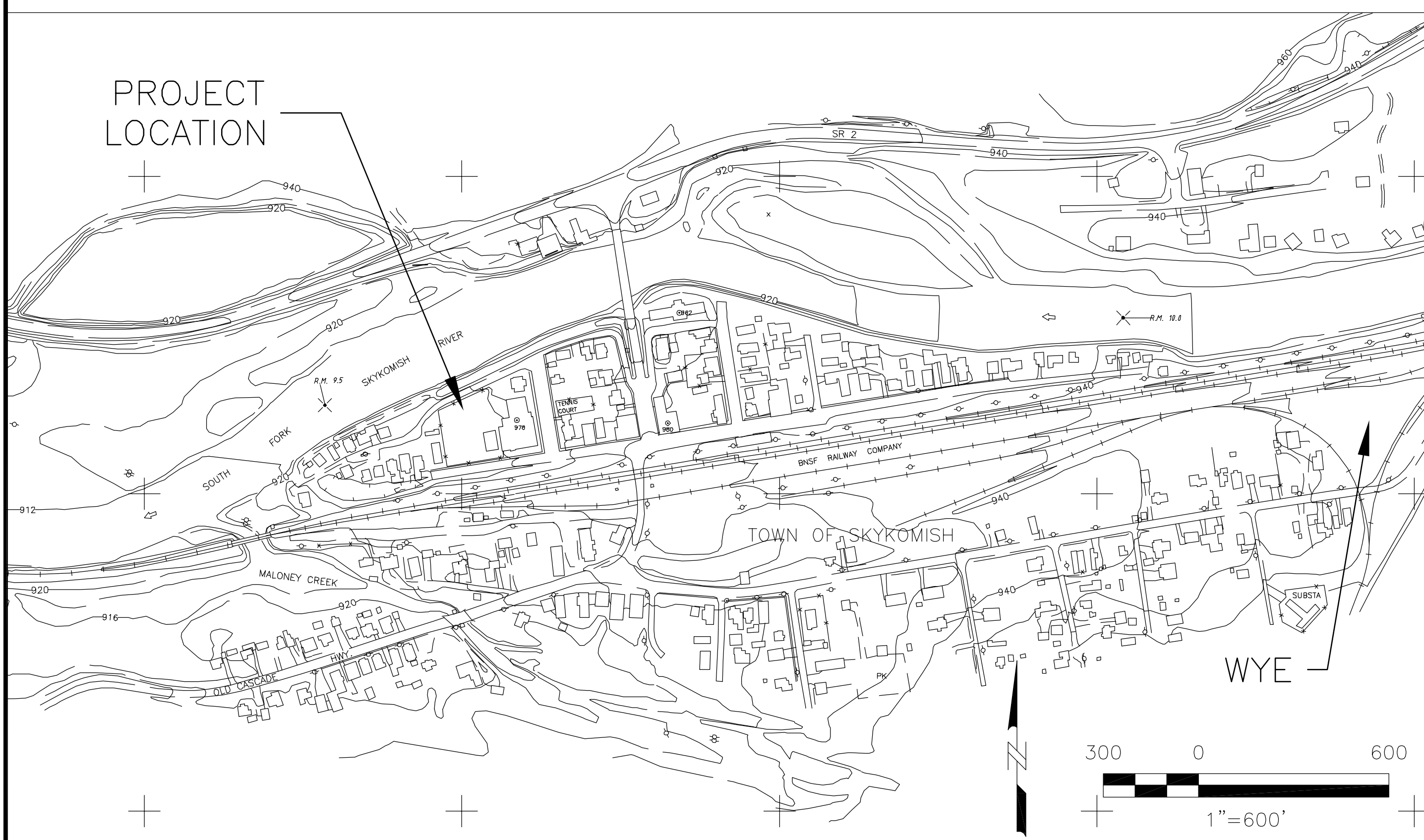
RETEC, 2006a. *Final Engineering Design Report, Levee Remedial Action; Former Maintenance and Fueling Facility, Skykomish, Washington*. Prepared for the BNSF Railway Company by The RETEC Group, Inc. Seattle, Washington. May 3, 2006.

RETEC, 2006b. *Plans and Specifications for Skykomish Levee Remediation*. Prepared for the BNSF Railway Company by The RETEC Group, Inc. Seattle, Washington. March 30, 2006. Addenda added on April 18 and 20, 2006.

RETEC, 2007. *2006 Levee Zone Interim Action for 2006 – As-Built Completion Report*. Prepared for the BNSF Railway Company by the RETEC Group, Inc. Seattle, Washington. July 2, 2007.

# Figures

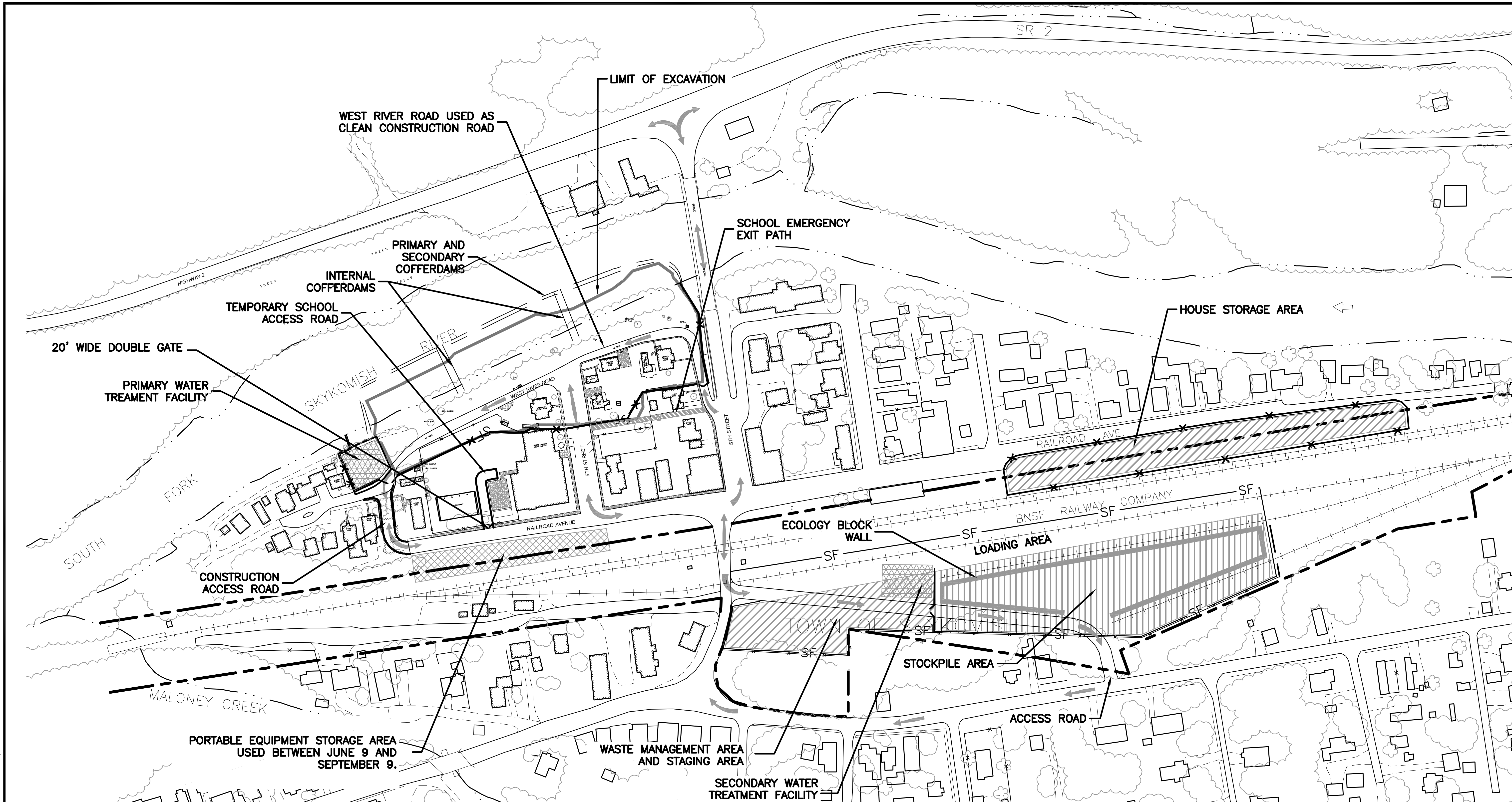



File: L:\BNSF-Skykomish\BN050-19390-CON-T001.dwg Layout: FIG 1-1 User: MarshallE Plotted: Feb 10, 2009 - 4:02pm Xref's:

AECOM

| | | |
|---|---|---|
| COMPLETION REPORT<br>SKYKOMISH LEVEE REMEDIATION<br>BN050-19390-230 | | SITE LOCATION MAP |
| DATE: 02/10/09 | DRWN: E.M./SEA | FIGURE 1-1 |




LEGEND

- STAGING AREAS
- PORTABLE EQUIPMENT STORAGE AREA
- DESIGNATED CONSTRUCTION TRAFFIC ROUTE
- BNSF PROPERTY LINE
- LIMIT OF DISTURBANCE
- HIGH VISIBILITY METAL FENCE
- SILT FENCE

NOTE:

THE WYE AND FORMER CITY BURN DUMP USED FOR STOCKPILING CLEAN MATERIALS ARE EAST OF THE AREA SHOWN

100 0 200

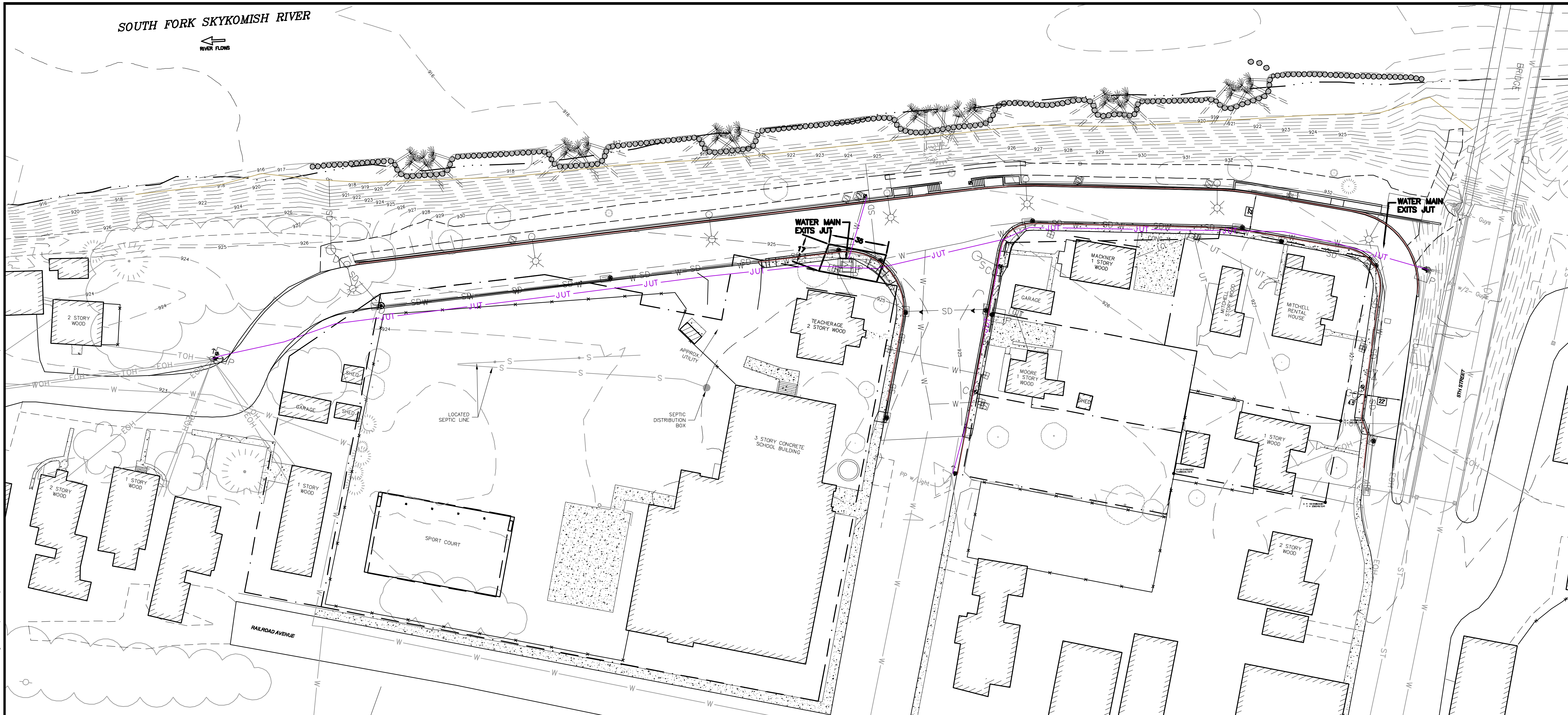
1"=200'

N

AECOM

| | | |
|---|---|---|
| COMPLETION REPORT<br>SKYKOMISH LEVEE REMEDIATION<br>BN050-19390-230 | | CONSTRUCTION LAYOUT PLAN |
| DATE: 02/10/09 | DRWN: E.M./SEA | FIGURE 3-1 |

File: L:\BNSF-Skykomish\BN050-19390S020.DWG Layout: FIG 3-1 User: MarshallE Plotted: Feb 10, 2009 - 4:04pm Xref's:




LEGEND

| | |
|---|---|
| CATCH BASIN | POWER LINE |
| WATER VALVE | POWER LINE (UNDERGROUND) |
| IRRIGATION CONTROL VALVE | SEWER LINE |
| LUMINAIRE | STORM DRAIN LINE |
| MONITORING WELL | TELEPHONE LINE |
| CULVERT END | TELEPHONE LINE (UNDERGROUND) |
| TRANSFORMER PAD | WATER LINE |
| POWER VAULT | BUILDING FOOTPRINT |
| STORM DRAIN MANHOLE | CONCRETE |
| SANITARY SEWER CLEANOUT | PROPERTY LINE |
| SEWER MANHOLE | |
| TELEPHONE PEDESTAL | |
| POWER POLE W/ U.G. FEED | |
| GUY ANCHOR | |
| WATER METER | |

NOTES:

1. JOINT UTILITY TRENCH CONTAINS A WATER MAIN, AN ELECTRICAL CONDUIT, A TELEPHONE CONDUIT, AND A SPARE CONDUIT.
2. UTILITY LOCATIONS SHOULD BE CONSIDERED APPROXIMATE. IT IS IMPORTANT TO CALL 1-800-424-5555 TO ACCURATELY LOCATE UTILITIES BEFORE ANY EXCAVATION IS ATTEMPTED.
3. SURFACE FEATURES SURVEYED BY HARMSEN AND ASSOCIATES ON JULY 17, 2007.

HORIZONTAL DATUM NAD '83-91
VERTICAL DATUM NAVD '88

30 0 60
SCALE IN FEET

AECOM

THE BNSF RAILWAY COMPANY
SKYKOMISH, WASHINGTON
01140-144-230

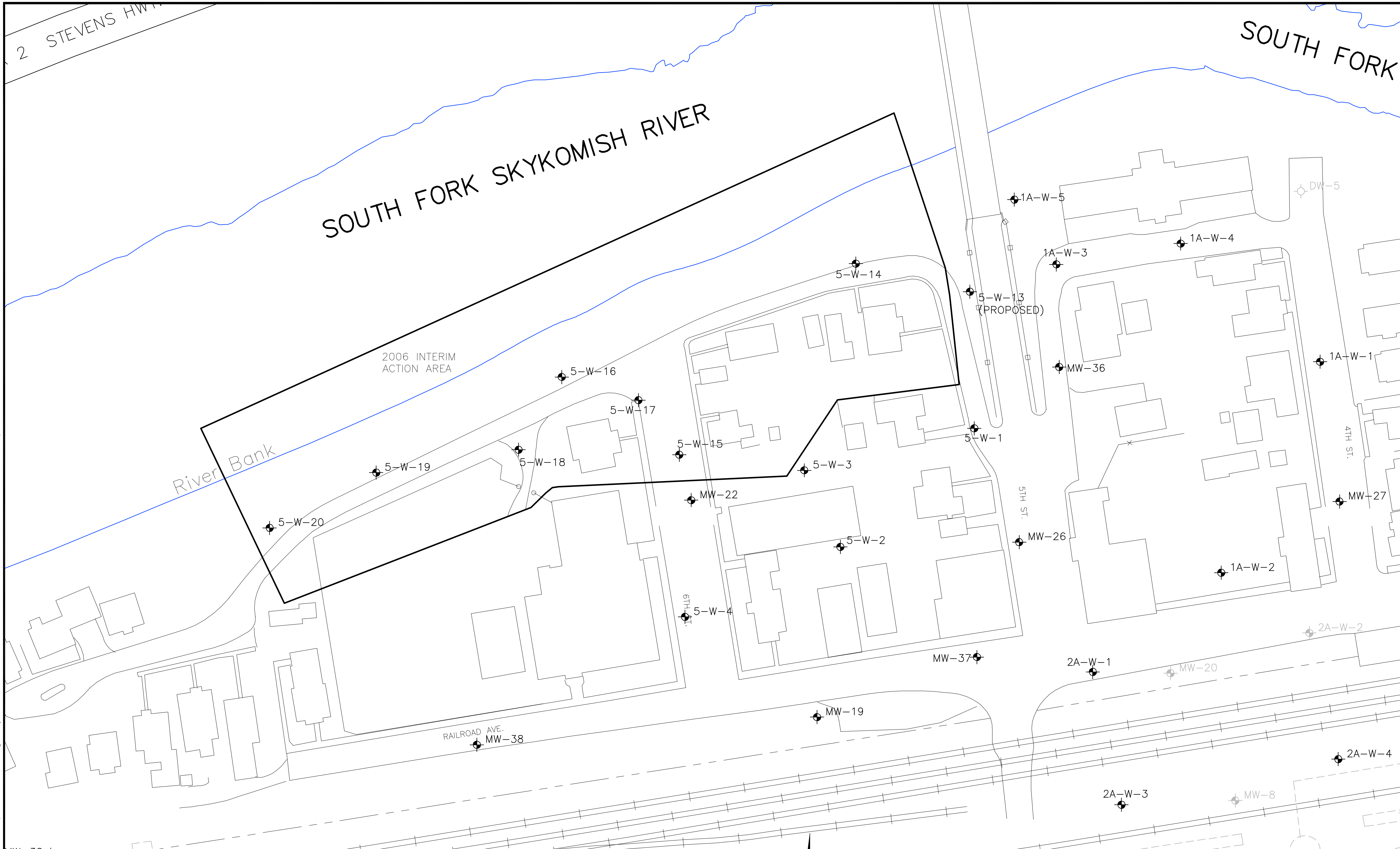
SKYKOMISH LEVEE REMEDIATION

FINAL SITE UTILITY LAYOUT
WITH SURFACE FEATURES

DATE: 02/10/09 | DRWN: E.M./SEA

FIGURE 6-1

File: L:\BNSF-Skykomish\BN050-19390-CON-U-01-G.dwg Layout: Final Site Layout (11x17) User: MarshallE Plotted: Feb 10, 2009 - 4:00pm Xref's:




AECOM

LEGEND

FLUID LEVEL GAUGING WELLS

EXTENT OF WORK DONE IN 2006

40 0 80

SCALE IN FEET

THE BNSF RAILWAY COMPANY
SKYKOMISH, WASHINGTON
01140-144-230

DATE: 02/10/09 | DRWN: E.M./SEA

MONITORING WELL LOCATIONS

FIGURE 7-1

File: L:\BNSF-Skykomish\16423S473-b.dwg Layout: FIGURE 3-1 User: MarshallE Plotted: Feb 10, 2009 - 4:06pm Xref's:

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000*

December 21, 2006

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South, Suite 1A
Seattle, Washington 98134-1451

Dear Mr. Sheppard:

Re: Approval of Extension of Schedule/Minor Modification to Agreed Order DE-2379 (Exhibit E - Schedule)
BNSF Former Maintenance and Fueling Facility, Skykomish, WA

This letter documents Ecology's approval of BNSF Railway Company's (BNSF's) request for an extension of schedule under Section VIII.K of Agreed Order DE-2379 (Order), for work being performed by BNSF under the Order. Your letters of December 8 and December 18, 2006 requested another extension due to adverse weather and related power outages and road closures. You stated that Potelco would not guarantee to have power connections made by the end of the year. Due to this, you believe the houses would be ready for occupancy by January 6, 2007 and residents moved back by January 12, 2007.

Since the delays were due to circumstances outside of BNSF's control, Ecology believes the schedule extension is reasonable and considers this to be a minor modification to the Agreed Order. Ecology understands that BNSF either has already, or will expeditiously, notify all affected residents of this schedule extension. Ecology expects that BNSF will coordinate in good faith with residents to ensure continued and undisputed access to their properties in order to finish work according to this extended schedule.

Please see the enclosed modified Exhibit E Construction Schedule reflecting the revised dates.

Thank you for all your efforts to move the residents back into their homes as soon as possible. If you have any questions, please contact me at 426-649-7209 or lbar461@ecy.wa.gov.

Sincerely,

Louise Bardy

Louise Bardy
Toxics Cleanup Program

Enclosure: 1

cc: Tim Nord/Ron Timm/Dave South/Susan Lee, Ecology
Kristie Carevich, Assistant Attorney General
Halah Voges, The Retec Group
Craig Trueblood, Preston Gates Ellis
Mayor Charlotte Mackner, Town of Skykomish
David Carson, Bell & Ingram
Clint Stanovsky, Town of Skykomish
Michael Moore, Skykomish Environmental Coalition
Daryl Petrarca, ADapt Engineering
Dick and Roberta Mitchell
Allan Bakalian, Hanson Baker Ludlow Drumheller
Bill and Desiree Gould

## Exhibit E
## Construction Schedule

| | |
|---|---|
| April 15, 2006 | Notify Ecology whether all relocation/access agreements signed |
| May 1, 2006 | Submit revised work plan for Ecology review and approval if all relocation/access agreements have not been obtained |
| May 15, 2006 | Begin temporarily relocating houses |
| September 15, 2006 | Work completed to a point and site conditions such that school can start on this date |
| January 6, 2007 | Temporarily relocated homes ready for occupancy |
| January 12, 2007 | Complete moving residents back into houses |
| December 31, 2006 | All material to be sent off-site for disposal has been sent off-site OR a contingency plan is to be presented to Ecology for review and approval which provides for all material to be sent offsite for disposal by March 30, 2007. |
| March 30, 2007 | All material to be sent off-site for disposal has been sent off-site. |
| March 30, 2007 | Submit Draft As-Built Report to Ecology for all work completed prior to December 31, 2007. This report will note work which remains to be completed. |
| June 30, 2007 | All work completed, including infrastructure replacement; all construction equipment demobilized |
| July 31, 2007 | Submit Draft As-built Report to Ecology for all work completed between January 1, 2007 and June 30, 2007. |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000*

January 9, 2007

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South
Suite 1A
Seattle, WA 98134-1451

Dear Mr. Sheppard:

Re: Approval of Extension of Schedule/Minor Modification to Agreed Order DE-2379 (Exhibit E – Schedule) BNSF Former Maintenance and Fueling Facility, Skykomish, Washington

This letter documents the Department of Ecology's (Ecology) approval of BNSF Railway Company's (BNSF) request for an extension of schedule under Section VIII.K of Agreed Order DE-2379 (Order), for work being performed by BNSF under the Order. Your letter of January 5, 2007, received by facsimile on January 5, 2007, requested another extension due to power connection delays by Potelco which were due to adverse weather conditions. The last schedule required "Temporarily relocated homes ready for occupancy" by January 6, 2007 and "Complete moving residents back into houses" by January 12, 2007.

Since the delays were due to circumstances outside of BNSF's control, Ecology believes the schedule extension is reasonable and considers this to be a minor modification to the Order. Ecology understands that BNSF has already, or will expeditiously, notify all affected residents of this schedule extension. Ecology expects that BNSF will coordinate in good faith with residents to ensure continued and undisputed access to their properties in order to finish work according to this extended schedule. The revised schedule will allow an extension to January 31, 2007 for both date requirements.

Please see the enclosed modified Exhibit E Construction Schedule reflecting the revised dates.

Thank you for your efforts to move residents back into their homes as soon as possible. If you have any questions, please contact me at 425-649-7209 or lbar461@ecy.wa.gov.

# Exhibit E
# Construction Schedule

| | |
|---|---|
| April 15, 2006 | Notify Ecology whether all relocation/access agreements signed |
| May 1, 2006 | Submit revised work plan for Ecology review and approval if all relocation/access agreements have not been obtained |
| May 15, 2006 | Begin temporarily relocating houses |
| September 15, 2006 | Work completed to a point and site conditions such that school can start on this date |
| January 31, 2007 | Temporarily relocated homes ready for occupancy |
| January 31, 2007 | Complete moving residents back into houses |
| December 31, 2006 | All material to be sent off-site for disposal has been sent off-site OR a contingency plan is to be presented to Ecology for review and approval which provides for all material to be sent offsite for disposal by March 30, 2007. |
| March 30, 2007 | All material to be sent off-site for disposal has been sent off-site. |
| March 30, 2007 | Submit Draft As-Built Report to Ecology for all work completed prior to December 31, 2007. This report will note work which remains to be completed. |
| June 30, 2007 | All work completed, including infrastructure replacement; all construction equipment demobilized |
| July 31, 2007 | Submit Draft As-built Report to Ecology for all work completed between January 1, 2007 and June 30, 2007. |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000*

April 2, 2007

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South
Suite 1A
Seattle, WA 98134-1451

Dear Mr. Sheppard:

Re: Approval of Extension of Schedule/Minor Modification to Agreed Order DE-2379 (Exhibit E – Schedule) BNSF Former Maintenance and Fueling Facility, Skykomish, Washington

This letter documents the Department of Ecology's (Ecology) approval of BNSF Railway Company's (BNSF) request for an extension of schedule under Section VIII.K of Agreed Order DE-2379 (Order), for work being performed by BNSF under the Order. Your letter of March 30, 2007, requested an extension of the deliverable date of March 30, 2007 to April 6, 2007 for the Draft As-Built Report for all work completed prior to December 31, 2006 in Exhibit E Construction Schedule. You described the rationale for requesting the extension was based on project staff involvement in other project priorities.

Since the delay is reasonable and project work continues according to the overall schedule, Ecology believes the one-week extension is reasonable and considers this to be a minor modification to the Order. The modified Exhibit E Construction Schedule is enclosed and notes the extension from March 30, 2007 to April 6, 2007.

Thank you for your efforts to complete the levee zone remediation. If you have any questions, please contact me at 425-649-7209 or lbar461@ecy.wa.gov.

Sincerely,

Louise Bardy

Louise Bardy
Toxics Cleanup Program

Enclosure: 1

cc: Tim Nord/Ron Timm/Dave South/Susan Lee, Ecology
Kristie Carevich, AAG
Halah Voges, Retec
Craig Trueblood, Preston Gates Ellis
Mayor Charlotte Mackner, Town of Skykomish
David Carlson, Bell & Ingram
Clint Stanovsky, Town of Skykomish
Michael Moore, Skykomish Environmental Coalition
Daryl Petrarca, ADapt Engineering
Dick and Roberta Mitchell
Allan Bakalian, Hanson Baker Ludlow Drumheller
Bill and Desiree Gould

# Exhibit E
# Construction Schedule

| | |
|---|---|
| April 15, 2006 | Notify Ecology whether all relocation/access agreements signed |
| May 1, 2006 | Submit revised work plan for Ecology review and approval if all relocation/access agreements have not been obtained |
| May 15, 2006 | Begin temporarily relocating houses |
| September 15, 2006 | Work completed to a point and site conditions such that school can start on this date |
| January 31, 2007 | Temporarily relocated homes ready for occupancy |
| January 31, 2007 | Complete moving residents back into houses |
| December 31, 2006 | All material to be sent off-site for disposal has been sent off-site OR a contingency plan is to be presented to Ecology for review and approval which provides for all material to be sent offsite for disposal by March 30, 2007. |
| March 30, 2007 | All material to be sent off-site for disposal has been sent off-site. |
| April 6, 2007 | Submit Draft As-Built Report to Ecology for all work completed prior to December 31, 2006. This report will note work which remains to be completed. |
| June 30, 2007 | All work completed, including infrastructure replacement; all construction equipment demobilized |
| July 31, 2007 | Submit Draft As-built Report to Ecology for all work completed between January 1, 2007 and June 30, 2007. |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

March 5, 2008

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South
Suite 1A
Seattle, WA 98134-1451

Dear Mr. Sheppard:

Re: Approval of Extension of Schedule/Minor Modification to Consent Decree 07-2-33672-9 for outstanding work under former Agreed Order No. DE 3279, BNSF Former Maintenance and Fueling Facility, Skykomish, Washington

This letter documents the Department of Ecology's (Ecology) approval of BNSF Railway Company's (BNSF) request for an extension of schedule under Section VI.1.a. and b. of Consent Decree 07-2-33672-9. Your letter of February 25, 2008 requested an extension of the March 31, 2008 deadline for the completion of restoration activities on the levee including planting the remaining trees and shrubs, installation of the levee lighting and railing, and submittal of the final As-Built Report for the work between January 1 though July 31, 2008.

The rationale for requesting the extension was based on the planting of trees and shrubs along the toe of the levee needs to occur when the river level is low in June or July. Since restoration activities will be delayed, the As-Built Report documenting the completed project will not be completed until these activities are completed.

Because the delay is reasonable and the project work continues according to the overall schedule, Ecology agrees to extend the deadline to August 31, 2008. This extension is considered to be a minor modification to the original schedule. The modified schedule (Exhibit C List and Schedule of Deliverables) is enclosed.

Thank you for your efforts to complete the levee zone remediation. If you have any questions, please contact me at 425-649-7265 or bsat461@ecy.wa.gov.

Sincerely,

Brian S. Sato, P.E.
Project Coordinator
Toxics Cleanup Program

Enclosure: 1

cc: Bob Warren/Louise Bardy/Ron Timm/Dave South/Brad Petrovich, Ecology
Kristie Carevich, AAG
Halah Voges, ENSR
Craig Trueblood, K & L Gates
Mayor Charlotte Mackner, Town of Skykomish
David Carlson, Carson Law Group
Clint Stanovsky, Town of Skykomish
Michael Moore, Skykomish Environmental Coalition
Daryl Petrarca, ADapt Engineering

# EXHIBIT C

## LIST AND SCHEDULE OF DELIVERABLES

CMP – Compliance Monitoring Plan
CPS – Construction Plans and Specifications
EDR – Engineering Design Report
O&M – Operations and Maintenance
PPP – Public Participation Plan

| Date | Deliverable |
|---|---|
| **2007** | |
| September 15, 2007 | Draft Hydraulic Control and Containment System Special Design Report Work Plan |
| September 30, 2007 | Draft School Alternatives Evaluation Work Plan |
| October 5, 2007 or 14 days after receipt of Ecology's final comments | Final Hydraulic Control and Containment System Special Design Report Work Plan |
| October 22, 2007 | Draft Master EDR for all work years |
| November 16, 2007 | Draft Annual EDR for Work Year 2008 (Annual EDR will be the 30% design) |
| Within 60 days of effective date of consent decree | Financial Assurance Documentation per §XXII(1) |
| November 30, 2007 or 45 days after receipt of Ecology's final comments | Final School Alternatives Evaluation Work Plan |
| December 5, 2007 | Draft Hydraulic Control and Containment System Special Design Report |
| November/December 2007 | Public Scoping Meeting for 2008 work. |
| December 31, 2007 | Documentation that access agreements necessary for Work Year 2008 have been obtained |
| **2008** | |
| January 2008 | Annual schedule review and update |
| January 15, 2008 or 30 days after receipt of Ecology comments | Final Hydraulic Control and Containment System Special Design Report |
| January 31, 2008 | Draft School Technology Review Report |

| Date | Deliverable |
| --- | --- |
| Feb. 4, 2008 or 60 days after receipt of Ecology's final comments on Draft EDR | Final Master and Annual EDR, Draft CPS, Draft CMP, and updated PPP for Work Year 2008 |
| February 29, 2008 | Draft Comparative Physical Testing Study Work Plan |
| March 15, 2008 or 30 days after receipt of Ecology's final comments on Draft CPS, CMP and PPP | Final CPS, CMP and PPP for Year 2008 |
| March 31, 2008 or 30 days after receipt of Ecology's final comments | Final School Technology Review Report |
| March 31, 2008 (due annually) | Institutional Control Documentation |
| March 31, 2008 (Extended to Aug. 31, 2008) | Restoration activities for 2006/2007 Levee Zone Interim Action for cleanup complete |
| March 31, 2008 | Final As-Built Report for 2007 Work |
| March 31, 2008 | Draft FMC Wetlands Special Design Report |
| April 30, 2008 | Final Comparative Physical Testing Study Work Plan |
| June 30, 2008 or 60 days after receipt of Ecology's final comments | Final FMC Wetlands Special Design Report |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| August 31, 2008 | Restoration activities for 2006/2007 Levee Zone Interim Action for cleanup complete |
| October 6, 2008 | Draft Annual EDR for Work Year 2009 (EDR will be 30% design) |
| October 2008 | Public Scoping Meeting for Work Year 2009. |
| December 31, 2008 | Documentation access agreements necessary for Work Year 2009 have been obtained |
| December 31, 2008 | O&M Plans for systems installed in 2008 |
| **2009** | |
| January 2009 | Annual schedule review and update |
| January 2, 2009 | Draft Annual Hydraulic Control and Containment System Report |

| Date | Deliverable |
|---|---|
| January 2, 2009 | Draft Annual Air-Sparging System Report |
| Feb. 2, 2009 or 60 days after receipt of Ecology's final comments | Final Annual EDR, Draft CPS, updated CMP, and updated PPP for Work Year 2009 |
| March 15, 2009 or 30 days after receipt of Ecology's final comments | Final CPS, CMP and PPP for Work Year 2009 |
| March 31, 2009 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| March 31, 2009 | Draft Bridge Coordination Report |
| March 31, 2009 or 20 days after receipt of Ecology's final comments | Final Air-Sparging System Report |
| March 31, 2009 | Draft As-Built Report for 2008 work |
| March 31, 2009 | Institutional Control Documentation |
| Within 30 days of anniversary date (Oct.19, 2007) of consent decree | Annual Financial Assurance Report, per § XXII.B(1) |
| April 1, 2009 | Draft School Comparative Physical Testing Study Report |
| May 1, 2009 | Final School Comparative Physical Testing Study Report |
| June 1, 2009 | Draft School Alternatives Evaluation Report |
| June 30, 2009 or 30 days after receipt of Ecology's final comments | Final Bridge Coordination Report |
| June 30, 2009 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2008 work |
| July 1, 2009 | Final School Alternatives Evaluation Report |
| October 5, 2009 | Draft Annual EDR for Work Year 2010 (EDR will be 30% design) |
| October 30, 2009 | Draft Hotel Structural Survey Report |
| October 2009 | Public Scoping Meeting for 2010 Work |
| December 31, 2009 or 14 days after receipt of Ecology's comments | Final Hotel Structural Survey Report |

| Date | Deliverable |
|---|---|
| December 31, 2009 | Documentation access agreements necessary for Work Year 2010 have been obtained |
| December 31, 2009 | O&M Plans for systems installed in 2009 |
| **2010** | |
| January 2010 | Annual schedule review and update |
| January 2, 2010 | Draft Annual Hydraulic Control and Containment System Report |
| January 2, 2010 | Draft Annual Air-Sparging System Report |
| Feb. 1, 2010 or 60 days after receipt of Ecology's final comments | Final Annual EDR, Draft CPS, updated CMP and updated PPP for Work Year 2010 |
| March 31, 2010 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| March 31, 2010 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| March 31, 2010 | Draft As-Built Report for 2009 work |
| March 31, 2010 or 30 days after receipt of Ecology's final comments | Final CPS, CMP, and PPP for Work Year 2010 |
| March 31, 2010 | Institutional Control Documentation |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| June 30, 2010 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2009 Work |
| October 4, 2010 | Draft Annual EDR for Work Year 2011 (EDR will be 30% design) |
| October 2010 | Public Scoping Meeting for 2011 Work |
| December 31, 2010 | Documentation access agreements necessary for Work Year 2011 have been obtained |
| December 31, 2010 | O&M Plans for systems installed in 2010 |
| **2011** | |
| January 2011 | Annual schedule review and update |

| Date | Deliverable |
| --- | --- |
| January 2, 2011 | Draft Annual Hydraulic Control and Containment System Report |
| January 2, 2011 | Draft Annual Air-Sparging System Report |
| January 31, 2011 or 60 days after receipt of Ecology's final comments | Final EDR, Draft CPS, updated CMP, and updated PPP for Work Year 2011 |
| March 30, 2011 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| March 30, 2011 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| March 30, 2011 | Draft As-Built Report for 2010 work |
| March 31, 2011 or 30 days after receipt of Ecology's final comments | Final CPS, CMP and PPP for Work Year 2011 |
| March 31, 2011 | Institutional Control Documentation |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| June 30, 2011 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2010 Work |
| October 2011 | Public construction completion meeting |
| December 31, 2011 | O&M Plans for systems installed in 2011 |
| December 31, 2011 | Draft Long-Term Confirmational Monitoring Plan |
| **2012 and following** | |
| January 2012 | Annual schedule review and update |
| March 30, 2012 or 30 days after receipt of Ecology's final comments | Final Long-Term Confirmational Monitoring Plan |
| March 30, 2012 | Draft As-Built Report for 2011 work |
| March 31, 2012 | Institutional Control Documentation |
| June 30, 2012 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2011 work |

| Date | Deliverable |
|---|---|
| Annually, by January 2 | Draft Annual Hydraulic Control and Containment System Report |
| Annually, by January 2 | Draft Annual Air-Sparging System Report |
| Annually, by March 30 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| Annually, by March 30 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| Annually, Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| At least every 5 years beginning March 2013 | Draft Periodic Review Report |
| 60 Days after receipt of Ecology Comments | Final Periodic Review Report |
| Within 20 years of effective date of consent decree | Excavation of all soil required to be excavated from BNSF's railyard facility property completed. |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000*

October 1, 2008

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South
Suite 1A
Seattle, WA 98134-1451

Dear Mr. Sheppard:

**Re: Approval of Extension of Schedule/Minor Modification to Consent Decree 07-2-33672-9 SEA for outstanding work under former Agreed Order No. DE 3279, BNSF Former Maintenance and Fueling Facility, Skykomish, Washington**

This letter documents the Department of Ecology's (Ecology) approval of BNSF Railway Company's (BNSF) request for an extension of schedule under Section VI.1.a. and b. of Consent Decree 07-2-33672-9 SEA. Your letter of July 8, 2008 requested an extension of the August 31, 2008 deadline for the completion of restoration activities for the 2006/2007 Levee Zone Interim Action and submittal of the final As-Built Report.

The rationale for requesting the extension was based on the (lack of) availability of certain plant stock. Since restoration activities will be delayed, the As-Built Report documenting the completed project will not be completed until these activities are completed.

Because the delay is reasonable and the project work continues according to the overall schedule, Ecology agreed to extend the restoration activities deadline to November 30, 2008 and the final As-Built Report deadline to December 31, 2008. In addition, deadlines for the Annual Hydraulic Control and Containment System Report, Annual Air-Sparging System Report, Annual Engineering Design Report, Construction Plans and Specifications, and Compliance Monitoring Plans have been revised, as agreed, to improve the overall project schedule. These revisions are considered to be a minor modification to the original schedule. The revised schedule (Exhibit C List and Schedule of Deliverables) is enclosed.

Thank you for your efforts to complete the levee zone remediation. If you have any questions, please contact me at 425-649-7265 or bsat461@ecy.wa.gov.

Sincerely,

Brian S. Sato, P.E.
Project Coordinator
Toxics Cleanup Program

Enclosure: 1

cc: Bob Warren/Louise Bardy/Ron Timm/Dave South/Brad Petrovich, Ecology
Kristie Carevich, AAG
Halah Voges, ENSR
Craig Trueblood, K & L Gates
Mayor Charlotte Mackner, Town of Skykomish
David Carson, Carson Law Group
Clint Stanovsky, Town of Skykomish
Michael Moore, Skykomish Environmental Coalition
Daryl Petrarca, ADapt Engineering

**EXHIBIT C**

**LIST AND SCHEDULE OF DELIVERABLES**

CMP – Compliance Monitoring Plan
CPS – Construction Plans and Specifications
EDR – Engineering Design Report
O&M – Operations and Maintenance
PPP – Public Participation Plan

| Date | Deliverable |
|---|---|
| **2007** | |
| September 15, 2007 | Draft Hydraulic Control and Containment System Special Design Report Work Plan |
| September 30, 2007 | Draft School Alternatives Evaluation Work Plan |
| October 5, 2007 or 14 days after receipt of Ecology's final comments | Final Hydraulic Control and Containment System Special Design Report Work Plan |
| October 22, 2007 | Draft Master EDR for all work years |
| November 16, 2007 | Draft Annual EDR for Work Year 2008 (Annual EDR will be the 30% design) |
| Within 60 days of effective date of consent decree | Financial Assurance Documentation per §XXII(1) |
| November 30, 2007 or 45 days after receipt of Ecology's final comments | Final School Alternatives Evaluation Work Plan |
| December 5, 2007 | Draft Hydraulic Control and Containment System Special Design Report |
| November/December 2007 | Public Scoping Meeting for 2008 work. |
| December 31, 2007 | Documentation that access agreements necessary for Work Year 2008 have been obtained |
| **2008** | |
| January 2008 | Annual schedule review and update |
| January 15, 2008 or 30 days after receipt of Ecology comments | Final Hydraulic Control and Containment System Special Design Report |
| January 31, 2008 | Draft School Technology Review Report |

| Date | Deliverable |
|---|---|
| Feb. 4, 2008 or 60 days after receipt of Ecology's final comments on Draft EDR | Final Master and Annual EDR, Draft CPS, Draft CMP, and updated PPP for Work Year 2008 |
| February 29, 2008 | Draft Comparative Physical Testing Study Work Plan |
| March 15, 2008 or 30 days after receipt of Ecology's final comments on Draft CPS, CMP and PPP | Final CPS, CMP and PPP for Year 2008 |
| March 31, 2008 or 30 days after receipt of Ecology's final comments | Final School Technology Review Report |
| March 31, 2008 (due annually) | Institutional Control Documentation |
| March 31, 2008 (Extended to August 31, 2008) | Restoration activities for 2006/2007 Levee Zone Interim Action for cleanup complete |
| March 31, 2008 (extended to August 31, 2008) | Final As-Built Report for 2007 Work |
| March 31, 2008 | Draft FMC East Wetland Special Design Report |
| April 30, 2008 | Final Comparative Physical Testing Study Work Plan |
| June 30, 2008 or 60 days after receipt of Ecology's final comments | Final FMC East Wetland Special Design Report |
| August 31, 2008 (extended to November 30, 2008) | Restoration activities for 2006/2007 Levee Zone Interim Action for cleanup complete |
| August 31, 2008 (extended to December 31, 2008) | Final As-Built Report for 2007 Work |
| October 6, 2008 | Draft Annual EDR for Work Year 2009 (EDR will be 30% design) |
| October 2008 | Public Scoping Meeting for Work Year 2009. |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| November 30, 2008 | Restoration activities for 2006-2007 Levee Zone Interim Action for cleanup complete (Levee plantings) |
| December 19, 2008 or 30 days after receipt of Ecology's final comments | Final Annual EDR |

| Date | Deliverable |
|---|---|
| December 31, 2008 | Final As-Built Report for 2007 Work |
| December 31, 2008 | Documentation access agreements necessary for Work Year 2009 have been obtained |
| December 31, 2008 | O&M Plans for systems installed in 2008 |
| **2009** | |
| January 2009 | Annual schedule review and update |
| January 2, 2009 (Extended to February 20, 2009) | Draft Annual Hydraulic Control and Containment System Report |
| January 2, 2009 (Extended to February 6, 2009) | Draft Annual Air-Sparging System Report |
| January 16, 2009 | Draft CPS |
| Feb. 2, 2009 or 60 days after receipt of Ecology's final comments | Final Annual EDR (moved to December 19, 2008), Draft CPS (moved to January 16, 2009), updated CMP (extended to February 27, 2009), and updated PPP for Work Year 2009 |
| February 6, 2009 | Draft Annual Air-Sparging System Report |
| February 20, 2009 | Draft Annual Hydraulic Control and Containment System Report |
| February 27, 2009 | Draft updated CMP |
| March 15, 2009 or 30 days after receipt of Ecology's final comments | Final CPS, CMP (extended to May 22, 2009) and PPP for Work Year 2009 |
| March 31, 2009 or 30 days after receipt of Ecology's final comments (Extended to May 15, 2009) | Final Annual Hydraulic Control and Containment System Report |
| March 31, 2009 | Draft Bridge Coordination Report |
| March 31, 2009 or 20 days after receipt of Ecology's final comments (Extended to May 1, 2009) | Final Air-Sparging System Report |
| March 31, 2009 | Draft As-Built Report for 2008 work |
| March 31, 2009 | Institutional Control Documentation |
| March 31, 2009 | Draft FMC West Wetland Special Design Report |
| April 1, 2009 | Draft School Comparative Physical Testing Study Report |
| May 1, 2009 | Final School Comparative Physical Testing Study Report |

| Date | Deliverable |
|---|---|
| May 1, 2009 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| May 15, 2009 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| May 22, 2009 or 30 days after receipt of Ecology's final comments | Final updated CMP |
| June 1, 2009 | Draft School Alternatives Evaluation Report |
| June 30, 2009 or 30 days after receipt of Ecology's final comments | Final Bridge Coordination Report |
| June 30, 2009 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2008 work |
| June 30, 2009 or 60 days after receipt of Ecology's final comments | Final FMC West Wetland Special Design Report |
| July 1, 2009 | Final School Alternatives Evaluation Report |
| October 5, 2009 | Draft Annual EDR for Work Year 2010 (EDR will be 30% design) |
| October 30, 2009 | Draft Hotel Structural Survey Report |
| October 2009 | Public Scoping Meeting for 2010 Work |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| December 18, 2009 or 30 days after receipt of Ecology's final comments | Final Annual EDR |
| December 31, 2009 or 14 days after receipt of Ecology's comments | Final Hotel Structural Survey Report |
| December 31, 2009 | Documentation access agreements necessary for Work Year 2010 have been obtained |
| December 31, 2009 | O&M Plans for systems installed in 2009 |
| **2010** | |

| Date | Deliverable |
|---|---|
| January 2010 | Annual schedule review and update |
| January 2, 2010 (moved to February 19, 2010) | Draft Annual Hydraulic Control and Containment System Report |
| January 2, 2010 (moved to February 5, 2010) | Draft Annual Air-Sparging System Report |
| January 15, 2010 | Draft CPS |
| Feb. 1, 2010 or 60 days after receipt of Ecology's final comments | Final Annual EDR (moved to December 18, 2009), Draft CPS (moved to January 15, 2010), updated CMP (extended to February 26, 2010) and updated PPP for Work Year 2010 |
| February 5, 2010 | Draft Annual Air-Sparging System Report |
| February 19, 2010 | Draft Annual Hydraulic Control and Containment System Report |
| February 26, 2010 | Updated CMP |
| March 31, 2010 or 30 days after receipt of Ecology's final comments (extended to May 14, 2010) | Final Annual Hydraulic Control and Containment System Report |
| March 31, 2010 or 30 days after receipt of Ecology's final comments (extended to April 30, 2010) | Final Annual Air-Sparging System Report |
| March 31, 2010 | Draft As-Built Report for 2009 work |
| March 31, 2010 or 30 days after receipt of Ecology's final comments | Final CPS, CMP (extended to May 21, 2010), and PPP for Work Year 2010 |
| March 31, 2010 | Institutional Control Documentation |
| April 30, 2010 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| May 14, 2010 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |

| Date | Deliverable |
| --- | --- |
| May 21, 2010 or 30 days after receipt of Ecology's final comments | Final updated CMP |
| June 30, 2010 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2009 Work |
| October 4, 2010 | Draft Annual EDR for Work Year 2011 (EDR will be 30% design) |
| October 2010 | Public Scoping Meeting for 2011 Work |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| December 31, 2010 | Documentation access agreements necessary for Work Year 2011 have been obtained |
| December 31, 2010 | O&M Plans for systems installed in 2010 |
| December 17, 2010 | Final EDR |
| **2011** | |
| January 2011 | Annual schedule review and update |
| January 2, 2011 (moved to February 18, 2011) | Draft Annual Hydraulic Control and Containment System Report |
| January 2, 2011 (moved to February 4, 2011) | Draft Annual Air-Sparging System Report |
| January 14, 2011 | Draft CPS |
| January 31, 2011 or 60 days after receipt of Ecology's final comments | Final EDR (moved to December 17, 2010), Draft CPS (moved to January 14, 2011), updated CMP (moved to February 25, 2011), and updated PPP for Work Year 2011 |
| February 4, 2011 | Draft Annual Air-Sparging System Report |
| February 18, 2011 | Draft Annual Hydraulic Control and Containment System Report |
| February 25, 2011 | Updated CMP |
| March 30, 2011 or 30 days after receipt of Ecology's final comments (moved to May 13, 2011) | Final Annual Hydraulic Control and Containment System Report |

| Date | Deliverable |
|---|---|
| March 30, 2011 or 30 days after receipt of Ecology's final comments (moved to April 29, 2011) | Final Annual Air-Sparging System Report |
| March 30, 2011 | Draft As-Built Report for 2010 work |
| March 31, 2011 or 30 days after receipt of Ecology's final comments | Final CPS, CMP (extended to May 20, 2011) and PPP for Work Year 2011 |
| March 31, 2011 | Institutional Control Documentation |
| April 28, 2011 or 30 days after receipt of Ecology's final comments | Final Annual Air-Sparging System Report |
| May 13, 2011 or 30 days after receipt of Ecology's final comments | Final Annual Hydraulic Control and Containment System Report |
| May 20, 2011 or 30 days after receipt of Ecology's final comments | Final Updated CMP |
| June 30, 2011 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2010 Work |
| October 2011 | Public construction completion meeting |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| December 31, 2011 | O&M Plans for systems installed in 2011 |
| December 31, 2011 | Draft Long-Term Confirmational Monitoring Plan |
| **2012 and following** | |
| January 2012 | Annual schedule review and update |
| March 30, 2012 or 30 days after receipt of Ecology's final comments | Final Long-Term Confirmational Monitoring Plan |
| March 30, 2012 | Draft As-Built Report for 2011 work |
| March 31, 2012 | Institutional Control Documentation |
| June 30, 2012 or 60 days after receipt of Ecology's final comments | Final As-Built Report for 2011 work |

| Date | Deliverable |
|---|---|
| Annually, by January 2 (moved to February 15) | Draft Annual Hydraulic Control and Containment System Report |
| Annually, by January 2 (moved to February 1) | Draft Annual Air-Sparging System Report |
| Annually, by March 30 or 30 days after receipt of Ecology's final comments (moved to May 15) | Final Annual Hydraulic Control and Containment System Report |
| Annually, by March 30 or 30 days after receipt of Ecology's final comments (moved to May 1) | Final Annual Air-Sparging System Report |
| At least every 5 years beginning March 2013 | Draft Periodic Review Report |
| 60 Days after receipt of Ecology Comments | Final Periodic Review Report |
| Within 30 days of anniversary date (Oct. 19, 2007) of consent decree | Annual Financial Assurance Report, per §XXII.B(1) |
| Within 20 years of effective date of consent decree (Oct. 19, 2007) | Excavation of all soil required to be excavated from BNSF's railyard facility property completed. |

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000*

January 5, 2009

Mr. Bruce Sheppard
BNSF Railway Company
2454 Occidental Avenue South
Suite 1A
Seattle, WA 98134-1451

Dear Mr. Sheppard:

**Re: Approval of Extension to Section VI.Ia. and b., Work To Be Preformed, of Consent Decree 07-2-33672-9 SEA for the BNSF Former Maintenance and Fueling Facility, Skykomish, Washington.**

This letter documents the Department of Ecology's (Ecology) approval of BNSF Railway Company's (BNSF) request for an extension of the November 30, 2008 deadline for completion of the levee restoration activities and the December 31, 2008 deadline to submit the final As-Built Report for 2007. Your letter dated November 21, 2008 requested the final As-Built Report deadline be extended to one month from completion of restoration, i.e., until January 31, 2009.

Ecology agrees to extend the final As-Built Report deadline to January 31, 2009.

If you have any questions, please contact me at 425-649-7265 or bsat461@ecy.wa.gov.

Sincerely,

Brian S. Sato, P.E.
Project Coordinator
Toxics Cleanup Program

bs/kp

cc: Bob Warren, Ecology
Kristie Carevich, AAG
Halah Voges, AECOM
Craig Trueblood, K & L Gates
Mayor Charlotte Mackner, Town of Skykomish
David Carson, Carson Law Group
Clint Stanovsky, Town of Skykomish
Michael Moore, Skykomish Environmental Coalition
Daryl Petrarca, Adapt Engineering

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/05/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-20's to U-30's | |
| Weather: | Snowing and cold | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Septic testing and inspection- Moore septic system passed
- DB Davis stripping concrete forms off the garage pours
- WCC crew is placing and compacting for the Mackners sidewalk and driveway

## Upcoming Work

- Michell septic system inspection.
- Grading work for Mackner driveway

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None

### MEETINGS HELD

None

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07
Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/06/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | 20- 40 | |
| Weather: | High winds, snow rain | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Septic testing and inspection- Moore septic system passed
- DB Davis restoring the teacherage and checked the house heaters

## Upcoming Work

-

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None

### MEETINGS HELD

None

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07

Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/08/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | 20- 40 | |
| Weather: | High winds, snow rain | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Septic testing and inspection- Moore septic system passed
- DB Davis consulted on placement of propane tanks and worked on Teacherage repairs

## Upcoming Work

- Handrail and back step concrete pour for Mackner
- Sidewalk stamping work was discussed

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None

### MEETINGS HELD

None

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07
Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/09/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | 20- 40 | |
| Weather: | High winds, snow rain | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Concrete stamping completed.
- DB Davis worked on Teacherage repairs
- WTP shutdown and drained.

## Upcoming Work

- Concrete pads for propane tanks and Shot-crete technician to visit houses.
- Sidewalk stamping work was discussed

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None

### MEETINGS HELD

None

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07

Completed by: Daniel Arcieri

## Daily Report

| | | |
|---|---|---|
| Date: | 01/10/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | | |
| Weather: | Snow and cold | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

### Summary of Field Activities

- DB Davis dug snow out of Moore garage. Concrete forms were set up for upcoming pour
- WCC crew setting up tents around 5th Street corner

### Upcoming Work

- Concrete pour

### Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

### Other Site Activity

**SAFETY/ISSUES MEETINGS**

Safety topic:

**DELIVERIES/SHIPMENTS**

None

**MEETINGS HELD**

None

**MONITORING PERFORMED**

None

**STAKEHOLDER/MEDIA ISSUES**

None

**SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT**

None

**VERBAL INSTRUCTIONS GIVEN/RECEIVED**

None

**OUT OF SCOPE WORK – SCHEDULE IMPACTS**

None

**GENERAL REMARKS**

Date: 8/23/07

Completed by: Daniel Arcieri

**Daily Report**

| | |
|---|---|
| Date: 01/11/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | |
| Weather: Snow and cold | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | |

**Summary of Field Activities**

- Loaded 2 sets of Rail cars

**Upcoming Work**

- Concrete pour

**Personnel on Site:**

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

**Other Site Activity**

**SAFETY/ISSUES MEETINGS**

Safety topic:

**DELIVERIES/SHIPMENTS**

None

**MEETINGS HELD**

None

**MONITORING PERFORMED**

None

**STAKEHOLDER/MEDIA ISSUES**

None

**SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT**

None

**VERBAL INSTRUCTIONS GIVEN/RECEIVED**

None

**OUT OF SCOPE WORK – SCHEDULE IMPACTS**

None

**GENERAL REMARKS**

Date: 8/23/07

Completed by: Daniel Arcieri

**Daily Report**

| | |
|---|---|
| Date: 01/12/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | |
| Weather: Snow and cold | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | |

## Summary of Field Activities

- Backfill, grade and compact sidewalk area
- Dropped off boxes to BN house

## Upcoming Work

- Concrete pour (preparing for Monday)

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis, WCC

**Visitor(s):** None

## Other Site Activity

**SAFETY/ISSUES MEETINGS**

Safety topic:

**DELIVERIES/SHIPMENTS**

None

**MEETINGS HELD**

None

**MONITORING PERFORMED**

None

**STAKEHOLDER/MEDIA ISSUES**

None

**SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT**

None

**VERBAL INSTRUCTIONS GIVEN/RECEIVED**

None

**OUT OF SCOPE WORK – SCHEDULE IMPACTS**

None

**GENERAL REMARKS**

Date: 8/23/07

Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/03/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-20's to U-30's | |
| Weather: | Raining and mildly cool | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Loaded train, demolish the levee WTP pad and haul to Railyard
- Painter onsite for Teacherage kitchen, backwashing sand filters

## Upcoming Work

- Preparing to excavate small trench to 6th St.
- Mitchell basement ready for cement pour

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Concrete truck

### MEETINGS HELD

Construction Meeting.

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07
Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: | 01/04/07 | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-20's to U-30's | |
| Weather: | Snowing and cold | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | | |

## Summary of Field Activities

- Identified repairs for houses including Mitchell east, WTP CoC completed
- Filled Mackner and Moore septic tanks with water
- WCC crew setting up tents over the two driveway areas at Mackner and Moore properties

## Upcoming Work

- Straw incoming tomorrow to cover drain field
- Septic testing and inspection

## Personnel on Site:

**RETEC:** D. Mentz

**Subcontractor(s):** DB Davis

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None

### MEETINGS HELD

None

### MONITORING PERFORMED

None

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 8/23/07

Completed by: Daniel Arcieri

**Daily Report**

| | | |
|---|---|---|
| Date: 05/02/07 (Wednesday) | | The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390 |
| Temp: U-20's to M-40's | | |
| Weather: Rain | | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: 0.48 in. | | |

## Summary of Field Activities

-Discussed Mackner front steps with Del and Chad (DB Davis)
-Concrete forms built; sidewalks and curbs poured

## Upcoming Work

- DB Davis repairing Mackner steps, septic access ports to be adjusted
- Overhang to be partially poured on Friday 5/4/07

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Concrete truck

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 05/03/07 (Thursday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-20's to U-30's | |
| Weather: | Mostly cloudy with drizzle at times. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.08 in. | |

## Summary of Field Activities

-Discussed Mackner front steps with Jackie and Dan (DB Davis)
-Concrete forms built; sidewalks and curbs poured

## Upcoming Work

- DB Davis repairing Mackner steps, septic access ports to be adjusted
- Walkways and driveways scheduled for concrete on 5/8/07 (Tuesday)
- Temporary railing needed on levee
- Monday 5/7/07 Wilder to place large seating rocks on levee
-

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Concrete truck

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

| |
|---|
| |
| |

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 05/08/07 (Tuesday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | M-30's to M-60's | |
| Weather: | Partly cloudy to sunny. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.00 in. | |

## Summary of Field Activities

-Residential walkways and driveways poured
-Placing blocks on levee wall
-Telebelting material onto levee walkway path and Mitchell septic drainfield
-Demo curb by levee (due to concrete form contractor error)

## Upcoming Work

- Temporary railing on levee
- Concrete scheduled for May 10th or 11th

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Concrete truck, rock for levee walkway and sub-grade

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

|  |
|---|
|  |
|  |

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| Date: | 05/16/07 (Wednesday) | The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390 |
|---|---|---|
| Temp: | M-30's to M-50's | |
| Weather: | Partly cloudy to sunny. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.00 in. | |

## Summary of Field Activities

-Railing subcontractor and fence subcontractors for Wilder on-site to prepare estimates

## Upcoming Work

-

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

**SAFETY/ISSUES MEETINGS**

Safety topic:

**DELIVERIES/SHIPMENTS**

None.

**MEETINGS HELD**

None.

**MONITORING PERFORMED**

None.

**STAKEHOLDER/MEDIA ISSUES**

None

**SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT**

None

**VERBAL INSTRUCTIONS GIVEN/RECEIVED**

None

**OUT OF SCOPE WORK – SCHEDULE IMPACTS**

None

**GENERAL REMARKS**

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 05/24/07 (Thursday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | M-30's to U-50's | |
| Weather: | Partly cloudy to sunny. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.00 in. | |

## Summary of Field Activities

-Painters touching up Teacherage

## Upcoming Work

- Fence along school yard: 5 feet tall to backstop, along W. River Road, 6 feet tall with 3 feet bury
- Topsoil next week
- Concrete to be placed around sonotubes on levee on Tuesday

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 05/29/07 (Tuesday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | M-30's to U-50's | |
| Weather: | Partly cloudy to sunny. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.00 in. | |

## Summary of Field Activities

-Concrete being placed in sonotubes to stiffen hand railing along levee

## Upcoming Work

- Topsoil to arrive this week. Placement next week
- Asphalt paving week of June 11th weather permitting

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

None.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 06/14/07 (Thursday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-30's to M-50's | |
| Weather: | Partly cloudy. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.00 in. | |

## Summary of Field Activities

-Topsoil placement on levee using telebelt
-Placing polymer on levee walkway

## Upcoming Work

- Asphalt paving scheduled for next week
- Remove temporary fence on school yard
- Install fence along school yard

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Topsoil.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 06/18/07 (Monday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-30's to L-50's | |
| Weather: | Partly cloudy. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.02 in. | |

## Summary of Field Activities

-Length of fence in lieu of backstop= 36 feet per measurement made with M. Moore (Skykomish School)

## Upcoming Work

- Asphalt paving
- Remove temporary fence on school yard
- Install fence along school yard

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Topsoil.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07
Completed by: Sarah Albano

RETEC

**Daily Report**

| | | |
|---|---|---|
| Date: | 06/27/07 (Wednesday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | U-30's to L-50's | |
| Weather: | Partly cloudy. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.02 in. | |

## Summary of Field Activities

-Video structural survey of school by Saad and Mark
- Site-walk to develop punch list

## Upcoming Work

- Cleanup of miscellaneous construction signs and cones

## Personnel on Site:

**RETEC:** Sarah Albano, Mike Byers, Saad Moustafa

**Subcontractor(s):** Mark Anderson/Glasswater Media

**Visitor(s):** Ron Timm/Ecology, Louise Bardy/Ecology, Angie Thomson/EnviroIssues, Bruce Sheppard/BNSF, Clint Stanovsky/Town of Skykomish, Amy Essig Dessai/Farallon, Rich McMannis/Farallon

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic:

### DELIVERIES/SHIPMENTS

Topsoil.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

**Daily Report**

| | | |
|---|---|---|
| Date: | 06/06/07 (Wednesday) | **The BNSF Skykomish, Washington Levee Remediation Project Project No. BN050-19390** |
| Temp: | M-30's to U-30's | |
| Weather: | Rain. | 1011 SW Klickitat Way, Suite 207, Seattle WA 98134 |
| Rainfall: | 0.44 in. | |

## Summary of Field Activities

-Topsoil placement on levee using telebelt

## Upcoming Work

- Sprinkler installation this week
- School emergency gravel path between 5th and 6th

## Personnel on Site:

**RETEC:** Sarah Albano

**Subcontractor(s):** None

**Visitor(s):** None

## Other Site Activity

### SAFETY/ISSUES MEETINGS

Safety topic: Walking on levee- some soft spots are present, move slowly and test surface before putting full weight on your foot

### DELIVERIES/SHIPMENTS

Topsoil.

### MEETINGS HELD

None.

### MONITORING PERFORMED

None.

### STAKEHOLDER/MEDIA ISSUES

None

### SUBMITTALS/TRANSMITTAL RECEIVED AND/OR SENT

None

### VERBAL INSTRUCTIONS GIVEN/RECEIVED

None

### OUT OF SCOPE WORK – SCHEDULE IMPACTS

None

### GENERAL REMARKS

Date: 7/11/07

Completed by: Sarah Albano

01-07 01

01-07 02

01-07 03

01-07 04

01-07 05

01-07 06

01-07 07

01-07 08

04-07 01

04-07 02

04-07 03

04-07 04

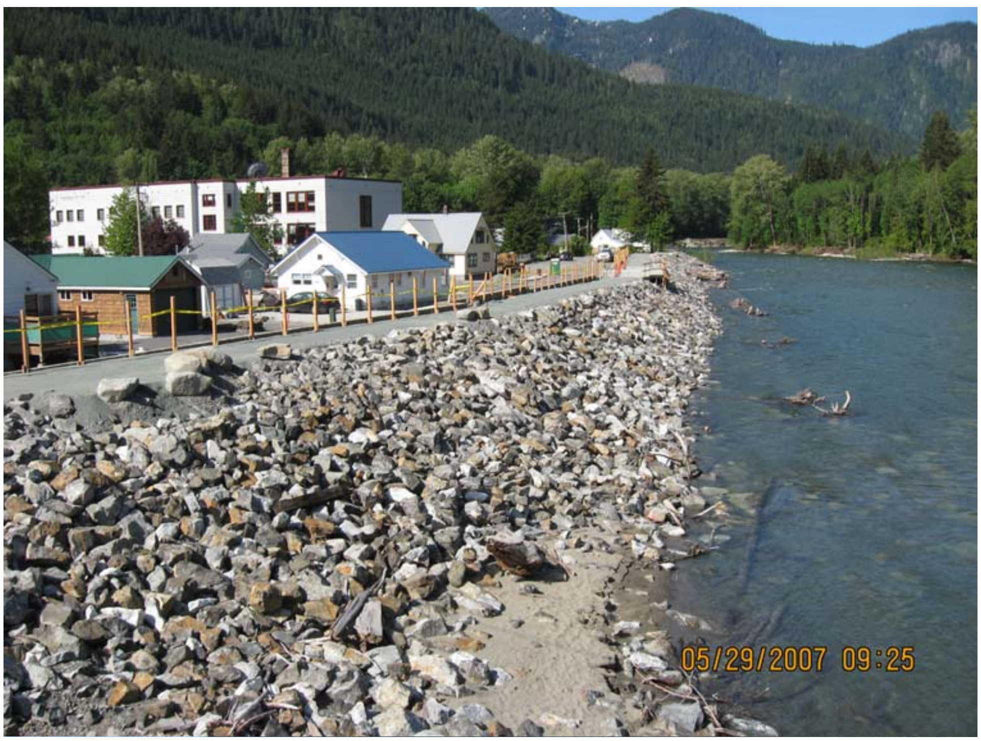
04-07 05

04-07 06

04-07 07

04-07 08

05-07 09

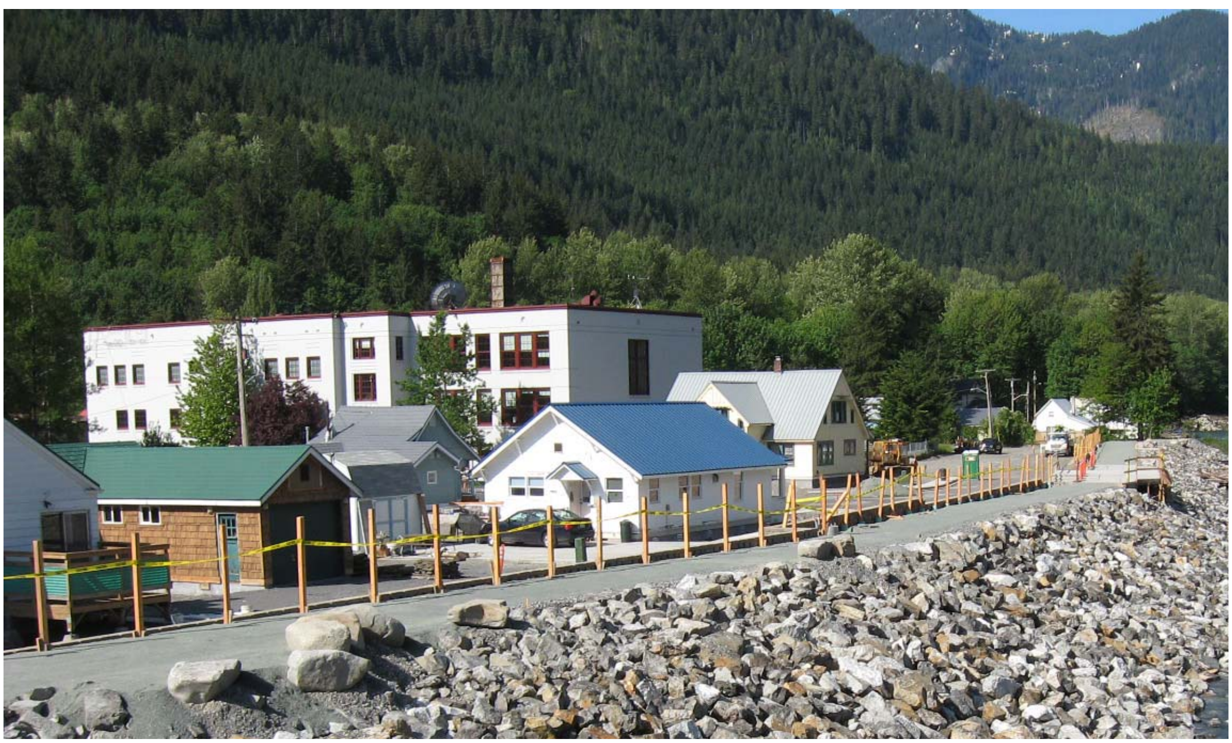


05-07 10

05-07 11

05-07 12

05-07 13



05-07 14


05-07 15

05-07 01

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06-07 11


06-07 12


06-07 13

BNSF RAILWAY

**Bruce A. Sheppard**
*Manager Environmental Remediation*

**BNSF Railway Company**
2454 Occidental Avenue S, Suite 1A
Seattle, WA 98134-1451

Phone (206) 625-6035
Fax (206) 625-6007

September 14, 2006

Louise Bardy, Project Manager
Washington State Department of Ecology, Toxics Cleanup Program
3190 160th Ave. SE
Bellevue, WA 98008

**RE: BNSF Railway Company Former Maintenance and Fueling Facility, Skykomish, WA**
**NPDES Permit No. WA-003212-3**

Dear Louise:

This letter is to provide notification of possible noncompliance with National Pollutant Discharge Elimination System Waste Discharge Permit No. WA-003212-3. In accordance with Section S3.E - Noncompliance Notification - this report contains a description of the facts and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the events which may not have been in compliance with the Permit.

On September 11, 2006 from 13:00 - 19:00 turbidity of discharge water may have exceeded the permit limit. Data was recorded from the Chitosan Control Box, and not the actual discharge for the majority of this duration. In addition to reading data from the Chitosan Control boxes, several samples were pulled from the discharge and analyzed in our on-site laboratory to ensure that our in-line readings were consistent. You will note that the Chitosan box in-line meter is slightly higher than that from the lab instrument.

| Time | Chitosan Box (NTU) | Discharge (NTU) |
|---|---|---|
| 13:00 | 15.0 | -- |
| 14:00 | 85.0 | -- |
| 15:00 | -- | 38 |
| 17:30 | 100 | -- |
| 18:00 | 30 | -- |
| 19:00 | 10 | -- |
| 19:30 | < 5 | -- |
| 21:00 | -- | 3.36 |
| 24:00 | -- | 3.36 |

We believe that the turbidity observed was caused by extremely small rock particles passing through the water treatment facility system components. These particles were non-reactive to ionic charge with Chitosan because they have no ionic charge. Additionally, the particles have a low density which prevents them from settling out in the clarifiers.

Wilder rectified the problem by dramatically reducing the flow through the system (from ~750 gpm to ~400 gpm), adjusting Chitosan dosage (both up and down); back flushing both sand filters and carbon cells, and repositioning the intake from the excavation/backfill area so that water was not being drawn from a location that contained a high concentration of extremely small rock particles. Subsequent sampling showed that these actions achieved compliance with the permit limit for turbidity. Wilder has noted that turbid water from both rock fines and soil fines appears to be more receptive to treatment, while water with turbidity primarily from rock fines is problematic. Wilder has also noticed that during periods of back flush, permit parameter levels have typically increased, but not to the point of exceedance that was observed on Sept. 11.

Wilder is also in the process of evaluating the sand filter media bed depth. On September 12, 2006 Wilder noted that sand filter media bed depth has been reduced as a result of frequent back flushing. Consistent with the terms of the Permit, Wilder will conduct an aggressive back flush to clean the remaining media and add additional media as make-up. If this is ineffective, we will replace the media in all sand filter pods. On Monday, Wilder ordered activated carbon to service each of the lead cells. The granular activated carbon cells have not only removed dissolved organics, but also the rock fines. It is anticipated that the replenished sand filters and replaced granular activated carbon will prevent turbidity exceedances in the future.

Sincerely,

Bruce A. Sheppard
Manager Environmental Remediation

Cc: J Tran, Dept. of Ecology
H. Voges, Retec
C. Trueblood, Preston Gates & Ellis
K Yost, Wilder Construction

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162

# Letter of Transmittal

RETEC

206.624. 9349 Phone
206.624. 2839 Fax
www.retec.com

**TO:** Louise Bardy, Washington Dept of Ecology **DATE:** February 15, 2007

**RE:** BNSF Skykomish Cleanup Site Discharge Monitoring Report **PROJECT NO:** BN050-19390-210

**PLEASE FIND:** ☑ Attached ☐ Under separate cover via:

☐ Copy of Letter ☐ Change Order ☐ Drawings/Figures ☐ Plans/Specs

☐ Samples ☐ Other:

| Copies | Date | No. | Description |
|---|---|---|---|
| 1 | February 15, 2007 | | BNSF Skykomish Cleanup Site Discharge Monitoring Report (per AO DE-2379, Exhibit J) |
| | | | |

☐ For Approval ☐ Approved as Submitted ☐ Resubmit Copies for Approval

☑ For Your Use ☐ Approved as Noted ☐ Submit Copies for Distribution

Remarks:

**Attached is the NPDES Discharge Monitoring Report for the January 2007 monitoring period in accordance with Agreed Order DE-2379, Exhibit J.**

Should you have any questions, please feel free to call me.

Sincerely,

The RETEC Group, Inc.

**Halah M. Voges, P.E. Senior Program Manager**

cc: **Jeanne Tran, Ecology**
**Bruce Sheppard, BNSF**
**RETEC file**

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYOMISH, WA

# DISCHARGE MONITORING REPORT (*DMR*)

| AGREED ORDER DE-2379, EXHIBIT J | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 01 | 01 | TO | 2007 | 01 | 31 |

NOTE: Read instructions before completing this form.

| Discharge Location |
|---|
| Lat 47° 42' 33" N |
| Long 121° 21' 36" W |
| NO DISCHARGE |

DISCHARGE TO GROUNDWATER*

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HYDRAULIC LOADING RATE- PRIMARY APPLICATION RATE | Sample Measurement | ****** | 0 | GPD | ****** | ****** | ****** | *** | 0 | CONT. | METER |
| | Permit Requirement | ****** | 30,900 | | ****** | ****** | ****** | | | CONT. | METER |
| HYDRAULIC LOADING RATE- SECONDARY APPLIC. RATE | Sample Measurement | ****** | 50,100 | GPD | ****** | ****** | ****** | *** | 0 | CONT. | METER |
| | Permit Requirement | ****** | 91,000 | | ****** | ****** | ****** | | | CONT. | METER |
| TPH (BEFORE GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | 3,210 | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH (AFTER GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | 1,695 | ug/L | 2 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| pH | Sample Measurement | ****** | ****** | *** | 8.48 | ****** | 9.36 | STD. | 1 | 1/4 | GRAB |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.0 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/BNSF Manager, Environmental Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

| TELEPHONE | | DATE | | |
|---|---|---|---|---|
| (206) | 625-6035 | 07 | 02 | 14 |
| AREA CODE | NUMBER | YEAR | MO | DAY |

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)

*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.

ND- Not detected

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)

# DISCHARGE MONITORING REPORT(*DMR*)

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

AGREED ORDER DE-2379, EXHIBIT J
PERMIT NUMBER

001
DISCHARGE NUMBER

MONITORING PERIOD

| | YEAR | MO | DAY |
|---|---|---|---|
| FROM | 2007 | 01 | 01 |
| TO | 2007 | 01 | 31 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 33" N
Long 121° 21' 36" W
NO DISCHARGE
DISCHARGE TO GROUNDWATER*

| Parameter | | Quality or Loading: Average | Quality or Loading: Maximum | Quality or Loading: Units | Quality or Concentration: Minimum | Quality or Concentration: Average | Quality or Concentration: Maximum | Quality or Concentration: Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL CHROMIUM | Sample Measurement | ****** | ****** | *** | ****** | ****** | 12.7 | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL COPPER | Sample Measurement | ****** | ****** | *** | ****** | ****** | 12.4 | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL LEAD | Sample Measurement | ****** | ****** | *** | ****** | ****** | 14.4 | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 17.5 | | | 01/07 | GRAB |
| POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) | Sample Measurement | ****** | ****** | *** | ****** | ****** | 0.56[1] | ug/L | 2 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| TOTAL ARSENIC | Sample Measurement | ****** | ****** | *** | ****** | ****** | 20.7 | ug/L | 0 | 2/4 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
Bruce Sheppard / BNSF Manager, Environmental Remediation
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: (206) 625-6035
AREA CODE / NUMBER

DATE: 07/02/14
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.

[1] Reported value is sum of detected PAHs

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

January 22, 2007

Stephen Howard
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

RE: BNSF-Skykomish AOJ

Enclosed are the results of analyses for samples received by the laboratory on 01/04/07 14:10. The following list is a summary of the Work Orders contained in this report, generated on 01/22/07 16:59.

If you have any questions concerning this report, please feel free to contact me.

| Work Order | Project | ProjectNumber |
|---|---|---|
| BQA0050 | BNSF-Skykomish AOJ | BN050-19390-220 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SKY-EFF-010307 | BQA0050-01 | Water | 01/03/07 16:50 | 01/04/07 14:10 |
| SKY-EFF-010307 | BQA0050-02 | Water | 01/03/07 16:55 | 01/04/07 14:10 |
| SKY-INF-010307 | BQA0050-03 | Water | 01/03/07 16:40 | 01/04/07 14:10 |
| SKY-MID-010307 | BQA0050-04 | Water | 01/03/07 16:45 | 01/04/07 14:10 |
| SKY-TB-010307 | BQA0050-05 | Water | 01/03/07 17:00 | 01/04/07 14:10 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Analytical Case Narrative
TestAmerica - Seattle, WA

**BQA0050**

SAMPLE RECEIPT

The samples were received January 4th, 2006 by TestAmerica - Seattle. The temperature of the samples at the time of receipt was 6.6 degrees Celsius. The pH for sample -01 was cancelled and added to -02 per The RETEC Group, Inc. The AOJ from the sample IDs were removed per Jennifer Wald of The RETEC Group due to EDD sample length requirements.

PREPARATIONS AND ANALYSIS

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up): No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Total Metals by EPA 200 Series Methods: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Volatile Organic Compounds by EPA Method 8260B: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Polynuclear Aromatic Hydrocarbons by GC/MS with High Volume Injection: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Conventional Chemistry Parameters by APHA/EPA Methods: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0050-01 (SKY-EFF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:50** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **0.713** | *0.0377* | 0.236 | mg/l | 1x | 7A08026 | 01/08/07 10:34 | 01/10/07 07:41 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **0.982** | *0.0849* | 0.472 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *104%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *114%* | | *68 - 125 %* | " | | | " | |
| **BQA0050-03 (SKY-INF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:40** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **1.54** | *0.0377* | 0.236 | mg/l | 1x | 7A08026 | 01/08/07 10:34 | 01/10/07 08:07 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **1.67** | *0.0849* | 0.472 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *110%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *114%* | | *68 - 125 %* | " | | | " | |
| **BQA0050-04 (SKY-MID-010307)** | | **Water** | | | **Sampled: 01/03/07 16:45** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **1.08** | *0.0385* | 0.240 | mg/l | 1x | 7A08026 | 01/08/07 10:34 | 01/10/07 08:33 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **1.72** | *0.0865* | 0.481 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *86.2%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *123%* | | *68 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Total Metals by EPA 200 Series Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0050-01 (SKY-EFF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:50** | | | | | |
| Arsenic | EPA 200.8 | **0.0207** | *0.000430* | 0.00100 | mg/l | 1x | 7A05002 | 01/05/07 06:56 | 01/08/07 10:49 | |
| Chromium | " | **0.0127** | *0.000260* | 0.00100 | " | " | " | " | " | |
| Copper | " | **0.0124** | *0.000150* | 0.00100 | " | " | " | " | " | |
| Lead | " | **0.0144** | *0.000140* | 0.00100 | " | " | " | " | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

| | | | |
|---|---|---|---|
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## Volatile Organic Compounds by EPA Method 8260B

TestAmerica - Seattle, WA

| Analyte | | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0050-01** | **(SKY-EFF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:50** | | | | | |
| Benzene | | EPA 8260B | ND | *0.114* | 0.500 | ug/l | 1x | 7A04027 | 01/04/07 11:10 | 01/04/07 17:18 | |
| Ethylbenzene | | " | ND | *0.125* | 0.500 | " | " | " | " | " | |
| Toluene | | " | ND | *0.127* | 0.500 | " | " | " | " | " | |
| Total Xylenes | | " | ND | *0.298* | 3.00 | " | " | " | " | " | |
| *Surrogate(s):* | *1,2-DCA-d4* | | | *102%* | | *70 - 130 %* | " | | | " | |
| | *Toluene-d8* | | | *98.0%* | | *75 - 125 %* | " | | | " | |
| | *4-BFB* | | | *104%* | | *75 - 125 %* | " | | | " | |
| **BQA0050-05** | **(SKY-TB-010307)** | | **Water** | | | **Sampled: 01/03/07 17:00** | | | | | |
| Benzene | | EPA 8260B | ND | *0.114* | 0.500 | ug/l | 1x | 7A04027 | 01/04/07 11:10 | 01/04/07 16:53 | |
| Ethylbenzene | | " | ND | *0.125* | 0.500 | " | " | " | " | " | |
| Toluene | | " | ND | *0.127* | 0.500 | " | " | " | " | " | |
| **Total Xylenes** | | " | **0.430** | *0.298* | 3.00 | " | " | " | " | " | J |
| *Surrogate(s):* | *1,2-DCA-d4* | | | *100%* | | *70 - 130 %* | " | | | " | |
| | *Toluene-d8* | | | *99.5%* | | *75 - 125 %* | " | | | " | |
| | *4-BFB* | | | *105%* | | *75 - 125 %* | " | | | " | |

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## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0050-01 (SKY-EFF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:50** | | | | | |
| Acenaphthene | EPA 8270C-HVI | ND | *0.00279* | 0.103 | ug/l | 1x | 7A10024 | 01/10/07 11:05 | 01/17/07 17:53 | |
| Acenaphthylene | " | ND | *0.00260* | 0.103 | " | " | " | " | " | |
| Anthracene | " | ND | *0.00293* | 0.103 | " | " | " | " | " | |
| Benzo (a) anthracene | " | ND | *0.00163* | 0.0103 | " | " | " | " | " | |
| Benzo (a) pyrene | " | ND | *0.00325* | 0.0103 | " | " | " | " | " | |
| Benzo (b) fluoranthene | " | ND | *0.00212* | 0.0103 | " | " | " | " | " | |
| Benzo (k) fluoranthene | " | ND | *0.00192* | 0.0103 | " | " | " | " | " | |
| Benzo (ghi) perylene | " | ND | *0.00305* | 0.103 | " | " | " | " | " | |
| Chrysene | " | ND | *0.00194* | 0.0103 | " | " | " | " | " | |
| Dibenz (a,h) anthracene | " | ND | *0.00258* | 0.0103 | " | " | " | " | " | |
| **Fluoranthene** | " | **0.0873** | *0.00202* | 0.103 | " | " | " | " | " | J |
| **Fluorene** | " | **0.0738** | *0.00368* | 0.103 | " | " | " | " | " | J |
| Indeno (1,2,3-cd) pyrene | " | ND | *0.00254* | 0.0103 | " | " | " | " | " | |
| **1-Methylnaphthalene** | " | **0.0259** | *0.00230* | 0.103 | " | " | " | " | " | J |
| **2-Methylnaphthalene** | " | **0.0478** | *0.00235* | 0.103 | " | " | " | " | " | J |
| Naphthalene | " | ND | *0.00432* | 0.103 | " | " | " | " | " | |
| **Phenanthrene** | " | **0.138** | *0.00267* | 0.103 | " | " | " | " | " | |
| **Pyrene** | " | **0.193** | *0.00252* | 0.103 | " | " | " | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | | *59.8%* | | *20 - 125 %* | " | | | " | |
| *1-Methylnaphthalene-d10* | | | *77.3%* | | *39 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

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## Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0050-02 (SKY-EFF-010307)** | | **Water** | | | **Sampled: 01/03/07 16:55** | | | | | |
| pH | EPA 150.1 | 9.36 | ---- | | pH Units | 1x | 7A05028 | 01/04/07 16:30 | 01/04/07 16:30 | |

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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Laboratory Quality Control Results**

TestAmerica - Seattle, WA

**QC Batch: 7A08026 Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A08026-BLK1)** | | | | | | | | Extracted: 01/08/07 10:34 | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 0.0748 | 0.0400 | 0.250 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 01/10/07 05:58 | J |
| Lube Oil Range Hydrocarbons | " | 0.176 | 0.0900 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | J |
| *Surrogate(s): 2-FBP* | | *Recovery: 104%* | | *Limits: 53-125%* | " | | | | | | | | *01/10/07 05:58* | |
| *Octacosane* | | *113%* | | *68-125%* | " | | | | | | | | " | |
| **LCS (7A08026-BS1)** | | | | | | | | Extracted: 01/08/07 10:34 | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.85 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 92.5% | (61-132) | -- | -- | 01/10/07 06:50 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 106%* | | *Limits: 53-125%* | " | | | | | | | | *01/10/07 06:50* | |
| *Octacosane* | | *110%* | | *68-125%* | " | | | | | | | | " | |
| **LCS Dup (7A08026-BSD1)** | | | | | | | | Extracted: 01/08/07 10:34 | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 2.04 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 102% | (61-132) | 9.77% | (40) | 01/10/07 07:15 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 113%* | | *Limits: 53-125%* | " | | | | | | | | *01/10/07 07:15* | |
| *Octacosane* | | *108%* | | *68-125%* | " | | | | | | | | " | |

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## Total Metals by EPA 200 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A05002** **Water Preparation Method: EPA 200 Series**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A05002-BLK1)** | | | | | | | | | Extracted: 01/05/07 06:56 | | | | | |
| Arsenic | EPA 200.8 | ND | 0.000430 | 0.00100 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 01/08/07 09:08 | |
| Copper | " | ND | 0.000150 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chromium | " | 0.000460 | 0.000260 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | J |
| Lead | " | ND | 0.000140 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| **LCS (7A05002-BS1)** | | | | | | | | | Extracted: 01/05/07 06:56 | | | | | |
| Copper | EPA 200.8 | 0.0839 | 0.000150 | 0.00100 | mg/l | 1x | -- | 0.0800 | 105% | (85-115) | -- | -- | 01/08/07 09:14 | |
| Arsenic | " | 0.0830 | 0.000430 | 0.00100 | " | " | -- | " | 104% | " | -- | -- | " | |
| Chromium | " | 0.0827 | 0.000260 | 0.00100 | " | " | -- | " | 103% | " | -- | -- | " | |
| Lead | " | 0.0807 | 0.000140 | 0.00100 | " | " | -- | " | 101% | " | -- | -- | " | |
| **Duplicate (7A05002-DUP1)** | | | | QC Source: BQA0014-01 | | | | | Extracted: 01/05/07 06:56 | | | | | |
| Copper | EPA 200.8 | 0.00320 | 0.000150 | 0.00100 | mg/l | 1x | 0.00306 | -- | -- | -- | 4.47% | (20) | 01/08/07 09:32 | |
| Lead | " | 0.000270 | 0.000140 | 0.00100 | " | " | 0.000180 | -- | -- | -- | 40.0% | " | " | R4, J |
| Arsenic | " | 0.00272 | 0.000430 | 0.00100 | " | " | 0.00247 | -- | -- | -- | 9.63% | " | " | |
| Chromium | " | 0.000660 | 0.000260 | 0.00100 | " | " | 0.000650 | -- | -- | -- | 1.53% | " | " | R4, J |
| **Matrix Spike (7A05002-MS1)** | | | | QC Source: BQA0014-01 | | | | | Extracted: 01/05/07 06:56 | | | | | |
| Copper | EPA 200.8 | 0.0885 | 0.000150 | 0.00100 | mg/l | 1x | 0.00306 | 0.0800 | 107% | (75-125) | -- | -- | 01/08/07 09:20 | |
| Lead | " | 0.0844 | 0.000140 | 0.00100 | " | " | 0.000180 | " | 105% | " | -- | -- | " | |
| Arsenic | " | 0.0892 | 0.000430 | 0.00100 | " | " | 0.00247 | " | 108% | " | -- | -- | " | |
| Chromium | " | 0.0863 | 0.000260 | 0.00100 | " | " | 0.000650 | " | 107% | " | -- | -- | " | |
| **Matrix Spike (7A05002-MS2)** | | | | QC Source: BQA0031-09 | | | | | Extracted: 01/05/07 06:56 | | | | | |
| Lead | EPA 200.8 | 0.0872 | 0.000140 | 0.00100 | mg/l | 1x | 0.000720 | 0.0800 | 108% | (75-125) | -- | -- | 01/08/07 09:26 | |
| Arsenic | " | 0.0889 | 0.000430 | 0.00100 | " | " | 0.00118 | " | 110% | " | -- | -- | " | |
| Copper | " | 0.0926 | 0.000150 | 0.00100 | " | " | 0.00555 | " | 109% | " | -- | -- | " | |
| Chromium | " | 0.0870 | 0.000260 | 0.00100 | " | " | 0.00125 | " | 107% | " | -- | -- | " | |

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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Volatile Organic Compounds by EPA Method 8260B - Laboratory Quality Control Results
TestAmerica - Seattle, WA

**QC Batch: 7A04027** **Water Preparation Method: EPA 5030B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A04027-BLK1)** | | | | | | | | | Extracted: 01/04/07 09:10 | | | | | |
| Benzene | EPA 8260B | ND | 0.114 | 0.500 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 01/04/07 11:30 | |
| Ethylbenzene | " | ND | 0.125 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Toluene | " | ND | 0.127 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Total Xylenes | " | ND | 0.298 | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 104%* | | *Limits: 70-130%* | " | | | | | | | | *01/04/07 11:30* | |
| *Toluene-d8* | | *102%* | | *75-125%* | " | | | | | | | | " | |
| *4-BFB* | | *104%* | | *75-125%* | " | | | | | | | | " | |
| **LCS (7A04027-BS1)** | | | | | | | | | Extracted: 01/04/07 09:10 | | | | | |
| Benzene | EPA 8260B | 18.8 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 94.0% | (80-120) | -- | -- | 01/04/07 10:27 | |
| Ethylbenzene | " | 19.5 | 0.125 | 0.500 | " | " | -- | " | 97.5% | (75-125) | -- | -- | " | |
| Toluene | " | 18.7 | 0.127 | 0.500 | " | " | -- | " | 93.5% | " | -- | -- | " | |
| Total Xylenes | " | 60.8 | 0.298 | 1.00 | " | " | -- | 60.0 | 101% | " | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 103%* | | *Limits: 70-130%* | " | | | | | | | | *01/04/07 10:27* | |
| *Toluene-d8* | | *99.5%* | | *75-125%* | " | | | | | | | | " | |
| *4-BFB* | | *97.0%* | | *75-125%* | " | | | | | | | | " | |
| **LCS Dup (7A04027-BSD1)** | | | | | | | | | Extracted: 01/04/07 09:10 | | | | | |
| Benzene | EPA 8260B | 19.6 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 98.0% | (80-120) | 4.17% | (20) | 01/04/07 10:58 | |
| Ethylbenzene | " | 20.4 | 0.125 | 0.500 | " | " | -- | " | 102% | (75-125) | 4.51% | " | " | |
| Toluene | " | 19.6 | 0.127 | 0.500 | " | " | -- | " | 98.0% | " | 4.70% | " | " | |
| Total Xylenes | " | 63.9 | 0.298 | 1.00 | " | " | -- | 60.0 | 106% | " | 4.97% | " | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 104%* | | *Limits: 70-130%* | " | | | | | | | | *01/04/07 10:58* | |
| *Toluene-d8* | | *100%* | | *75-125%* | " | | | | | | | | " | |
| *4-BFB* | | *98.5%* | | *75-125%* | " | | | | | | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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PH: (425) 420.9200 FAX: (425) 420.9210

| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish AOJ | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A10024** **Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A10024-BLK3)** | | | | | | | | | Extracted: 01/10/07 11:05 | | | | | |
| Acenaphthene | EPA 8270C-HVI | ND | 0.00271 | 0.100 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 01/19/07 10:03 | |
| Acenaphthylene | " | ND | 0.00252 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Anthracene | " | ND | 0.00284 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) anthracene | " | ND | 0.00158 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) pyrene | " | ND | 0.00315 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (b) fluoranthene | " | ND | 0.00206 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (k) fluoranthene | " | ND | 0.00186 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (ghi) perylene | " | ND | 0.00296 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chrysene | " | ND | 0.00188 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenz (a,h) anthracene | " | ND | 0.00250 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluoranthene | " | ND | 0.00196 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluorene | " | ND | 0.00357 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | 0.00246 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1-Methylnaphthalene | " | ND | 0.00223 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylnaphthalene | " | ND | 0.00228 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Naphthalene | " | ND | 0.00419 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenanthrene | " | ND | 0.00259 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pyrene | " | ND | 0.00244 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 80.1%* | | *Limits: 20-125%* | " | | | | | | | | *01/19/07 10:03* | |
| *1-Methylnaphthalene-d10* | | *79.0%* | | *39-125%* | " | | | | | | | | " | |
| **LCS (7A10024-BS3)** | | | | | | | | | Extracted: 01/10/07 11:05 | | | | | |
| Acenaphthene | EPA 8270C-HVI | 15.9 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 79.5% | (44-125) | -- | -- | 01/16/07 16:23 | |
| Acenaphthylene | " | 15.9 | 0.0252 | 1.00 | " | " | -- | " | 79.5% | (51-125) | -- | -- | " | |
| Anthracene | " | 15.3 | 0.0284 | 1.00 | " | " | -- | " | 76.5% | (50-125) | -- | -- | " | |
| Benzo (a) anthracene | " | 14.7 | 0.0158 | 0.100 | " | " | -- | " | 73.5% | " | -- | -- | " | |
| Benzo (a) pyrene | " | 15.3 | 0.0315 | 0.100 | " | " | -- | " | 76.5% | (47-125) | -- | -- | " | |
| Benzo (b) fluoranthene | " | 15.5 | 0.0206 | 0.100 | " | " | -- | " | 77.5% | (50-125) | -- | -- | " | |
| Benzo (k) fluoranthene | " | 15.6 | 0.0186 | 0.100 | " | " | -- | " | 78.0% | (46-125) | -- | -- | " | |
| Benzo (ghi) perylene | " | 14.0 | 0.0296 | 1.00 | " | " | -- | " | 70.0% | (49-125) | -- | -- | " | |
| Chrysene | " | 14.7 | 0.0188 | 0.100 | " | " | -- | " | 73.5% | (53-125) | -- | -- | " | |
| Dibenz (a,h) anthracene | " | 15.6 | 0.0250 | 0.100 | " | " | -- | " | 78.0% | (47-125) | -- | -- | " | |
| Fluoranthene | " | 16.3 | 0.0196 | 1.00 | " | " | -- | " | 81.5% | (55-125) | -- | -- | " | |
| Fluorene | " | 15.6 | 0.0357 | 1.00 | " | " | -- | " | 78.0% | (52-125) | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | 15.6 | 0.0246 | 0.100 | " | " | -- | " | 78.0% | (49-125) | -- | -- | " | |
| 1-Methylnaphthalene | " | 13.3 | 0.0223 | 1.00 | " | " | -- | " | 66.5% | (37-125) | -- | -- | " | |
| 2-Methylnaphthalene | " | 14.9 | 0.0228 | 1.00 | " | " | -- | " | 74.5% | (40-125) | -- | -- | " | |
| Naphthalene | " | 14.7 | 0.0419 | 1.00 | " | " | -- | " | 73.5% | (42-125) | -- | -- | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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ANALYTICAL TESTING CORPORATION

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| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/22/07 16:59 |

**Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results**
TestAmerica - Seattle, WA

**QC Batch: 7A10024** **Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7A10024-BS3)** | | | | | | | | | | Extracted: 01/10/07 11:05 | | | | |
| Phenanthrene | EPA 8270C-HVI | 16.7 | 0.0259 | 1.00 | ug/l | 10x | -- | 20.0 | 83.5% | (47-125) | -- | -- | 01/16/07 16:23 | |
| Pyrene | " | 15.0 | 0.0244 | 1.00 | " | " | -- | " | 75.0% | " | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 78.1%* | | *Limits: 20-125%* | " | | | | | | | | *01/16/07 16:23* | |
| *1-Methylnaphthalene-d10* | | *82.1%* | | *39-125%* | " | | | | | | | | " | |
| **LCS Dup (7A10024-BSD3)** | | | | | | | | | | Extracted: 01/10/07 11:05 | | | | |
| Acenaphthene | EPA 8270C-HVI | 15.3 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 76.5% | (44-125) | 3.85% | (35) | 01/16/07 16:57 | |
| Acenaphthylene | " | 15.3 | 0.0252 | 1.00 | " | " | -- | " | 76.5% | (51-125) | 3.85% | " | " | |
| Anthracene | " | 14.8 | 0.0284 | 1.00 | " | " | -- | " | 74.0% | (50-125) | 3.32% | " | " | |
| Benzo (a) anthracene | " | 13.7 | 0.0158 | 0.100 | " | " | -- | " | 68.5% | " | 7.04% | " | " | |
| Benzo (a) pyrene | " | 14.5 | 0.0315 | 0.100 | " | " | -- | " | 72.5% | (47-125) | 5.37% | " | " | |
| Benzo (b) fluoranthene | " | 15.5 | 0.0206 | 0.100 | " | " | -- | " | 77.5% | (50-125) | 0.00% | " | " | |
| Benzo (k) fluoranthene | " | 14.4 | 0.0186 | 0.100 | " | " | -- | " | 72.0% | (46-125) | 8.00% | " | " | |
| Benzo (ghi) perylene | " | 13.8 | 0.0296 | 1.00 | " | " | -- | " | 69.0% | (49-125) | 1.44% | " | " | |
| Chrysene | " | 14.1 | 0.0188 | 0.100 | " | " | -- | " | 70.5% | (53-125) | 4.17% | " | " | |
| Dibenz (a,h) anthracene | " | 14.9 | 0.0250 | 0.100 | " | " | -- | " | 74.5% | (47-125) | 4.59% | " | " | |
| Fluoranthene | " | 15.7 | 0.0196 | 1.00 | " | " | -- | " | 78.5% | (55-125) | 3.75% | " | " | |
| Fluorene | " | 15.8 | 0.0357 | 1.00 | " | " | -- | " | 79.0% | (52-125) | 1.27% | " | " | |
| Indeno (1,2,3-cd) pyrene | " | 14.7 | 0.0246 | 0.100 | " | " | -- | " | 73.5% | (49-125) | 5.94% | " | " | |
| 1-Methylnaphthalene | " | 13.1 | 0.0223 | 1.00 | " | " | -- | " | 65.5% | (37-125) | 1.52% | " | " | |
| 2-Methylnaphthalene | " | 14.7 | 0.0228 | 1.00 | " | " | -- | " | 73.5% | (40-125) | 1.35% | " | " | |
| Naphthalene | " | 14.4 | 0.0419 | 1.00 | " | " | -- | " | 72.0% | (42-125) | 2.06% | " | " | |
| Phenanthrene | " | 15.8 | 0.0259 | 1.00 | " | " | -- | " | 79.0% | (47-125) | 5.54% | " | " | |
| Pyrene | " | 14.3 | 0.0244 | 1.00 | " | " | -- | " | 71.5% | " | 4.78% | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 68.9%* | | *Limits: 20-125%* | " | | | | | | | | *01/16/07 16:57* | |
| *1-Methylnaphthalene-d10* | | *80.2%* | | *39-125%* | " | | | | | | | | " | |

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| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A05028** **Water Preparation Method: General Preparation**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duplicate (7A05028-DUP1)** | | | | | QC Source: BQA0050-02 | | | | Extracted: 01/04/07 16:30 | | | | | |
| pH | EPA 150.1 | 9.36 | --- | | pH Units | 1x | 9.36 | -- | -- | -- | 0.00% | (10) | 01/04/07 16:30 | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/22/07 16:59 |

## Notes and Definitions

Report Specific Notes:

- J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
- Q4 - The hydrocarbons present are a complex mixture of diesel range and heavy oil range organics.
- R4 - Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information.

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
- Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Seattle, WA

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January 23, 2007

Stephen Howard
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

RE: BNSF-Skykomish AOJ

Enclosed are the results of analyses for samples received by the laboratory on 01/09/07 13:20.
The following list is a summary of the Work Orders contained in this report, generated on 01/23/07 15:04.

If you have any questions concerning this report, please feel free to contact me.

| Work Order | Project | ProjectNumber |
|---|---|---|
| BQA0122 | BNSF-Skykomish AOJ | BN050-19390-220 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/23/07 15:04 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| SKY-EFF-010807 | BQA0122-01 | Water | 01/08/07 14:15 | 01/09/07 13:20 |
| SKY-EFF-010807 | BQA0122-02 | Water | 01/08/07 14:10 | 01/09/07 13:20 |
| SKY-INF-010807 | BQA0122-03 | Water | 01/08/07 14:00 | 01/09/07 13:20 |
| SKY-MID-010807 | BQA0122-04 | Water | 01/08/07 14:05 | 01/09/07 13:20 |
| SKY-TB-010807 | BQA0122-05 | Water | 01/08/07 17:00 | 01/09/07 13:20 |

TestAmerica - Seattle, WA

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Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Analytical Case Narrative

TestAmerica - Seattle, WA

**BQA0122**

SAMPLE RECEIPT

The samples were received January 9th, 2007 by TestAmerica - Seattle. The temperature of the samples at the time of receipt was 4.6 degrees Celsius. The AOJ from the sample IDs were removed per Jennifer Wald of The RETEC Group due to EDD sample length requirements.

PREPARATIONS AND ANALYSIS

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up): No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Total Metals by EPA 200 Series Methods: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Volatile Organic Compounds by EPA Method 8260B: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Polynuclear Aromatic Hydrocarbons by GC/MS with High Volume Injection: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Conventional Chemistry Parameters by APHA/EPA Methods: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

TestAmerica - Seattle, WA

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|---|---|---|---|
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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0122-01 (SKY-EFF-010807)** | | **Water** | | | **Sampled: 01/08/07 14:15** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **0.613** | *0.0385* | 0.240 | mg/l | 1x | 7A10026 | 01/10/07 11:09 | 01/13/07 19:04 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **0.878** | *0.0865* | 0.481 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *92.1%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *100%* | | *68 - 125 %* | " | | | " | |
| **BQA0122-03RE1 (SKY-INF-010807)** | | **Water** | | | **Sampled: 01/08/07 14:00** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **0.733** | *0.0385* | 0.240 | mg/l | 1x | 7A10026 | 01/10/07 11:09 | 01/16/07 18:01 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **0.902** | *0.0865* | 0.481 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *83.8%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *92.1%* | | *68 - 125 %* | " | | | " | |
| **BQA0122-04 (SKY-MID-010807)** | | **Water** | | | **Sampled: 01/08/07 14:05** | | | | | |
| **Diesel Range Hydrocarbons** | NWTPH-Dx | **0.627** | *0.0377* | 0.236 | mg/l | 1x | 7A10026 | 01/10/07 11:09 | 01/13/07 19:55 | Q4 |
| **Lube Oil Range Hydrocarbons** | " | **0.876** | *0.0849* | 0.472 | " | " | " | " | " | Q4 |
| *Surrogate(s): 2-FBP* | | | *93.6%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *106%* | | *68 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

# Total Metals by EPA 200 Series Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0122-01 (SKY-EFF-010807)** | | **Water** | | | | **Sampled: 01/08/07 14:15** | | | | |
| **Arsenic** | EPA 200.8 | **0.00892** | *0.000430* | 0.00100 | mg/l | 1x | 7A11016 | 01/11/07 12:58 | 01/12/07 15:35 | |
| **Chromium** | " | **0.00842** | *0.000260* | 0.00100 | " | " | " | " | " | |
| **Copper** | " | **0.00983** | *0.000150* | 0.00100 | " | " | " | " | " | |
| **Lead** | " | **0.0117** | *0.000140* | 0.00100 | " | " | " | " | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| **The RETEC Group, Inc.** | Project Name: **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/23/07 15:04 |

## Volatile Organic Compounds by EPA Method 8260B

TestAmerica - Seattle, WA

| Analyte | | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0122-01** | **(SKY-EFF-010807)** | | **Water** | | | **Sampled: 01/08/07 14:15** | | | | | |
| Benzene | | EPA 8260B | ND | *0.114* | 0.500 | ug/l | 1x | 7A12007 | 01/10/07 09:09 | 01/10/07 15:42 | |
| Ethylbenzene | | " | ND | *0.125* | 0.500 | " | " | " | " | " | |
| Toluene | | " | ND | *0.127* | 0.500 | " | " | " | " | " | |
| Total Xylenes | | " | ND | *0.298* | 3.00 | " | " | " | " | " | |
| *Surrogate(s):* | *1,2-DCA-d4* | | | *102%* | | *70 - 130 %* | " | | | " | |
| | *Toluene-d8* | | | *101%* | | *75 - 125 %* | " | | | " | |
| | *4-BFB* | | | *102%* | | *75 - 125 %* | " | | | " | |
| **BQA0122-05** | **(SKY-TB-010807)** | | **Water** | | | **Sampled: 01/08/07 17:00** | | | | | |
| Benzene | | EPA 8260B | ND | *0.114* | 0.500 | ug/l | 1x | 7A12007 | 01/10/07 09:09 | 01/10/07 15:19 | |
| Ethylbenzene | | " | ND | *0.125* | 0.500 | " | " | " | " | " | |
| Toluene | | " | ND | *0.127* | 0.500 | " | " | " | " | " | |
| Total Xylenes | | " | ND | *0.298* | 3.00 | " | " | " | " | " | |
| *Surrogate(s):* | *1,2-DCA-d4* | | | *102%* | | *70 - 130 %* | " | | | " | |
| | *Toluene-d8* | | | *99.0%* | | *75 - 125 %* | " | | | " | |
| | *4-BFB* | | | *100%* | | *75 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/23/07 15:04 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection

TestAmerica - Seattle, WA

**BQA0122-01 (SKY-EFF-010807)** — **Water** — **Sampled: 01/08/07 14:15**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | EPA 8270C-HVI | ND | *0.00261* | 0.0962 | ug/l | 1x | 7A10024 | 01/10/07 11:05 | 01/17/07 16:36 | |
| Acenaphthylene | " | ND | *0.00242* | 0.0962 | " | " | " | " | " | |
| Anthracene | " | ND | *0.00273* | 0.0962 | " | " | " | " | " | |
| Benzo (a) anthracene | " | ND | *0.00152* | 0.00962 | " | " | " | " | " | |
| Benzo (a) pyrene | " | ND | *0.00303* | 0.00962 | " | " | " | " | " | |
| Benzo (b) fluoranthene | " | ND | *0.00198* | 0.00962 | " | " | " | " | " | |
| Benzo (k) fluoranthene | " | ND | *0.00179* | 0.00962 | " | " | " | " | " | |
| Benzo (ghi) perylene | " | ND | *0.00285* | 0.0962 | " | " | " | " | " | |
| Chrysene | " | ND | *0.00181* | 0.00962 | " | " | " | " | " | |
| Dibenz (a,h) anthracene | " | ND | *0.00240* | 0.00962 | " | " | " | " | " | |
| **Fluoranthene** | " | **0.0617** | *0.00188* | 0.0962 | " | " | " | " | " | J |
| Fluorene | " | ND | *0.00343* | 0.0962 | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | *0.00237* | 0.00962 | " | " | " | " | " | |
| **1-Methylnaphthalene** | " | **0.0225** | *0.00214* | 0.0962 | " | " | " | " | " | J |
| **2-Methylnaphthalene** | " | **0.0449** | *0.00219* | 0.0962 | " | " | " | " | " | J |
| Naphthalene | " | ND | *0.00403* | 0.0962 | " | " | " | " | " | |
| **Phenanthrene** | " | **0.113** | *0.00249* | 0.0962 | " | " | " | " | " | |
| **Pyrene** | " | **0.128** | *0.00235* | 0.0962 | " | " | " | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | | *47.7%* | | *20 - 125 %* | " | | | " | |
| *1-Methylnaphthalene-d10* | | | *86.8%* | | *39 - 125 %* | " | | | " | |

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Kate Haney

Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQA0122-02 (SKY-EFF-010807)** | | **Water** | | | **Sampled: 01/08/07 14:10** | | | | | |
| **pH** | EPA 150.1 | 8.48 | ----- | | pH Units | 1x | 7A10018 | 01/09/07 13:55 | 01/09/07 13:55 | |

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## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A10026 Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A10026-BLK1)** | | | | | | | | | | Extracted: 01/10/07 11:09 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | 0.0400 | 0.250 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 01/13/07 16:30 | |
| Lube Oil Range Hydrocarbons | " | ND | 0.0900 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery: 82.8%* | | *Limits: 53-125%* | | " | | | | | | | *01/13/07 16:30* | |
| *Octacosane* | | *90.8%* | | *68-125%* | | " | | | | | | | " | |
| **LCS (7A10026-BS1)** | | | | | | | | | | Extracted: 01/10/07 11:09 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.75 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 87.5% | (61-132) | -- | -- | 01/13/07 16:56 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 90.8%* | | *Limits: 53-125%* | | " | | | | | | | *01/13/07 16:56* | |
| *Octacosane* | | *88.8%* | | *68-125%* | | " | | | | | | | " | |
| **LCS Dup (7A10026-BSD1)** | | | | | | | | | | Extracted: 01/10/07 11:09 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.87 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 93.5% | (61-132) | 6.63% | (40) | 01/13/07 17:21 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 99.2%* | | *Limits: 53-125%* | | " | | | | | | | *01/13/07 17:21* | |
| *Octacosane* | | *91.2%* | | *68-125%* | | " | | | | | | | " | |

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| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Total Metals by EPA 200 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A11016** **Water Preparation Method: EPA 200 Series**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A11016-BLK1)** | | | | | | | | Extracted: 01/11/07 12:58 | | | | | | |
| Lead | EPA 200.8 | ND | 0.000140 | 0.00100 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 01/12/07 15:06 | |
| Arsenic | " | ND | 0.000430 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chromium | " | 0.000460 | 0.000260 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | J |
| Copper | " | ND | 0.000150 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| **LCS (7A11016-BS1)** | | | | | | | | Extracted: 01/11/07 12:58 | | | | | | |
| Lead | EPA 200.8 | 0.0750 | 0.000140 | 0.00100 | mg/l | 1x | -- | 0.0800 | 93.8% | (85-115) | -- | -- | 01/12/07 15:12 | |
| Arsenic | " | 0.0766 | 0.000430 | 0.00100 | " | " | -- | " | 95.8% | " | -- | -- | " | |
| Copper | " | 0.0798 | 0.000150 | 0.00100 | " | " | -- | " | 99.8% | " | -- | -- | " | |
| Chromium | " | 0.0781 | 0.000260 | 0.00100 | " | " | -- | " | 97.6% | " | -- | -- | " | |
| **Duplicate (7A11016-DUP1)** | | | | QC Source: BQA0115-01 | | | | Extracted: 01/11/07 12:58 | | | | | | |
| Arsenic | EPA 200.8 | 0.000800 | 0.000430 | 0.00100 | mg/l | 1x | 0.000830 | -- | -- | -- | 3.68% | (20) | 01/12/07 15:23 | R4, J |
| Lead | " | 0.000820 | 0.000140 | 0.00100 | " | " | 0.000830 | -- | -- | -- | 1.21% | " | " | R4, J |
| Copper | " | 0.00669 | 0.000150 | 0.00100 | " | " | 0.00668 | -- | -- | -- | 0.150% | " | " | |
| Chromium | " | 0.00140 | 0.000260 | 0.00100 | " | " | 0.00150 | -- | -- | -- | 6.90% | " | " | |
| **Matrix Spike (7A11016-MS1)** | | | | QC Source: BQA0115-01 | | | | Extracted: 01/11/07 12:58 | | | | | | |
| Lead | EPA 200.8 | 0.0778 | 0.000140 | 0.00100 | mg/l | 1x | 0.000830 | 0.0800 | 96.2% | (75-125) | -- | -- | 01/12/07 15:18 | |
| Arsenic | " | 0.0792 | 0.000430 | 0.00100 | " | " | 0.000830 | " | 98.0% | " | -- | -- | " | |
| Chromium | " | 0.0801 | 0.000260 | 0.00100 | " | " | 0.00150 | " | 98.2% | " | -- | -- | " | |
| Copper | " | 0.0864 | 0.000150 | 0.00100 | " | " | 0.00668 | " | 99.6% | " | -- | -- | " | |

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## Volatile Organic Compounds by EPA Method 8260B - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A12007** **Water Preparation Method: EPA 5030B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A12007-BLK1)** | | | | | | | | | | | Extracted: 01/10/07 09:09 | | | |
| Benzene | EPA 8260B | ND | 0.114 | 0.500 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 01/10/07 12:32 | |
| Ethylbenzene | " | ND | 0.125 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Toluene | " | ND | 0.127 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Total Xylenes | " | ND | 0.298 | 3.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 104%* | | *Limits: 70-130%* | | " | | | | | | | *01/10/07 12:32* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *104%* | | *75-125%* | | " | | | | | | | " | |
| **LCS (7A12007-BS1)** | | | | | | | | | | | Extracted: 01/10/07 09:09 | | | |
| Benzene | EPA 8260B | 18.2 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 91.0% | (80-120) | -- | -- | 01/10/07 11:27 | |
| Ethylbenzene | " | 18.6 | 0.125 | 0.500 | " | " | -- | " | 93.0% | (75-125) | -- | -- | " | |
| Toluene | " | 18.7 | 0.127 | 0.500 | " | " | -- | " | 93.5% | " | -- | -- | " | |
| Total Xylenes | " | 57.2 | 0.298 | 3.00 | " | " | -- | 60.0 | 95.3% | " | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 102%* | | *Limits: 70-130%* | | " | | | | | | | *01/10/07 11:27* | |
| *Toluene-d8* | | *100%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *104%* | | *75-125%* | | " | | | | | | | " | |
| **LCS Dup (7A12007-BSD1)** | | | | | | | | | | | Extracted: 01/10/07 09:09 | | | |
| Benzene | EPA 8260B | 18.5 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 92.5% | (80-120) | 1.63% | (20) | 01/10/07 11:58 | |
| Ethylbenzene | " | 19.4 | 0.125 | 0.500 | " | " | -- | " | 97.0% | (75-125) | 4.21% | " | " | |
| Toluene | " | 19.5 | 0.127 | 0.500 | " | " | -- | " | 97.5% | " | 4.19% | " | " | |
| Total Xylenes | " | 60.3 | 0.298 | 3.00 | " | " | -- | 60.0 | 100% | " | 5.28% | " | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 102%* | | *Limits: 70-130%* | | " | | | | | | | *01/10/07 11:58* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *103%* | | *75-125%* | | " | | | | | | | " | |

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| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/23/07 15:04 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A10024 Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7A10024-BLK3)** | | | | | | | | | | Extracted: 01/10/07 11:05 | | | | |
| Acenaphthene | EPA 8270C-HVI | ND | 0.00271 | 0.100 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 01/19/07 10:03 | |
| Acenaphthylene | " | ND | 0.00252 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Anthracene | " | ND | 0.00284 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) anthracene | " | ND | 0.00158 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) pyrene | " | ND | 0.00315 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (b) fluoranthene | " | ND | 0.00206 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (k) fluoranthene | " | ND | 0.00186 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (ghi) perylene | " | ND | 0.00296 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chrysene | " | ND | 0.00188 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenz (a,h) anthracene | " | ND | 0.00250 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluoranthene | " | ND | 0.00196 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluorene | " | ND | 0.00357 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | 0.00246 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1-Methylnaphthalene | " | ND | 0.00223 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylnaphthalene | " | ND | 0.00228 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Naphthalene | " | ND | 0.00419 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenanthrene | " | ND | 0.00259 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pyrene | " | ND | 0.00244 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 80.1%* | | *Limits: 20-125%* | " | | | | | | | | *01/19/07 10:03* | |
| *1-Methylnaphthalene-d10* | | *79.0%* | | *39-125%* | " | | | | | | | | " | |
| **LCS (7A10024-BS3)** | | | | | | | | | | Extracted: 01/10/07 11:05 | | | | |
| Acenaphthene | EPA 8270C-HVI | 15.9 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 79.5% | (44-125) | -- | -- | 01/16/07 16:23 | |
| Acenaphthylene | " | 15.9 | 0.0252 | 1.00 | " | " | -- | " | 79.5% | (51-125) | -- | -- | " | |
| Anthracene | " | 15.3 | 0.0284 | 1.00 | " | " | -- | " | 76.5% | (50-125) | -- | -- | " | |
| Benzo (a) anthracene | " | 14.7 | 0.0158 | 0.100 | " | " | -- | " | 73.5% | " | -- | -- | " | |
| Benzo (a) pyrene | " | 15.3 | 0.0315 | 0.100 | " | " | -- | " | 76.5% | (47-125) | -- | -- | " | |
| Benzo (b) fluoranthene | " | 15.5 | 0.0206 | 0.100 | " | " | -- | " | 77.5% | (50-125) | -- | -- | " | |
| Benzo (k) fluoranthene | " | 15.6 | 0.0186 | 0.100 | " | " | -- | " | 78.0% | (46-125) | -- | -- | " | |
| Benzo (ghi) perylene | " | 14.0 | 0.0296 | 1.00 | " | " | -- | " | 70.0% | (49-125) | -- | -- | " | |
| Chrysene | " | 14.7 | 0.0188 | 0.100 | " | " | -- | " | 73.5% | (53-125) | -- | -- | " | |
| Dibenz (a,h) anthracene | " | 15.6 | 0.0250 | 0.100 | " | " | -- | " | 78.0% | (47-125) | -- | -- | " | |
| Fluoranthene | " | 16.3 | 0.0196 | 1.00 | " | " | -- | " | 81.5% | (55-125) | -- | -- | " | |
| Fluorene | " | 15.6 | 0.0357 | 1.00 | " | " | -- | " | 78.0% | (52-125) | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | 15.6 | 0.0246 | 0.100 | " | " | -- | " | 78.0% | (49-125) | -- | -- | " | |
| 1-Methylnaphthalene | " | 13.3 | 0.0223 | 1.00 | " | " | -- | " | 66.5% | (37-125) | -- | -- | " | |
| 2-Methylnaphthalene | " | 14.9 | 0.0228 | 1.00 | " | " | -- | " | 74.5% | (40-125) | -- | -- | " | |
| Naphthalene | " | 14.7 | 0.0419 | 1.00 | " | " | -- | " | 73.5% | (42-125) | -- | -- | " | |

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Kate Haney, Project Manager

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BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | |
|---|---|---|
| **The RETEC Group, Inc.** | Project Name: **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 01/23/07 15:04 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A10024** **Water Preparation Method: EPA 3520C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7A10024-BS3)** | | | | | | | | | Extracted: 01/10/07 11:05 | | | | | |
| Phenanthrene | EPA 8270C-HVI | 16.7 | 0.0259 | 1.00 | ug/l | 10x | -- | 20.0 | 83.5% | (47-125) | -- | -- | 01/16/07 16:23 | |
| Pyrene | " | 15.0 | 0.0244 | 1.00 | " | " | -- | " | 75.0% | " | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 78.1%* | | *Limits: 20-125%* | " | | | | | | | | *01/16/07 16:23* | |
| *1-Methylnaphthalene-d10* | | *82.1%* | | *39-125%* | " | | | | | | | | " | |
| **LCS Dup (7A10024-BSD3)** | | | | | | | | | Extracted: 01/10/07 11:05 | | | | | |
| Acenaphthene | EPA 8270C-HVI | 15.3 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 76.5% | (44-125) | 3.85% | (35) | 01/16/07 16:57 | |
| Acenaphthylene | " | 15.3 | 0.0252 | 1.00 | " | " | -- | " | 76.5% | (51-125) | 3.85% | " | " | |
| Anthracene | " | 14.8 | 0.0284 | 1.00 | " | " | -- | " | 74.0% | (50-125) | 3.32% | " | " | |
| Benzo (a) anthracene | " | 13.7 | 0.0158 | 0.100 | " | " | -- | " | 68.5% | " | 7.04% | " | " | |
| Benzo (a) pyrene | " | 14.5 | 0.0315 | 0.100 | " | " | -- | " | 72.5% | (47-125) | 5.37% | " | " | |
| Benzo (b) fluoranthene | " | 15.5 | 0.0206 | 0.100 | " | " | -- | " | 77.5% | (50-125) | 0.00% | " | " | |
| Benzo (k) fluoranthene | " | 14.4 | 0.0186 | 0.100 | " | " | -- | " | 72.0% | (46-125) | 8.00% | " | " | |
| Benzo (ghi) perylene | " | 13.8 | 0.0296 | 1.00 | " | " | -- | " | 69.0% | (49-125) | 1.44% | " | " | |
| Chrysene | " | 14.1 | 0.0188 | 0.100 | " | " | -- | " | 70.5% | (53-125) | 4.17% | " | " | |
| Dibenz (a,h) anthracene | " | 14.9 | 0.0250 | 0.100 | " | " | -- | " | 74.5% | (47-125) | 4.59% | " | " | |
| Fluoranthene | " | 15.7 | 0.0196 | 1.00 | " | " | -- | " | 78.5% | (55-125) | 3.75% | " | " | |
| Fluorene | " | 15.8 | 0.0357 | 1.00 | " | " | -- | " | 79.0% | (52-125) | 1.27% | " | " | |
| Indeno (1,2,3-cd) pyrene | " | 14.7 | 0.0246 | 0.100 | " | " | -- | " | 73.5% | (49-125) | 5.94% | " | " | |
| 1-Methylnaphthalene | " | 13.1 | 0.0223 | 1.00 | " | " | -- | " | 65.5% | (37-125) | 1.52% | " | " | |
| 2-Methylnaphthalene | " | 14.7 | 0.0228 | 1.00 | " | " | -- | " | 73.5% | (40-125) | 1.35% | " | " | |
| Naphthalene | " | 14.4 | 0.0419 | 1.00 | " | " | -- | " | 72.0% | (42-125) | 2.06% | " | " | |
| Phenanthrene | " | 15.8 | 0.0259 | 1.00 | " | " | -- | " | 79.0% | (47-125) | 5.54% | " | " | |
| Pyrene | " | 14.3 | 0.0244 | 1.00 | " | " | -- | " | 71.5% | " | 4.78% | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 68.9%* | | *Limits: 20-125%* | " | | | | | | | | *01/16/07 16:57* | |
| *1-Methylnaphthalene-d10* | | *80.2%* | | *39-125%* | " | | | | | | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish AOJ | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7A10018** **Water Preparation Method: General Preparation**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duplicate (7A10018-DUP1)** | | | | | QC Source: BQA0122-02 | | | Extracted: 01/09/07 13:55 | | | | | | |
| pH | EPA 150.1 | 8.48 | --- | | pH Units | 1x | 8.48 | -- | -- | -- | 0.00% | (10) | 01/09/07 13:55 | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 01/23/07 15:04 |

## Notes and Definitions

Report Specific Notes:

- J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
- Q4 - The hydrocarbons present are a complex mixture of diesel range and heavy oil range organics.
- R4 - Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information.

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
- Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162

# Letter of Transmittal

RETEC

206.624.9349 Phone
206.624.2839 Fax
www.retec.com

**TO:** Louise Bardy, Washington Dept of Ecology **DATE:** March 13, 2007

**RE:** BNSF Skykomish Cleanup Site Discharge Monitoring Report **PROJECT NO:** BN050-19390-210

**PLEASE FIND:** ☑ Attached ☐ Under separate cover via:

☐ Copy of Letter ☐ Change Order ☐ Drawings/Figures ☐ Plans/Specs

☐ Samples ☐ Other:

| Copies | Date | No. | Description |
|---|---|---|---|
| 1 | March 13, 2007 | | BNSF Skykomish Cleanup Site Discharge Monitoring Report (per AO DE-2379, Exhibit J) |
| | | | |

☐ For Approval ☐ Approved as Submitted ☐ Resubmit Copies for Approval

☑ For Your Use ☐ Approved as Noted ☐ Submit Copies for Distribution

Remarks:

**Attached is the NPDES Discharge Monitoring Report for the February 2007 monitoring period in accordance with Agreed Order DE-2379, Exhibit J.**

Should you have any questions, please feel free to call me.

Sincerely,

The RETEC Group, Inc.

**Halah M. Voges, P.E. Senior Program Manager**

cc: **Jeanne Tran, Ecology**
**Bruce Sheppard, BNSF**
**RETEC file**

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYOMISH, WA

# DISCHARGE MONITORING REPORT(*DMR*)

| PERMIT NUMBER | DISCHARGE NUMBER |
|---|---|
| AGREED ORDER DE-2379, EXHIBIT J | 001 |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 02 | 01 | TO | 2007 | 02 | 28 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 33" N
Long 121° 21' 36" W
NO DISCHARGE X
DISCHARGE TO GROUNDWATER*

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HYDRAULIC LOADING RATE- | Sample Measurement | ****** | | GPD | ****** | ****** | ****** | *** | | | |
| PRIMARY APPLICATION RATE | Permit Requirement | ****** | 30,900 | | ****** | ****** | ****** | | | CONT. | METER |
| HYDRAULIC LOADING RATE- | Sample Measurement | ****** | | GPD | ****** | ****** | ****** | *** | | | |
| SECONDARY APPLIC. RATE | Permit Requirement | ****** | 91,000 | | ****** | ****** | ****** | | | CONT. | METER |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| (BEFORE GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| (AFTER GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| pH | Sample Measurement | ****** | ****** | *** | | ****** | | STD. | | | |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.0 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/BNSF Manager, Environmental Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B. Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206)625-6035
AREA CODE NUMBER

DATE
07/03/12
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)

*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

# DISCHARGE MONITORING REPORT(*DMR*)

AGREED ORDER DE-2379, EXHIBIT J — PERMIT NUMBER

001 — DISCHARGE NUMBER

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 02 | 01 | TO | 2007 | 02 | 28 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 33" N
Long 121° 21' 36" W
NO DISCHARGE [X]
DISCHARGE TO GROUNDWATER*

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL CHROMIUM | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL COPPER | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL LEAD | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 17.5 | | | 01/07 | GRAB |
| POLYNUCLEAR AROMATIC | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| HYDROCARBONS (PAH) | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| TOTAL ARSENIC | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/BNSF
Manager, Environmental
Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206) 625-6035
AREA CODE NUMBER

DATE
07/03/12
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.

ENSR | AECOM

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207, Seattle, WA 98134-1162
T 206.624.9349 F 206.624.2839 www.ensr.aecom.com

# Letter of Transmittal

Attention: Chris Smith, WA Dept of Ecology Date: April 13, 2007

Project reference: BNSF Skykomish Project number: BN050-19390-210

**We are sending you the following:**

| Number of originals: | Number of copies: | Description: |
|---|---|---|
| 1 | | BNSF Skykomish Cleanup Site (WA 0032123) Discharge Monitoring Report |

Attached is the NPDES Discharge Monitoring Report for the March 2007 monitoring period.

Should you have any questions, please feel free to call me.

Sincerely,

Halah M. Voges, P.E. Snr Program Manager

Cc: Louise Bardy, Ecology
Jeanne Tran, Ecology
Bruce Sheppard, BNSF
RETEC file

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT (*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 03 | 01 | TO | 2007 | 03 | 31 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
NO DISCHARGE X

| Parameter | | QUALITY OR LOADING Average | Maximum | Units | QUALITY OR CONCENTRATION Minimum | Average | Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 1) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 2) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| CHITOSAN ACETATE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | mg/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.1 | | | 07/07 | GRAB |
| OILY SHEEN | Sample Measurement | ****** | ****** | *** | ****** | ****** | | YES/ | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | NO | | 07/07 | VISUAL |
| pH | Sample Measurement | ****** | ****** | *** | | ****** | | STD. | | | |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| DISSOLVED | Sample Measurement | ****** | ****** | *** | | ****** | ****** | mg/L | | | |
| OXYGEN* | Permit Requirement | ****** | ****** | | 8 | ****** | ****** | | | 01/07 | GRAB |
| BACKGROUND | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| TURBIDITY(1) | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/BNSF
Manager, Environmental Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

BKSheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206) 625-6035
AREA CODE NUMBER

DATE
07/04/13
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*DISSOLVED OXYGEN SHALL BE MONITORED FOR A PERIOD OF 5 WEEKS.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT (*DMR*)

NOTE: Read instructions before completing this form.

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

WA-0032123 — PERMIT NUMBER
001 — DISCHARGE NUMBER

MONITORING PERIOD
FROM YEAR 2007 MO 03 DAY 01 TO YEAR 2007 MO 03 DAY 31

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
NO DISCHARGE X

| Parameter | | Quality or Loading: Average | Quality or Loading: Maximum | Quality or Loading: Units | Quality or Concentration: Minimum | Quality or Concentration: Average | Quality or Concentration: Maximum | Quality or Concentration: Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFFLUENT | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| TURBIDITY (2) | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |
| INCREASE OVER | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| BACKGROUND (2-1) | Permit Requirement | ****** | 5* | | ****** | ****** | ****** | | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.2 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| (BEFORE GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| (AFTER GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| LEAD (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 12.5 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
Bruce Sheppard/BNSF
Manager, Environmental Remediation
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE (206) 625-6035
AREA CODE NUMBER

DATE 07/04/13
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*WHEN BACKGROUND TURBIDITY IS GREATER THAN 50 NTU, TURBIDITY IS LIMITED TO A 10% INCREASE OVER BACKGROUND.

TR - MEANS TOTAL RECOVERABLE

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
**DISCHARGE MONITORING REPORT(*DMR*)**

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 03 | 01 | TO | 2007 | 03 | 31 |

NOTE: Read instructions before completing this form.

| Discharge Location | |
|---|---|
| Lat | 47° 42' 37" N |
| Long | 121° 21' 44" W |
| **NO DISCHARGE** | X |

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARSENIC (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 360 | | | 01/07 | GRAB |
| ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 2400 | | | 01/07 | GRAB |
| FLUORENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 640 | | | 01/07 | GRAB |
| NAPHTHALENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 160 | | | 01/07 | GRAB |
| PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 480 | | | 01/07 | GRAB |
| BENZO(a)ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(b)FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard / BNSF
Manger, Environmental
Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: (206) 625-6035
AREA CODE / NUMBER

DATE: 07 04 13
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
TR - MEANS TOTAL RECOVERABLE

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

| | MONITORING PERIOD | | | | | | |
|---|---|---|---|---|---|---|---|
| | YEAR | MO | DAY | | YEAR | MO | DAY |
| FROM | 2007 | 03 | 01 | TO | 2007 | 03 | 31 |

NOTE: Read instructions before completing this form.

| Discharge Location | |
|---|---|
| Lat | 47° 42' 37" N |
| Long | 121° 21' 44" W |
| **NO DISCHARGE** | X |

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZO(k)FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(a)PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| CHRYSENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| DIBENZO(a,h)- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| ANTHRACENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| INDENO(1,2,3- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| cd)PYRENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| ACENAPHTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 643 | | | 01/07 | GRAB |
| FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 90.2 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard / BNSF Manager, Environmental Remediation

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: (206) 625-6035 (AREA CODE, NUMBER)

DATE: 07 / 04 / 13 (YEAR, MO, DAY)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)

ENSR | AECOM

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207, Seattle, WA 98134-1162
T 206.624.9349 F 206.624.2839 www.ensr.aecom.com

# Letter of Transmittal

Attention: Louise Bardy

Date: May 15, 2007

Project reference: BNSF Skykomish

Project number: BN050-19390-210

**We are sending you the following:**

| Number of originals: | Number of copies: | Description: |
| --- | --- | --- |
| 1 | | BNSF Skykomish Cleanup Site, Discharge Monitoring Report (per AO DE-2379, Exhibit J) |

Attached is the Discharge Monitoring Report for the April 2007 monitoring period in accordance with Agreed Order DE-2379, Exhibit J. Please note this is the final discharge monitoring report under AO DE-2379, as this discharge was permitted to occur from November 1, 2006 through March 30, 2007. Although discharge of this final batch of stormwater and water generated through decontamination of the soil stockpile pad on the RY occurred on April 3 and 4, 2007, water treatment was completed in March and the water was not discharged pending receipt of compliance sample analytical results confirming that the treated batch of water met the discharge limits.

Should you have any questions, please feel free to call me.

Best Regards,

Halah M. Voges, P.E., Senior Program Manager

cc: Jeanne Tran, Ecology
Bruce Sheppard, BNSF
RETEC/ENSR file

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYOMISH, WA

# DISCHARGE MONITORING REPORT(*DMR*)

| AGREED ORDER DE-2379, EXHIBIT J | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 04 | 01 | TO | 2007 | 04 | 30 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 33" N
Long 121° 21' 36" W
NO DISCHARGE

DISCHARGE TO GROUNDWATER*

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HYDRAULIC LOADING RATE- | Sample Measurement | ****** | 21,300 | GPD | ****** | ****** | ****** | *** | 0 | CONT. | METER |
| PRIMARY APPLICATION RATE | Permit Requirement | ****** | 30,900 | | ****** | ****** | ****** | | | CONT. | METER |
| HYDRAULIC LOADING RATE- | Sample Measurement | ****** | 0 | GPD | ****** | ****** | ****** | *** | 0 | CONT. | METER |
| SECONDARY APPLIC. RATE | Permit Requirement | ****** | 91,000 | | ****** | ****** | ****** | | | CONT. | METER |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND* | ug/L | 0 | CONT. | METER |
| (BEFORE GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 1/2 | GRAB |
| (AFTER GAC) | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| pH | Sample Measurement | ****** | ****** | *** | 7.65 | ****** | 7.8 | STD. | 0 | 1/1 | GRAB |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.0 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| Bruce Sheppard/BNSF Manager, Environmental Remediation | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. | B Sheppard | (206) 625-6035 | 2007 05 14 |
| TYPED OR PRINTED | | SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT | AREA CODE NUMBER | YEAR MO DAY |

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)

*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.

NOTES: ND - Not detected above method reporting limit (MRL).
* TPH (before GAC) based on performance sample results (Attachment B).

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)



Attachments: A - Compliance Sample Analytical Results. B - Performance Data

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

# DISCHARGE MONITORING REPORT (*DMR*)

AGREED ORDER DE-2379, EXHIBIT J — PERMIT NUMBER

001 — DISCHARGE NUMBER

MONITORING PERIOD: FROM YEAR 2007 MO 04 DAY 01 TO YEAR 2007 MO 04 DAY 30

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 33" N
Long 121° 21' 36" W
NO DISCHARGE
DISCHARGE TO GROUNDWATER*

| Parameter | | Quality or Loading: Average | Quality or Loading: Maximum | Quality or Loading: Units | Quality or Concentration: Minimum | Quality or Concentration: Average | Quality or Concentration: Maximum | Quality or Concentration: Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL CHROMIUM | Sample Measurement | ****** | ****** | *** | ****** | ****** | 0.6 | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL COPPER | Sample Measurement | ****** | ****** | *** | ****** | ****** | 11.3 | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| TOTAL LEAD | Sample Measurement | ****** | ****** | *** | ****** | ****** | 0.14 | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 17.5 | | | 01/07 | GRAB |
| POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) | Sample Measurement | ****** | ****** | *** | ****** | ****** | ND | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| TOTAL ARSENIC | Sample Measurement | ****** | ****** | *** | ****** | ****** | 3.18 | ug/L | 0 | 1/2 | GRAB |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/14 | GRAB |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | CERTIFICATION | SIGNATURE | TELEPHONE | DATE |
|---|---|---|---|---|
| Bruce Sheppard/BNSF Manager, Environmental Remediation<br>TYPED OR PRINTED | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. | BTSheppard<br>SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT | (206) 625-6035<br>AREA CODE NUMBER | 07/05/14<br>YEAR MO DAY |

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*LEGAL DESCRIPTION: NE SECTION 26, TOWNSHIP 26N, RANGE 1E.
NOTES: ND - Not detected above method reporting limit (MRL).
Attachments: A - Compliance Sample Analytical Results B - Performance Data

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)

# ATTACHMENT A

## Compliance Sample Analytical Results

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

April 04, 2007

Mike Byers
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

RE: Skykomish AOJ

Enclosed are the results of analyses for samples received by the laboratory on 03/27/07 08:58. The following list is a summary of the Work Orders contained in this report, generated on 04/04/07 17:06.

If you have any questions concerning this report, please feel free to contact me.

| Work Order | Project | ProjectNumber |
|---|---|---|
| BQC0605 | Skykomish AOJ | BN050-19390-220 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| FTT-2 | BQC0605-01 | Water | 03/26/07 13:15 | 03/27/07 08:58 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| The RETEC Group, Inc. | Project Name: | Skykomish AOJ | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Analytical Case Narrative

TestAmerica - Seattle, WA

**BQC0605**

SAMPLE RECEIPT

The samples were received March 27th, 2007 by TestAmerica - Seattle. The temperature of the samples at the time of receipt was 5.9 degrees Celsius. The analysis for sample FB was cancelled 03/29/07 per Karl Yost.

PREPARATIONS AND ANALYSIS

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up): No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Total Metals by EPA 6000/7000 Series Methods: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Polynuclear Aromatic Compounds by GC/MS with High Volume Injection: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Conventional Chemistry Parameters by APHA/EPA Methods: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| The RETEC Group, Inc. | Project Name: | Skykomish AOJ | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQC0605-01 (FTT-2)** | | **Water** | | | **Sampled: 03/26/07 13:15** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | *0.0400* | 0.250 | mg/l | 1x | 7C27027 | 03/27/07 14:08 | 03/27/07 22:36 | |
| Lube Oil Range Hydrocarbons | " | ND | *0.0900* | 0.500 | " | " | " | " | " | |
| *Surrogate(s): 2-FBP* | | | *71.2%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *91.2%* | | *68 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Total Metals by EPA 200 Series Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQC0605-01 (FTT-2)** | | **Water** | | | **Sampled: 03/26/07 13:15** | | | | | |
| **Arsenic** | EPA 200.8 | **0.00318** | *0.000430* | 0.00100 | mg/l | 1x | 7C29042 | 03/29/07 12:55 | 04/02/07 09:05 | |
| **Chromium** | " | **0.000600** | *0.000260* | 0.00100 | " | " | " | " | " | J |
| **Copper** | " | **0.0113** | *0.000150* | 0.00100 | " | " | " | " | " | |
| **Lead** | " | **0.00591** | *0.000140* | 0.00100 | " | " | " | " | " | |

TestAmerica - Seattle, WA

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Kate Haney

Kate Haney, Project Manager

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Volatile Organic Compounds by EPA Method 8260B

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQC0605-01 (FTT-2)** | | **Water** | | | **Sampled: 03/26/07 13:15** | | | | | |
| Benzene | EPA 8260B | ND | *0.114* | 0.500 | ug/l | 1x | 7C28042 | 03/28/07 10:42 | 03/28/07 20:14 | |
| Ethylbenzene | " | ND | *0.125* | 0.500 | " | " | " | " | " | |
| Toluene | " | ND | *0.127* | 0.500 | " | " | " | " | " | |
| Total Xylenes | " | ND | *0.298* | 3.00 | " | " | " | " | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *96.0%* | | *70 - 130 %* | " | | | | " | |
| *Toluene-d8* | | *102%* | | *75 - 125 %* | " | | | | " | |
| *4-BFB* | | *108%* | | *75 - 125 %* | " | | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| The RETEC Group, Inc. | Project Name: | Skykomish AOJ | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection

TestAmerica - Seattle, WA

**BQC0605-01 (FTT-2)** — **Water** — **Sampled: 03/26/07 13:15**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | EPA 8270C-HVI | ND | *0.00271* | 0.100 | ug/l | 1x | 7C27028 | 03/27/07 14:11 | 03/28/07 12:19 | |
| Acenaphthylene | " | ND | *0.00252* | 0.100 | " | " | " | " | " | |
| Anthracene | " | ND | *0.00284* | 0.100 | " | " | " | " | " | |
| Benzo (a) anthracene | " | ND | *0.00158* | 0.0100 | " | " | " | " | " | |
| Benzo (a) pyrene | " | ND | *0.00315* | 0.0100 | " | " | " | " | " | |
| Benzo (b) fluoranthene | " | ND | *0.00206* | 0.0100 | " | " | " | " | " | |
| Benzo (k) fluoranthene | " | ND | *0.00186* | 0.0100 | " | " | " | " | " | |
| Benzo (ghi) perylene | " | ND | *0.00296* | 0.100 | " | " | " | " | " | |
| Chrysene | " | ND | *0.00188* | 0.0100 | " | " | " | " | " | |
| Dibenz (a,h) anthracene | " | ND | *0.00250* | 0.0100 | " | " | " | " | " | |
| Fluoranthene | " | ND | *0.00196* | 0.100 | " | " | " | " | " | |
| Fluorene | " | ND | *0.00357* | 0.100 | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | *0.00246* | 0.0100 | " | " | " | " | " | |
| 1-Methylnaphthalene | " | ND | *0.00223* | 0.100 | " | " | " | " | " | |
| 2-Methylnaphthalene | " | ND | *0.00228* | 0.100 | " | " | " | " | " | |
| Naphthalene | " | ND | *0.00419* | 0.100 | " | " | " | " | " | |
| Phenanthrene | " | ND | *0.00259* | 0.100 | " | " | " | " | " | |
| Pyrene | " | ND | *0.00244* | 0.100 | " | " | " | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | | *68.5%* | | *20 - 125 %* | *"* | | | *"* | |
| *1-Methylnaphthalene-d10* | | | *66.4%* | | *39 - 125 %* | *"* | | | *"* | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQC0605-01 (FTT-2)** | | **Water** | | | **Sampled: 03/26/07 13:15** | | | | | |
| pH | EPA 150.1 | **5.94** | ----- | | pH Units | 1x | 7C28044 | 03/27/07 13:00 | 03/27/07 13:00 | A-01 |

Note: Field performance data are used in DMR for reporting pH results since holding time was exceeded.

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## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27027** **Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7C27027-BLK1)** | | | | | | | | **Extracted: 03/27/07 14:08** | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | 0.0400 | 0.250 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 03/27/07 21:18 | |
| Lube Oil Range Hydrocarbons | " | ND | 0.0900 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery: 76.4%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 21:18* | |
| *Octacosane* | | *94.4%* | | *68-125%* | | " | | | | | | | " | |
| **LCS (7C27027-BS1)** | | | | | | | | **Extracted: 03/27/07 14:08** | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.96 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 98.0% | (61-132) | -- | -- | 03/27/07 21:44 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 87.2%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 21:44* | |
| *Octacosane* | | *101%* | | *68-125%* | | " | | | | | | | " | |
| **LCS Dup (7C27027-BSD1)** | | | | | | | | **Extracted: 03/27/07 14:08** | | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.76 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 88.0% | (61-132) | 10.8% | (40) | 03/27/07 22:10 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 82.8%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 22:10* | |
| *Octacosane* | | *96.0%* | | *68-125%* | | " | | | | | | | " | |

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|---|---|---|
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| Seattle, WA 98134 | Project Manager: Mike Byers | 04/04/07 17:06 |

## Total Metals by EPA 200 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C29042 Water Preparation Method: EPA 200 Series**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7C29042-BLK1)** | | | | | | | | Extracted: 03/29/07 12:55 | | | | | | |
| Arsenic | EPA 200.8 | ND | 0.000430 | 0.00100 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 03/31/07 04:00 | |
| Chromium | " | ND | 0.000260 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Copper | " | ND | 0.000150 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Lead | " | ND | 0.000140 | 0.00100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| **LCS (7C29042-BS1)** | | | | | | | | Extracted: 03/29/07 12:55 | | | | | | |
| Lead | EPA 200.8 | 0.0764 | 0.000140 | 0.00100 | mg/l | 1x | -- | 0.0800 | 95.5% | (85-115) | -- | -- | 03/31/07 04:18 | |
| Copper | " | 0.0822 | 0.000150 | 0.00100 | " | " | -- | " | 103% | " | -- | -- | " | |
| Arsenic | " | 0.0832 | 0.000430 | 0.00100 | " | " | -- | " | 104% | " | -- | -- | " | |
| Chromium | " | 0.0828 | 0.000260 | 0.00100 | " | " | -- | " | 104% | " | -- | -- | " | |
| **Duplicate (7C29042-DUP1)** | | | | | QC Source: BQC0651-01 | | | Extracted: 03/29/07 12:55 | | | | | | |
| Arsenic | EPA 200.8 | 0.000930 | 0.000430 | 0.00100 | mg/l | 1x | 0.000970 | -- | -- | -- | 4.21% | (20) | 03/31/07 04:35 | R4, J |
| Copper | " | 0.0495 | 0.000150 | 0.00100 | " | " | 0.0496 | -- | -- | -- | 0.202% | " | " | |
| Lead | " | 0.000240 | 0.000140 | 0.00100 | " | " | 0.000180 | -- | -- | -- | 28.6% | " | " | R4, J |
| Chromium | " | 0.000810 | 0.000260 | 0.00100 | " | " | 0.000900 | -- | -- | -- | 10.5% | " | " | R4, J |
| **Matrix Spike (7C29042-MS1)** | | | | | QC Source: BQC0651-01 | | | Extracted: 03/29/07 12:55 | | | | | | |
| Lead | EPA 200.8 | 0.0826 | 0.000140 | 0.00100 | mg/l | 1x | 0.000180 | 0.0800 | 103% | (75-125) | -- | -- | 03/31/07 04:24 | |
| Copper | " | 0.136 | 0.000150 | 0.00100 | " | " | 0.0496 | " | 108% | " | -- | -- | " | |
| Chromium | " | 0.0862 | 0.000260 | 0.00100 | " | " | 0.000900 | " | 107% | " | -- | -- | " | |
| Arsenic | " | 0.0876 | 0.000430 | 0.00100 | " | " | 0.000970 | " | 108% | " | -- | -- | " | |
| **Matrix Spike (7C29042-MS2)** | | | | | QC Source: BQC0653-01 | | | Extracted: 03/29/07 12:55 | | | | | | |
| Chromium | EPA 200.8 | 0.0826 | 0.000260 | 0.00100 | mg/l | 1x | 0.000400 | 0.0800 | 103% | (75-125) | -- | -- | 03/31/07 04:30 | |
| Lead | " | 0.0782 | 0.000140 | 0.00100 | " | " | ND | " | 97.8% | " | -- | -- | " | |
| Copper | " | 0.0839 | 0.000150 | 0.00100 | " | " | 0.00394 | " | 100% | " | -- | -- | " | |
| Arsenic | " | 0.0837 | 0.000430 | 0.00100 | " | " | 0.000640 | " | 104% | " | -- | -- | " | |

TestAmerica - Seattle, WA

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| | | |
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| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Mike Byers | 04/04/07 17:06 |

## Volatile Organic Compounds by EPA Method 8260B - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C28042 Water Preparation Method: EPA 5030B**

**Blank (7C28042-BLK1)** Extracted: 03/28/07 10:00

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | EPA 8260B | ND | 0.114 | 0.500 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 03/28/07 12:33 | |
| Ethylbenzene | " | ND | 0.125 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Toluene | " | ND | 0.127 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Total Xylenes | " | ND | 0.298 | 3.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 98.0%* | | *Limits: 70-130%* | | " | | | | | | | *03/28/07 12:33* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *114%* | | *75-125%* | | " | | | | | | | " | |

**LCS (7C28042-BS1)** Extracted: 03/28/07 10:00

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | EPA 8260B | 16.9 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 84.5% | (80-120) | -- | -- | 03/28/07 11:12 | |
| Ethylbenzene | " | 18.3 | 0.125 | 0.500 | " | " | -- | " | 91.5% | (75-125) | -- | -- | " | |
| Toluene | " | 18.8 | 0.127 | 0.500 | " | " | -- | " | 94.0% | " | -- | -- | " | |
| Total Xylenes | " | 52.2 | 0.298 | 3.00 | " | " | -- | 60.0 | 87.0% | " | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 96.0%* | | *Limits: 70-130%* | | " | | | | | | | *03/28/07 11:12* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *112%* | | *75-125%* | | " | | | | | | | " | |

**LCS Dup (7C28042-BSD1)** Extracted: 03/28/07 10:00

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | EPA 8260B | 18.1 | 0.114 | 0.500 | ug/l | 1x | -- | 20.0 | 90.5% | (80-120) | 6.86% | (20) | 03/28/07 11:53 | |
| Ethylbenzene | " | 19.3 | 0.125 | 0.500 | " | " | -- | " | 96.5% | (75-125) | 5.32% | " | " | |
| Toluene | " | 19.9 | 0.127 | 0.500 | " | " | -- | " | 99.5% | " | 5.68% | " | " | |
| Total Xylenes | " | 54.3 | 0.298 | 3.00 | " | " | -- | 60.0 | 90.5% | " | 3.94% | " | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 97.0%* | | *Limits: 70-130%* | | " | | | | | | | *03/28/07 11:53* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | " | | | | | | | " | |
| *4-BFB* | | *112%* | | *75-125%* | | " | | | | | | | " | |

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## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27028 Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7C27028-BLK1)** | | | | | | | | | | | **Extracted: 03/27/07 14:11** | | | |
| Acenaphthene | EPA 8270C-HVI | ND | 0.00271 | 0.100 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 03/28/07 10:42 | |
| Acenaphthylene | " | ND | 0.00252 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Anthracene | " | ND | 0.00284 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) anthracene | " | ND | 0.00158 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) pyrene | " | ND | 0.00315 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (b) fluoranthene | " | ND | 0.00206 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (k) fluoranthene | " | ND | 0.00186 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (ghi) perylene | " | ND | 0.00296 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chrysene | " | ND | 0.00188 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenz (a,h) anthracene | " | ND | 0.00250 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluoranthene | " | ND | 0.00196 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluorene | " | ND | 0.00357 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | 0.00246 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1-Methylnaphthalene | " | ND | 0.00223 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylnaphthalene | " | ND | 0.00228 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Naphthalene | " | ND | 0.00419 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenanthrene | " | ND | 0.00259 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pyrene | " | ND | 0.00244 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 74.2%* | | *Limits: 20-125%* | *"* | | | | | | | | *03/28/07 10:42* | |
| *1-Methylnaphthalene-d10* | | *67.1%* | | *39-125%* | *"* | | | | | | | | *"* | |
| **LCS (7C27028-BS1)** | | | | | | | | | | | **Extracted: 03/27/07 14:11** | | | |
| Acenaphthene | EPA 8270C-HVI | 14.3 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 71.5% | (44-125) | -- | -- | 03/28/07 11:14 | |
| Acenaphthylene | " | 16.3 | 0.0252 | 1.00 | " | " | -- | " | 81.5% | (51-125) | -- | -- | " | |
| Anthracene | " | 17.2 | 0.0284 | 1.00 | " | " | -- | " | 86.0% | (50-125) | -- | -- | " | |
| Benzo (a) anthracene | " | 14.5 | 0.0158 | 0.100 | " | " | -- | " | 72.5% | " | -- | -- | " | |
| Benzo (a) pyrene | " | 16.1 | 0.0315 | 0.100 | " | " | -- | " | 80.5% | (47-125) | -- | -- | " | |
| Benzo (b) fluoranthene | " | 12.5 | 0.0206 | 0.100 | " | " | -- | " | 62.5% | (50-125) | -- | -- | " | |
| Benzo (k) fluoranthene | " | 17.9 | 0.0186 | 0.100 | " | " | -- | " | 89.5% | (46-125) | -- | -- | " | |
| Benzo (ghi) perylene | " | 18.4 | 0.0296 | 1.00 | " | " | -- | " | 92.0% | (49-125) | -- | -- | " | |
| Chrysene | " | 16.2 | 0.0188 | 0.100 | " | " | -- | " | 81.0% | (53-125) | -- | -- | " | |
| Dibenz (a,h) anthracene | " | 18.7 | 0.0250 | 0.100 | " | " | -- | " | 93.5% | (47-125) | -- | -- | " | |
| Fluoranthene | " | 17.9 | 0.0196 | 1.00 | " | " | -- | " | 89.5% | (55-125) | -- | -- | " | |
| Fluorene | " | 14.7 | 0.0357 | 1.00 | " | " | -- | " | 73.5% | (52-125) | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | 18.9 | 0.0246 | 0.100 | " | " | -- | " | 94.5% | (49-125) | -- | -- | " | |
| 1-Methylnaphthalene | " | 9.76 | 0.0223 | 1.00 | " | " | -- | " | 48.8% | (37-125) | -- | -- | " | |
| 2-Methylnaphthalene | " | 10.5 | 0.0228 | 1.00 | " | " | -- | " | 52.5% | (40-125) | -- | -- | " | |
| Naphthalene | " | 11.4 | 0.0419 | 1.00 | " | " | -- | " | 57.0% | (42-125) | -- | -- | " | |

TestAmerica - Seattle, WA

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

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| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 | |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27028** **Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7C27028-BS1)** | | | | | | | | | | Extracted: 03/27/07 14:11 | | | | |
| Phenanthrene | EPA 8270C-HVI | 15.5 | 0.0259 | 1.00 | ug/l | 10x | -- | 20.0 | 77.5% | (47-125) | -- | -- | 03/28/07 11:14 | |
| Pyrene | " | 14.3 | 0.0244 | 1.00 | " | " | -- | " | 71.5% | " | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 75.9%* | | *Limits: 20-125%* | *"* | | | | | | | | *03/28/07 11:14* | |
| *1-Methylnaphthalene-d10* | | *53.1%* | | *39-125%* | *"* | | | | | | | | *"* | |
| **LCS Dup (7C27028-BSD1)** | | | | | | | | | | Extracted: 03/27/07 14:11 | | | | |
| Acenaphthene | EPA 8270C-HVI | 13.1 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 65.5% | (44-125) | 8.76% | (35) | 03/28/07 11:46 | |
| Acenaphthylene | " | 14.8 | 0.0252 | 1.00 | " | " | -- | " | 74.0% | (51-125) | 9.65% | " | " | |
| Anthracene | " | 16.6 | 0.0284 | 1.00 | " | " | -- | " | 83.0% | (50-125) | 3.55% | " | " | |
| Benzo (a) anthracene | " | 13.7 | 0.0158 | 0.100 | " | " | -- | " | 68.5% | " | 5.67% | " | " | |
| Benzo (a) pyrene | " | 15.4 | 0.0315 | 0.100 | " | " | -- | " | 77.0% | (47-125) | 4.44% | " | " | |
| Benzo (b) fluoranthene | " | 12.1 | 0.0206 | 0.100 | " | " | -- | " | 60.5% | (50-125) | 3.25% | " | " | |
| Benzo (k) fluoranthene | " | 17.3 | 0.0186 | 0.100 | " | " | -- | " | 86.5% | (46-125) | 3.41% | " | " | |
| Benzo (ghi) perylene | " | 17.6 | 0.0296 | 1.00 | " | " | -- | " | 88.0% | (49-125) | 4.44% | " | " | |
| Chrysene | " | 15.4 | 0.0188 | 0.100 | " | " | -- | " | 77.0% | (53-125) | 5.06% | " | " | |
| Dibenz (a,h) anthracene | " | 17.7 | 0.0250 | 0.100 | " | " | -- | " | 88.5% | (47-125) | 5.49% | " | " | |
| Fluoranthene | " | 16.9 | 0.0196 | 1.00 | " | " | -- | " | 84.5% | (55-125) | 5.75% | " | " | |
| Fluorene | " | 14.0 | 0.0357 | 1.00 | " | " | -- | " | 70.0% | (52-125) | 4.88% | " | " | |
| Indeno (1,2,3-cd) pyrene | " | 17.9 | 0.0246 | 0.100 | " | " | -- | " | 89.5% | (49-125) | 5.43% | " | " | |
| 1-Methylnaphthalene | " | 9.28 | 0.0223 | 1.00 | " | " | -- | " | 46.4% | (37-125) | 5.04% | " | " | |
| 2-Methylnaphthalene | " | 9.89 | 0.0228 | 1.00 | " | " | -- | " | 49.4% | (40-125) | 5.98% | " | " | |
| Naphthalene | " | 10.7 | 0.0419 | 1.00 | " | " | -- | " | 53.5% | (42-125) | 6.33% | " | " | |
| Phenanthrene | " | 14.4 | 0.0259 | 1.00 | " | " | -- | " | 72.0% | (47-125) | 7.36% | " | " | |
| Pyrene | " | 13.3 | 0.0244 | 1.00 | " | " | -- | " | 66.5% | " | 7.25% | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 63.0%* | | *Limits: 20-125%* | *"* | | | | | | | | *03/28/07 11:46* | |
| *1-Methylnaphthalene-d10* | | *50.2%* | | *39-125%* | *"* | | | | | | | | *"* | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| | | |
|---|---|---|
| **The RETEC Group, Inc.** | Project Name: **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Mike Byers | 04/04/07 17:06 |

## Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C28044 Water Preparation Method: General Preparation**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duplicate (7C28044-DUP1)** | | | QC Source: BQC0605-01 | | | | | Extracted: 03/27/07 13:00 | | | | | | |
| pH | EPA 150.1 | 5.94 | --- | | pH Units | 1x | 5.94 | -- | -- | -- | 0.00% | (10) | 03/27/07 13:00 | |

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Mike Byers | 04/04/07 17:06 |

## Notes and Definitions

Report Specific Notes:

- A-01 - pH in water by EPA Method 150.1 is a field parameter with a holding time of 15 minutes per 40CFR Part 136.
- J - Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
- R4 - Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information.

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
- Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

# TestAmerica
ANALYTICAL TESTING CORPORATION

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11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

## CHAIN OF CUSTODY REPORT

Work Order #: BQC0605

CLIENT: BNSF/Retec
REPORT TO: Mike Byus
ADDRESS: Retec
PHONE: FAX:
PROJECT NAME: BNSF/Retec
PROJECT NUMBER: Skykomish
SAMPLED BY:

INVOICE TO: See Kate H.
P.O. NUMBER:

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: [X] STD. 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: [X] STD. 4 3 2 1 <1
~~OTHER~~ Specify: PAHs - 48hr FTT-2 only
* Turnaround Requests less than standard may incur Rush Charges.

| | CLIENT SAMPLE IDENTIFICATION | SAMPLING DATE/TIME | PAHs | NWTPH | VOC's | Metals | pH | | | | | | | | MATRIX (W, S, O) | # OF CONT. | LOCATION / COMMENTS | TA WO ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FTT-2 | 3/26/07 - 1315 | 2 | 2 | 3 | 1 | 1 | | | | | | | | W | 9 | Discharge Bottles | 01 |
| 2 | FB | 3/26/07 - 1400 | 2 | | | | | | | | | | | | W | 2 | Std. TA | 02 |
| 3 | Trip Blank | 3·26·07 17:00 | | | | | | | | | | | | | W | 1 | | 03 |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |

CG 3/27

RELEASED BY: [illegible] PRINT NAME: [illegible] FIRM: Wilder DATE: 3/26/07 TIME: 3/27/07 0830
RECEIVED BY: Cathy Gamble PRINT NAME: Cathy Gamble FIRM: TA DATE: 3/27/07 TIME: 8:52
RELEASED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS: FTT-2 PAHs on 48hr TA. All others - STD TA
TEMP: 5.9° w/o
PAGE OF

COC REV 05/2006

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

# ATTACHMENT B

Performance Data including Field pH measurements (laboratory analytical results for operational purposes only except for TPH results for *GAC In* results – these data were collected prior to complete treatment of batch that was discharged)

WILDER

WILDER CONSTRUCTION COMPANY

# BNSF Skykomish Levee Remediation Project
# Containment Pad Batch Treatment System Operations
# and
# Discharge Report for April 2007

This report is excerpted from the FINAL WTF System Operations and Discharge Report for the batch processing of water obtained from the contaminated containment pad for the Skykomish Levee Remediation Project. The Final WTF System Operations and Discharge Report that summarizes water treatment for the entire project will be provided to ReTec during the month of May 2007.

In summary for the month of April 2007, Wilder Construction Company treated and batch discharged a total of 28,400 gallons of water by means of ground surface application to the western infiltration area. This volume of water was treated and discharged as Batch 2. All water was treated during the month of March, but was not discharged until April 3rd and 4th, pending receipt of compliance analytical data from Test America that confirmed that all parameters were within the discharge permit limits. All water has been treated and no further water will be treated onsite for this phase of the project.

Wilder had originally treated the water of Batch 2 immediately after the first treatment of Batch 1 in March 2007. However, performance samples collected by Wilder indicated that several individual PAH constituents were identified with concentrations in excess of permit limits.

In efforts to achieve treatment compliance with the modified discharge permit for both Batch 1 and Batch 2 water volumes, Wilder performed waste treatability studies at bench-scale in the onsite field laboratory. Results of this study were used to modify the treatment system and processing chemistry to accommodate the non-reactive soil/rock fine particles, and the elevated TPH/PAH constituents adhereing to the particle fines. Because Batch 2 water consisted of waste water generated from the tail-end of the pad decontamination and tank cleaning efforts, substantial amounts of oil sheen, fuel oil odor, and suspended solid fines were evident in the waste water. The treatment regime used to process water to meet compliance for Batch1 water was again modified for Batch 2 water to consist of the following sequential process adjustments:

- pH adjustment to 3.0-3.5 SU with HCl and thorough mixing,
- mixing in a specifically activated bentonite pre-slurried onsite,
- pH adjustment to the weak acidic range and thorough mixing,
- 12 ppm Chitosan dosing,
- batch settling/clarification for a period of at least 24 hours,
- supernatant decanting

- supernatant filtration by sand, 1 um, and 0.5 um filters, respectively,
- activated carbon adsorption of filtrate with a contact time of nearly 120 minutes (~35-37 gpm through 15,000 lbs. GAC), and
- a final pH adjustment with carbon dioxide to within permit range.

Wilder resampled and analyzed the water prior to, between, and after carbon cells (GAC-Out from holding tanks) for performance control purposes. RUSH results reported verbally by CCI to Wilder suggested all parameters were within permit limits, triggered the analyses of final compliance sampling and testing. Water discharged on April 3 and 4 was in accordance with all permit limits. This water was sampled on 3/26/2007 and analyzed by Test America with the "Partial" Results reported to Wilder on 3/29/2007. Results of the sampling event for sample FTT -2 (Final Treated Tanks – Batch 2) were as follows:

**Batch 1 (April Discharge)**

| Parameter | Result | Units | Comments |
|---|---|---|---|
| Total flow | 28,400 | gallons | total for the period |
| 4/3 | 7,100 | gallons | total for day |
| 4/4 | 21,300 | gallons | total for day |
| pH | 7.65 - 7.80 | S.U. | field data, TA results exceeded holding time |
| Turbidity | 0.91 – 1.12 | NTU | field data |
| TPH-Dx (diesel) | ND | | |
| TPH-Dx (lube oil) | ND | | |
| As | * | | |
| Cr | * | | |
| Cu | * | | |
| Pb | * | | |
| BETX | ND | ug/L | |
| PAH's | ND | ug/L | |

* Not reported to Wilder in Test America "PARTIAL" data of 3/29/2007.

All water was discharged to the western discharge infiltration area in batch. A copy of Wilder's field data tracking form is attached, along with Wilder's performance sample data and the "Partial" compliance sample results from Test America.

Sludges, precipitated solids, other highly contaminated treatment system and pad residuals, and final decon fluids were removed from the site by vacuum truck and disposed offsite at a licensed disposal facility. The water treatment system was fully deactivated, decontaminated and demobilized during the month of April, including the removal and disposal of activated carbon. The carbon cells (clean) and a few ancillary system components (some pumps and hose, field lab, etc.) will be demobilized upon Wilder's final departure from the site.

Wilder Construction Company
1525 East Marine View Drive
Everett, Washington 98201-1927
(425) 551-3100 FAX (425) 551-3116

Skykomish Stockpile Testing

Authorization to discharge from DOE on 3/20/07 for water treated prior to 3/16/07
C N DDO

| Primary Application Area Discharge Limit = | 30,900 gpd |
|---|---|
| Secondary Application Area Discharge Limit = | 91,000 gpd |

Batch-1 FT-1 MAR

APR Batch 2 FT-2

4/30/07

| Date | Location | pH (must be between 6.5 and 8.5) | Turbidity | Begin Time | Beginning Meter (gallons) | End Time | Ending Meter (Gallons) | Total Gallons Discharged | Total Time Discharged | Flowrate (Gallons/Min) | Flowrate for the Day (gallons/min * 1440) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3-20-07 | Discharge GAC | 6.82 | 2.29 | 12:30p.m | 41~~7969~~00 | 11 p.m. | 4183100 | 34,100 | 9hrs | 60gpm | 34,100gals |
| 3-21-07 | 7GAC | 6.75 | 1.10 | 8am | 4183100 | 1pm | 4184690 | 15,900 | Approx 5hrs | 60gpm | 15,900gal |
| 3-22-07 | 7GAC | 6.90 | .90 | 8am | 41846900 | 3:30pm | 41874300 | 27,400 | 7.6hrs | 60gpm | 27,400 |
| 3-23-07 | 7GAC | 6.68 | .43 | 10:50am | 41874300 | 1:30pm | 41884100 | 9,800 | 3.0hrs | 54gpm | 9,800gal |
| 3-25-07 | 7GAC | 7.74 | .39 | 8am | 41884100 | 8:00pm | 41913100 | 29,000 | 8.6hrs | 60gpm | 29,000gal |
| 4-3-07 | 7GAC | 7.80 | 1.12 | 9am | 41931900 | 11:00am | 41939000 | 7100 | 2.0hrs | 60gpm | 7100gal |
| 4-4-07 | 7GAC | 7.65 | .91 | 730am | 41939000 | 1:30pm | 41960300 | 21,300 | 6.0hrs | 60gpm | 21,300gal |
| ALL | DONE | START | D-CON | PROCEDURE | @ | H2O | PLANT | | | | |

4/4/2007

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PH: (425) 420.9200 FAX: (425) 420.9210

Compliance

March 29, 2007

Stephen Howard
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

RE: Skykomish AOJ

Enclosed are the results of analyses for samples received by the laboratory on 03/27/07 08:58. The following list is a summary of the Work Orders contained in this report, generated on 03/29/07 08:55.

If you have any questions concerning this report, please feel free to contact me.

| Work Order | Project | ProjectNumber |
|---|---|---|
| BQC0605 | Skykomish AOJ | BN050-19390-220 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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BOTHELL, WA 98011-8244
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Partial Report

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 03/29/07 08:55 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| FTT-2 | BQC0605-01 | Water | 03/26/07 13:15 | 03/27/07 08:58 |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

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BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| | | |
|---|---|---|
| **The RETEC Group, Inc.** | Project Name: **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 03/29/07 08:55 |

## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQC0605-01 (FTT-2)** | | **Water** | | | **Sampled: 03/26/07 13:15** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | *0.0400* | 0.250 | mg/l | 1x | 7C27027 | 03/27/07 14:08 | 03/27/07 22:36 | |
| Lube Oil Range Hydrocarbons | " | ND | *0.0900* | 0.500 | " | " | " | " | " | |
| *Surrogate(s): 2-FBP* | | | *71.2%* | | *53 - 125 %* | " | | | " | |
| *Octacosane* | | | *91.2%* | | *68 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| The RETEC Group, Inc. | Project Name: | Skykomish AOJ | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 03/29/07 08:55 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection

TestAmerica - Seattle, WA

**BQC0605-01 (FTT-2)** — **Water** — **Sampled: 03/26/07 13:15**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | EPA 8270C-HVI | ND | *0.00271* | 0.100 | ug/l | 1x | 7C27028 | 03/27/07 14:11 | 03/28/07 12:19 | |
| Acenaphthylene | " | ND | *0.00252* | 0.100 | " | " | " | " | " | |
| Anthracene | " | ND | *0.00284* | 0.100 | " | " | " | " | " | |
| Benzo (a) anthracene | " | ND | *0.00158* | 0.0100 | " | " | " | " | " | |
| Benzo (a) pyrene | " | ND | *0.00315* | 0.0100 | " | " | " | " | " | |
| Benzo (b) fluoranthene | " | ND | *0.00206* | 0.0100 | " | " | " | " | " | |
| Benzo (k) fluoranthene | " | ND | *0.00186* | 0.0100 | " | " | " | " | " | |
| Benzo (ghi) perylene | " | ND | *0.00296* | 0.100 | " | " | " | " | " | |
| Chrysene | " | ND | *0.00188* | 0.0100 | " | " | " | " | " | |
| Dibenz (a,h) anthracene | " | ND | *0.00250* | 0.0100 | " | " | " | " | " | |
| Fluoranthene | " | ND | *0.00196* | 0.100 | " | " | " | " | " | |
| Fluorene | " | ND | *0.00357* | 0.100 | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | *0.00246* | 0.0100 | " | " | " | " | " | |
| 1-Methylnaphthalene | " | ND | *0.00223* | 0.100 | " | " | " | " | " | |
| 2-Methylnaphthalene | " | ND | *0.00228* | 0.100 | " | " | " | " | " | |
| Naphthalene | " | ND | *0.00419* | 0.100 | " | " | " | " | " | |
| Phenanthrene | " | ND | *0.00259* | 0.100 | " | " | " | " | " | |
| Pyrene | " | ND | *0.00244* | 0.100 | " | " | " | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | | *68.5%* | | *20 - 125 %* | " | | | " | |
| *1-Methylnaphthalene-d10* | | | *66.4%* | | *39 - 125 %* | " | | | " | |

TestAmerica - Seattle, WA

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Kate Haney

Kate Haney, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

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BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| | | |
|---|---|---|
| **The RETEC Group, Inc.** | Project Name: **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: Stephen Howard | 03/29/07 08:55 |

## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27027** **Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7C27027-BLK1)** | | | | | | | | | | Extracted: 03/27/07 14:08 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | 0.0400 | 0.250 | mg/l | 1x | -- | -- | -- | -- | -- | -- | 03/27/07 21:18 | |
| Lube Oil Range Hydrocarbons | " | ND | 0.0900 | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery: 76.4%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 21:18* | |
| *Octacosane* | | *94.4%* | | *68-125%* | | " | | | | | | | " | |
| **LCS (7C27027-BS1)** | | | | | | | | | | Extracted: 03/27/07 14:08 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.96 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 98.0% | (61-132) | -- | -- | 03/27/07 21:44 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 87.2%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 21:44* | |
| *Octacosane* | | *101%* | | *68-125%* | | " | | | | | | | " | |
| **LCS Dup (7C27027-BSD1)** | | | | | | | | | | Extracted: 03/27/07 14:08 | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 1.76 | 0.0400 | 0.250 | mg/l | 1x | -- | 2.00 | 88.0% | (61-132) | 10.8% | (40) | 03/27/07 22:10 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 82.8%* | | *Limits: 53-125%* | | " | | | | | | | *03/27/07 22:10* | |
| *Octacosane* | | *96.0%* | | *68-125%* | | " | | | | | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 03/29/07 08:55 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27028** **Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7C27028-BLK1)** | | | | | | | | | | | | | Extracted: 03/27/07 14:11 | |
| Acenaphthene | EPA 8270C-HVI | ND | 0.00271 | 0.100 | ug/l | 1x | -- | -- | -- | -- | -- | -- | 03/28/07 10:42 | |
| Acenaphthylene | " | ND | 0.00252 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Anthracene | " | ND | 0.00284 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) anthracene | " | ND | 0.00158 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) pyrene | " | ND | 0.00315 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (b) fluoranthene | " | ND | 0.00206 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (k) fluoranthene | " | ND | 0.00186 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (ghi) perylene | " | ND | 0.00296 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chrysene | " | ND | 0.00188 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenz (a,h) anthracene | " | ND | 0.00250 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluoranthene | " | ND | 0.00196 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluorene | " | ND | 0.00357 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | 0.00246 | 0.0100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1-Methylnaphthalene | " | ND | 0.00223 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylnaphthalene | " | ND | 0.00228 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Naphthalene | " | ND | 0.00419 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenanthrene | " | ND | 0.00259 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pyrene | " | ND | 0.00244 | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s) Benzo (a) pyrene-d12* | | *Recovery: 74.2%* | | *Limits: 20-125%* | " | | | | | | | | *03/28/07 10:42* | |
| *1-Methylnaphthalene-d10* | | *67.1%* | | *39-125%* | " | | | | | | | | " | |
| **LCS (7C27028-BS1)** | | | | | | | | | | | | | Extracted: 03/27/07 14:11 | |
| Acenaphthene | EPA 8270C-HVI | 14.3 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 71.5% | (44-125) | -- | -- | 03/28/07 11:14 | |
| Acenaphthylene | " | 16.3 | 0.0252 | 1.00 | " | " | -- | " | 81.5% | (51-125) | -- | -- | " | |
| Anthracene | " | 17.2 | 0.0284 | 1.00 | " | " | -- | " | 86.0% | (50-125) | -- | -- | " | |
| Benzo (a) anthracene | " | 14.5 | 0.0158 | 0.100 | " | " | -- | " | 72.5% | " | -- | -- | " | |
| Benzo (a) pyrene | " | 16.1 | 0.0315 | 0.100 | " | " | -- | " | 80.5% | (47-125) | -- | -- | " | |
| Benzo (b) fluoranthene | " | 12.5 | 0.0206 | 0.100 | " | " | -- | " | 62.5% | (50-125) | -- | -- | " | |
| Benzo (k) fluoranthene | " | 17.9 | 0.0186 | 0.100 | " | " | -- | " | 89.5% | (46-125) | -- | -- | " | |
| Benzo (ghi) perylene | " | 18.4 | 0.0296 | 1.00 | " | " | -- | " | 92.0% | (49-125) | -- | -- | " | |
| Chrysene | " | 16.2 | 0.0188 | 0.100 | " | " | -- | " | 81.0% | (53-125) | -- | -- | " | |
| Dibenz (a,h) anthracene | " | 18.7 | 0.0250 | 0.100 | " | " | -- | " | 93.5% | (47-125) | -- | -- | " | |
| Fluoranthene | " | 17.9 | 0.0196 | 1.00 | " | " | -- | " | 89.5% | (55-125) | -- | -- | " | |
| Fluorene | " | 14.7 | 0.0357 | 1.00 | " | " | -- | " | 73.5% | (52-125) | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | 18.9 | 0.0246 | 0.100 | " | " | -- | " | 94.5% | (49-125) | -- | -- | " | |
| 1-Methylnaphthalene | " | 9.76 | 0.0223 | 1.00 | " | " | -- | " | 48.8% | (37-125) | -- | -- | " | |
| 2-Methylnaphthalene | " | 10.5 | 0.0228 | 1.00 | " | " | -- | " | 52.5% | (40-125) | -- | -- | " | |
| Naphthalene | " | 11.4 | 0.0419 | 1.00 | " | " | -- | " | 57.0% | (42-125) | -- | -- | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 03/29/07 08:55 |

## Polynuclear Aromatic Compounds by GC/MS with High Volume Injection - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7C27028** **Water Preparation Method: EPA 3510C**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7C27028-BS1)** | | | | | | | | | | Extracted: 03/27/07 14:11 | | | | |
| Phenanthrene | EPA 8270C-HVI | 15.5 | 0.0259 | 1.00 | ug/l | 10x | -- | 20.0 | 77.5% | (47-125) | -- | -- | 03/28/07 11:14 | |
| Pyrene | " | 14.3 | 0.0244 | 1.00 | " | " | -- | " | 71.5% | " | -- | -- | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 75.9%* | | *Limits: 20-125%* | | " | | | | | | | *03 28 07 11.14* | |
| *1-Methylnaphthalene-d10* | | *53.1%* | | *39-125%* | | " | | | | | | | " | |
| **LCS Dup (7C27028-BSD1)** | | | | | | | | | | Extracted: 03/27/07 14:11 | | | | |
| Acenaphthene | EPA 8270C-HVI | 13.1 | 0.0271 | 1.00 | ug/l | 10x | -- | 20.0 | 65.5% | (44-125) | 8.76% | (35) | 03/28/07 11:46 | |
| Acenaphthylene | " | 14.8 | 0.0252 | 1.00 | " | " | -- | " | 74.0% | (51-125) | 9.65% | " | " | |
| Anthracene | " | 16.6 | 0.0284 | 1.00 | " | " | -- | " | 83.0% | (50-125) | 3.55% | " | " | |
| Benzo (a) anthracene | " | 13.7 | 0.0158 | 0.100 | " | " | -- | " | 68.5% | " | 5.67% | " | " | |
| Benzo (a) pyrene | " | 15.4 | 0.0315 | 0.100 | " | " | -- | " | 77.0% | (47-125) | 4.44% | " | " | |
| Benzo (b) fluoranthene | " | 12.1 | 0.0206 | 0.100 | " | " | -- | " | 60.5% | (50-125) | 3.25% | " | " | |
| Benzo (k) fluoranthene | " | 17.3 | 0.0186 | 0.100 | " | " | -- | " | 86.5% | (46-125) | 3.41% | " | " | |
| Benzo (ghi) perylene | " | 17.6 | 0.0296 | 1.00 | " | " | -- | " | 88.0% | (49-125) | 4.44% | " | " | |
| Chrysene | " | 15.4 | 0.0188 | 0.100 | " | " | -- | " | 77.0% | (53-125) | 5.06% | " | " | |
| Dibenz (a,h) anthracene | " | 17.7 | 0.0250 | 0.100 | " | " | -- | " | 88.5% | (47-125) | 5.49% | " | " | |
| Fluoranthene | " | 16.9 | 0.0196 | 1.00 | " | " | -- | " | 84.5% | (55-125) | 5.75% | " | " | |
| Fluorene | " | 14.0 | 0.0357 | 1.00 | " | " | -- | " | 70.0% | (52-125) | 4.88% | " | " | |
| Indeno (1,2,3-cd) pyrene | " | 17.9 | 0.0246 | 0.100 | " | " | -- | " | 89.5% | (49-125) | 5.43% | " | " | |
| 1-Methylnaphthalene | " | 9.28 | 0.0223 | 1.00 | " | " | -- | " | 46.4% | (37-125) | 5.04% | " | " | |
| 2-Methylnaphthalene | " | 9.89 | 0.0228 | 1.00 | " | " | -- | " | 49.4% | (40-125) | 5.98% | " | " | |
| Naphthalene | " | 10.7 | 0.0419 | 1.00 | " | " | -- | " | 53.5% | (42-125) | 6.33% | " | " | |
| Phenanthrene | " | 14.4 | 0.0259 | 1.00 | " | " | -- | " | 72.0% | (47-125) | 7.36% | " | " | |
| Pyrene | " | 13.3 | 0.0244 | 1.00 | " | " | -- | " | 66.5% | " | 7.25% | " | " | |
| *Surrogate(s): Benzo (a) pyrene-d12* | | *Recovery: 63.0%* | | *Limits: 20-125%* | | " | | | | | | | *03 28 07 11.46* | |
| *1-Methylnaphthalene-d10* | | *50.2%* | | *39-125%* | | " | | | | | | | " | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.*

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

Partial Report

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **Skykomish AOJ** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Stephen Howard | 03/29/07 08:55 |

## Notes and Definitions

Report Specific Notes:

None

Laboratory Reporting Conventions:

| | | |
|---|---|---|
| DET | - | Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only. |
| ND | - | Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate). |
| NR/NA | - | Not Reported / Not Available |
| dry | - | Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight. |
| wet | - | Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis. |
| RPD | - | RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries). |
| MRL | - | METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table. |
| MDL* | - | METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results. |
| Dil | - | Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data. |
| Reporting Limits | - | Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable. |
| Electronic Signature | - | Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature. |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

8620 Holly Drive
Everett, WA 98208
Phone (425) 356-2600
(206) 292-9059 Seattle
(425) 356-2626 Fax
http://www.ccilabs.com

# Chain Of Custody/ Laboratory Analysis Request

STD. TA

Date 3/26/07 Page 2 Of 2

PROJECT ID: BDSF / Bky Komil
REPORT TO COMPANY: Wilder
PROJECT MANAGER: Kurt Vogt
ADDRESS:
PHONE: FAX:
P.O. NUMBER: E-MAIL:
INVOICE TO COMPANY: Wilder
ATTENTION:
ADDRESS:

ANALYSIS REQUESTED

| | SAMPLE I.D. | DATE | TIME | TYPE | LAB# | NWTPH-HCID | NWTPH-DX | NWTPH-GX | BTEX by EPA-8021 | MTBE by EPA-8021 ☐ EPA-8260 ☐ | Halogenated Volatiles by EPA 8260 | Volatile Organic Compounds by EPA 8260 BTEX | EDB / EDC by EPA 8260 SIM (water) | EDB / EDC by EPA 8260 (soil) | Semivolatile Organic Compounds by EPA 8270 PAH | Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐ | PCB ☐ Pesticides ☐ by EPA 8081/8082 | Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ | Metals Other (Specify) | TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐ | OTHER (Specify) | NUMBER OF CONTAINERS | RECEIVED IN GOOD CONDITION? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | GAC-IN | 3/26/07 | 1330 | G | 2 | | 1 | | | | | 2 | | | 2 | | | | | | | 5 | |
| 2. | GAC-BTWN | 3/26/07 | 1335 | G | 3 | | 1 | | | | | 2 | | | 2 | | | | | | | 5 | |
| 3. | ~~GAC-OUT~~ | ~~3/26/07~~ | ~~1340~~ | ~~G~~ | | | ~~1~~ | | | | | ~~2~~ | | | ~~2~~ | | | | | | | ~~5~~ | |
| 4. | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | |

SPECIAL INSTRUCTIONS

CCI Analytical Laboratories, Inc accepts and processes this request on the terms and conditions set forth on the reverse side. By its signature hereon, Customer accepts these terms and conditions.

SIGNATURES (Name, Company, Date, Time):
1. Relinquished By: Wilder 3/27/07 0700
Received By: CCI AL 3/27/07 8:15
2. Relinquished By:
Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: ☒ 10 Standard ☐ 5 ☐ 3 ☐ 2 ☐ 1 ☐ SAME DAY

Fuels & Hydrocarbon Analysis: ☒ 5 Standard ☐ 3 ☐ 1 ☐ SAME DAY

OTHER:
Specify: Std TA

* Turnaround request less than standard may incur Rush Charges

REPORT COPY

# TestAmerica
ANALYTICAL TESTING CORPORATION

11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

## CHAIN OF CUSTODY REPORT

Work Order #: BQC0605

CLIENT: BNSF/Retec
REPORT TO: Mike Byers
ADDRESS: Retec
PHONE:
FAX:
PROJECT NAME: BNSF/Retec
PROJECT NUMBER: Skykomish
SAMPLED BY:

INVOICE TO: See Kate H.

P.O. NUMBER:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: ~~10~~ STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: ~~5~~ STD. | 4 | 3 | 2 | 1 | <1

~~OTHER~~ Specify: PAHs - 48 hr FTT-2 ONLY

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE

REQUESTED ANALYSES

| | CLIENT SAMPLE IDENTIFICATION | SAMPLING DATE/TIME | PAHs | NWTPH | VOC's | Metals | pH | | | | | | | | MATRIX (W, S, O) | # OF CONT. | LOCATION / COMMENTS | TA WO ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FTT-2 | 3/26/07 - 1315 | 2 | 2 | 3 | 1 | 1 | | | | | | | | W | 9 | Discharge Retec | 01 |
| 2 | ~~FB~~ | ~~3/26/07 - 1400~~ | ~~2~~ cancelled per Kar Yost 3/29/07 | | | | | | | | | | | | W | 2 | Skl-TA | 02 |
| 3 | Trip Blank | 3-26-07 · 17:00 | | | | | | | | | | | | | W | 1 | | 03 |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |

4/30/07

FB = Field Blank

RELEASED BY: [signature] PRINT NAME: Karl Yost FIRM: Wilder DATE: 3/26/07 TIME: 3/27/07 0835

RECEIVED BY: Cathy Gamble PRINT NAME: Cathy Gamble FIRM: TA DATE: 3/27/07 TIME: 8:52

RELEASED BY: PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS: FTT-2 PAHs on 48hr TA. All others - STD TAT

TEMP: 5.9° PAGE OF

COCREV 05/2006

Note: By relinquishing samples to TestAmerica, client agrees to pay for the services requested on this chain of custody form and for any additional analyses performed on this project. [illegible] 30 days from the date of invoice unless otherwise contracted. Sample(s) will be disposed of after 30 days unless otherwise contracted.

CCI
ANALYTICAL
LABORATORIES

Performance on Retest

## CERTIFICATE OF ANALYSIS

CLIENT: WILDER CONSTRUCTION CO.
1525 EAST MARINE VIEW DRIVE
EVERETT, WA 98201

DATE: 4/2/2007
CCIL JOB #: 0703145
DATE RECEIVED: 3/27/2007
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARL YOST
CLIENT PROJECT ID: BNSF/SKYKOMISH
CLIENT SAMPLE ID: 3/26/2007 13:20 GAC-OUT
CCIL SAMPLE #: -01

## DATA RESULTS

| ANALYTE | METHOD | RESULTS* | UNITS** | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|
| TPH-Diesel Range | NWTPH-DX | ND(<130) | UG/L | 3/27/2007 | DLC |
| TPH-Oil Range | NWTPH-DX | ND(<250) | UG/L | 3/27/2007 | DLC |
| Naphthalene | EPA-8270 SIM | 0.03 | UG/L | 3/27/2007 | RAL |
| 1-Methylnaphthalene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| 2-Methylnaphthalene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Acenaphthylene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Acenaphthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluorene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Phenanthrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[A]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Chrysene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[B]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[K]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo(A)Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Indeno[1,2,3-Cd]Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Dibenz[A,H]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[G,H,I]Perylene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |

* "ND" INDICATES ANALYTE ANALYZED FOR BUT NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES.
** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

APPROVED BY:



8620 Holly Drive Suite 100 Everett, WA 98208 425 356-2600 FAX 425 356-2626 Seattle 206 292-9059

CCI
ANALYTICAL
LABORATORIES

Performance on "Retreat"

## CERTIFICATE OF ANALYSIS

CLIENT: WILDER CONSTRUCTION CO.
1525 EAST MARINE VIEW DRIVE
EVERETT, WA 98201

DATE: 4/2/2007
CCIL JOB #: 0703145
DATE RECEIVED: 3/27/2007
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARL YOST
CLIENT PROJECT ID: BNSF/SKYKOMISH
CLIENT SAMPLE ID: 3/26/2007 13:30 GAC-IN
CCIL SAMPLE #: -02

## DATA RESULTS

| ANALYTE | METHOD | RESULTS* | UNITS** | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|
| TPH-Diesel Range | NWTPH-DX | ND(<130) | UG/L | 3/28/2007 | DLC |
| TPH-Oil Range | NWTPH-DX | ND(<250) | UG/L | 3/28/2007 | DLC |
| Benzene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Toluene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Ethylbenzene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| M+P Xylene | EPA-8260 | ND(<4) | UG/L | 3/29/2007 | MLC |
| O-Xylene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Naphthalene | EPA-8270 SIM | 0.10 | UG/L | 3/27/2007 | RAL |
| 1-Methylnaphthalene | EPA-8270 SIM | 0.13 | UG/L | 3/27/2007 | RAL |
| 2-Methylnaphthalene | EPA-8270 SIM | 0.15 | UG/L | 3/27/2007 | RAL |
| Acenaphthylene | EPA-8270 SIM | 0.02 | UG/L | 3/27/2007 | RAL |
| Acenaphthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluorene | EPA-8270 SIM | 0.03 | UG/L | 3/27/2007 | RAL |
| Phenanthrene | EPA-8270 SIM | 0.03 | UG/L | 3/27/2007 | RAL |
| Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[A]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Chrysene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[B]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[K]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo(A)Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Indeno[1,2,3-Cd]Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Dibenz[A,H]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[G,H,I]Perylene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |

* "ND" INDICATES ANALYTE ANALYZED FOR BUT NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES.
** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

APPROVED BY:



8620 Holly Drive Suite 100 Everett, WA 98208 425 356-2600 FAX 425 356-2626 Seattle 206 292-9059

CCI ANALYTICAL LABORATORIES

## CERTIFICATE OF ANALYSIS

CLIENT: WILDER CONSTRUCTION CO.
1525 EAST MARINE VIEW DRIVE
EVERETT, WA 98201

DATE: 4/2/2007
CCIL JOB #: 0703145
DATE RECEIVED: 3/27/2007
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARL YOST
CLIENT PROJECT ID: BNSF/SKYKOMISH
CLIENT SAMPLE ID: 3/26/2007 13:35 GAC-BTWN
CCIL SAMPLE #: -03

## DATA RESULTS

| ANALYTE | METHOD | RESULTS* | UNITS** | ANALYSIS DATE | ANALYSIS BY |
|---|---|---|---|---|---|
| TPH-Diesel Range | NWTPH-DX | ND(<130) | UG/L | 3/27/2007 | DLC |
| TPH-Oil Range | NWTPH-DX | ND(<250) | UG/L | 3/27/2007 | DLC |
| Benzene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Toluene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Ethylbenzene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| M+P Xylene | EPA-8260 | ND(<4) | UG/L | 3/29/2007 | MLC |
| O-Xylene | EPA-8260 | ND(<2) | UG/L | 3/29/2007 | MLC |
| Naphthalene | EPA-8270 SIM | 0.03 | UG/L | 3/27/2007 | RAL |
| 1-Methylnaphthalene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| 2-Methylnaphthalene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Acenaphthylene | EPA-8270 SIM | 0.02 | UG/L | 3/27/2007 | RAL |
| Acenaphthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluorene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Phenanthrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[A]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Chrysene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[B]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[K]Fluoranthene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo(A)Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Indeno[1,2,3-Cd]Pyrene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Dibenz[A,H]Anthracene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |
| Benzo[G,H,I]Perylene | EPA-8270 SIM | ND(<0.02) | UG/L | 3/27/2007 | RAL |

* "ND" INDICATES ANALYTE ANALYZED FOR BUT NOT DETECTED AT LEVEL ABOVE REPORTING LIMIT. REPORTING LIMIT IS GIVEN IN PARENTHESES.
** UNITS FOR ALL NON LIQUID SAMPLES ARE REPORTED ON A DRY WEIGHT BASIS

APPROVED BY:

Carl Fro



8620 Holly Drive Suite 100 Everett, WA 98208 425 356-2600 FAX 425 356-2626 Seattle 206 292-9059

## CERTIFICATE OF ANALYSIS

CLIENT: WILDER CONSTRUCTION CO.
1525 EAST MARINE VIEW DRIVE
EVERETT, WA 98201

DATE: 4/2/2007
CCIL JOB #: 0703145
DATE RECEIVED: 3/27/2007
WDOE ACCREDITATION #: C142

CLIENT CONTACT: KARL YOST
CLIENT PROJECT ID: BNSF/SKYKOMISH

## QUALITY CONTROL RESULTS

### SURROGATE RECOVERY

| CCIL SAMPLE ID | METHOD | SUR ID | % RECV |
|---|---|---|---|
| 0703145-01 | NWTPH-DX | C25 | 84 |
| 0703145-01 | EPA-8270 SIM | Terphenyl-d14 | 117 |
| 0703145-02 | NWTPH-DX | C25 | 94 |
| 0703145-02 | EPA-8260 | Toluene-d8 | 92 |
| 0703145-02 | EPA-8270 SIM | Terphenyl-d14 | 99 |
| 0703145-03 | NWTPH-DX | C25 | 85 |
| 0703145-03 | EPA-8260 | Toluene-d8 | 97 |
| 0703145-03 | EPA-8270 SIM | Terphenyl-d14 | 103 |

APPROVED BY:



8620 Holly Drive Suite 100 Everett, WA 98208 425 356-2600 FAX 425 356-2626 Seattle 206 292-9059

8620 Holly Drive
Everett, WA 98208
Phone (425) 356-2600
(206) 292-9059 Seattle
(425) 356-2626 Fax
http://www.ccilabs.com

# Chain Of Custody/ Laboratory Analysis Request

(SAME DAY!)

Date 3/26/07 Page 1 Of 2

PROJECT ID: BNSF Skykomish

REPORT TO COMPANY: Wilder

PROJECT MANAGER: Karl Vost

ADDRESS:

PHONE: FAX:

P.O. NUMBER: E-MAIL:

INVOICE TO COMPANY: Wilder

ATTENTION:

ADDRESS:

| | SAMPLE I.D. | DATE | TIME | TYPE | LAB# |
|---|---|---|---|---|---|
| 1. | GAC-OUT | 3/26/07 | 1320 | G | 1 |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |

ANALYSIS REQUESTED

| | NWTPH-HCID | NWTPH-DX | NWTPH-GX | BTEX by EPA-8021 | MTBE by EPA-8021 ☐ EPA-8260 ☐ | Halogenated Volatiles by EPA 8260 | Volatile Organic Compounds by EPA 8260 | EDB / EDC by EPA 8260 SIM (water) | EDB / EDC by EPA 8260 (soil) | Semivolatile Organic Compounds by EPA 8270 | Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐ | PCB ☐ Pesticides ☐ by EPA 8081/8082 | Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐ | Metals Other (Specify) | TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐ | OTHER (Specify) | | | | | | | NUMBER OF CONTAINERS | RECEIVED IN GOOD CONDITION? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | | | | | | | | | | | 2 | | | | | | | | | | | | 3 | |
| 2. | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | | | | | | | | | |

SPECIAL INSTRUCTIONS



SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Wilder 3/27/07 0700

   Received By: CCIAL 3/27/07 815

2. Relinquished By:

   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

10 (Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis

5 (Standard) 3 1 ~~SAME DAY~~

OTHER:

Specify: SAME DAY

Verbally to Karl Vost @ (425) 508-3230

* Turnaround request less than standard may incur Rush Charge

REPORT COPY

ENSR | AECOM

**The RETEC Group, Inc.**
**1011 SW Klickitat Way, Suite 207, Seattle, WA 98134-1162**
T **206.624.9349** F **206.624.2839** www.ensr.aecom.com

# Letter of Transmittal

Attention: Chris Smith, WA Dept of Ecology    Date: July 5, 2007

Project reference: BNSF Skykomish    Project number: BN050-19390-210

**We are sending you the following:**

| Number of originals: | Number of copies: | Description: |
|---|---|---|
| **1** | | BNSF Skykomish Cleanup Site NPDES Permit No. WA 0032123 Discharge Monitoring Report for June 2007 |

Attached is the NPDES Discharge Monitoring Report for the June 2007 monitoring period.

Should you have any questions, please feel free to call me.

Best Regards,

Halah M. Voges, P.E., Senior Program Manager

cc: Louise Bardy, Ecology
Jeanne Tran, Ecology
Bruce Sheppard, BNSF
RETEC/ENSR file

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 06 | 01 | TO | 2007 | 06 | 30 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
NO DISCHARGE X

| | | QUALITY OR LOADING | | | QUALITY OR CONCENTRATION | | | | No. of | Frequency | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | | Average | Maximum | Units | Minimum | Average | Maximum | Units | Exceed-ances | of Analysis | Type |
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 1) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 2) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| CHITOSAN ACETATE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | mg/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.1 | | | 07/07 | GRAB |
| OILY SHEEN | Sample Measurement | ****** | ****** | *** | ****** | ****** | | YES/ | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | NO | | 07/07 | VISUAL |
| pH | Sample Measurement | ****** | ****** | *** | | ****** | | STD. | | | |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| DISSOLVED | Sample Measurement | ****** | ****** | *** | | ****** | ****** | mg/L | | | |
| OXYGEN* | Permit Requirement | ****** | ****** | | 8 | ****** | ****** | | | 01/07 | GRAB |
| BACKGROUND | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| TURBIDITY(1) | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| Bruce Sheppard / Manager Environmental Remediation | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. | BSheppard | (206) 625-6035 | 2007 6 / 4 |
| TYPED OR PRINTED | | SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT | AREA CODE NUMBER | YEAR MO DAY |

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*DISSOLVED OXYGEN SHALL BE MONITORED FOR A PERIOD OF 5 WEEKS.

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

WA-0032123 — PERMIT NUMBER
001 — DISCHARGE NUMBER

MONITORING PERIOD
FROM YEAR 2007 MO 06 DAY 01 TO YEAR 2007 MO 06 DAY 30

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
**NO DISCHARGE** X

| Parameter | | Quality or Loading: Average | Quality or Loading: Maximum | Quality or Loading: Units | Quality or Concentration: Minimum | Quality or Concentration: Average | Quality or Concentration: Maximum | Quality or Concentration: Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFFLUENT TURBIDITY (2) | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |
| INCREASE OVER BACKGROUND (2-1) | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| | Permit Requirement | ****** | 5* | | ****** | ****** | ****** | | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.2 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |
| TPH (BEFORE GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH (AFTER GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| LEAD (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 12.5 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
Bruce Sheppard / Manager Environmental Remediation
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: (206) 625-6035 (AREA CODE, NUMBER)

DATE: 07 / 6 / 4 (YEAR MO DAY)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*WHEN BACKGROUND TURBIDITY IS GREATER THAN 50 NTU, TURBIDITY IS LIMITED TO A 10% INCREASE OVER BACKGROUND.

TR - MEANS TOTAL RECOVERABLE

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

| PERMIT NUMBER | DISCHARGE NUMBER |
|---|---|
| WA-0032123 | 001 |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 06 | 01 | TO | 2007 | 06 | 30 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
NO DISCHARGE X

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | QUALITY OR LOADING Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | QUALITY OR CONCENTRATION Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARSENIC (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 360 | | | 01/07 | GRAB |
| ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 2400 | | | 01/07 | GRAB |
| FLUORENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 640 | | | 01/07 | GRAB |
| NAPHTHALENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 160 | | | 01/07 | GRAB |
| PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 480 | | | 01/07 | GRAB |
| BENZO(a)ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(b)FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/Manager Environmental Remediation

TYPED OR PRINTED

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BSheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206) 625-6035
AREA CODE NUMBER

DATE
2007/6/4
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
TR - MEANS TOTAL RECOVERABLE

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
## DISCHARGE MONITORING REPORT(*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

| | MONITORING PERIOD | | | | | | |
|---|---|---|---|---|---|---|---|
| | YEAR | MO | DAY | | YEAR | MO | DAY |
| FROM | 2007 | 06 | 01 | TO | 2007 | 06 | 30 |

NOTE: Read instructions before completing this form.

| Discharge Location | |
|---|---|
| Lat 47° 42' 37" N | |
| Long 121° 21' 44" W | |
| NO DISCHARGE | X |

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZO(k)FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(a)PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| CHRYSENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| DIBENZO(a,h)- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| ANTHRACENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| INDENO(1,2,3- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| cd) PYRENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| ACENAPHTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 643 | | | 01/07 | GRAB |
| FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 90.2 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard/Manager Environmental Remediation

TYPED OR PRINTED

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B Sheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE: (206) 625-6035
AREA CODE NUMBER

DATE: 07 6 19
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)

ENSR | AECOM

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207, Seattle, WA 98134-1162
T 206.624.9349 F 206.624.2839 www.ensr.aecom.com

# Letter of Transmittal

Attention: Chris Smith, WA Dept of Ecology Date: August 14, 2007

Project reference: BNSF Skykomish Project number: 01140-144-210

**We are sending you the following:**

| Number of originals: | Number of copies: | Description: |
|---|---|---|
| 1 | | BNSF Skykomish Cleanup Site NPDES Permit NO. WA 0032123 Discharge Monitoring Report for July 2007 |

Attached is the NPDES Discharge Monitoring Report for the July 2007 monitoring period. Should you have any questions, please feel free to call me.

Best Regards,

Halah M. Voges, P.E., Senior Program Manager

cc: Louise Bardy, Ecology
Jeanne Tran, Ecology
Bruce Sheppard, BNSF
RETEC/ENSR File 01140-144-210

Permittee Name/Address
*Include Name/Location (if different)*

NAME BNSF RAILWAY COMPANY 6374
ADDRESS 2454 OCCIDENTAL AVE S, STE 1A
SEATTLE, WA 98134
FACILITY BNSF SKYKOMISH CLEANUP SITE
LOCATION SKYKOMISH, WA

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

# DISCHARGE MONITORING REPORT(*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
| FROM | 2007 | 07 | 01 | TO | 2007 | 07 | 31 |

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
**NO DISCHARGE** X

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 1) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| FLOW (TREATMENT | Sample Measurement | ****** | | GPM | ****** | ****** | ****** | *** | | | |
| TRAIL NO. 2) | Permit Requirement | ****** | 500 | | ****** | ****** | ****** | | | CONT. | METER |
| CHITOSAN ACETATE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | mg/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.1 | | | 07/07 | GRAB |
| OILY SHEEN | Sample Measurement | ****** | ****** | *** | ****** | ****** | | YES/ | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | NO | | 07/07 | VISUAL |
| pH | Sample Measurement | ****** | ****** | *** | | ****** | | STD. | | | |
| | Permit Requirement | ****** | ****** | | 6.5 | ****** | 8.5 | UNIT | | 01/07 | GRAB |
| DISSOLVED | Sample Measurement | ****** | ****** | *** | | ****** | ****** | mg/L | | | |
| OXYGEN* | Permit Requirement | ****** | ****** | | 8 | ****** | ****** | | | 01/07 | GRAB |
| BACKGROUND | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| TURBIDITY(1) | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
Bruce Sheppard/BNSF Manager, Environmental Remediation
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

B Sheppard
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206) 625-6035
AREA CODE NUMBER

DATE
07/07/31
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*DISSOLVED OXYGEN SHALL BE MONITORED FOR A PERIOD OF 5 WEEKS.

Permittee Name/Address
*Include Name/Location (if different)*

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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

# DISCHARGE MONITORING REPORT(*DMR*)

WA-0032123
PERMIT NUMBER

001
DISCHARGE NUMBER

MONITORING PERIOD
FROM YEAR 2007 MO 07 DAY 01 TO YEAR 2007 MO 07 DAY 31

NOTE: Read instructions before completing this form.

Discharge Location
Lat 47° 42' 37" N
Long 121° 21' 44" W
NO DISCHARGE X

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EFFLUENT TURBIDITY (2) | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| | Permit Requirement | ****** | REPORT | | ****** | ****** | ****** | | | 01/07 | GRAB |
| INCREASE OVER BACKGROUND (2-1) | Sample Measurement | ****** | | NTU | ****** | ****** | ****** | *** | | | |
| | Permit Requirement | ****** | 5* | | ****** | ****** | ****** | | | 01/07 | GRAB |
| BENZENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 1.2 | | | 01/07 | GRAB |
| BTEX | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 100 | | | 01/07 | GRAB |
| TPH (BEFORE GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | REPORT | | | 01/07 | GRAB |
| TPH (AFTER GAC) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 208 | | | 01/07 | GRAB |
| LEAD (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 12.5 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

Bruce Sheppard /BNSF Manager, Environmental Remediation

TYPED OR PRINTED

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BSheppard

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE
(206) 625-6035
AREA CODE NUMBER

DATE
07 07 31
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
*WHEN BACKGROUND TURBIDITY IS GREATER THAN 50 NTU, TURBIDITY IS LIMITED TO A 10% INCREASE OVER BACKGROUND.

TR - MEANS TOTAL RECOVERABLE

Substitute for EPA Form 3320-1 (Rev. 8-96 by WADOE)

Permittee Name/Address
*Include Name/Location (if different)*

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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

| WA-0032123 | 001 |
|---|---|
| PERMIT NUMBER | DISCHARGE NUMBER |

| | MONITORING PERIOD | | | | | | |
|---|---|---|---|---|---|---|---|
| | YEAR | MO | DAY | | YEAR | MO | DAY |
| FROM | 2007 | 07 | 01 | TO | 2007 | 07 | 31 |

NOTE: Read instructions before completing this form.

| Discharge Location | |
|---|---|
| Lat 47° 42' 37" N | |
| Long 121° 21' 44" W | |
| NO DISCHARGE | X |

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARSENIC (TR) | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 360 | | | 01/07 | GRAB |
| ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 2400 | | | 01/07 | GRAB |
| FLUORENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 640 | | | 01/07 | GRAB |
| NAPHTHALENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 160 | | | 01/07 | GRAB |
| PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 480 | | | 01/07 | GRAB |
| BENZO(a)ANTHRACENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(b)FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |

| NAME/TITLE PRINCIPAL EXECUTIVE OFFICER | | | TELEPHONE | DATE |
|---|---|---|---|---|
| Bruce Sheppard / BNSF Manager, Environmental Remediation | I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. | B Sheppard | (206) 625-6035 | 07/31/07 |
| TYPED OR PRINTED | | SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT | AREA CODE NUMBER | YEAR MO DAY |

COMMENT AND EXPLANATION OF ANY VIOLATIONS (**Reference all attachments here**)
TR - MEANS TOTAL RECOVERABLE

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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
# DISCHARGE MONITORING REPORT(*DMR*)

| PERMIT NUMBER | DISCHARGE NUMBER |
|---|---|
| WA-0032123 | 001 |

MONITORING PERIOD

| | YEAR | MO | DAY | | YEAR | MO | DAY |
|---|---|---|---|---|---|---|---|
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Discharge Location
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NO DISCHARGE X

| Parameter | | QUALITY OR LOADING Average | QUALITY OR LOADING Maximum | Units | QUALITY OR CONCENTRATION Minimum | QUALITY OR CONCENTRATION Average | QUALITY OR CONCENTRATION Maximum | Units | No. of Exceed-ances | Frequency of Analysis | Sample Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BENZO(k) FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| BENZO(a) PYRENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| CHRYSENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| DIBENZO(a,h)- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| ANTHRACENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| INDENO(1,2,3- | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| cd) PYRENE | Permit Requirement | ****** | ****** | | ****** | ****** | 0.01 | | | 01/07 | GRAB |
| ACENAPHTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 643 | | | 01/07 | GRAB |
| FLUORANTHENE | Sample Measurement | ****** | ****** | *** | ****** | ****** | | ug/L | | | |
| | Permit Requirement | ****** | ****** | | ****** | ****** | 90.2 | | | 01/07 | GRAB |

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
Bruce Sheppard/BNSF
Manager, Environmental
Remediation
TYPED OR PRINTED

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BHSheppard
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ENSR
**1011 SW Klickitat Way, Suite 207, Seattle, WA  98134-1162**
T **206.624.9349**   F **206.624.2839**   www.ensr.aecom.com

# Memorandum

Date: January 25, 2008

To: Ron Timm, Department of Ecology

From: Mike Byers, P.E., ENSR

Subject: Skykomish Levee

Distribution: Tom Bean KC, Louise Bardy, Bruce Sheppard, Clint Stanovsky, Halah Voges, Sarah Albano, Brian Sato

This memo is a follow-up to our meeting at the Skykomish Levee on Wednesday, October 10, 2007 with Ron Timm from the Washington State Department of Ecology and Clint Stanovsky for the Town of Skykomish.  This memo addresses the issues which arose at that meeting and attempts to resolve them to enable the County to agree that BNSF has satisfied the substantive requirements of the draft Special Use Permit No. S-64-06 associated with levee cleanup activities.

1. **Topsoil and Coir Matting**- During our meeting we discussed methods of anchoring the coir matting to prevent topsoil erosion.  After discussions with Grette and Associates (who developed the planting plan and oversaw the landscaping activities), the matting was staked every linear foot along the perimeter of the matting to secure it.  Trenching was not feasible due to the proximity of the rip rap.

2. **Water flowing into the Levee at the east end**-  The water flowing into the levee at the east end is likely due to the 4-5 foot thick rip rap that was placed to armor the levee.  The large voids between the rip rap were not filled during construction which allows water to enter the voids. Water then flows through the large voids within the rip rap and filters out at different points along the Levee.  In particular, there is some out watering just east of the outfall.  In our opinion, this does not have any effect on the stability of the levee and we anticipate that overtime, sand and sediment will fill the voids and water will stop entering the voids in the rip rap at the east end of the levee.  As a general note, the levee was never designed or constructed to be an impermeable barrier.  The pre-existing levee was a permeable levee and the new levee was designed to be permeable.

3. **Large Woody Debris-** During our meeting we discussed the fact that the large woody debris that was lost in the November 2006 flood has not yet been reported to the Army Corps of Engineers.  The large woody debris placement was a requirement of the Army Corps of Engineers Nationwide 38 Permit.  Some of the large woody debris was washed downstream during the November 2006 flood.  Our assessment of the remaining debris is that it provides good habitat as intended by the Nationwide 38 Permit.  Reporting of the remaining large woody

debris will be completed when the Levee planting is completed in the spring of 2008. In our opinion, the loss of the large woody debris does not compromise the stability of the levee,

4. **Hydraulic Pressure and Stability Calculations. Calculations (attached) indicate the levee is stable.**

5. **Final Elevations of the Levee Crest**- Please refer to the previously transmitted *2006 Levee Zone Interim Action for Cleanup 2006 As-Built Completion Report* (*2006 As-Built*, July 2, 2007) and a copy of the *Draft Levee Zone Interim Action for Cleanup 2007- As-Built Completion Report* (*Draft 2007 As-Built*, August 31, 2007). The elevation of the Levee walk way varies from approximately 932 NAVD 88 at the eastern end to 930 NAVD 88 at the western end of the Levee as shown in Figure 6-1 of the *Draft 2007 As-Built*. A final 2007 as built report will be issued once final levee improvements (lighting, railing and vegetation) are completed.

6. **Levee Path Width**- During our meeting you stated that the path along the crest of the levee is of sufficient width for emergency access, if necessary.

7. **Levee Elevation at Western End**- During our meeting you questioned the final elevation of the Levee at the location of the new park property (where the water treatment system was located last year). This area is generally outside of the levee replacement work conducted during the cleanup, but the area was cleared of vegetation during the 2006 work, and topsoil was placed in the area at the completion of construction. Since this area was outside of the active construction, a final survey was not completed in that area. The question from Mr. Bean related to placing additional fill in that single area within the floodplain. However, when taking a project wide view of fill in the floodplain, the project is very likely a net increase in floodplain capacity since a new retaining wall was constructed on the south face of the levee. Prior to cleanup activities, the levee consisted of a sloped embankment in that area.

8. **Check Valve-** During our meeting Clint Stanovsky asked what river water elevations would be necessary to completely close the check valve to prevent back-flow. The check valve cut sheets are provided as Submittal 7 in Appendix K (Contractor Submittals) of the *2006 As-Built*. This indicates that the maximum back pressure is 10 feet. The invert elevation of the culvert, shown in Figure 6-1 of the *Draft 2007 As-Built* is 918.37'. This means that the river water elevation must be at 928.37' to close the check valve to prevent back-flow.

9. **Levee Vegetation-** During our meeting you requested a copy of the as-built planting survey. This survey will be completed in the spring once planting on the levee is completed. Due to high river levels during planting, plants were not placed at the Levee benches. This planting survey will be included in the final 2007 As-Built report which is anticipated to be completed on March 31, 2008.

10. **Stormwater Outfall**- The Town had previously indicated that they would like more rip rap placed around the outfall for protection. After looking into this issue and receiving your feedback, the Town no longer wants this work to be completed.

Skykomish Levee Stability Calculations
January 25, 2008

1. Engineering manual EM 1110-2-1913, Design and Construction of Levees general statements:
    a. "For levees of significant height or when there is a concern about adequacy of available embankment materials or foundation conditions embankment design requires detailed analysis. Low levees or levees to be built of good materials resting on proven foundation material may not require extensive stability analysis."
    b. "Minimum levee widths of 10 to 12 feet are recommended."

2. Characteristics of the Skykomish Levee include:
    a. Levee geometry – same as preexisting levee, 2H:1V slope, 5 ft high, 15 ft crest width. The pre-existing levee was stable under these conditions.
    b. Compacted foundation and compacted levee body – controlled and compacted to at least 95% of ASTM D-1557, modified proctor
    c. Granular compacted foundation material
    d. Meets the minimum levee configuration stated
    e. Levee and foundation were constructed to be homogeneous, and therefore circular analysis is considered to be suitable – no inherent planes of weakness (like weak foundation material etc).
    f. Levee retaining wall constructed of geogrid reinforced backfill and block facing. Soil placed in the geogrid section was 3/4 inch to 1-1/4 inch crushed gravel. This material was compacted to at least 95% ASTM D-1557, modified proctor.

3. Levee and foundation strength parameters – Reference from Naval Facilities Design Manual 7-01 (Figure 7 is attached). Note that this levee is considered to be a low levee constructed of very good material and constructed on a very good foundation. It is nearly the same geometry as the pre-existing levee which was stable on the site for many years. Therefore, more detailed analyses of strength parameters is not considered warranted.
    a. The foundation and levee material was SW-GW compacted to at least 95% ASTM D-1557 (conservatively estimated to be 75% relative density). A friction angle between 37 degrees and 40 degrees is appropriate and a unit weight of between 118 and 135 pounds per cubic foot is appropriate. Calculations use a friction angle of 35 degrees to be conservative and a unit weight of 125 pounds per cubic foot.
    b. Retaining wall backfill was crushed rock that was ¾-inch to 1-1/4 inch and compacted to at least 95% ASTM D-1557, modified proctor (conservatively estimated to be 75% relative density). This material was modeled using a friction angle of 38 degrees and a unit weight of 125 pounds per cubic foot.

c. Levee rip rap was sound, hard angular large rock. It was modeled using a unit weight of 135 pounds per cubic foot and a strength of 38 degrees.
d. The rip rap and topsoil mixed layer was modeled as a granular soil using a unit weight of 135 pounds per cubic foot and a strength of 35 degrees.

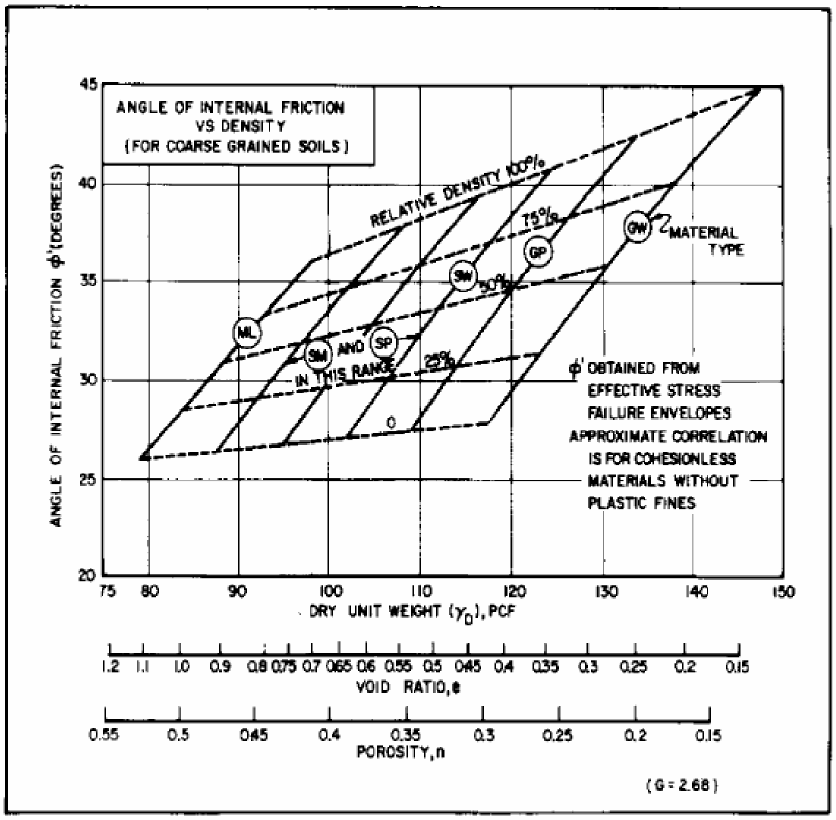



FIGURE 7
Correlations of Strength Characteristics for Granular Soils

4. Analyses cases:
   a. Post construction – no need to do since it is constructed
   b. Sudden drawdown – can be done, but levee is extremely granular and the levee will drain as quickly as the flood water receeds.
   c. Steady state seepage from full flood – applicable. This scenario was modeled using a phreatic water surface at full flood stage (elevation 930). The phreatic surface was modeled as remaining at elevation 930 through the rip rap, and then decreasing generally constantly through the body of the levee until it was at the street level (about 925) on the south side of the levee retaining wall. The geogrid reinforced retaining wall fill was modeled using a geotextile fabric reinforcement in the stability program with the failure surface generally extending outside of the limits of the reinforcement.

| Analyses method | Factor of Safety |
|---|---|
| Spencer | 1.6 |
| Janbu | 1.4 |

d. Earthquake – not considered applicable since there is a very low probability of an earthquake during a flood event and the foundation material drains quickly enough and is dense enough to resist liquefaction.
e. Required factors of safety from EM 1110-2-1913:

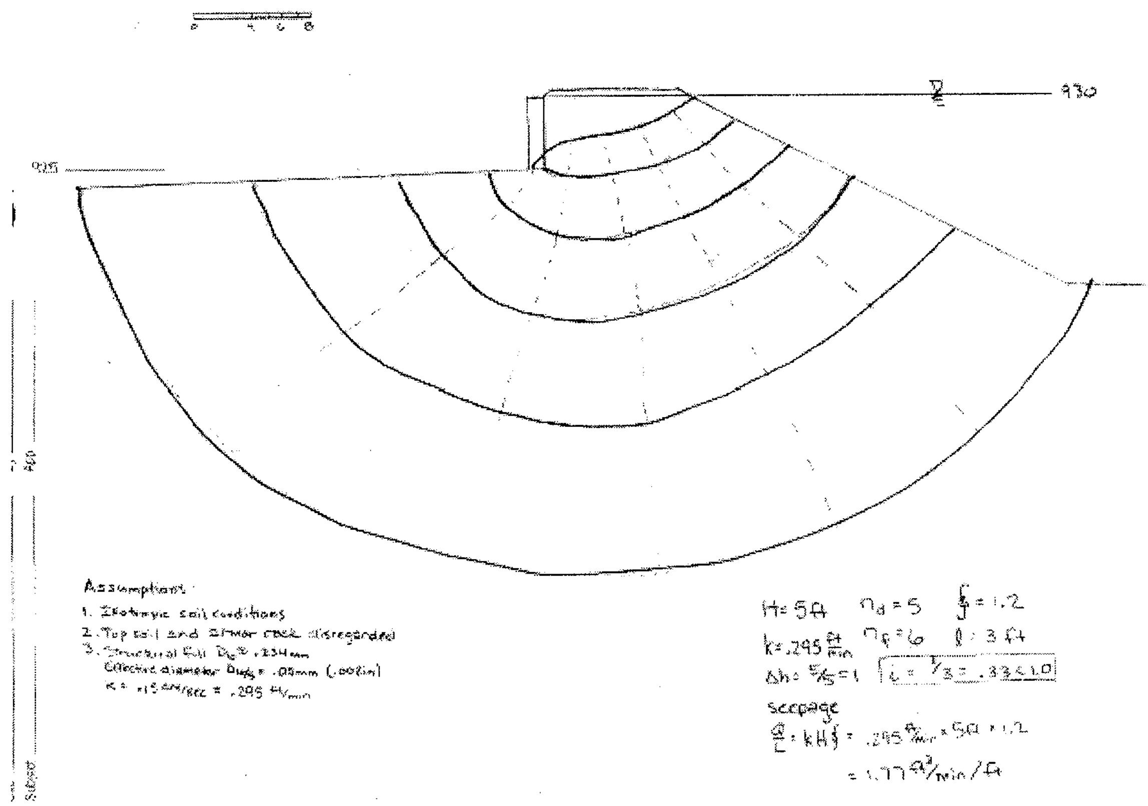
**Table 6-1b**
**Minimum Factors of Safety - Levee Slope Stability**

| | Applicable Stability Conditions and Required Factors of Safety | | | |
|---|---|---|---|---|
| Type of Slope | End-of-Construction | Long-Term (Steady Seepage) | Rapid Drawdown [a] | Earthquake[b] |
| New Levees | 1.3 | 1.4 | 1.0 to 1.2 | (see below) |
| Existing Levees | -- | 1.4[c] | 1.0 to 1.2 | (see below) |
| Other Embankments and dikes[d] | 1.3[e,f] | 1.4[c,f] | 1.0 to 1.2[f] | (see below) |

[a] Sudden drawdown analyses. F. S. = 1.0 applies to pool levels prior to drawdown for conditions where these water levels are unlikely to persist for long periods preceding drawdown. F. S. = 1.2 applies to pool level, likely to persist for long periods prior to drawdown.
[b] See ER 1110-2-1806 for guidance. An EM for seismic stability analysis is under preparation.
[c] For existing slopes where either sliding or large deformation have occurred previously and back analyses have been performed to establish design shear strengths lower factors of safety may be used. In such cases probabilistic analyses may be useful in supporting the use of lower factors of safety for design.
[d] Includes slopes which are part of cofferdams, retention dikes, stockpiles, navigation channels, breakwater, river banks, and excavation slopes.
[e] Temporary excavated slopes are sometimes designed for only short-term stability with the knowledge that long-term stability is not adequate. In such cases higher factors of safety may be required for end-of-construction to ensure stability during the time the excavation is to remain open. Special care is required in design of temporary slopes, which do not have adequate stability for the long-term (steady seepage) condition.
[f] Lower factors of safety may be appropriate when the consequences of failure in terms of safety, environmental damage and economic losses are small.

5. Settlement analysis – Guidance suggests that detailed settlement analyses should be completed when significant consolidation is anticipated. Conditions such as high embankment loads, embankments of highly compressible soil, embankments on compressible foundations, and beneath steel and concrete structures in levees founded on compressible foundations. None of these conditions exist for the Skykomish levee. The soil comprising the levee and the foundation is granular and has been compacted to at least 95% ASTM D-1557, modified proctor. Given these conditions, any settlement that was to occur should have occurred during construction of the levee itself.

6. Computation of seepage exit gradient to evaluate foundation piping and instability due to seepage. This levee is composed of a consistent ganular material for both the foundation and for the levee itself. In fact, the foundation of the levee below any excavations is highly granular although not as homogeneous as the newly placed fill. The maximum allowable exit gradient state in EM-1110-2-1913 is 0.5. The calculated exit gradient is 0.33.




## Conclusion

The levee in Skykomish is considered to be stable under analyses carried out generally as specified in EM 1110-2-1913, Design and Construction of Levees. Calculated factors of safety were greater than or equal to required factors of safety for embankment stability and stability against foundation piping.

MICHAEL G. BYERS
STATE OF WASHINGTON
30698
REGISTERED
PROFESSIONAL ENGINEER
1/25/2008
EXPIRES 12/11/2008

## Attachment A
## Slope Stability Analyses for Steady State Seepage Under Flood Conditions

Includes analyses completed using Slope/W computer analyses package for both Spencer and Janbu analyses methods.

# post construction levee stabilty



## File Information

Title: Skykomish levee stability - post construction
Created By: Mike Byers
Revision Number: 15
Last Edited By: Mike Byers
Date: 1/25/2008
Time: 10:56:43 AM
File Name: sky levee stability.gsz
Directory: C:\Documents and Settings\mbyers\My Documents\MBYERS\Projects\Active\Skykomish\levee remediation\Stability analyses\

## post construction levee stabilty

Kind: SLOPE/W
Method: Spencer
Convergence
    Minimum Slice Thickness: 0.1
    Ignore seismic load in strength: No
Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Right to Left
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: No
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1

## Materials

### Material 1: structural fill

Model: Mohr-Coulomb
Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °

Phi-B: 0 °

### Material 2: crushed drainage gravel

Model: Mohr-Coulomb
Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °

### Material 3: rip rap

Model: Mohr-Coulomb
Weight: 135 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °

### Material 4: riprap/topsoil layer

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

### Material 5: water

Model: No strength (e.g. Water)
Weight: 62.4 pcf

## Regions

| | Material | Points |
|---|---|---|
| **Region 1** | structural fill | 1,2,12,11,5,9,7,10,13 |
| **Region 2** | crushed drainage gravel | 3,11,12,2 |
| **Region 3** | rip rap | 5,6,8,9 |
| **Region 4** | riprap/topsoil layer | 6,4,7,8 |
| **Region 5** | water | 4,14,7 |

## Points

| | X | Y |
|---|---|---|
| **Point 1** | 91 | 924 |
| **Point 2** | 120 | 924 |
| **Point 3** | 120 | 930 |
| **Point 4** | 136 | 930 |

| | | |
|---|---|---|
| **Point 5** | 128 | 930 |
| **Point 6** | 133 | 930 |
| **Point 7** | 160 | 918 |
| **Point 8** | 157 | 918 |
| **Point 9** | 152 | 918 |
| **Point 10** | 160 | 916 |
| **Point 11** | 127 | 930 |
| **Point 12** | 127 | 924 |
| **Point 13** | 91 | 916 |
| **Point 14** | 160 | 930 |

# Tension Crack

Tension Crack Option: (none)

# Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (108, 924)
Left-Zone Right Coordinate: (118, 924)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (132, 930)
Right-Zone Right Coordinate: (134, 930)
Radius Increments: 4

# Slip Surface Limits

Left Coordinate: (91, 924)
Right Coordinate: (160, 918)

# Piezometric Lines

### Piezometric Line 1

Coordinates
Coordinate: (91, 923)
Coordinate: (95, 923)
Coordinate: (115, 923)
Coordinate: (120, 924)

Coordinate: (125, 928)
Coordinate: (128, 930)
Coordinate: (136, 930)
Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
Material: structural fill
Material: crushed drainage gravel
Material: rip rap
Material: riprap/topsoil layer
Material: water

# Reinforcements

## Reinforcement 1

Type: Fabric
Outside Point: (120, 925)
Inside Point: (127, 925)
Slip Surface Intersection: (126.88, 925)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °
Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 294.26 lbs/ft
Available Bond Length: 0.11688 ft
Required Bond Length: 0 ft
Governing Component: Fabric

## Reinforcement 2

Type: Fabric
Outside Point: (120, 926)
Inside Point: (127, 926)
Slip Surface Intersection: (128.35, 926)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °

Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 199.1 lbs/ft
Available Bond Length: 0 ft
Required Bond Length: 0 ft
Governing Component: Bond

### Reinforcement 3

Type: Fabric
Outside Point: (120, 928)
Inside Point: (127, 928)
Slip Surface Intersection: (130.49, 928)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °
Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 99.679 lbs/ft
Available Bond Length: 0 ft
Required Bond Length: 0 ft
Governing Component: Bond

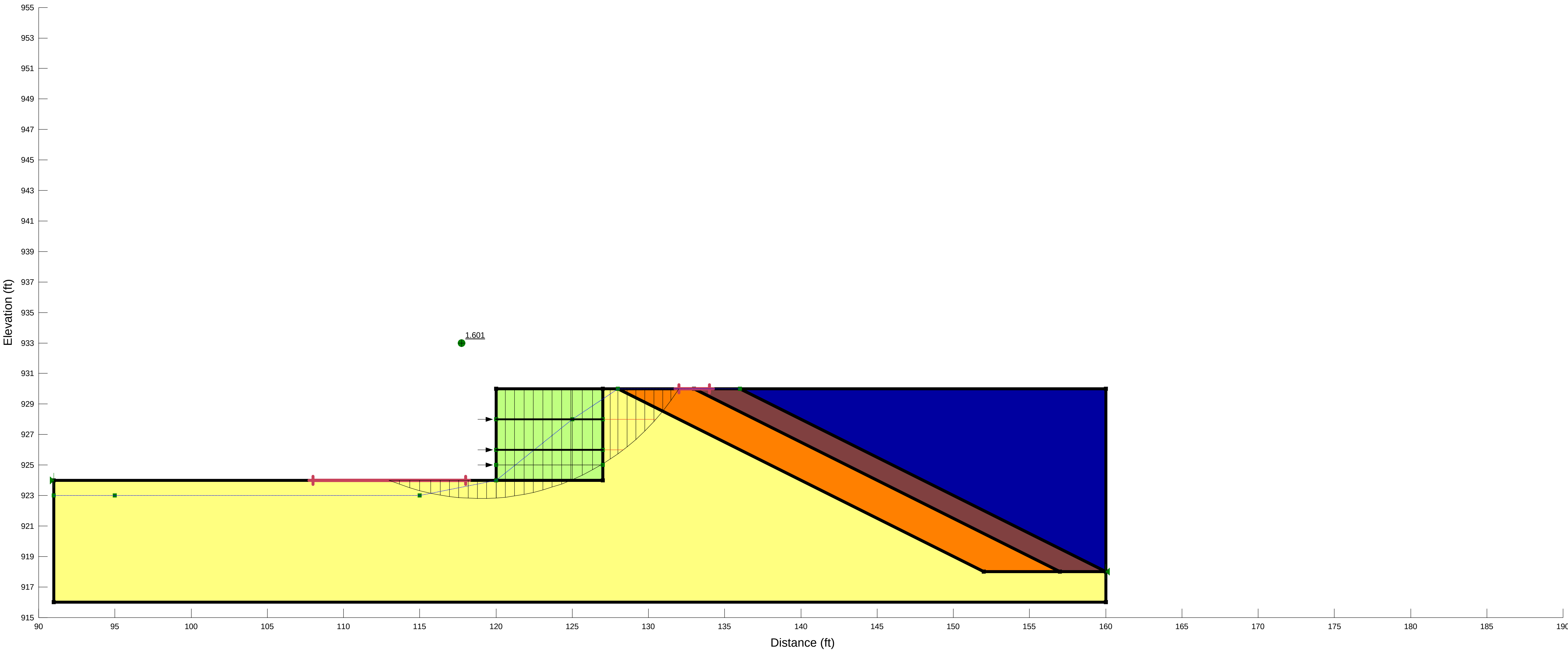
# Critical Slip Surfaces

| | Number | FOS | Center (ft) | Radius (ft) | Entry (ft) | Exit (ft) |
|---|---|---|---|---|---|---|
| 1 | 53 | 1.601 | (118.956, 938.222) | 15.419 | (132, 930) | (113, 924) |

# Slices of Slip Surface: 53

| | X (ft) | Y (ft) | PoreWaterPressure | Base | Frictional | Cohesive |
|---|---|---|---|---|---|---|

| | | | (psf) | Normal Stress (psf) | Strength (psf) | Strength (psf) |
|---|---|---|---|---|---|---|
| **1** | 113.33335 | 923.8694 | -53.972513 | 33.143491 | 25.894533 | 0 |
| **2** | 114 | 923.6256 | -38.775026 | 85.629721 | 66.901271 | 0 |
| **3** | 114.66665 | 923.41585 | -25.696508 | 123.77312 | 96.702163 | 0 |
| **4** | 115.36305 | 923.23225 | -9.6719253 | 151.91681 | 118.69042 | 0 |
| **5** | 116.0314 | 923.0862 | 7.6902903 | 167.08794 | 124.53509 | 0 |
| **6** | 116.64195 | 922.98085 | 21.880187 | 172.97864 | 118.05105 | 0 |
| **7** | 117.2525 | 922.90055 | 34.507758 | 175.48497 | 110.14347 | 0 |
| **8** | 117.86305 | 922.8449 | 45.59639 | 174.92965 | 101.04622 | 0 |
| **9** | 118.4736 | 922.81365 | 55.167051 | 171.58572 | 90.956232 | 0 |
| **10** | 119.08415 | 922.80665 | 63.225144 | 165.65361 | 80.025889 | 0 |
| **11** | 119.6947 | 922.82385 | 69.773483 | 157.30443 | 68.386667 | 0 |
| **12** | 120.30705 | 922.8655 | 86.314418 | 972.03683 | 692.00219 | 0 |
| **13** | 120.9211 | 922.93195 | 112.82424 | 927.40509 | 636.4203 | 0 |
| **14** | 121.53515 | 923.0235 | 137.76988 | 883.43543 | 582.57777 | 0 |
| **15** | 122.14925 | 923.1406 | 161.12233 | 839.83064 | 530.26504 | 0 |
| **16** | 122.7633 | 923.28385 | 182.83526 | 796.3835 | 479.35642 | 0 |
| **17** | 123.37735 | 923.454 | 202.88899 | 752.9013 | 429.71671 | 0 |
| **18** | 123.99145 | 923.652 | 221.19263 | 709.24158 | 381.30563 | 0 |
| **19** | 124.6055 | 923.87905 | 237.68527 | 665.22482 | 334.03051 | 0 |
| **20** | 124.95625 | 924.01845 | 246.26433 | 639.95235 | 307.58279 | 0 |
| **21** | 125.33335 | 924.1884 | 252.00037 | 612.27009 | 281.47356 | 0 |
| **22** | 126 | 924.51115 | 259.6284 | 562.69497 | 236.78155 | 0 |
| **23** | 126.66665 | 924.87495 | 264.67711 | 512.00346 | 193.23252 | 0 |
| **24** | 127.25 | 925.22705 | 266.84316 | 466.65944 | 156.11359 | 0 |
| **25** | 127.75 | 925.56025 | 266.86886 | 426.88833 | 125.02092 | 0 |
| **26** | 128.2946 | 925.9582 | 252.55205 | 381.87966 | 101.0418 | 0 |
| **27** | 128.88375 | 926.43055 | 223.12103 | 330.44918 | 83.85394 | 0 |
| **28** | 129.4729 | 926.9535 | 190.54938 | 276.44425 | 67.108425 | 0 |
| **29** | 130.0621 | 927.53455 | 154.36866 | 219.64408 | 50.998747 | 0 |
| **30** | 130.65125 | 928.1839 | 113.95744 | 159.77254 | 35.794673 | 0 |
| **31** | 131.20935 | 928.8725 | 70.986956 | 97.532556 | 20.739696 | 0 |
| **32** | 131.73645 | 929.60895 | 25.207353 | 33.258906 | 6.2905632 | 0 |


1.601
Elevation (ft)
955
953
951
949
947
945
943
941
939
937
935
933
931
929
927
925
923
921
919
917
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100
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110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
Distance (ft)

# post construction levee stabilty



## File Information

Title: Skykomish levee stability - post construction
Created By: Mike Byers
Revision Number: 15
Last Edited By: Mike Byers
Date: 1/25/2008
Time: 10:56:43 AM
File Name: sky levee stability.gsz
Directory: C:\Documents and Settings\mbyers\My Documents\MBYERS\Projects\Active\Skykomish\levee remediation\Stability analyses\

## post construction levee stabilty

Kind: SLOPE/W
Method: Spencer
Convergence
    Minimum Slice Thickness: 0.1
    Ignore seismic load in strength: No
Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Right to Left
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: No
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1

## Materials

### Material 1: structural fill

Model: Mohr-Coulomb
Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °

Phi-B: 0 °

### Material 2: crushed drainage gravel

Model: Mohr-Coulomb
Weight: 125 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °

### Material 3: rip rap

Model: Mohr-Coulomb
Weight: 135 pcf
Cohesion: 0 psf
Phi: 38 °
Phi-B: 0 °

### Material 4: riprap/topsoil layer

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 30 °
Phi-B: 0 °

### Material 5: water

Model: No strength (e.g. Water)
Weight: 62.4 pcf

## Regions

| | Material | Points |
|---|---|---|
| **Region 1** | structural fill | 1,2,12,11,5,9,7,10,13 |
| **Region 2** | crushed drainage gravel | 3,11,12,2 |
| **Region 3** | rip rap | 5,6,8,9 |
| **Region 4** | riprap/topsoil layer | 6,4,7,8 |
| **Region 5** | water | 4,14,7 |

## Points

| | X | Y |
|---|---|---|
| **Point 1** | 91 | 924 |
| **Point 2** | 120 | 924 |
| **Point 3** | 120 | 930 |
| **Point 4** | 136 | 930 |

| | | |
|---|---|---|
| **Point 5** | 128 | 930 |
| **Point 6** | 133 | 930 |
| **Point 7** | 160 | 918 |
| **Point 8** | 157 | 918 |
| **Point 9** | 152 | 918 |
| **Point 10** | 160 | 916 |
| **Point 11** | 127 | 930 |
| **Point 12** | 127 | 924 |
| **Point 13** | 91 | 916 |
| **Point 14** | 160 | 930 |

# Tension Crack

Tension Crack Option: (none)

# Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (108, 924)
Left-Zone Right Coordinate: (118, 924)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (132, 930)
Right-Zone Right Coordinate: (134, 930)
Radius Increments: 4

# Slip Surface Limits

Left Coordinate: (91, 924)
Right Coordinate: (160, 918)

# Piezometric Lines

### Piezometric Line 1

Coordinates
Coordinate: (91, 923)
Coordinate: (95, 923)
Coordinate: (115, 923)
Coordinate: (120, 924)

Coordinate: (125, 928)
Coordinate: (128, 930)
Coordinate: (136, 930)
Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
Material: structural fill
Material: crushed drainage gravel
Material: rip rap
Material: riprap/topsoil layer
Material: water

# Reinforcements

## Reinforcement 1

Type: Fabric
Outside Point: (120, 925)
Inside Point: (127, 925)
Slip Surface Intersection: (126.88, 925)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °
Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 294.26 lbs/ft
Available Bond Length: 0.11688 ft
Required Bond Length: 0 ft
Governing Component: Fabric

## Reinforcement 2

Type: Fabric
Outside Point: (120, 926)
Inside Point: (127, 926)
Slip Surface Intersection: (128.35, 926)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °

Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 199.1 lbs/ft
Available Bond Length: 0 ft
Required Bond Length: 0 ft
Governing Component: Bond

### Reinforcement 3

Type: Fabric
Outside Point: (120, 928)
Inside Point: (127, 928)
Slip Surface Intersection: (130.49, 928)
Total Length: 7 ft
Reinforcement Direction: 180 °
Applied Load Option: Variable
F of S Dependent: No
Contact Cohesion: 0 psf
Contact Phi: 38 °
Interface Factor: 1
Bond Safety Factor: 1
Bond Resistance: 0 lbs/ft
Fabric Capacity: 0 lbs
Fabric Safety Factor: 1
Fabric Load: 0 lbs
Load Distribution: Conc. in 1 slice
Load Orientation: 1
Applied Load: 0 lbs
Fabric Load Used: 0 lbs
Resisting Force Used: 99.679 lbs/ft
Available Bond Length: 0 ft
Required Bond Length: 0 ft
Governing Component: Bond

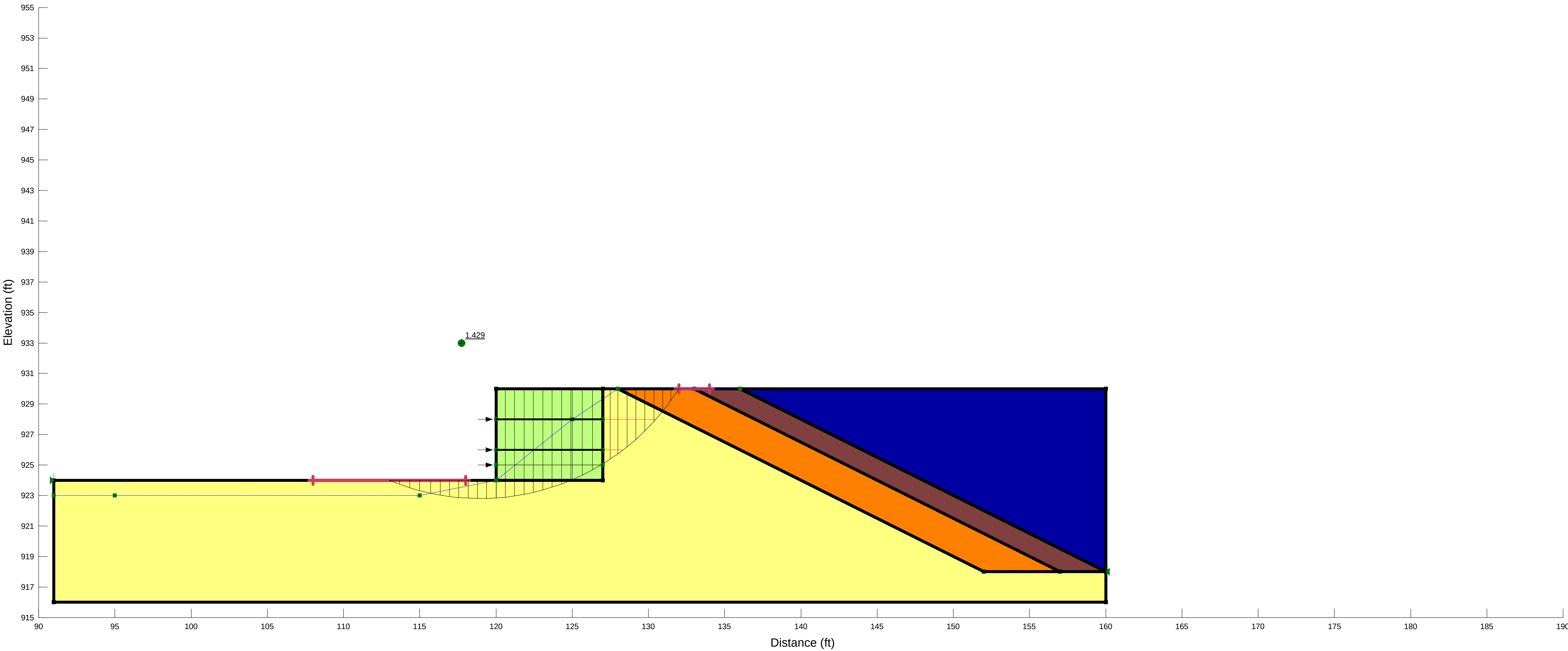
# Critical Slip Surfaces

| | Number | FOS | Center (ft) | Radius (ft) | Entry (ft) | Exit (ft) |
|---|---|---|---|---|---|---|
| 1 | 53 | 1.429 | (118.956, 938.222) | 15.419 | (132, 930) | (113, 924) |

# Slices of Slip Surface: 53

| | X (ft) | Y (ft) | PoreWaterPressure | Base | Frictional | Cohesive |
|---|---|---|---|---|---|---|

| | | | (psf) | Normal Stress (psf) | Strength (psf) | Strength (psf) |
|---|---|---|---|---|---|---|
| 1 | 113.33335 | 923.8694 | -53.972513 | 21.489573 | 16.789495 | 0 |
| 2 | 114 | 923.6256 | -38.775026 | 58.128454 | 45.414925 | 0 |
| 3 | 114.66665 | 923.41585 | -25.696508 | 87.378501 | 68.267567 | 0 |
| 4 | 115.36305 | 923.23225 | -9.6719253 | 111.12223 | 86.818197 | 0 |
| 5 | 116.0314 | 923.0862 | 7.6902903 | 127.26244 | 93.420006 | 0 |
| 6 | 116.64195 | 922.98085 | 21.880187 | 137.37253 | 90.232511 | 0 |
| 7 | 117.2525 | 922.90055 | 34.507758 | 144.49798 | 85.933781 | 0 |
| 8 | 117.86305 | 922.8449 | 45.59639 | 148.77025 | 80.608253 | 0 |
| 9 | 118.4736 | 922.81365 | 55.167051 | 150.29056 | 74.31863 | 0 |
| 10 | 119.08415 | 922.80665 | 63.225144 | 149.14721 | 67.129673 | 0 |
| 11 | 119.6947 | 922.82385 | 69.773483 | 145.40668 | 59.091132 | 0 |
| 12 | 120.30705 | 922.8655 | 86.314418 | 855.1147 | 600.65261 | 0 |
| 13 | 120.9211 | 922.93195 | 112.82424 | 833.16415 | 562.79122 | 0 |
| 14 | 121.53515 | 923.0235 | 137.76988 | 809.95494 | 525.16853 | 0 |
| 15 | 122.14925 | 923.1406 | 161.12233 | 785.41163 | 487.74825 | 0 |
| 16 | 122.7633 | 923.28385 | 182.83526 | 759.42828 | 450.48384 | 0 |
| 17 | 123.37735 | 923.454 | 202.88899 | 731.91978 | 413.32415 | 0 |
| 18 | 123.99145 | 923.652 | 221.19263 | 702.77756 | 376.25538 | 0 |
| 19 | 124.6055 | 923.87905 | 237.68527 | 671.90631 | 339.25066 | 0 |
| 20 | 124.95625 | 924.01845 | 246.26433 | 653.51726 | 318.18086 | 0 |
| 21 | 125.33335 | 924.1884 | 252.00037 | 632.35638 | 297.16669 | 0 |
| 22 | 126 | 924.51115 | 259.6284 | 592.93892 | 260.41072 | 0 |
| 23 | 126.66665 | 924.87495 | 264.67711 | 550.76995 | 223.52022 | 0 |
| 24 | 127.25 | 925.22705 | 266.84316 | 511.50136 | 191.14794 | 0 |
| 25 | 127.75 | 925.56025 | 266.86886 | 475.90271 | 163.31515 | 0 |
| 26 | 128.2946 | 925.9582 | 252.55205 | 432.37927 | 140.49642 | 0 |
| 27 | 128.88375 | 926.43055 | 223.12103 | 379.3421 | 122.05328 | 0 |
| 28 | 129.4729 | 926.9535 | 190.54938 | 321.91654 | 102.63527 | 0 |
| 29 | 130.0621 | 927.53455 | 154.36866 | 259.63071 | 82.239731 | 0 |
| 30 | 130.65125 | 928.1839 | 113.95744 | 191.83757 | 60.846627 | 0 |
| 31 | 131.20935 | 928.8725 | 70.986956 | 119.06339 | 37.561424 | 0 |
| 32 | 131.73645 | 929.60895 | 25.207353 | 41.384668 | 12.639104 | 0 |


1.429
Elevation (ft)
Distance (ft)
955
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# Letter of Submittal

Wilder Construction Company
1525 E. Marine View Dr
Everett, WA 98201

WILDER
WILDER CONSTRUCTION COMPANY

| | | | |
|---|---|---|---|
| **Project** | **Skykomish Levee Remediation** | **Date** | 1/18/2007 |
| | | **Submittal Number** | 17 |
| | | **Return By** | |

**To:** The RETEC Group, Inc.
Mike Byers
Project Manager
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

**From:** Wilder Construction Company
Quinn Golden
Project Engineer
1525 E. Marine View Dr
Everett, WA 98201

| Bid Item | Spec Reference | Copies | Submittal Description | Drawing Number |
|---|---|---|---|---|
| 27 | N/A | 1 | Levee Wall/Veiwing Platform Design | |

**Remarks by Contractor**

Attached is a preliminary design for the levee wall, stairs and viewing platform. Please review and comment. A final design will incorporate all comments and be resubmitted at a later date for approval.

The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134-1162

# Letter of Transmittal

RETEC

206.624. 9349 Phone
206.624. 2839 Fax
www.retec.com

**TO:** Louise Bardy, Department of Ecology **DATE:** April 3, 2007

**RE:** Skykomish Levee project **PROJECT NO:** BN050-19390-220

**PLEASE FIND:**
- ☑ Attached
- ☐ Under separate cover via:
- ☐ Copy of Letter
- ☐ Change Order
- ☐ Drawings/Figures
- ☐ Plans/Specs
- ☐ Samples
- ☐ Other:

| Copies | Date | No. | Description |
|---|---|---|---|
| 3 | | | WCC submittal 17, retaining wall |
| 3 | | | Response to comments on original submittal |
| | | | |
| | | | |
| | | | |

- ☐ For Approval
- ☑ For Your Use
- ☑ As Requested
- ☐ For Review & Comment
- ☐ Approved as Submitted
- ☐ Approved as Noted
- ☐ Returned for Corrections
- ☐ Resubmit
- ☐ Submit
- ☐ Return
- ☐ Other:
- ______ Copies for Approval
- ______ Copies for Distribution
- ______ Corrected Prints

Remarks:

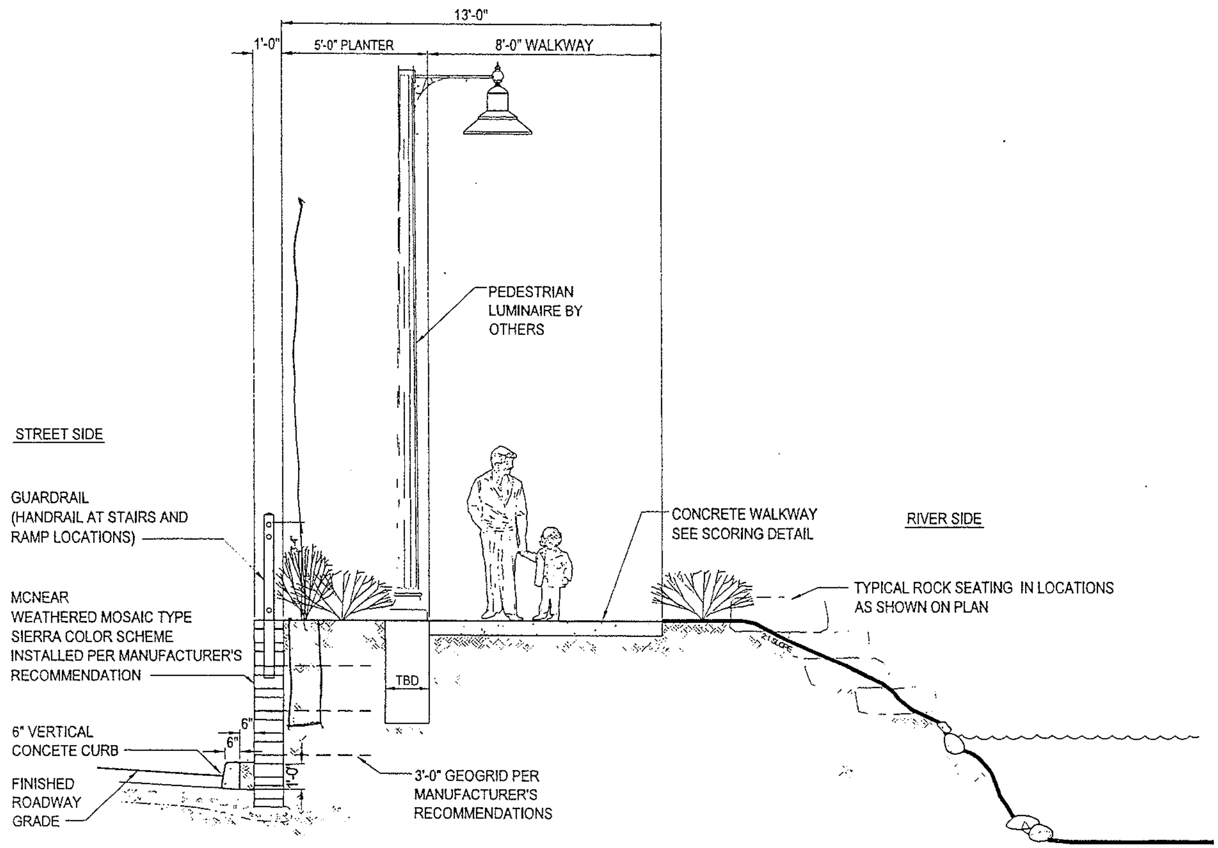
Should you have any questions, please feel free to call me.

Sincerely,

The RETEC Group, Inc.

**Michael Byers** MB

cc: **RETEC File**

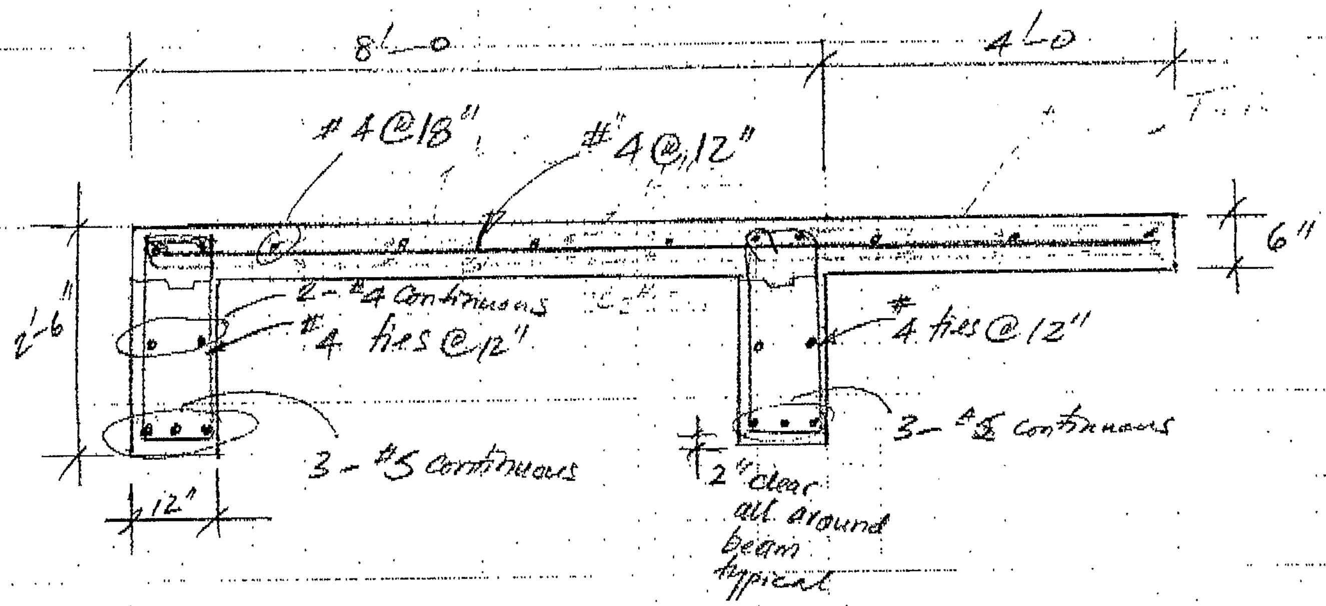



TOWN OF SKYKOMISH
# LEVEE ENHANCEMENT PROJECT

Typical Section Through Walkway | KPG

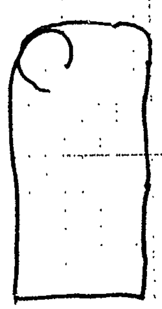
09.13.2006

Skykomish Walk 12/9/06




60' X 2 EA

122 EA #4 TIES @ 12" OC



#5 BAR 3EA X 2 = 6 X 60' + SPLICE

#4 BAR 2EA X 2 = 4 X 60' + SPLICE

City of Skykomish 2/7/07

Levee Enhancement Project

Light Pole Fdn. Design

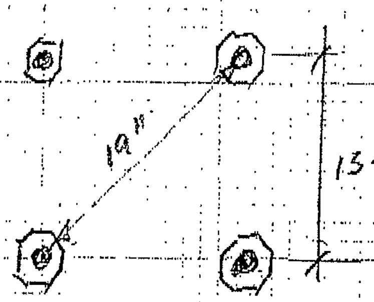
From Lighting Group Northwest

working moment = 2000 ft lbs

shear = 200 lbs

torsion load = 300 ft lbs

Bolts = 4 – 3/4"$\phi$ A307




A307 – 3/4"$\phi$ bolt in single shear good for 4.4k > 200 lbs

Check tension in bolt due to uplift

Assume lever arm of $\frac{19}{2}$" = 9.5"

$T = 12 \times 2000 / 9.5 = 2526^{\#}$/bolt

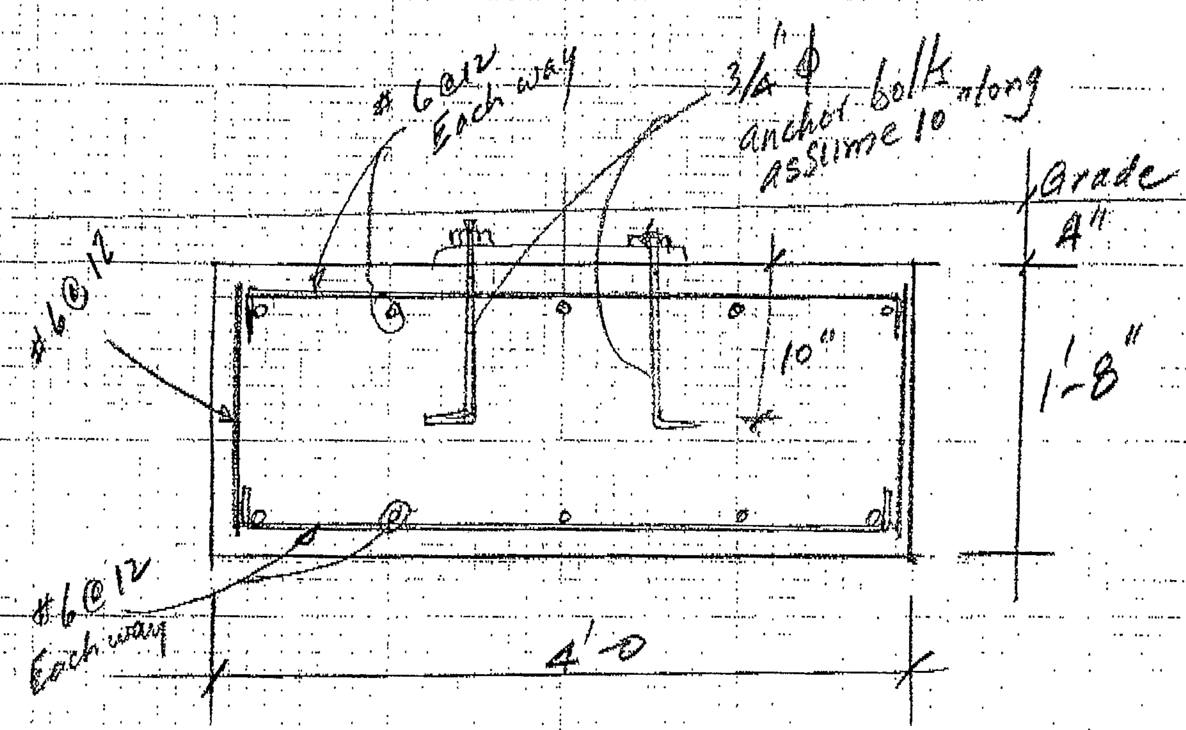
Torsional shear $= \frac{300 \times 12}{9.5 \times 4} = 94.7^{\#}$/bolt

3/4"$\phi$ bolt good for 8.8k in tension

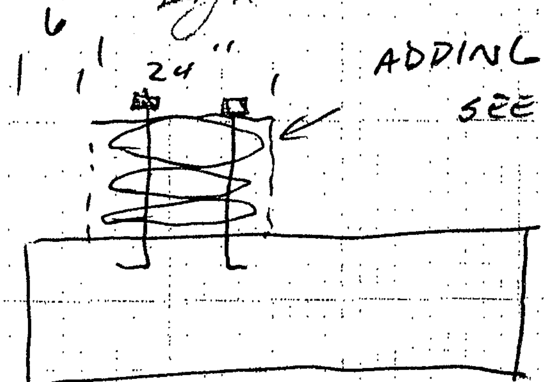
City of Skykomish 2/7/07
3

Light Pole Fdn Design

Assume min allow Brg Press = 2000 psf
actual toe press = 487.5 psf
OK




Light Pole Foundation




ADDING 18" OF 24" RADIUS
SEE ADDITIONAL DRAWING

## Steve Chambers

**From:** Frisbee, Greg [greg.frisbee@pse.com]
**Sent:** Tuesday, March 06, 2007 2:20 PM
**To:** Steve Chambers
**Cc:** Haydon, Del
**Subject:** FW: Skykomish Renovation

**Attachments:** scan.pdf

scan.pdf (30 KB)

<<scan.pdf>> Steve,

Attached is a drawing of the spread footing you described this morning.
I hope it meets your needs. This footing will support the Victorian II poles with one or two luminaires as specified when installed adjacent to the wall you are constructing alongside the levee in Skykomish.

If you have any questions or desire a change to the drawing please email or call.

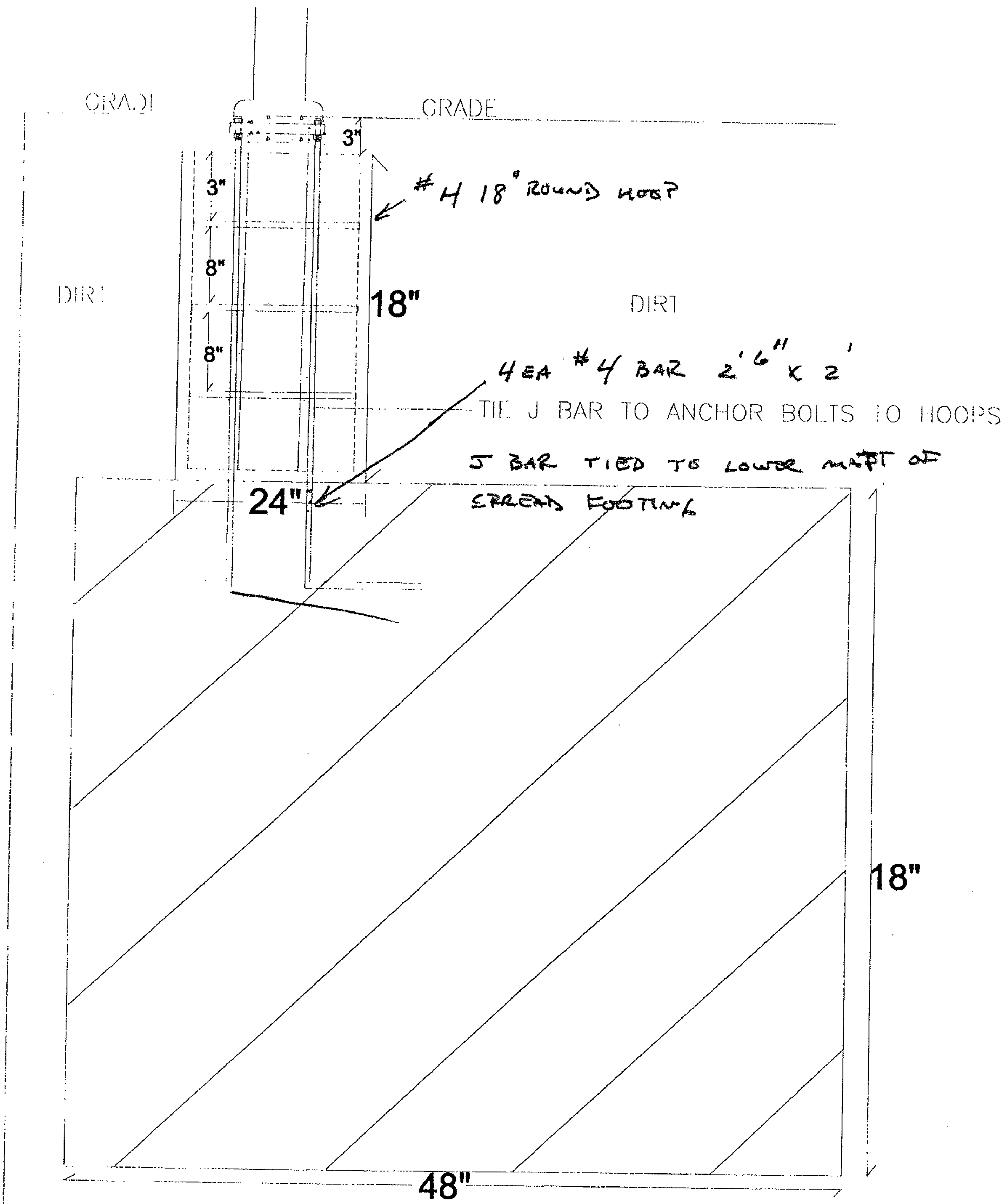
Regards,
Greg

Greg Frisbee
Manager Engineering & Construction
INTOLIGHT--Lighting Services from PSE
355 110th Ave. NE PSE-9W
Bellevue, WA 98004
425-456-2915   Cell 206-604-3347   Fax 425-462-3149
email greg.frisbee@pse.com

-----Original Message-----
From: Robins, Rawley B
Sent: Tuesday, March 06, 2007 11:29 AM
To: Frisbee, Greg
Subject: Skykomish Renovation

Here it is.

Rawley



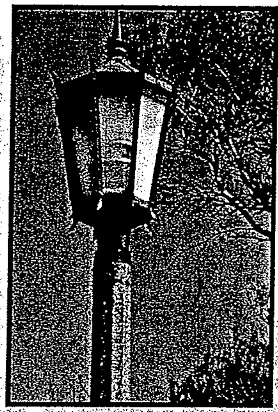

**STREET LIGHT SPREAD FOOTING**
**SKYKOMISH LEVEE RENOVATION**

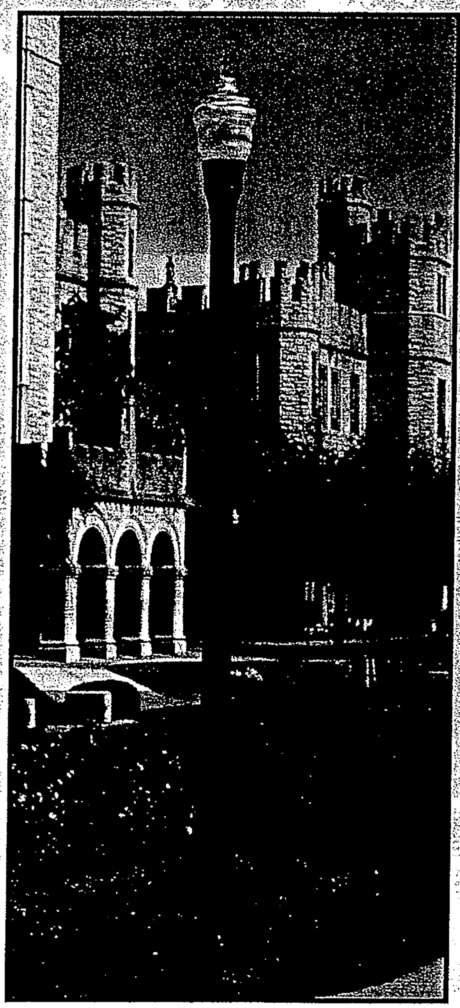
NTS

AMERON
INTERNATIONAL

# Traditional Series

# Victorian

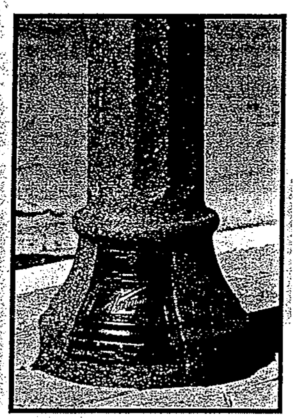




Style II

The fluted Victorian pole features neoclassical detailing that complements many period architectural styles, yet blends easily with more modern surroundings. The slightly tapered shaft lends a graceful look to this elegant Victorian.

Ameron's Traditional Series spun-cast, prestressed concrete lighting poles combine the charm of yesterday with today's technology. Available in a variety of configurations, colors and finishes, these poles provide architects and designers many creative options. All Ameron spun-cast concrete poles have our exclusive ten-year warranty. Durability with a classic touch.



## General Information

Ameron's Traditional Series poles are available in a variety of standard and custom configurations. Constructed with the highest quality prestressed concrete, these centrifugally cast, low-maintenance poles are strong, durable, and vibration resistant. Ameron poles conform to applicable sections of ACI, AASHTO, ASTM and UBC standards.

## Surface Treatment

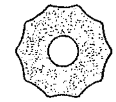
The concrete shafts are lightly blasted to expose the texture and beauty of the natural aggregates while maintaining sharp definition of details and patterns.

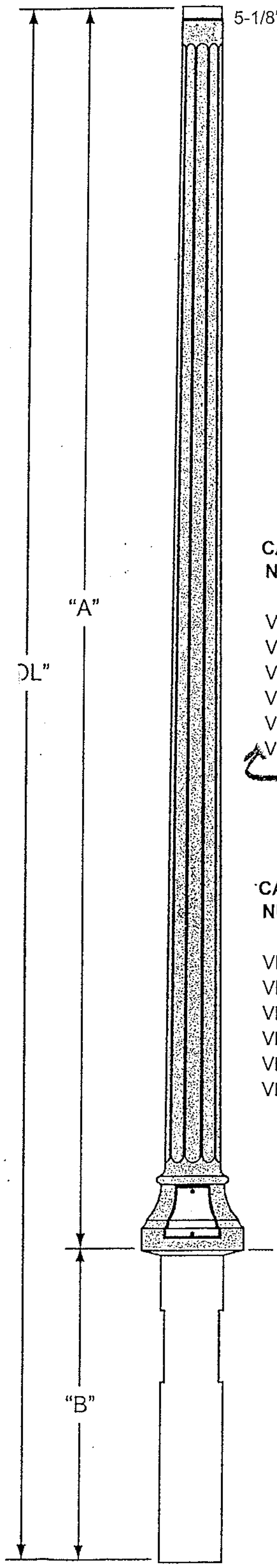
## Colors and Finishes

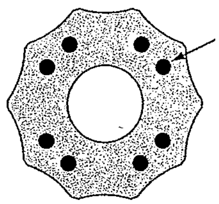
Standard, pre-formulated and custom aggregate colors are available. See separate aggregate sheet for details. Ameron offers Amershield™, a premium graffiti-resistant coating, plus an assortment of durable sealers and protectants that further enhance colors, protect the concrete surface and aid in the removal of graffiti.

Traditional Series

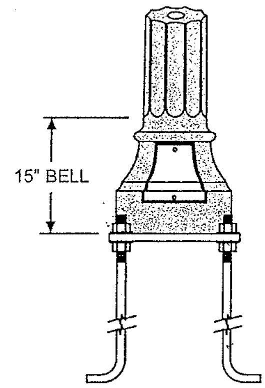
# Victorian II Pole



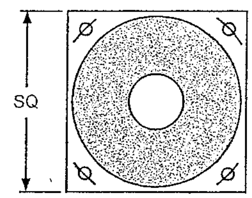



SHAFT CROSS SECTION DETAIL




VBF ELEVATION
See recommended
"capping detail"




BASE PLATE

## BASE PLATE STYLE - ORDERING INFORMATION

| CATALOG NUMBER | POLE HEIGHT "A" | BASE O.D. | ANCHOR BOLT | BOLT CIRCLE | BASE PLATE (SQ) | ULTIMATE G.L. MOMENT (FT. LBS.) | WEIGHT (LBS.) | MAXIMUM EPA/MPH (SQ FT)* 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| VBF-3.1 | 10'-2" | 13" | 3/4" x 24" x 4" | 16" | 14" | 12,000 | 350 | 15.0 | 12.5 | 11.0 |
| VBF-3.7** | 12'-2" | 13" | 3/4" x 24" x 4" | 16" | 14" | 12,000 | 375 | 15.0 | 12.5 | 11.0 |
| VBF-4.1 | 13'-5" | 13" | 3/4" x 24" x 4" | 16" | 14" | 12,000 | 400 | 15.0 | 12.5 | 11.0 |
| VBF-4.7** | 15'-5" | 13" | 3/4" x 24" x 4" | 16" | 14" | 15,000 | 500 | 13.0 | 13.0 | 8.0 |
| VBF-5.6 | 18'-4" | 16" | 3/4" x 24" x 4" | 19" | 17" | 15,500 | 700 | 13.0 | 11.0 | 8.0 |
| VBF-6.2** | 20'-4" | 16" | 3/4" x 24" x 4" | 19" | 17" | 17,000 | 800 | 13.0 | 9.0 | 6.0 |

## EMBEDDED STYLE - ORDERING INFORMATION

| CATALOG NUMBER | POLE HEIGHT "A" | BASE O.D. | EMBEDDED DEPTH "B" | OVERALL LENGTH "OL" | ULTIMATE G.L. MOMENT (FT. LBS.) | WEIGHT (LBS.) | MAXIMUM EPA/MPH (SQ FT)* 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|
| VEF-3 | 9'-10" | 13" | 3'-3" | 13'-1" | 12,000 | 475 | 15.0 | 12.5 | 11.0 |
| VEF-3.6** | 11'-10" | 13" | 3'-3" | 15'-1" | 12,000 | 500 | 15.0 | 12.5 | 11.0 |
| VEF-4 | 13'-0" | 13" | 4'-3" | 17'-3" | 12,000 | 575 | 15.0 | 12.5 | 11.0 |
| VEF-4.6** | 15'-0" | 13" | 4'-3" | 19'-3" | 15,000 | 725 | 13.0 | 11.0 | 9.5 |
| VEF-5.5 | 18'-0" | 16" | 4'-11" | 22'-11" | 15,500 | 760 | 13.0 | 11.0 | 8.0 |
| VEF-6.1** | 20'-0" | 16" | 4'-11" | 24'-11" | 17,000 | 860 | 13.0 | 9.0 | 6.0 |

*EPA based on post top mounting. Consult your representative for other attachment methods and increased load capacity requirements.

**Top 28" of pole is 5-1/8" non-fluted round.**

Notes:

### SPECIFICATIONS
Use Centrecon Specifications.

### LUMINAIRE MOUNTING
See Technical-Mounting Options Section for more information.

### COLORS & FINISHES
See Color Selection Guide.

### ANTI-GRAFFITI & SEALER
Optional Coatings available for added protection.

# Letter of Submittal

Wilder Construction Company
1525 E. Marine View Dr
Everett, WA 98201

WILDER
WILDER CONSTRUCTION COMPANY

**Project** **Skykomish Levee Remediation**

**Date** 3/6/2007
**Submittal Number** 17a
**Return By**

**To:**
The RETEC Group, Inc.
Mike Byers
Project Manager
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

**From:**
Wilder Construction Company
Quinn Golden
Project Engineer
1525 E. Marine View Dr
Everett, WA 98201

| Bid Item | Spec Reference | Copies | Submittal Description | Drawing Number |
|---|---|---|---|---|
| 27 | | | Levee Design | |

**Remarks by Contractor**

Attached is a letter that addresses the questions you had regarding Submittal No. 17.

WILDER
WILDER CONSTRUCTION COMPANY

3/6/2007

Mike Byers
Project Manager
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

**Subject: Submittal 17a**

Mike,
In your response to Submittal 17, you posed several questions. This letter addresses those questions as follows:

Questions #1: "Although MPA indicates that they are not the "designer of record", it is our understanding that, although the layout may have been completed by others, MPA completed the internal design of the wall, walkways and overlook and are responsible for adequate performance of the wall and the other features designed under the constraints indicated in the closure section of the submittal. Please clarify the statement "MPA is not the designer of record" as it applies to the features that MPA designed."

Response: MPA indicated in a meeting that this is a levee and it could be overtopped and the water moving over and around the designed elements was and is of concern. In that meeting I was told that the City was accepting that risk and I was told that the water would NOT overtop the levee and do not design for that condition. Therefore, the design does not take that into account. The light pole foundations, the hand railing, the stairs, the concrete walkway, the overlook, the geogrid & blocks are NOT designed to withstand an overtopping or a log/stump being moved by the water and hit them. That was the reason for the comment.

If the levee is considered an earthen mound made of large rock on one side and smaller rock on the inside, then MPA will stand behind the design. The lateral earth pressure for the block wall that resulted in the geogrid length and spacing was chosen for that condition. It was not designed for water flowing over the top. The pole foundations were also designed for being in the small rock type of material. So if the elements of the project are built as MPA designed and the conditions stay as they are during construction with the river water, then we stand behind our design.

Wilder Construction Company
1525 E. Marine View Dr
Everett, WA 98201

Question #2: "Walkway design - Will the walkway withstand the occasional light duty truck traffic? The expected load is the town's maintenance truck (F-450)?"

Response: Yes, the slab with support a pickup truck weight. The concrete transfers the load to the underlying soil so the levee must be intact, compacted and the concrete placed so no voids are beneath. . . .

Please contact me if you have any additional questions regarding these respsonses.

Sincerely,

WILDER CONSTRUCTION COMPANY

Quinn Golden
Project Engineer

**cc:** Project File

Milbor-Pita
& ASSOCIATES, INC.

| CONSTRUCTION MEMO | MPA Project # 1600 |
|---|---|
| Project Name: **Levee Wall** | Date: 30Mar07 |
| Location: Skykomish Levee by School | Report #2 |
| Client: Wilder Construction | |

**Comments:**

**Per the sketch you sent me & calculations that are attached, MPA is providing you with the remaining details for construction of the CIP wall & footing. The stair portion are already provided and the deck was provided in the plan for the overhang and should be extended to the south to connect to the top of the wall. Specifically:**

- **The wall, to be placed approximately where shown on Photo #2 below, is to be constructed per the attached detail sheet.**
- **The deck section that is to be located where the yellow line is in photo #1 is to be connected to the two footings shown in the photo and it should extend to the new retaining wall. The top of the retaining wall should be like the top of the footings shown in Photo #1 show there is a positive connection.**
- **The stairs should be constructed on the backfilled material per the detail shown in Appendix E in our earlier submittal.**
- **All the CIP slabs and walls are to be continuous and the rebar extends from one element and pour to the next, so leave then sticking out to they are incorporated in the next element or pour.**


1

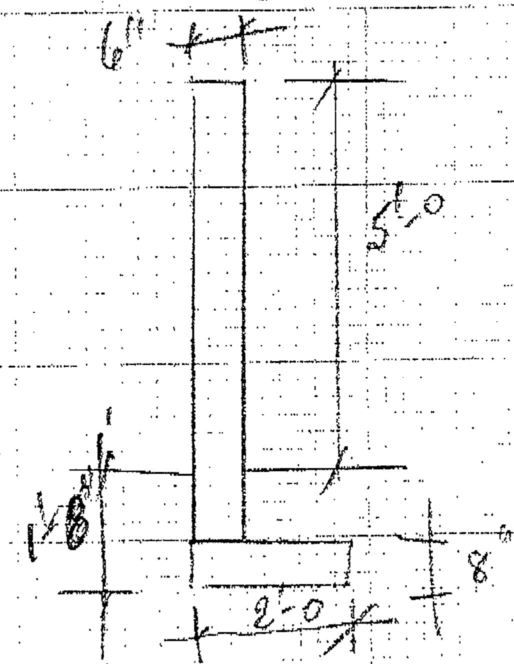

2

Photo Log:
1. Looking east at footings for overhang & the top of nearly completed block wall. Arrow points where back to back stairs are to be placed & yellow line is where deck is to extend. On the right side, a fill is required to support it.
2. Looking west; the temporary steps are sort of like the proposed ones in that they are parallel to the levee axis like shown but there is another block wall w/ geogrids along roadway & concrete steps behind. Yellow line is where wall is to be.

**Attached are the wall calculations.**

**Please call if questions.** **Frank Pita**

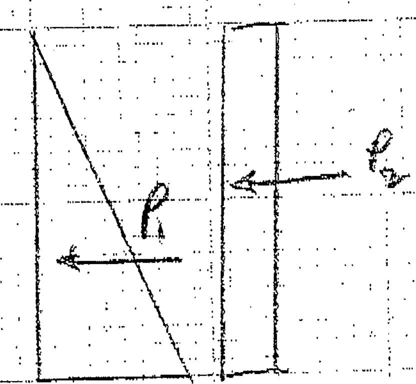
Retaining Wall @ Stairway.




Equiv Fluid Press
$= 0.3(125) = 37.5\ pcf$

Surcharge
pedestrian load = 100 psf

Equiv Lateral press
$= 0.3 \times 60 = 18\ psf$




$P_1 = \frac{1}{2}(37.5)(6)^2 = 675\ plf$

$P_2 = 18 \times 6 = 108\ plf$

wt of wall $= 6 \times \frac{6}{12} \times 150 = 450\ lb$

wt of ftg $= 2 \times \frac{8}{12} \times 150 = 200\ lbs$

wt of soil on ftg $= 1.5 \times 6 \times 125$
$= 1125\ lb$

Check overturning.

$M_{OT} = \left(P_1 \times \frac{6}{3}\right) + P_2\left(\frac{6}{2}\right)$

$= 675 \times \frac{6}{3} + 108\left(\frac{6}{2}\right) = 1674$

$M_R = \left(450 \times \frac{3}{12}\right) + \left(200 \times \frac{2}{2}\right) + (1125 \times 1.25$

1350
324

Overturning continued

$M_R = 112.75 + 200 + 1406.25$
$= 1719$

$FS = \frac{1719}{1674} = 1.02$ NG
Needs to be at least 1.2

Increase ftg width to 3'0

wt of wall = 450 lb/ft
wt of ftg = $3 \times \frac{8}{12} \times 150 = 300$ #/ft
wt of soil = $2.5 \times 6 \times 125 = 1875$

Revised $M_R = \left(450 \times \frac{3}{12}\right) + \left(300 \times \frac{3}{2}\right) + 1875 \times 1.75$
$= 112.75 + 450 + 3281.25$
$= 3844$

$FS = \frac{3844}{1674} = 2.29$ ok

Check Sliding

Assume $\mu = 0.4$

$L_1 = P_1 + P_2 = 675 + 108 = 783^{\#}$

$F = \overbrace{(450 + 300 + 1875)}^{2625}\mu = 1050^{\#}$

$FS = \frac{1050}{783} = 1.34$ OK

Check pressure underheel

$M = 1674$ lb ft

$P = (450 + 300 + 1875) = 2625$

$I$ . ftg $= \frac{1 \times 3^3}{12} = 2.25$ ft$^4$

$f = \frac{P}{A} \pm \frac{Mc}{I}$

$= \frac{2625}{3 \times 1} \pm \frac{1674 \times 1.5}{2.25}$

$= 875 \pm 1116 = 1991 < 2000$ ok

eccentricity $e = \frac{1674}{2625} = 0.64'$ outside middle third

try 3'-6" base

vertical load $= 3 \times 6 \times 125$
$= 2250$ lb/ft

wt of ftg $= 3.5 \times \frac{8}{12} \times 150$
$= 350$

$P = 450 + 2250 + 350$
$= 3050$ lb/ft

$S = \frac{3.5^2}{6} = 2.04$

$A = 3.5 \times 1 = 3.5$

$\frac{P}{A} \pm \frac{M}{S} = \frac{3050}{3.5} \pm \frac{1674}{2.04}$

$= 871 \pm 820$

$= 1691$ & $51$ ok

Use 3'-6" footing

Wall Design

$M = 1674 \text{ lb/ft}$

$\text{Factored } M = 1.4 \times 1674 = 2343.6 \text{ lb/ft}$

~~Horiz Shear = $P_1 + P_2$ = 783 lbs~~

$V_u = 783 \times 1.4 = 1096.2 \text{ lb}$

Assume $f_c' = 3000 \text{ psi}$

$f_y = 60000 \text{ psi}$ $\quad \beta_1 = 0.85$

$$\rho_b = \frac{0.85 f_c' \beta_1}{f_y}\left(\frac{87000}{87000 + f_y}\right) = 0.0214$$

$$\rho_{min} = \frac{200}{f_y} = 0.0033$$

$$R_N = \frac{M_n}{\phi b d^2} = \frac{2343.6 \times 12}{0.9 \times 12 \times 3^2} = 289.32$$

$d = 6 - 3$
$= 3$

$$m = \frac{f_y}{0.85 f_c'} = \frac{60}{0.85(3)} = 23.53$$

$$\rho = \frac{1}{m}\left(1 - \sqrt{1 - \frac{2 m R_n}{f_y}}\right)$$

$$= \frac{1}{23.53}\left(1 - \sqrt{1 - \frac{2(23.53 \times 289.3)}{60000}}\right) = 0.0051$$

$A_s = 0.0051 \times 12 \times 3 = 0.18 \text{ in}^2/\text{ft}$

use #4 @ 12

$A_{st} = 0.002 \times 12 \times 6 = 0.144$

use #4 @ 12 each way

$A_s = 0.20 \text{ in}^2$

$V_u = 1096.2$

$V_n = \frac{V_u}{\phi} = \frac{1096.2}{0.85} = 1289.6 \text{ lb/ft}$

$\frac{V_n}{bd} = \frac{1289.6}{12 \times 3} = 35.8 \text{ psi}$

$V_u = \phi\sqrt{f_c'}\,bd = 1676 \text{ psi} > 1289.6$

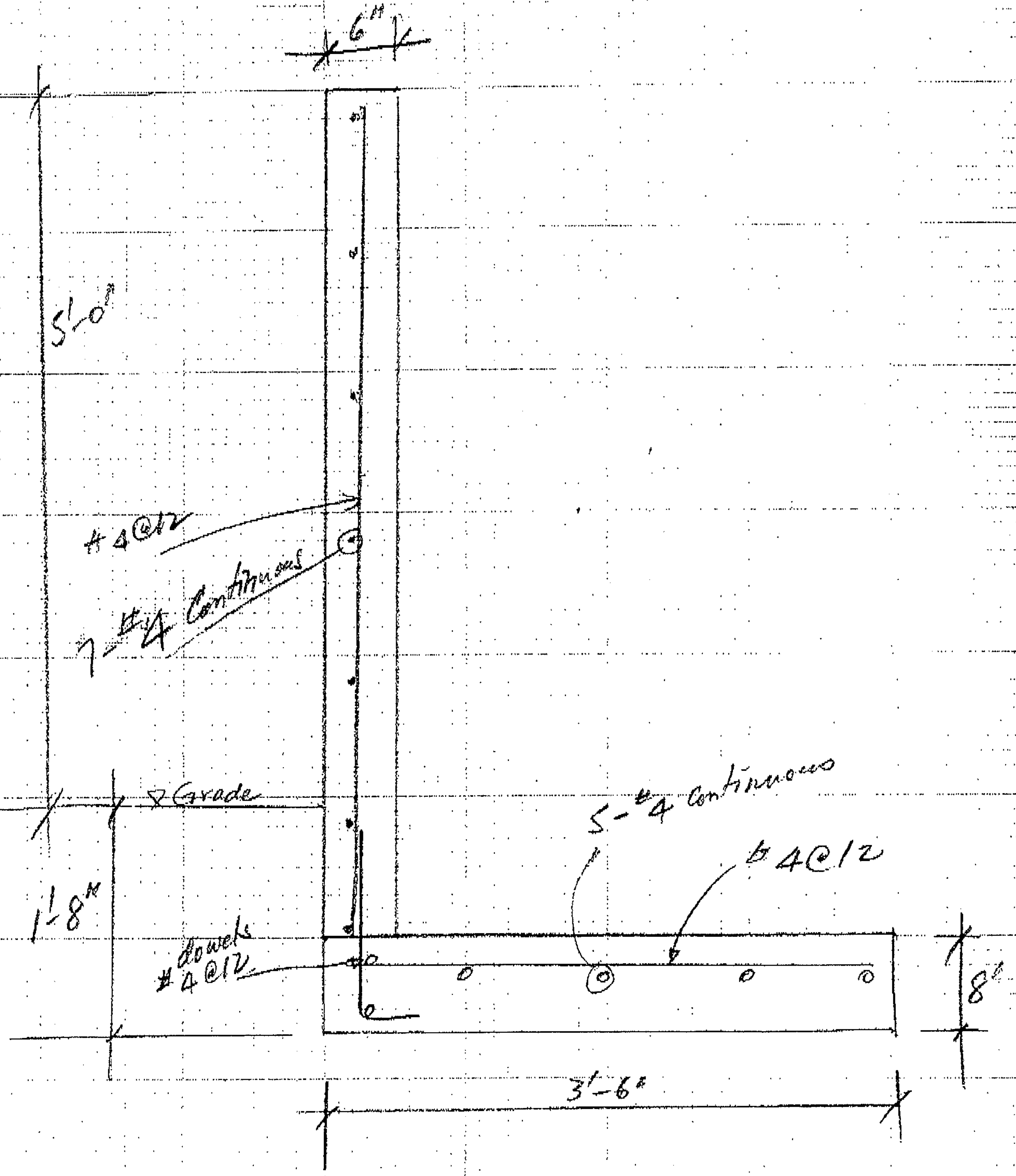
ok

for footing use $A_{st} = 0.002 \times 12 \times 8$

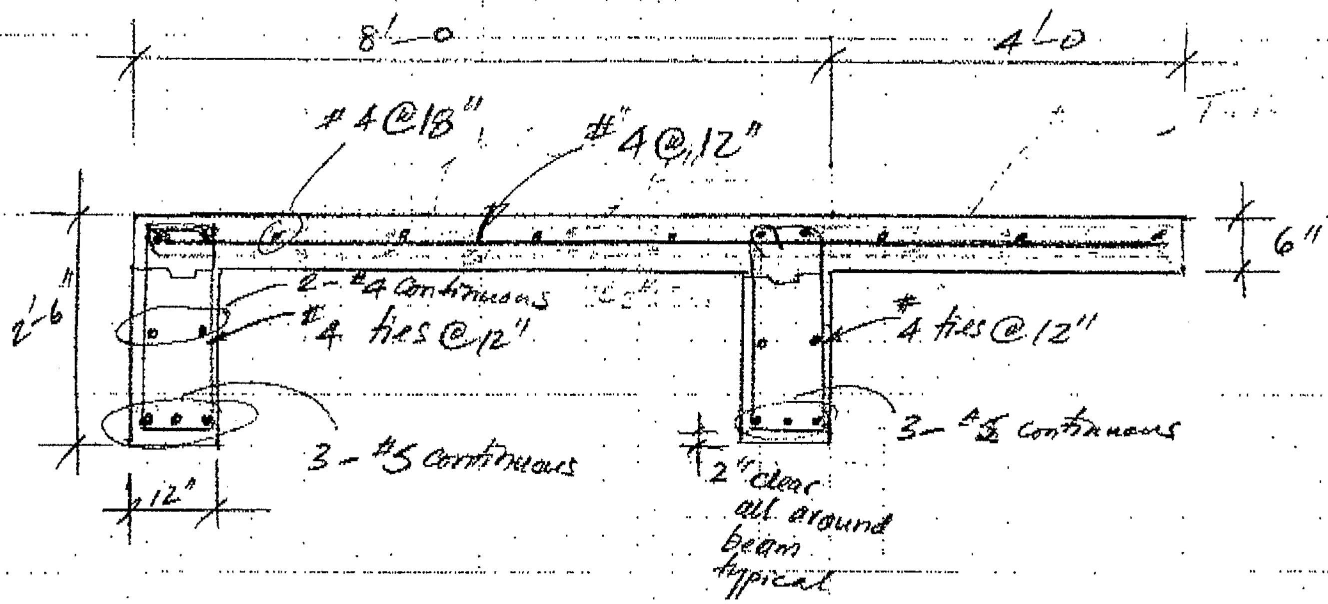
$= 0.192 \text{ in}^2/\text{ft}$

#4 @ 12 $= 0.20 \text{ in}^2/\text{ft}$

Skykomish 5/29/07

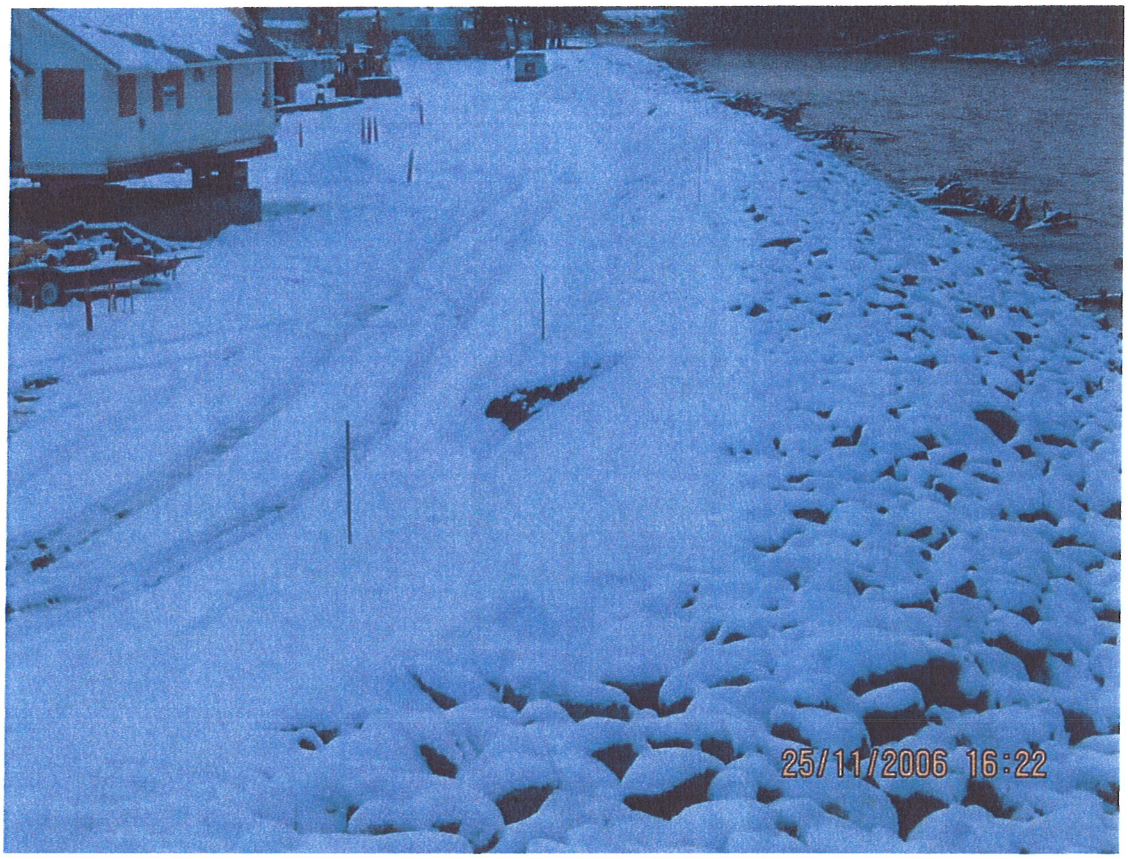


Skykomish Walk 12/8/06




DOES NOT REQUIRE STAIRS TO BE AN ANCHOR

# Additional Design Input of Details
# &
# Calculation Backup
# for
# The Levee Enhancement Project
# in
# The Town of Skykomish, WA




**for**
**Wilder Construction Company**
**Everett, WA**

**December 2006**

**Milbor – Pita & Associates, Inc.**
**Geotechnical & Tunnel Consultants**
**Job #1600**

Milbor-Pita
& ASSOCIATES, INC.

26Dec06
#1600

To: Quinn Golden/Wilder Construction
From: Frank Pita, PE

**RE: Final Design Input of Details & Calculation Backup for Levee Inside Wall, Overlook & Walkway, BNSF Cleanup, Skykomish, WA**

**Background**

The following submittal is a partial design of a larger project, and mainly covers details of the block wall, the geogrid, the external stairs at the east end, the concrete walkway and overlook, the concrete stairs, and the backfill material. MPA is not the designer of record.

As the attached drawing logos indicate, the project conceptual layout and horizontal/vertical control was prepared by KPG and RETEC, respectively. MPA has not changed these designs but has used these data for the generation of typical details for the construction. These details are either from published standard designs by suppliers and/or Highway departments or generated by MPA. These are presented in the following seven (7) appendices.

**Explanation of Attached Figures & Details w/ Comment**

**Attached Figures by Others**

Figures 1 through 6 (hand labeled) present the project conceptual layout and the horizontal/vertical control. They are as follows (number below is the figure number):

1. Overall site plan with stationing for layout.
2. Vertical and horizontal control for wall construction and walkway etc.
3. Remainder of #2 with elevation table.
4. Walkway stairs, planter and fence 'look' in center portion of the project.
5. Fence details included base plate details for anchoring into concrete, which is suitable where the fence with be founded on cast in place concrete. This is not to be used where fence is located on the block wall.
6. Typical sketch section of the walkway, a luminary, the planter and the block wall with fence on top. This detail MUST be modified so that fence is located just inside the planter area and behind the wall. Details in figure 2 in Appendix B should be followed.

**Appendices**

Appendix A contains details on block stair way construction and layout; corners and how the block alternate along the face. The pattern repeats but it is not every block. The blocks should be placed in a horizontal plane and not paralleling the river's slope. Details are shown on stepping the block system up and down. MPA is of the opinion that the two sets of stairs could be constructed by either blocks or cast in place concrete after forming. Both will work. Details are shown for both.

If concrete is used, the owner desires the block look on the exposed side. This can be done by building the geogrid wall in the soil beneath the cast in place stairs. The blocks that 'face' the concrete should be either:

- Glued together per the manufacturer's recommendations, or
- Casted into a grout that holds the backs. A tie should be placed in the concrete for attachment if it is constructed first. If not, pour the stairs against the blocks.

Appendix B contains details on the fence/railing construction. As can be seen, all posts are set in concrete behind and below the wall blocks. The glued on cap block can not support a railing alone.

Appendix C contains the computation for the geogrid size, length and vertical spacing. Also commented on was the proposed backfill material; MPA recommends a clean (less then 3% fines) angular (crushed) material that both drains and locks up with minimal compaction.

Appendix D contains the sketch & details for the walkway in all locations other than the overlook. To reduce the possibility of undermining during high water events, both sides of the walkway should have vertical or side elements. The rebar should be continuous but the sides and horizontal portion could be placed at different times.

Appendix E contains the details for the cast in place overlook walkway. Also shown are the two foundations or deadman. Calculations for the sizing of the members are included as well. Please note that this element of the project needs to be tied to the other deck slabs by overlapping rebar extending from the one element to the next. Entire walkway slab should be tied together.

Appendix F contains details for a concrete stairway, which should also be tied to the other slabs via rebar.

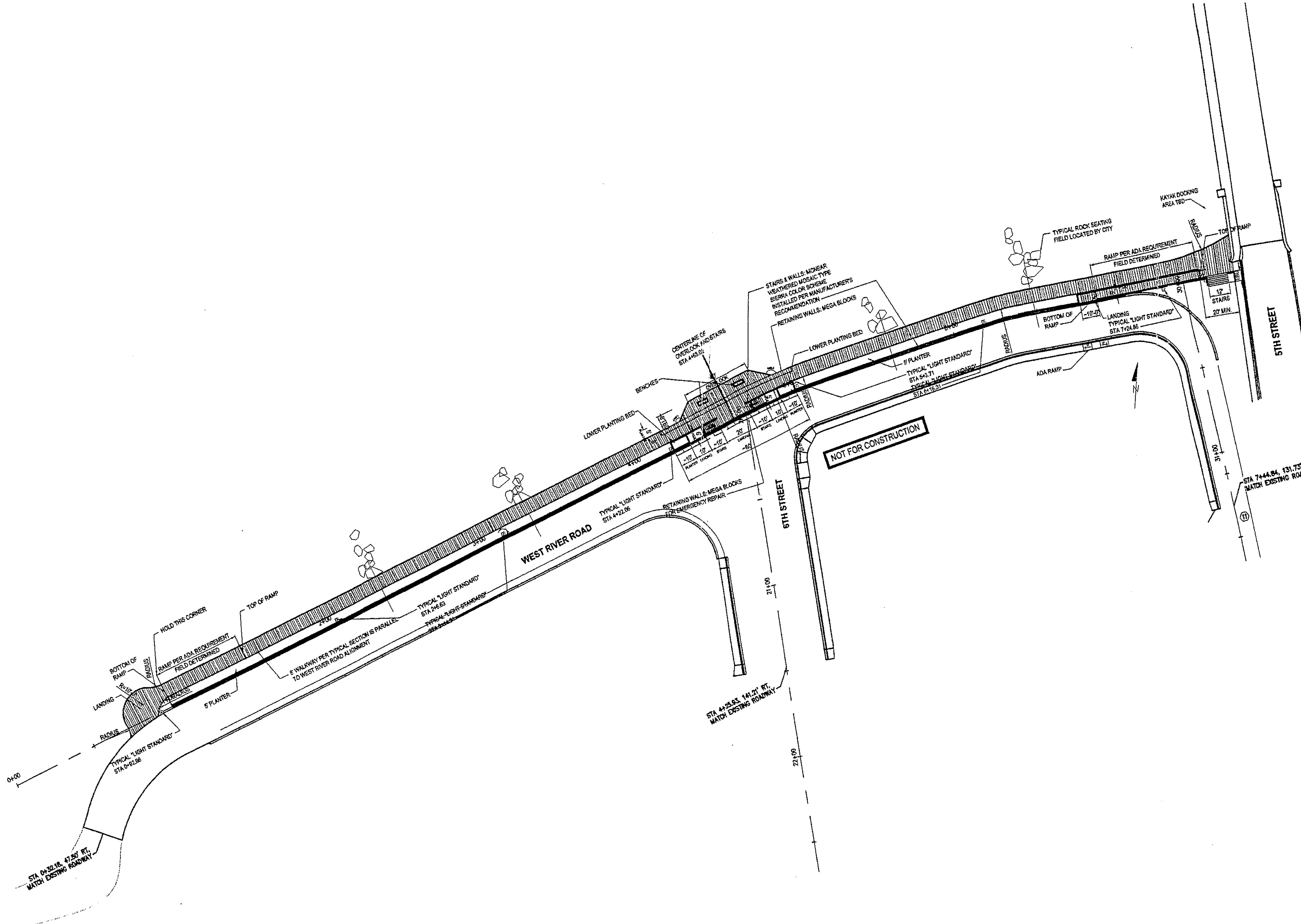
Appendix G contains details for the footing base for the luminaries. The pages are from WSDOT's standard plans. Your electrical subcontractor should follow these details.

**Closure**

At an all inclusive meeting held in Wilder's office on 4Dec06, where MPA questioned some of the design assumptions, it was made clear that the design parameters that MPA should use are as follows:

- The levee will NOT be overtopped so the design should NOT design for water flowing down the stairs or ramps. The luminaries and fence should not be designed to withstand impact of moving river debris.
- The overlook should only extend 4 feet out over the river. The bottom elevation of the overlook should be above the high water elevation.
- Wilder will make every attempt to strengthen the design by adding extra concrete to fill voids etc.

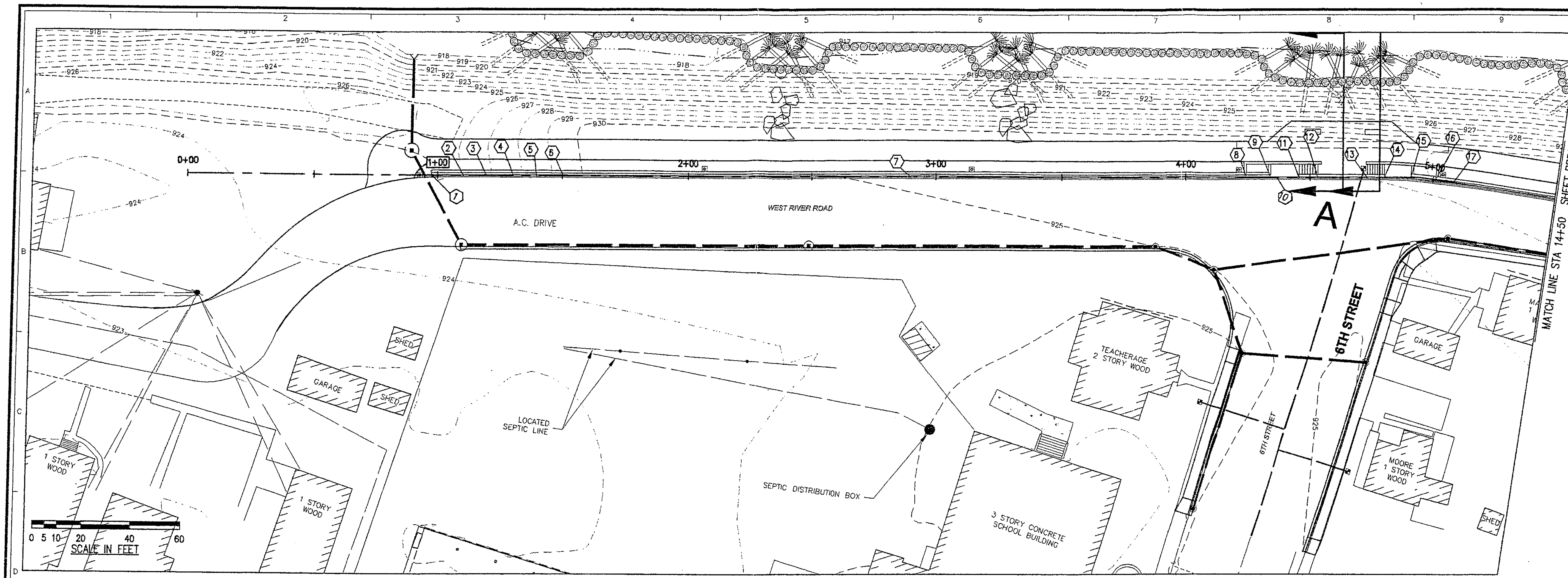
Call if questions.

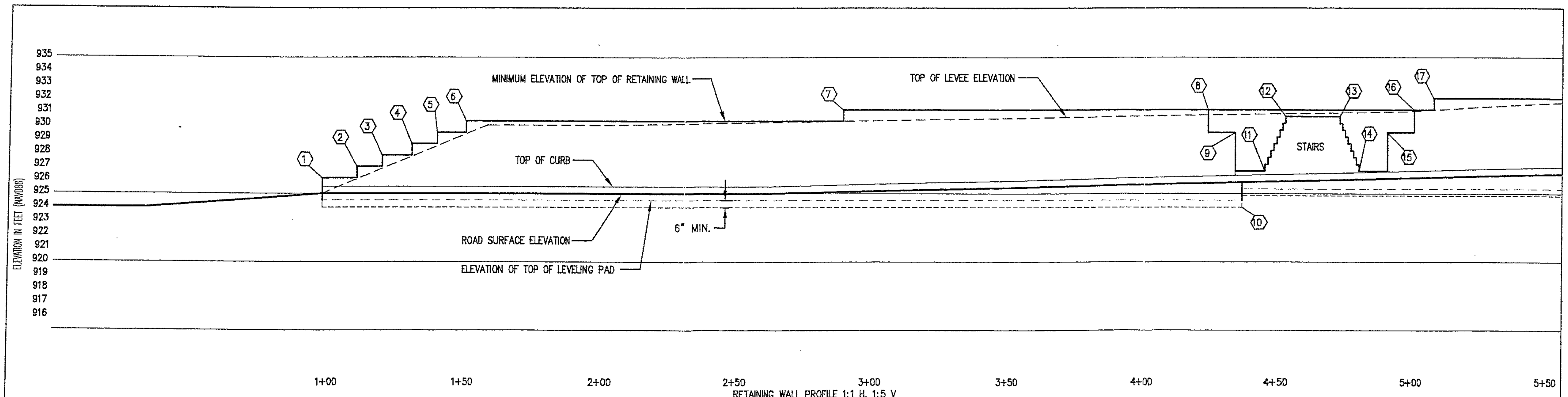



TOWN OF SKYKOMISH
LEVEE ENHANCEMENT PROJECT

09.26.2006

Fig. 1

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|---|---|---|---|---|---|---|---|
| A | RCW | 10/11/06 | DRAFT FOR INTERNAL REVIEW | | | | |

THE BNSF RAILWAY COMPANY
SKYKOMISH, WASHINGTON
BN050-19390-200

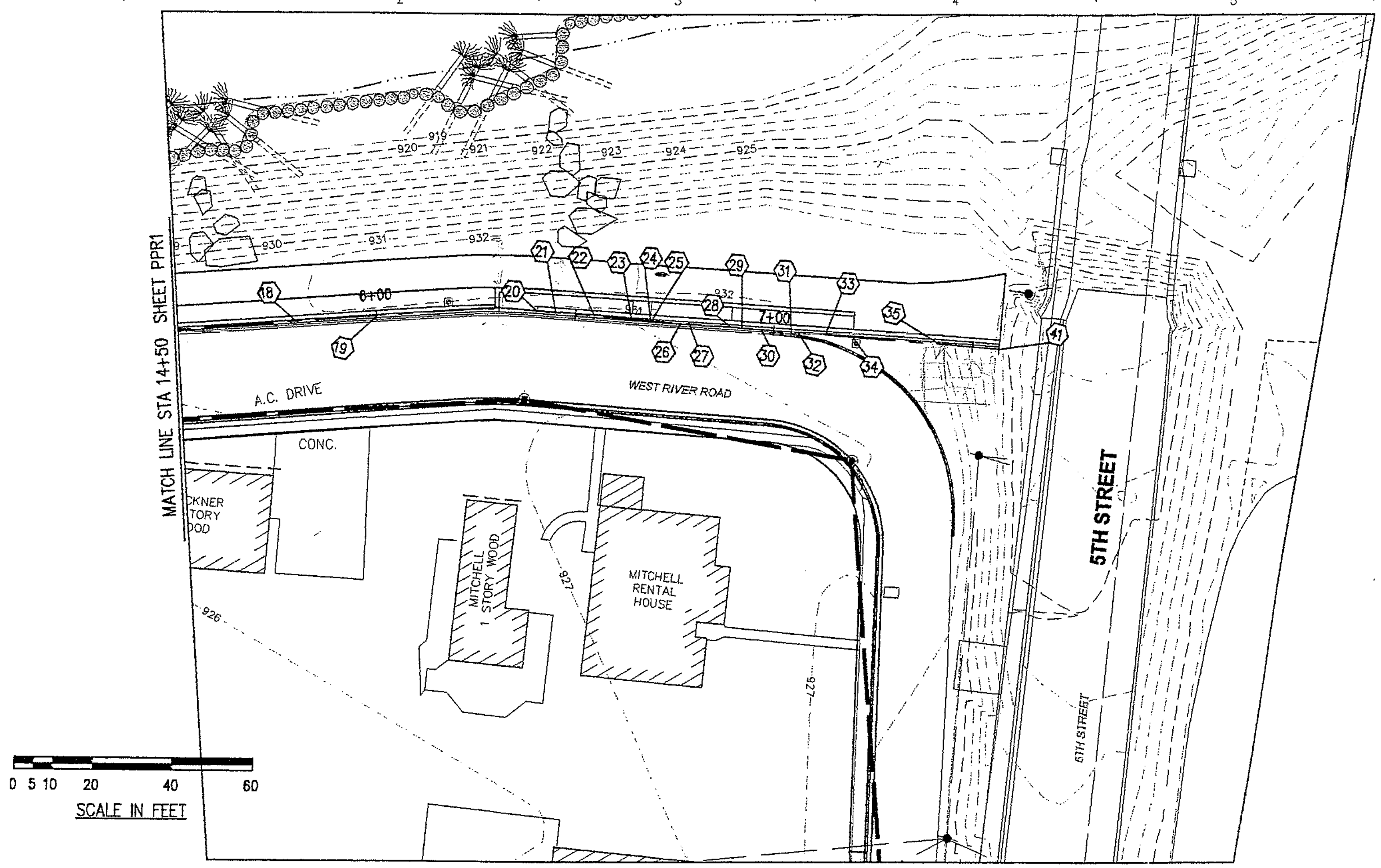
CURRENT DATE 10/11/06

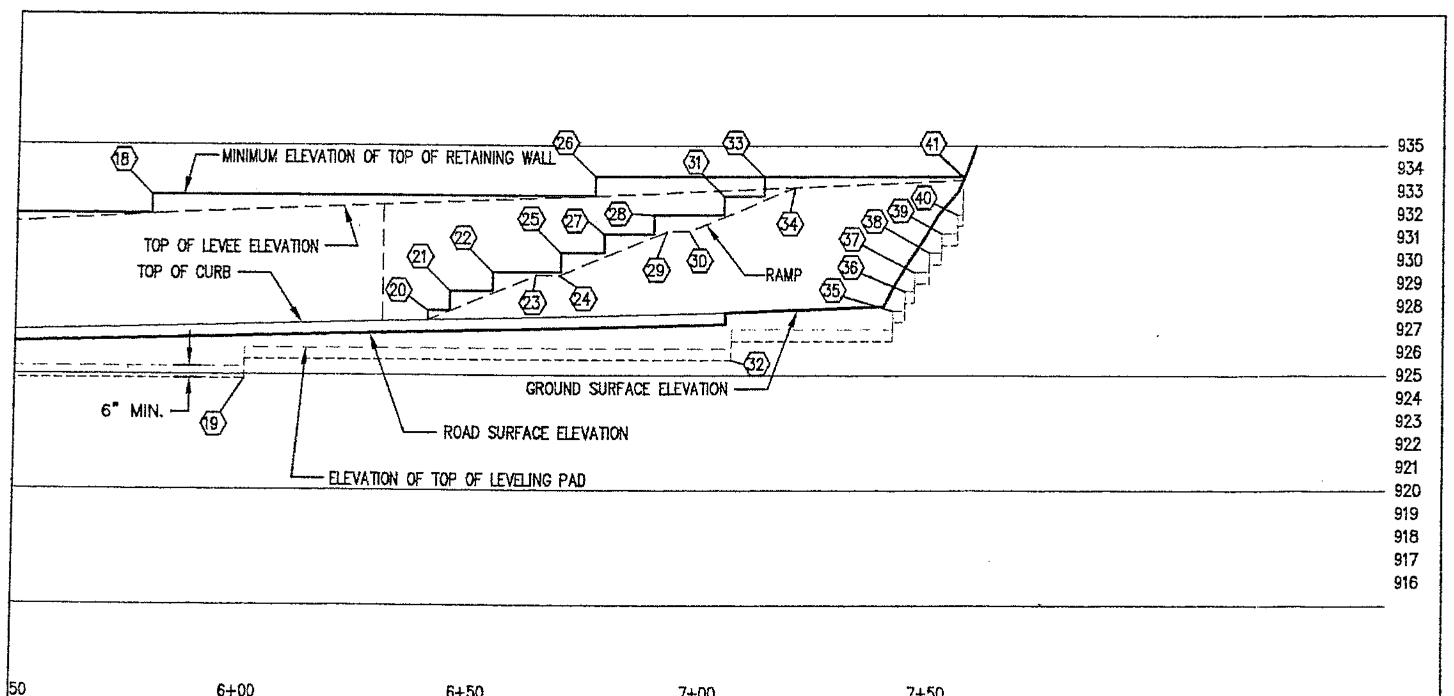
SKYKOMISH LEVEE REMEDIATION

LEVEE WALKWAY PLAN AND PROFILE WEST

DRAWING NO. LW-01 REVISION A

Fig 2



RETAINING WALL PROFILE 1:1 H, 1:5 V

## WALL LAYOUT COORDINATES

| Location | Station | Offset (feet) | Offset(1) West | Offset(1) East | Top of Levee Elev. (feet msl) | Top of Wall Elev. (feet msl) | Top of Lev. Pad Elev. West | Stair/Ramp Elev. (feet msl) | Top of Planter Elev. (feet msl) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 97.70 | 0.26 | NA | 0.18 | 925.00 | 926.14 | 924.50 | - | - |
| 2 | 110.40 | 0.25 | - | - | 926.10 | 926.97 | 924.50 | - | - |
| 3 | 119.70 | 0.25 | - | - | 926.80 | 927.80 | 924.50 | - | - |
| 4 | 130.40 | 0.24 | - | - | 927.70 | 928.60 | 924.50 | - | - |
| 5 | 139.70 | 0.24 | - | - | 928.47 | 929.47 | 924.50 | - | - |
| 6 | 150.37 | 0.23 | - | - | 929.35 | 930.31 | 925.33 | - | - |
| 7 | 289.70 | 0.17 | - | - | 930.30 | 931.14 | 925.33 | - | - |
| 8 | 424.97 | 0.11 | - | - | 930.80 | 931.14 | 925.33 | - | - |
| 9 | 434.97 | 0.10 | - | - | 930.85 | 931.14 | 925.33 | - | - |
| 10 | 437.70 | 0.10 | -0.10 | 0.03 | 930.85 | 931.14 | 925.33 | - | - |
| 11 | 445.97 | 0.10 | - | - | 930.85 | 931.14 | 925.33 | - | - |
| 12 | 452.97 | 0.09 | - | - | 930.90 | 931.14 | 925.33 | - | - |
| 13 | 472.97 | 0.09 | - | - | 930.95 | 931.14 | 925.33 | - | - |
| 14 | 479.97 | 0.11 | - | - | 930.95 | 931.14 | 925.33 | - | - |
| 15 | 490.97 | 0.27 | - | - | 931.00 | 931.14 | 925.33 | - | - |
| 16 | 500.97 | -0.36 | - | - | 931.00 | 931.14 | 925.33 | - | - |
| 17 | 508.37 | -0.15 | - | - | 931.05 | 931.97 | 925.33 | - | - |
| 18 | 579.70 | -0.42 | - | - | 932.00 | 932.81 | 925.33 | - | - |
| 19 | 600.37 | -0.53 | -0.73 | -0.61 | 932.15 | 932.81 | 926.17 | - | - |
| 20 | 640.53 | -0.63 | - | - | 932.50 | 927.81 | 926.17 | - | - |
| 21 | 645.19 | -0.59 | - | - | 932.55 | 928.64 | 926.17 | - | - |
| 22 | 654.53 | -0.49 | - | - | 932.60 | 929.47 | 926.17 | - | - |
| 23 | 663.85 | -0.39 | - | - | 932.65 | 929.47 | 926.17 | - | - |
| 24 | 668.85 | -0.34 | - | - | 932.70 | 929.47 | 926.17 | - | - |
| 25 | 669.19 | -0.34 | - | - | 932.75 | 930.31 | 926.17 | - | - |
| 26 | 676.37 | -0.26 | - | - | 932.80 | 930.31 | 926.17 | - | - |
| 27 | 678.53 | -0.24 | - | - | 932.85 | 931.14 | 926.17 | - | - |
| 28 | 689.19 | -0.13 | - | - | 932.90 | 931.97 | 926.17 | - | - |
| 29 | 691.92 | -0.10 | - | - | 932.95 | 931.97 | 926.17 | - | - |
| 30 | 696.92 | -0.05 | - | - | 933.00 | 931.97 | 926.17 | - | - |
| 31 | 704.53 | 0.03 | - | - | 933.05 | 932.81 | 926.17 | - | - |
| 32 | 706.37 | 0.05 | -0.15 | -0.02 | 933.05 | 933.64 | 927.00 | - | - |
| 33 | 713.19 | 0.12 | - | - | 933.10 | 933.64 | 927.00 | - | - |
| 34 | 720.00 | 0.19 | - | - | 933.20 | 933.64 | 927.00 | - | - |
| 35 | 741.70 | 0.42 | 0.22 | 0.34 | 933.40 | 933.64 | 927.83 | - | - |
| 36 | 744.37 | 0.45 | 0.25 | 0.37 | 933.42 | 933.64 | 928.67 | - | - |
| 37 | 746.37 | 0.47 | 0.27 | 0.39 | 933.45 | 933.64 | 929.50 | - | - |
| 38 | 749.70 | 0.50 | 0.30 | 0.43 | 933.50 | 933.64 | 930.33 | - | - |
| 39 | 752.37 | 0.53 | 0.33 | 0.45 | 933.52 | 933.64 | 931.17 | - | - |
| 40 | 755.70 | 0.56 | 0.36 | 0.49 | 933.53 | 933.64 | 932.00 | - | - |
| 41 | 756.80 | 0.58 | 0.38 | 0.50 | 933.53 | 933.64 | 932.00 | - | - |

Notes:
1) Indicates offset from baseline to base of wall at top of leveling pad. Positive values indicate north of baseline.
N = North
S = South

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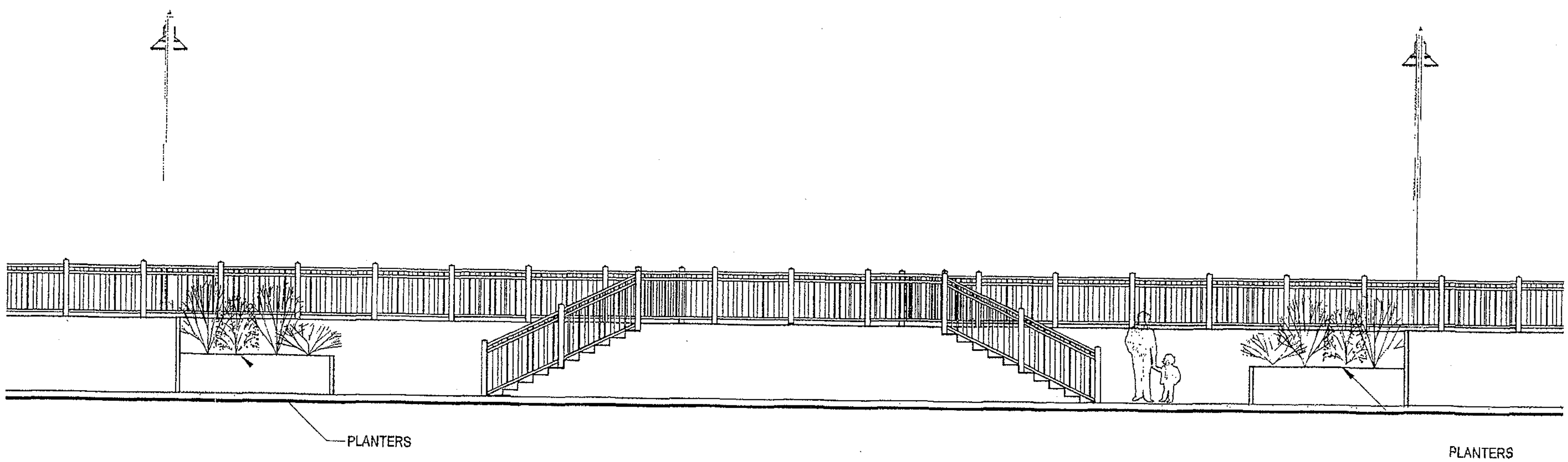
|---|---|---|---|---|---|---|---|
| A | RCW | 10/11/06 | DRAFT FOR INTERNAL REVIEW | | | | |

THE BNSF RAILWAY COMPANY
SKYKOMISH, WASHINGTON
BN050-19390-200

SKYKOMISH LEVEE REMEDIATION
LEVEE WALKWAY PLAN AND PROFILE EAST

CURRENT DATE 10/11/06
DRAWING NO. LW-02
REVISION A

Fig 3




TOWN OF SKYKOMISH
# LEVEE ENHANCEMENT PROJECT

Levee Stairs/Wall Elevaion | KPG
09.20.2006

Fig 4

NOTES: RAILINGS MEET AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS DATED 2001 AND INTERIMS THROUGH 2002.

FINISH: CLASS 1 CLEAR ANODIZED

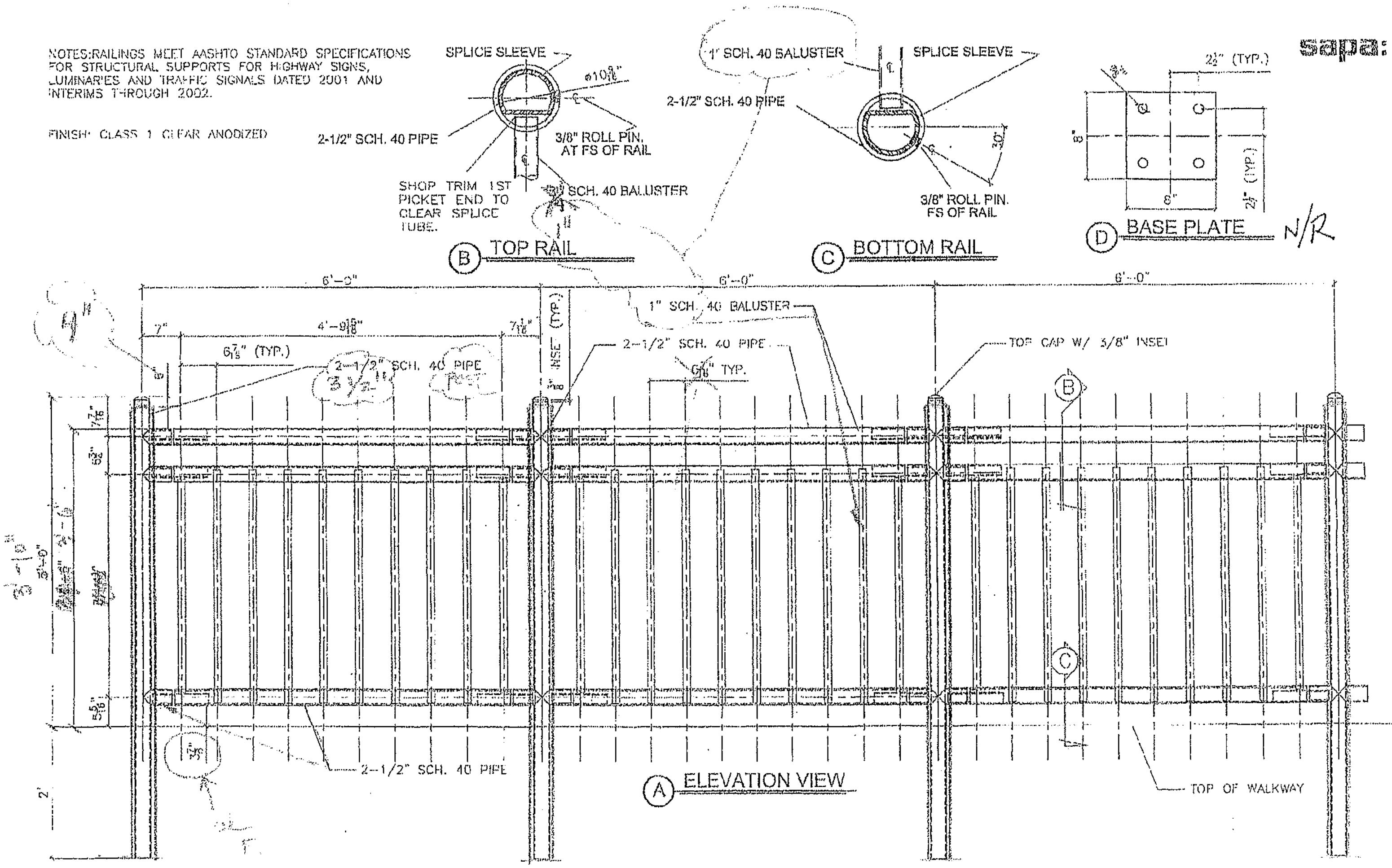
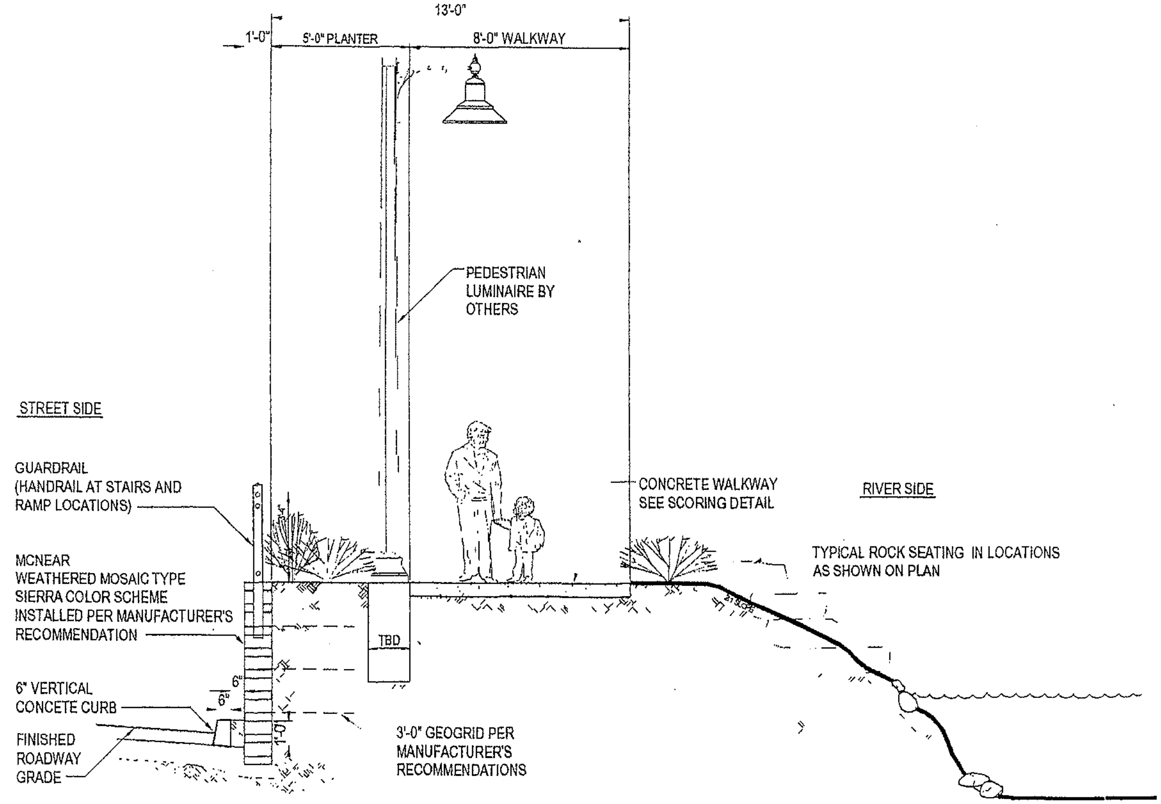



Fig 5

TOWN OF SKYKOMISH
**LEVEE ENHANCEMENT PROJECT**

Proposed Guardrail Details | KPG
08.15.2006




TOWN OF SKYKOMISH
**LEVEE ENHANCEMENT PROJECT**

Typical Section Through Walkway | KPG
09.13.2006

Fig 6

Milbor-Pita & ASSOCIATES, INC.

# APPENDIX A

**Versa-Lok Details**
**on**
**Stairs, Corners & Block Wall Construction**

FRANK W. PITA
STATE OF WASHINGTON
17522
REGISTERED
PROFESSIONAL ENGINEER

7 Dec 06

EXPIRES 5/6/07

## INSTALLING THE BASE PEDESTAL

For all types of VERSA-LOK® stairs, the "base pedestal" installation method is suggested for ease of construction. Using this method, the base courses beneath the step risers are all built at the same level. Then a pedestal of units is stacked to create subsequent step risers (Figure 1). While this method requires more units than simply cutting in a base for each riser, it can save substantial labor costs. This method also creates more accurate, level, and stable stairs.

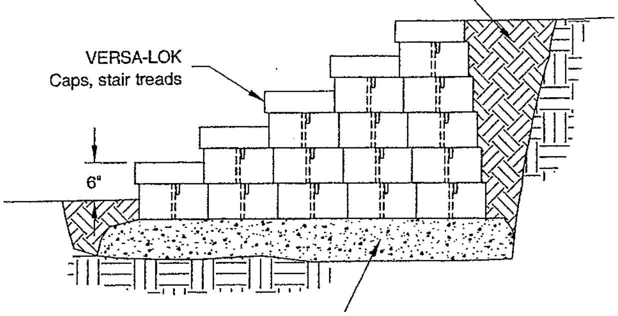
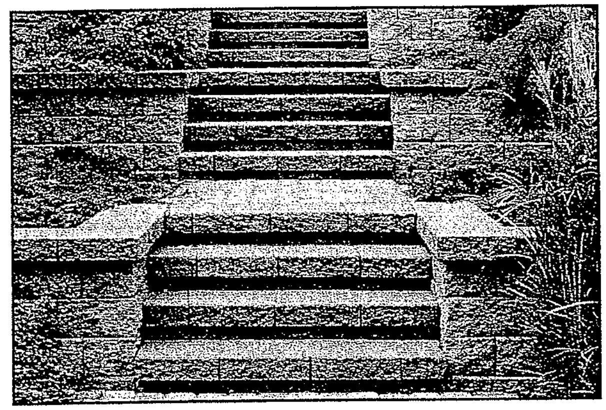



FIGURE 1

Careful preparation at the bottom of the pedestal is critical to the stability and levelness of the stairs. The leveling pad material should consist of crushed gravel, at least six inches thick. After placing and compacting the gravel, carefully check and adjust the level. A layer of fine sand may be used for final leveling. Place base course units on the leveling pad and check the level of the units front-to-back, side-to-side, and diagonally with a four-foot-long level. For more information regarding leveling pads and base installation, see Technical Bulletin No. 5—Base Installation.

The base course for stairs is usually buried 3-1/2 inches below the planned grade, leaving 2-1/2 inches of the unit exposed above grade. When a cap unit (about 3-1/2 inches high) is later placed on an embedded unit, it will create a six-inch-high step up from the grade (Figure 1).



*Often, stairs are built into retaining walls, inset between sidewalls.*

Create the remaining six-inch-high by 12-inch-deep risers by stacking courses of units in a pedestal. Shift each subsequent course of units forward about 3/4-inch, so they slightly overlap the row below (Figure 1). This will create an attractive overhang of the caps units when they are installed as treads.

If plans call for more than six risers, build the stairs in separate pedestals, each no more than five risers high (Figure 2). Building pedestals of more than five risers would bury more units than necessary.

Units placed in the stair pedestal are not pinned. The weight of the pedestal generally provides enough friction to keep stair units in place. If desired, use VERSA-LOK Concrete Adhesive to adhere each course to the one below. Be sure this completely cures before stairs are used, so the units do not shift (this can take several days).

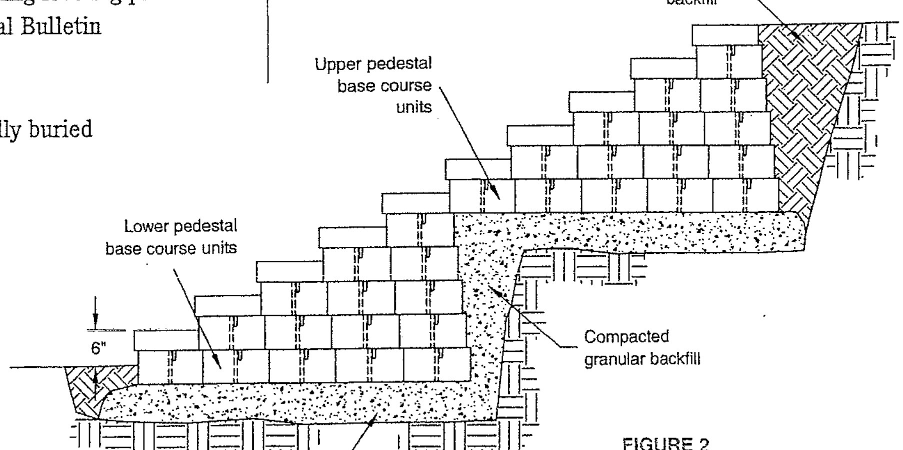
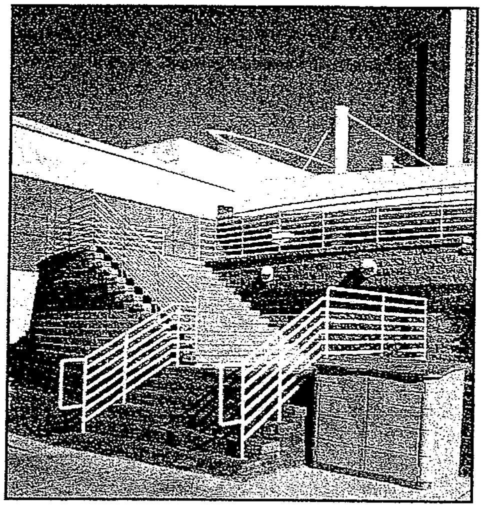



FIGURE 2



*With VERSA-LOK® units, the exposed sides of stair pedestals can have textured split faces.*

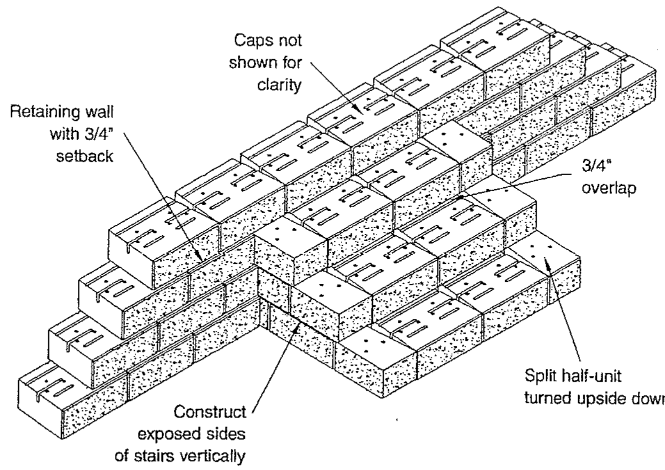



FIGURE 5

## STAIRS EXPOSED ON BOTH SIDES

Rather than being inset, sometimes stairs extend out from a wall. In these cases, the sides of the stair pedestal will be visible. For aesthetics, these exposed sides can be built with textured split faces that match the front of VERSA-LOK Standard walls.

Place half-units at both edges of each riser. Similar to a 90-degree outside corner, the half-units provide a textured split face for the side of each riser. For the remaining portions of the sidewalls, place whole units with the front, textured face of the units facing out (Figure 5).

To minimize special fitting, build the exposed sidewalls vertical. This keeps the risers at the same width throughout the height of the stairs. If the exposed stairs extend out from a VERSA-LOK Standard wall, interlock each course of the sidewalls into the main retaining wall, similar to installing an inside 90-degree corner.

Level the base units of the stairs and the retaining wall at the same time. Figure 6 shows a suggested installation sequence for exposed stairs (four feet wide and two feet high) extending from a VERSA-LOK Standard retaining wall.

The units inside the pedestal are not visible and do not have to fit tightly. However, they should be arranged to provide proper support for the units above.

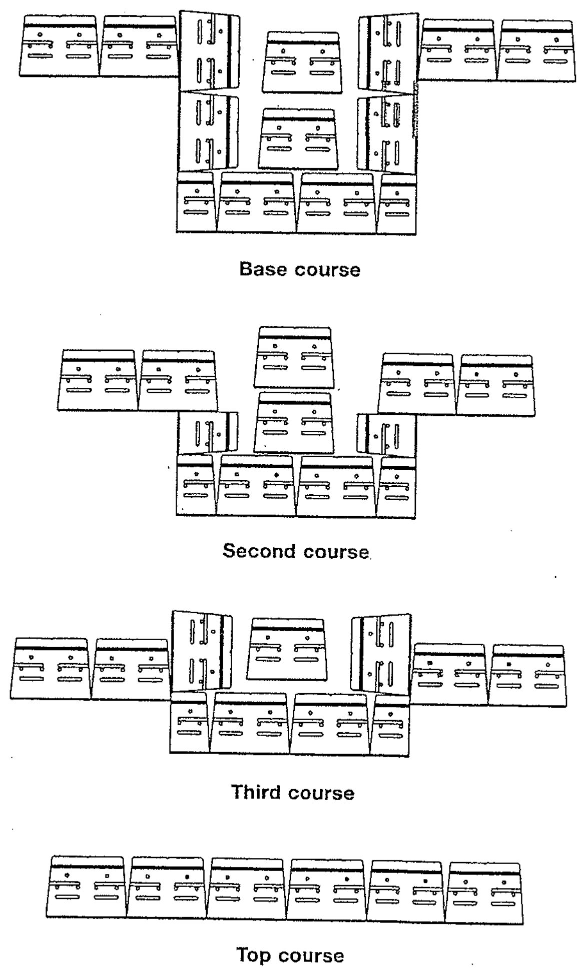


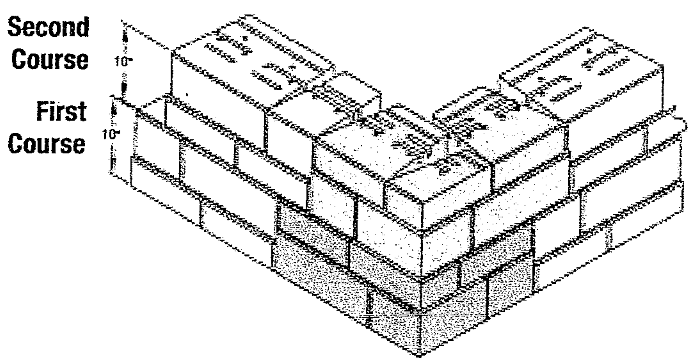

FIGURE 6

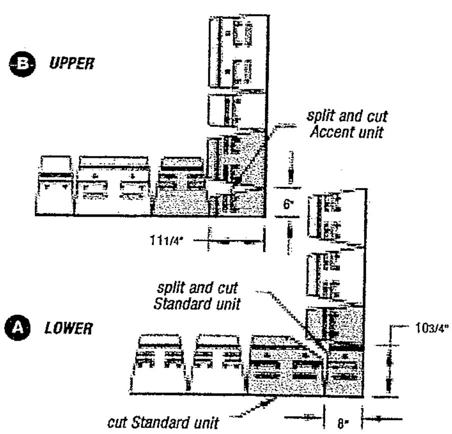
## Outside 90° Corner

For the first ten-inch high corner panel, split a Standard unit and an Accent® unit into halves. Next, cut off the backs of two of the split half units as shown (Figure A and B). Also cut or split off the rear corner of a whole Standard unit (Figure A). For the lower portion of the corner panel, place the modified half-Standard unit at the corner. Place the corner-cut Standard unit and a Cobble® unit at its sides (Figure A).

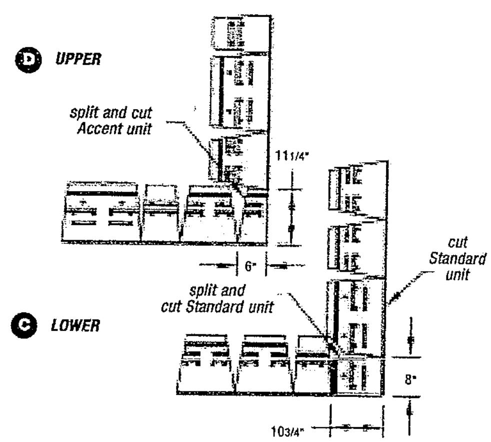
For the upper portion, place the modified half-Accent unit at the corner, with whole Accent units at both sides (Figure B). Complete this ten-inch-high course by building out from the corner panel with Mosaic® panels. On the next course, install another ten-inch-high corner panel that is basically the mirror image of the first course corner panel (Figures C & D). For the remaining courses, repeat these corner panels until reaching desired wall height.

*For each course, always build a ten-inch high corner panel first, then work out from this corner panel.*




First Course




Second Course

VERSA-LOK® Retaining Wall Systems Solid Solutions™

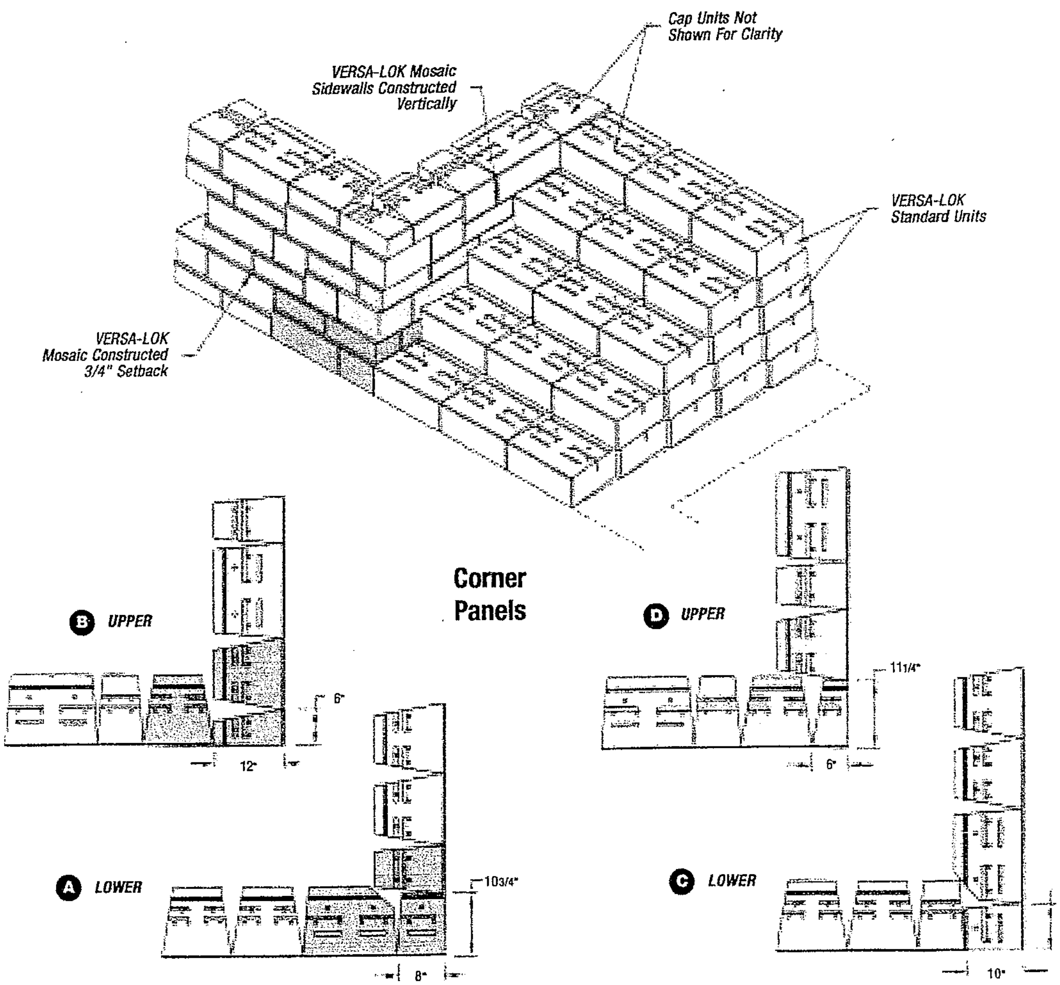
# 7

# Basic Wall Design Elements

*For corners at stairs, the front wall sets back but the side wall is vertical.*

## Outside 90° Corner at Stairs

When building an outside corner at stairs, the side wall abutting the stairs should be vertical *(see page 29)*. For the first ten-inch-high corner panel, split a Standard and an Accent® unit into halves and cut off the back of the Standard half unit as shown (Figure A). Also cut or split off the rear corner of a whole Standard unit (Figure A). Place the half-Standard unit at the corner, with a corner-cut Standard unit and a Cobble® unit at its side (Figure A). Above this, place the half-Accent unit at the corner, with whole Accent units at both sides (Figure B). On the next course, install another ten-inch-high corner panel similar to the first course panel (Figures C & D). For the remaining courses, repeat these corner panels until reaching desired wall height.



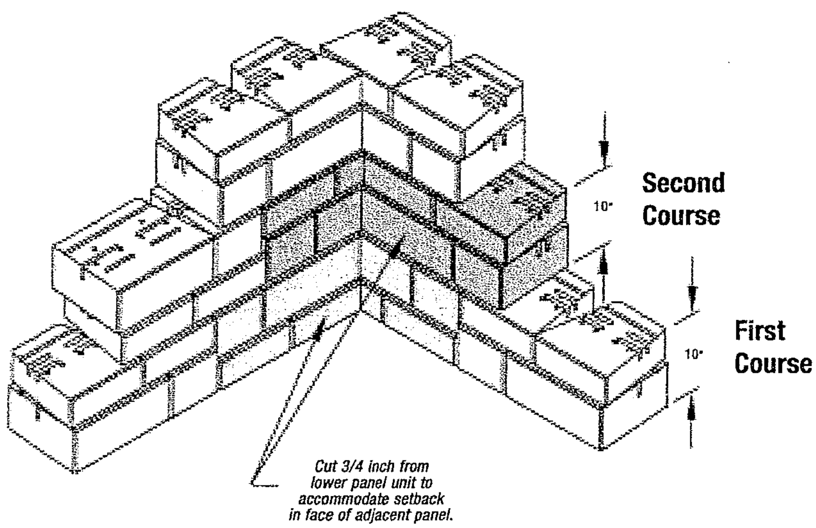

**First Course** **Second Course**

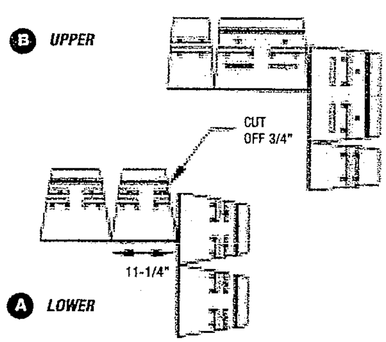
VERSA-LOK® Retaining Wall Systems *Solid Solutions.*

## Inside 90° Corners

For the first ten-inch-high course of a 90-degree inside corner, butt the left side panel into the right side panel (Figures A & B). This hides part of the right side panel that runs "wild" past the corner. Upper and lower portions of both panels meeting at the corner should have units of the same height. In the illustrations below, lower units of the first-course corner panels are all four inches high. Modify the left side panel to fit snugly against the setback in the right side panel face by saw cutting 3/4 inch off the lower unit (Figure A). Build regular Mosaic® panels out from the corner panels to complete the first course. On the second course, butt the right side panel into the left side panel and saw cut the lower right side unit (Figures C & D). For remaining courses, repeat these corner panels until reaching desired wall height.

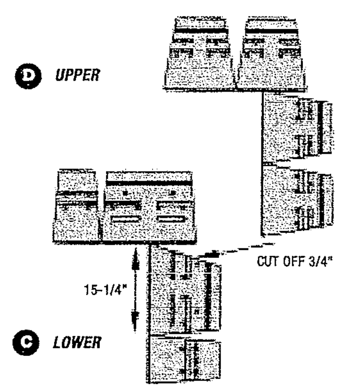
*For inside corners, saw-cut units in the abutting panels to fit snuggly against the setback within the adjacent panels.*




First Course

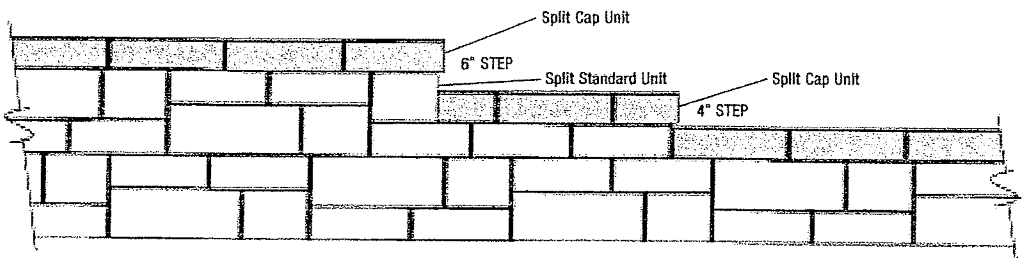
**Corner Panels**




Second Course

# 7

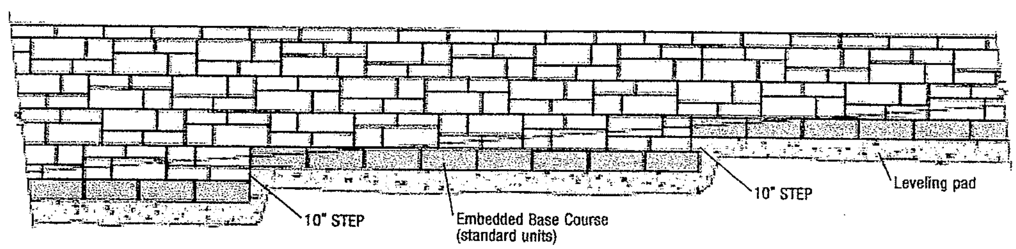
# Basic Wall Design Elements




*Create attractive step-downs by splitting sides of caps and Standard units.*

## Stepping Top of Wall

Wall tops should step to match grade changes. If a Mosaic® wall steps down six inches, use a modified Standard unit at the transition. Split a Standard unit in half so the textured wall end will match the wall face. When a step is four inches, splitting the Accent® unit is not necessary. The sides of two cap units should also be split to maintain texture on wall ends.




## Stepping Base of Wall

If the planned grade along the front of a Mosaic wall changes elevation, the leveling pad should be stepped in ten-inch increments to match the grade change. Always start wall construction at its lowest level and work upward. Step the leveling pad only often enough to avoid burying extra units while maintaining required minimum unit embedment. With the Mosaic pattern, always build with full ten-inch-high panels after base course installation.

Some of the base course of VERSA-LOK® Standard units can show above grade without changing the random look of the wall face pattern.

# APPENDIX B

## Versa-Lok Details
## on
## Fence/Railing Construction

# Fences, Railings, & Traffic Barriers

8

TECHNICAL BULLETIN

This Technical Bulletin is the eighth in a series of informational papers that provide specific application ideas and installation tips for VERSA-LOK® Retaining Wall Systems. Additional information is available in our *Design & Installation Guidelines.*

Often fences, stair rails, guide rails, or concrete traffic barriers are needed behind a VERSA-LOK wall. With proper design and installation, a variety of structural and aesthetic features can be placed at the top of a VERSA-LOK wall.

This bulletin provides a general discussion regarding the design and installation of fences and railings. However, conditions and loadings vary with each project and these guidelines are not intended as construction drawings for any specific project. The user is responsible for complying with all applicable building codes and obtaining a final, project-specific design prepared by a qualified professional engineer for a wall and any appurtenant structures.

## FENCES

When there is sufficient space, the easiest and most cost-effective way to install fences above VERSA-LOK walls is to place them several feet behind walls. With sufficient fence post depth and setback, the soil can provide a stable foundation. Separating fence posts from a wall also keeps wall movement from affecting the fence. While a minimum post depth of 30 inches is suggested, the embedment and distance behind the wall needed to create a stable post foundation varies and depends on the soil conditions.

When a fence is set back behind a wall, installers can dig or drill post holes after the wall is completed or they can install posts during wall construction. One option is to create post holes during wall construction by placing cylindrical tube forms at planned post locations and backfilling soil around them. After completing the wall, the tubes are filled with concrete and the fence posts set in the concrete (Figure 1).



VERSA-LOK®
Retaining Wall Systems
*Solid Solutions.*

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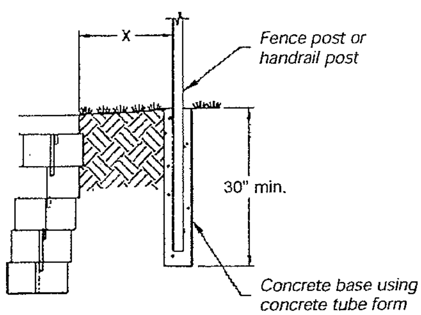
(651) 770-4089 *fax*
www.versa-lok.com

FIGURE 1 **Post Detail — Typical Section**
**Handrail or Fence Post (Set back from wall)**




When there is not enough room to set fence posts behind walls, they can be installed within top wall units prior to backfilling behind the wall. Break off the backs of the top few units to create room for the post. Cut or core the cap units to neatly receive posts (Figure 2 and 3). The fence should be flexible enough to accommodate differential movement between the units and the fence.

Placing posts near the front of a wall decreases the fence's foundation support. To improve stability to the post, the concrete foundation should be enlarged, extended behind the wall, and reinforced with steel rebar (Figures 2 and 3). The needed depth, extension length, and rebar placement will vary depending on conditions and loading.

FIGURE 2 **Post Detail — Section A-A**
**Typical Handrail or Fence Post (No Setback)**

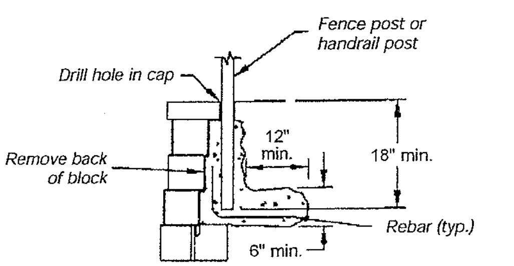
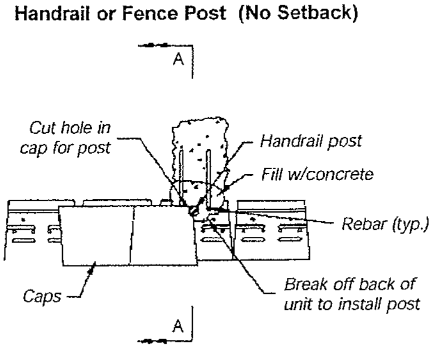


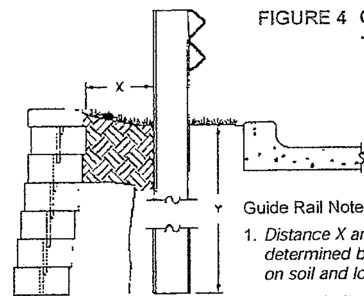

FIGURE 3 **Post Detail — Typical Plan**
**Handrail or Fence Post (No Setback)**




## GUIDE RAILS

With proper design, guide rails can be used behind VERSA-LOK walls. For proper support, place guide rails several feet behind the wall units (Figure 4). The setback and embedment depth of the guide rail will vary with conditions and loading. For highway loading, AASHTO recommends an embedment depth of 5 feet. Like fence posts, guide rails can be placed in cylindrical concrete tube forms placed during wall backfill.

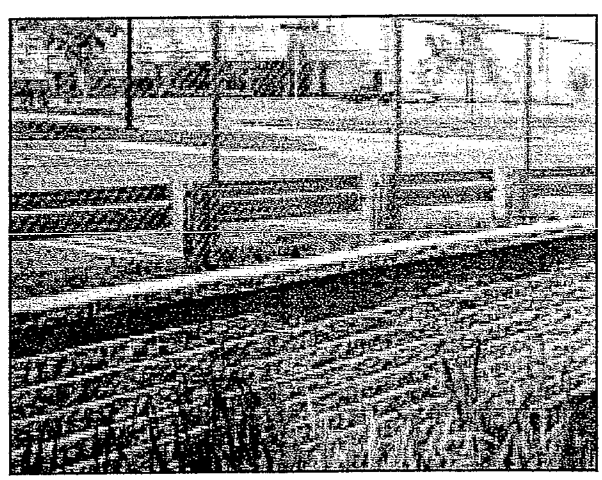
FIGURE 4 **Guide Rail Detail**
**Typical Section**




Guide Rail Notes:
1. *Distance X and Y to be determined by engineer based on soil and loading conditions.*
2. *Install H-pile or wood post as per manufacturer's recommendations.*

## POSTS PENETRATING GEOGRID

For walls requiring soil reinforcement, fence and guide rail posts will often extend below the top layer or two of geogrid. Often the geogrid can be cut to fit around the planned post locations. Usually the top layers of geogrid can accommodate small intrusions while still maintaining overall tensile strength. However, the area cut from the geogrid should be no more than the minimum needed to fit the post. The wall design engineer must evaluate any planned post intrusions into geogrid layers to ensure they do not reduce strengths below needed minimums. Augering or driving through backfilled geogrid after wall construction is generally not suggested because it may excessively disturb or pull geogrid from the soil or the wall units.



*When space allows, fences and railings should be placed several feet behind VERSA-LOK walls.*

# APPENDIX C

## Material Analysis, Sizing Geogrid Calculations & Suitability of Onsite Geogrid

Milbor-Pita & ASSOCIATES, INC.

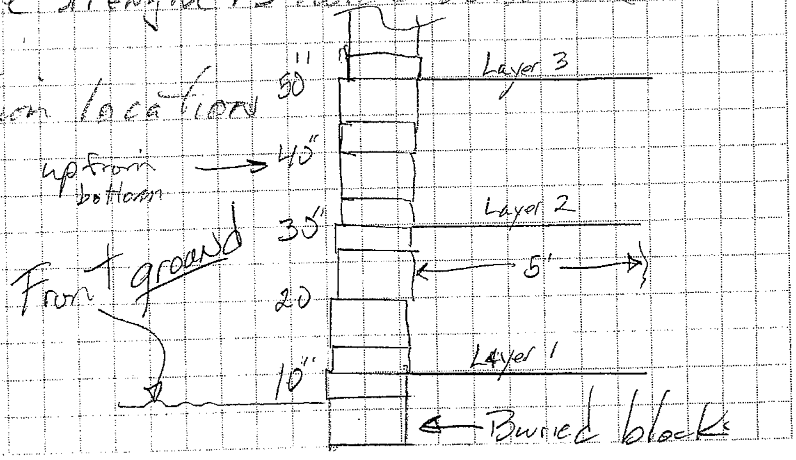
| | |
|---|---|
| Sheet 1 | of 2 |
| Job # 1600 | |
| Project BNSF/SKY Cleanup | |
| Designed by EWP | Date 4Nov06 |
| Checked by | Date |

# SkyKomish Levee Wall Calcs.

- Grid fill material = used crushed w/ < 3% fines
  (need all fill to drain in high water)

- Angular, Clean, compacted material has $\phi = 34°$

- Size geogrid:
  - a) $\phi = 34°$ chart (see table A)
  - b) For surcharge = 250 psf + 6' high wall =>
    1) grid length = 5.0' from back of blocks
    2) Number of layers = 3.
    3) Block buried 0.5'
  - c) PermaGrid 55 is OK
    Ultimate strength is twice Versa-lok needs.
  - D) Grid elevation location



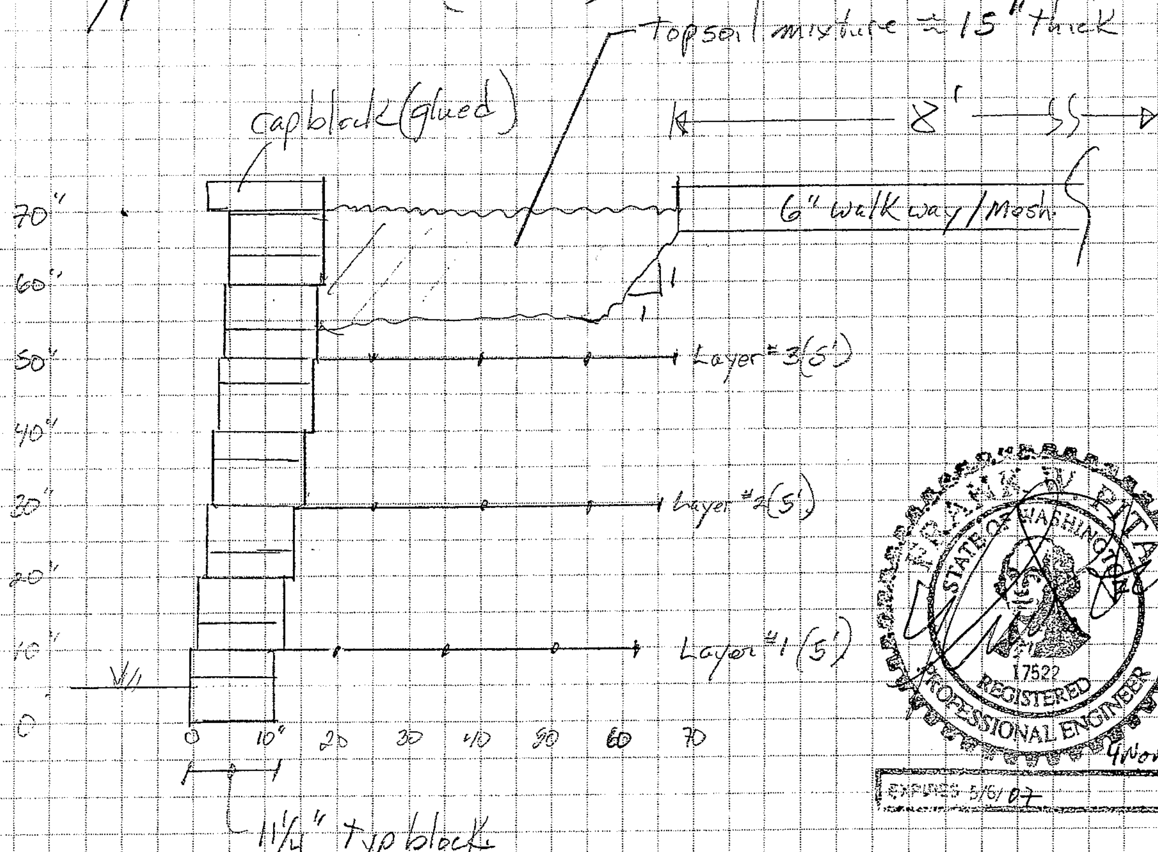

Layer 3 = 50"
Layer 2 = 30"
Layer 1 = 10" up

3080 125th Ave N.E. Bellevue, WA 98005 www.milbor-pita.com Phone (425) 869-5778 Fax (425) 861-0677

# Milbor-Pita & ASSOCIATES, INC.

| | |
|---|---|
| Sheet 2 of 2 | |
| Job # | |
| Project | |
| Designed by | Date |
| Checked by | Date |

Typical Section (Detail)




STATE OF WASHINGTON
17522
REGISTERED PROFESSIONAL ENGINEER
9Nov06
EXPIRES 5/6/07

Typ Section (wide)

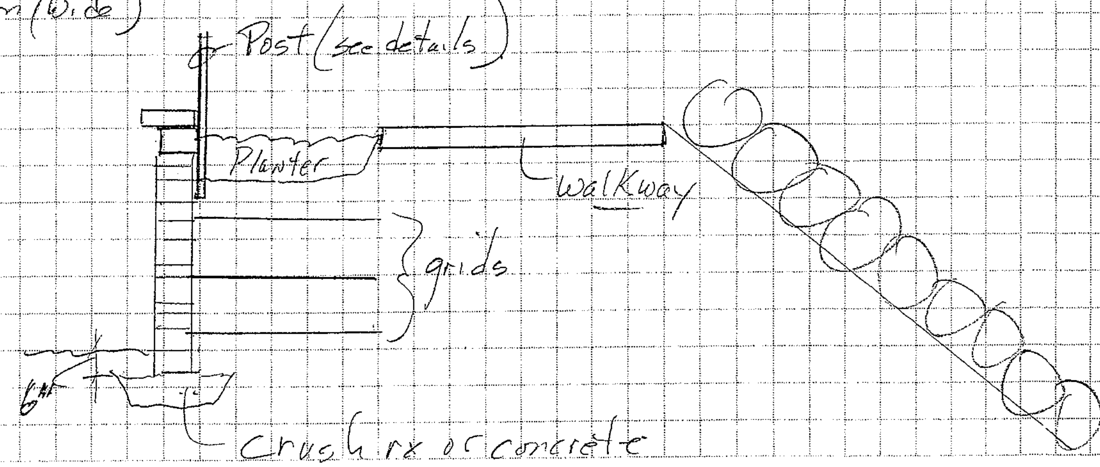



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Table A

# VERSA-GRID® Estimation Charts

*These tables are provided for **estimating purposes only**. They should not be used or relied upon for any application without verification of accuracy, suitability, and applicability for the use contemplated, which is the sole responsibility of the user. A final, project specific design should be prepared by a qualified, licensed, professional Civil Engineer (P.E.) based on actual site conditions. Preparation of these tables did not include consideration or analysis of global slope stability or allowable bearing capacity of foundation soils. These must be reviewed for each project by a qualified Geotechnical Engineer.*

*There are three tables provided in this guide to help estimate geogrid for different wall loading situations – level backfill, sloping backfill, and surcharges. To estimate geogrid quantities, first look under the **column** appropriate for project soils, determine the height (H) of the proposed wall and read across the **row** (under appropriate soil column) to approximate geogrid type, number of layers, and lengths of each layer.*

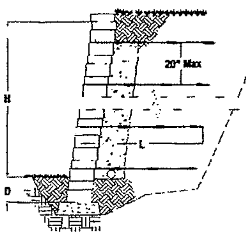
**These design charts assume the following conditions:**

- Uniform soil conditions
- Stable foundation soils
- Level grade in front of the wall
- No groundwater/water loads
- Slopes and loads behind the wall as shown
- No additional loading behind wall (such as tiered walls, building loads, etc.)

**Design standards and properties used to develop these charts were:**

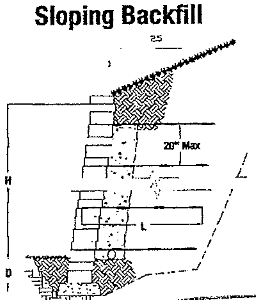
- Design methodology - in general accordance with NCMA Design Manual for SRWs
- Unit weight of soil (γ) 120 pcf
- Internal friction angle of soil (ϕ) as shown on charts
- Long term design strength of the geogrid (LTDS)
  - **VERSA-Grid VG 3.0 - 1250 lb/ft**
  - **VERSA-Grid VG 5.0 - 1875 lb/ft**

## Level Backfill



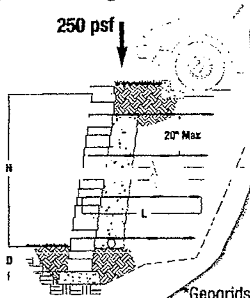

| Gravel (ϕ = 34°) | | | | | Sand (ϕ = 30°) | | | | | Clay (ϕ = 28°) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid |
| 4 | 0.5 | 0 | 0 | n/a | 4 | 0.5 | 4.0 | 1 | VG 3.0 | 4 | 0.5 | 4.0 | 1 | VG 3.0 |
| 5 | 0.5 | 3.5 | 2 | VG 3.0 | 5 | 0.5 | 4.0 | 2 | VG 3.0 | 5 | 0.5 | 4.5 | 2 | VG 3.0 |
| 6 | 0.5 | 4.0 | 2 | VG 3.0 | 6 | 0.5 | 4.5 | 2 | VG 3.0 | 6 | 0.5 | 5.0 | 2 | VG 3.0 |
| 7 | 1.0 | 5.0 | 3 | VG 3.0 | 7 | 1.0 | 5.5 | 3 | VG 3.0 | 7 | 1.0 | 5.5 | 3 | VG 3.0 |
| 8 | 1.0 | 5.5 | 4 | VG 3.0 | 8 | 1.0 | 6.0 | 4 | VG 3.0 | 8 | 1.0 | 6.0 | 4 | VG 3.0 |
| 9 | 1.0 | 6.0 | 4 | VG 3.0 | 9 | 1.0 | 6.5 | 5 | VG 3.0 | 9 | 1.0 | 6.5 | 5 | VG 3.0 |
| 10 | 1.0 | 6.5 | 5 | VG 3.0 | 10 | 1.0 | 7.0 | 5 | VG 3.0 | 10 | 1.0 | 7.0 | 6 | VG 3.0 |
| 12 | 1.0 | 8.0 | 6 | VG 3.0 | 12 | 1.0 | 8.5 | 7 | VG 3.0 | 12 | 1.0 | 8.5 | 7 | VG 3.0 |

## Sloping Backfill




| Gravel (ϕ = 34°) | | | | | Sand (ϕ = 30°) | | | | | Clay (ϕ = 28°) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid |
| 4 | 0.5 | 4.0 | 1 | VG 3.0 | 4 | 0.5 | 4.5 | 1 | VG 3.0 | 4 | 0.5 | 4.5 | 2 | VG 3.0 |
| 5 | 0.5 | 4.0 | 2 | VG 3.0 | 5 | 0.5 | 4.5 | 2 | VG 3.0 | 5 | 0.5 | 5.5 | 2 | VG 3.0 |
| 6 | 0.5 | 4.5 | 3 | VG 3.0 | 6 | 0.5 | 5.5 | 3 | VG 3.0 | 6 | 0.5 | 6.0 | 3 | VG 3.0 |
| 7 | 1.0 | 5.5 | 4 | VG 3.0 | 7 | 1.0 | 6.5 | 4 | VG 3.0 | 7 | 1.0 | 8.0 | 4 | VG 3.0 |
| 8 | 1.0 | 6.0 | 4 | VG 3.0 | 8 | 1.0 | 7.0 | 5 | VG 3.0 | 8 | 1.0 | 9.5 | 5 | VG 3.0 |
| 9 | 1.0 | 6.5 | 5 | VG 3.0 | 9 | 1.0 | 8.0 | 6 | VG 3.0 | 9 | 1.0 | 11.0 | 6 | VG 3.0 |
| 10 | 1.0 | 7.5 | 6 | VG 3.0 | 10 | 1.0 | 8.5 | 6 | VG 3.0 | 10 | 1.0 | 12.0 | 6 | VG 5.0 |
| 12 | 1.0 | 8.5 | 7 | VG 3.0 | 12 | 1.0 | 10.0 | 7 | VG 5.0 | 12 | 1.0 | 15.0 | 7 | VG 5.0 |

## Surcharge Backfill




| Gravel (ϕ = 34°) | | | | | Sand (ϕ = 30°) | | | | | Clay (ϕ = 28°) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid | H (feet) | D (feet) | L (feet) | layers | VERSA-Grid |
| 4 | 0.5 | 4.0 | 2 | VG 3.0 | 4 | 0.5 | 4.5 | 2 | VG 3.0 | 4 | 0.5 | 5.5 | 2 | VG 3.0 |
| 5 | 0.5 | 4.5 | 2 | VG 3.0 | 5 | 0.5 | 5.5 | 2 | VG 3.0 | 5 | 0.5 | 6.0 | 2 | VG 3.0 |
| 6 | 0.5 | 5.0 | 3 | VG 3.0 | 6 | 0.5 | 6.0 | 3 | VG 3.0 | 6 | 0.5 | 6.5 | 3 | VG 3.0 |
| 7 | 1.0 | 6.0 | 4 | VG 3.0 | 7 | 1.0 | 7.0 | 4 | VG 3.0 | 7 | 1.0 | 7.5 | 4 | VG 3.0 |
| 8 | 1.0 | 6.5 | 4 | VG 3.0 | 8 | 1.0 | 7.5 | 5 | VG 3.0 | 8 | 1.0 | 8.0 | 5 | VG 3.0 |
| 9 | 1.0 | 7.0 | 5 | VG 3.0 | 9 | 1.0 | 8.5 | 5 | VG 3.0 | 9 | 1.0 | 9.0 | 5 | VG 3.0 |
| 10 | 1.0 | 7.5 | 5 | VG 3.0 | 10 | 1.0 | 9.0 | 6 | VG 3.0 | 10 | 1.0 | 9.5 | 6 | VG 3.0 |
| 12 | 1.0 | 9.0 | 7 | VG 3.0 | 12 | 1.0 | 10.0 | 7 | VG 5.0 | 12 | 1.0 | 11.0 | 7 | VG 5.0 |

*Geogrids with similar LTDS and connection strengths to VERSA-LOK units can also be estimated using these charts. With some variations, the VERSA-Grid VG 3.0 charts also generally estimate quantities for Miragrid 3XT, Stratagrid 300, and Raugrid 4/2. The charts for VERSA-Grid VG 5.0 generally estimate quantities for Miragrid 5XT, Stratagrid 500, and Raugrid 6/3.

Table B

**NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.**
*"Helping to Protect the Environment"*
21000 77th Avenue South
Kent, WA 98032
(253) 872-0244 • (800) 729-6954
FAX: (253) 872-0245
www.northwestlinings.com
info@northwestlinings.com

# PermeaGrid™ 55

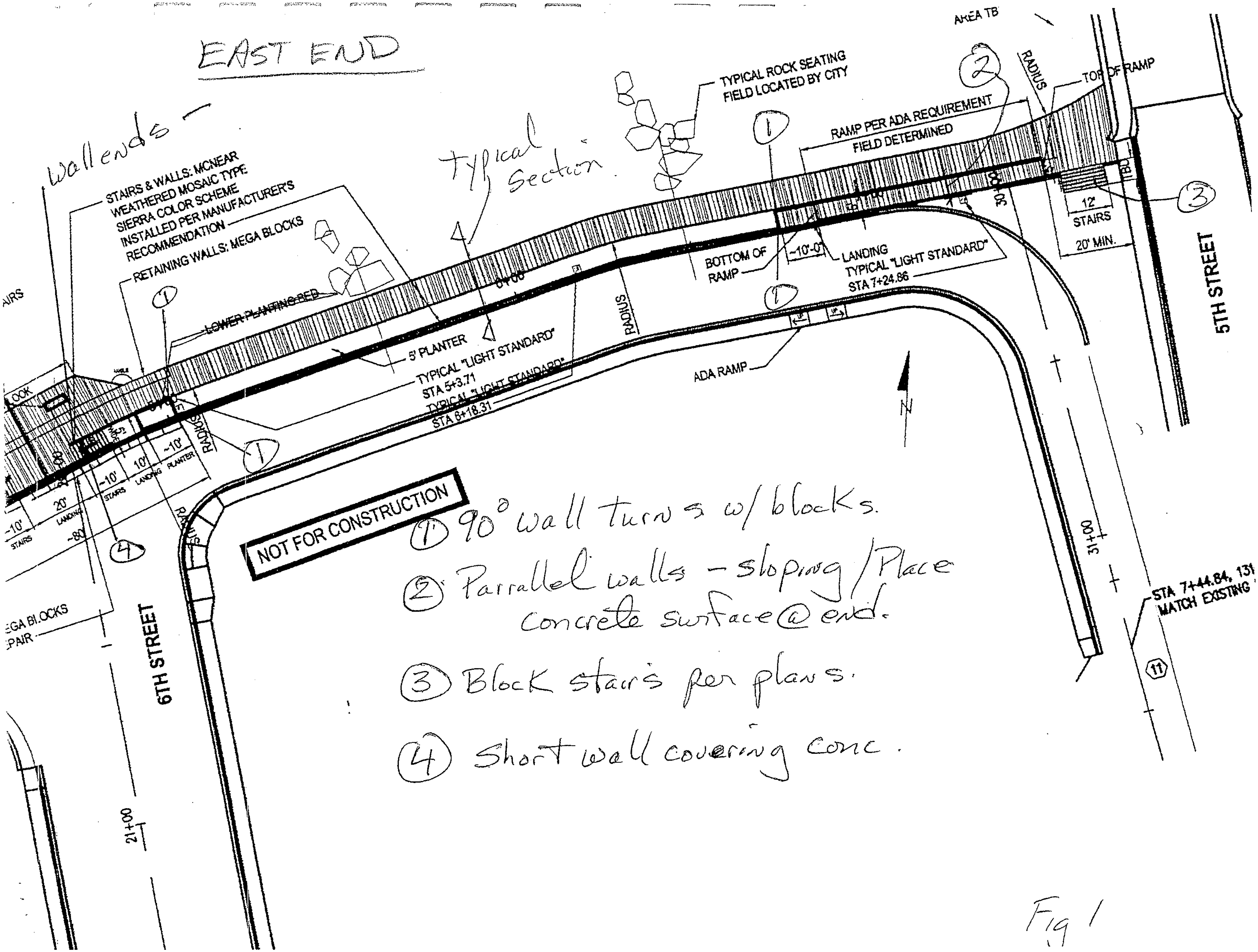
## Soil Reinforcement Geogrid Bi Axial

PermeaGrid™ 55 is composed of high molecular weight, high tenacity multifilament polyester yarns that are woven into a stable network yarns that are woven into a stable network placed under tension. The high strength polyester yarns are coated with a PVC material. PermeaGrid™ is inert to biological degradation and is resistant to naturally encountered chemicals, alkalis, and acids. PermeaGrid™ is typically used for soil reinforcement applications such as retaining walls, steepened slopes, embankments, sub grade stabilization, and embankments over soft soils and waste containment applications.

| TENSILE PROPERTIES | TEST METHOD | ~~MARV VALUES~~ (LBS/FT) |
|---|---|---|
| Ultimate Strength-MD<br>Ultimate Strength-CD | ASTM D4595 | 4200<br>4200 |
| Creep Reduced-MD | ASTM D5262 | 2727 |
| T al = Long Term Design Strength MD<br>T al = Long Term Design Strength CD | NCMA 97 | 2361<br>2361 |
| Aperture Size | Measured | 0.75 x 0.75 |

Twice Versa-grid recommendations

RF Creep-1.54
RF Durability-1.10
RF Installation Damage (soil type 3)-1.05




1. 90° wall turns w/ blocks.
2. Parrallel walls - sloping / Place concrete surface @ end.
3. Block stairs per plans.
4. Short wall covering conc.

Fig 1

WEST END

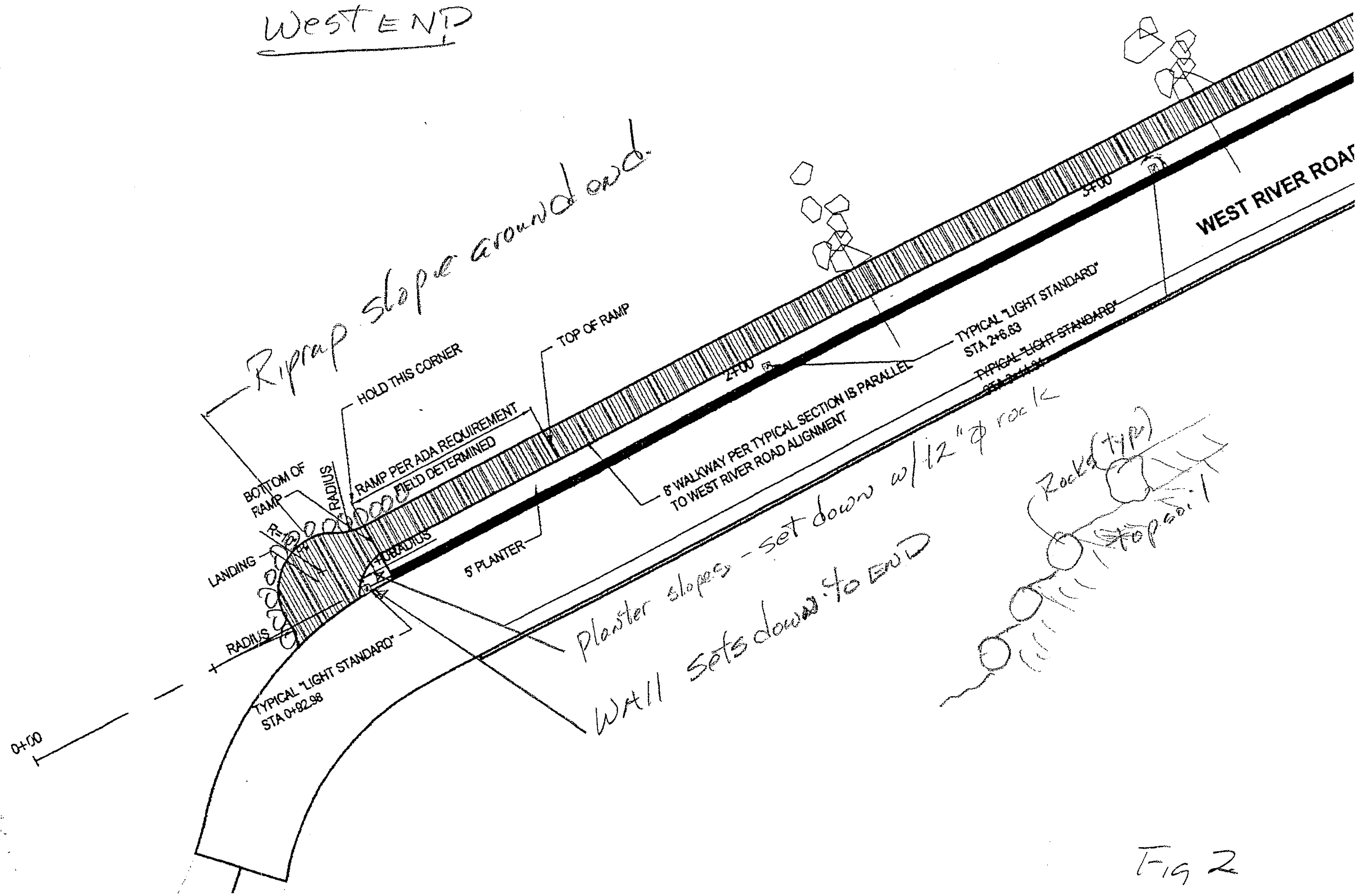



Fig 2

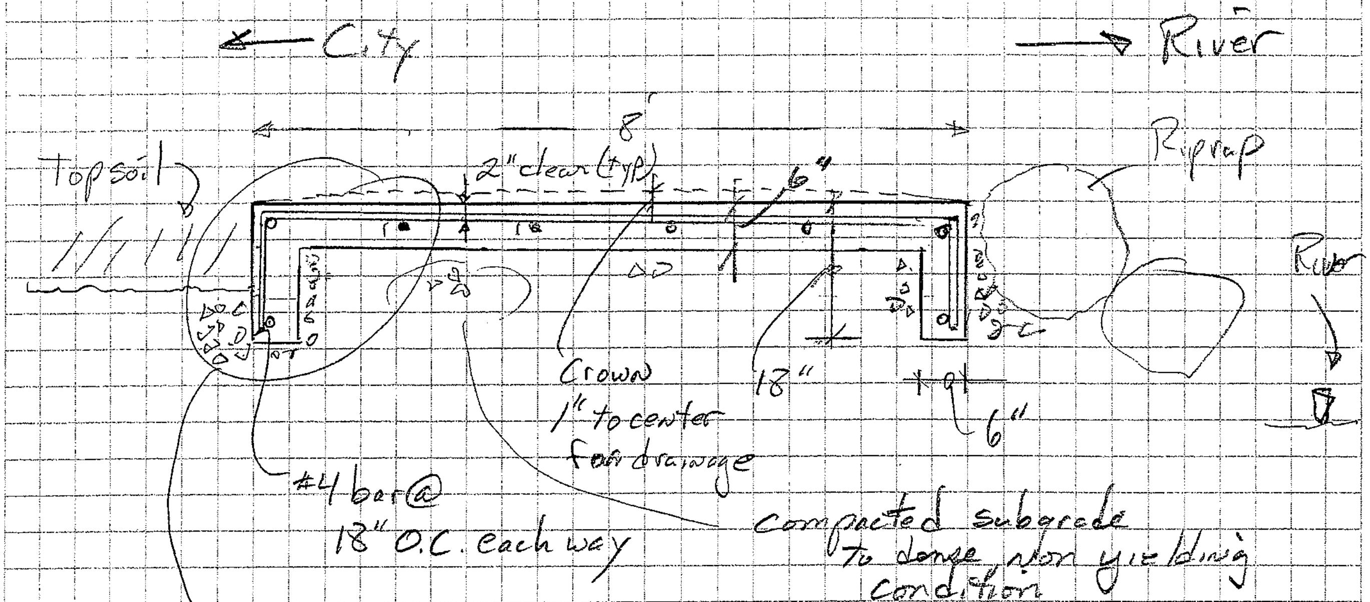
# APPENDIX D

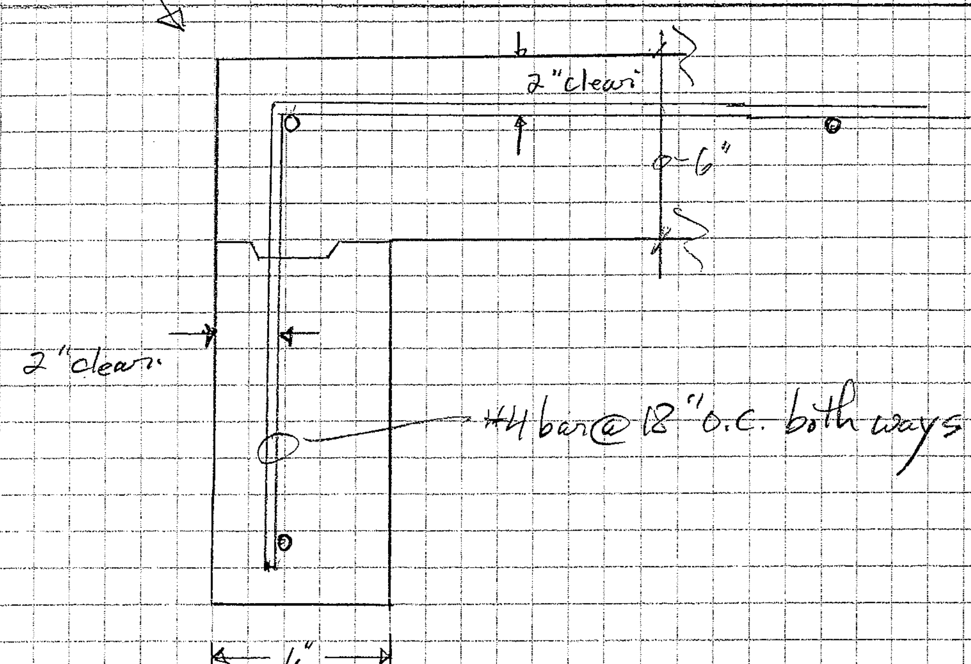
## Walkway XS Sketch & Rebar Mesh Details

Milbor-Pita
& ASSOCIATES, INC.

| | |
|---|---|
| Sheet 1 of | |
| Job # 1600 | |
| Project Sky Cleanup | |
| Designed by Pita | Date 26Dec06 |
| Checked by | Date |

Scale: 1" = 2'




17270 Woodinville-Redmond Road, Suite 703 Woodinville, WA 98072 Phone (425) 486-6561 Fax (425) 488-2660
www.milbor-pita.com

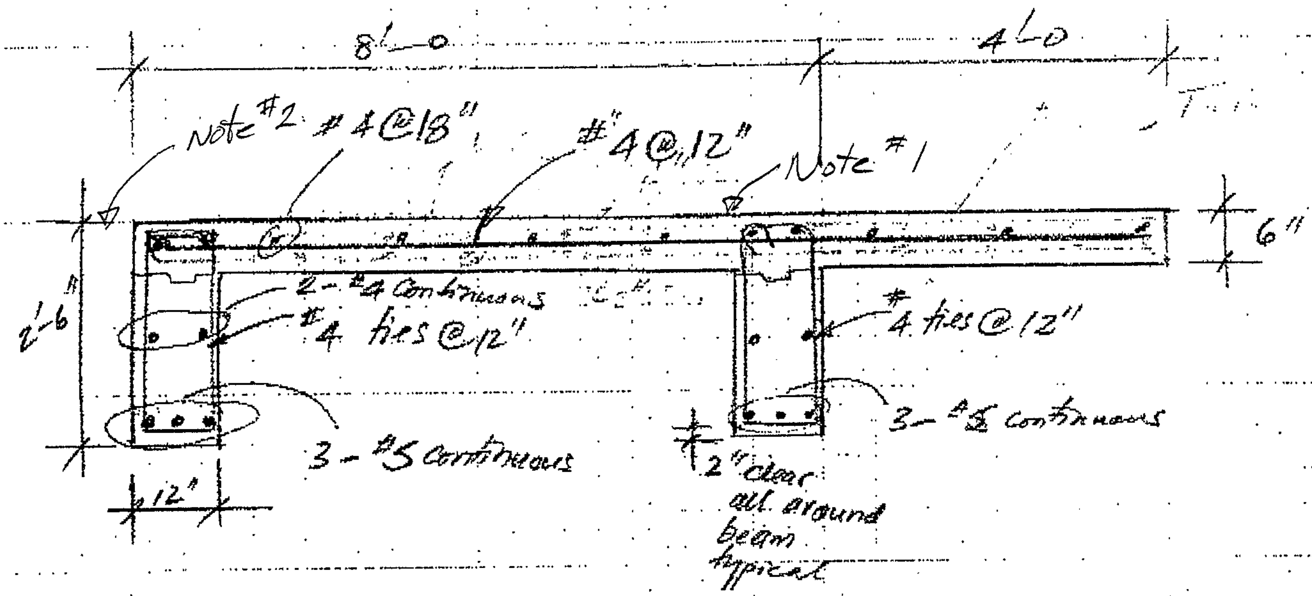
Milbor-Pita & Associates, Inc.

# APPENDIX E

## Walkway Overhang XS and Sizing Calculation Backup

FROM : LES BAKAR PHONE NO. : 520 579 8706 Dec. 10 2006 06:57PM P9

Skykomish Walk 12/9/06




Note: 1) Connect deck portion To walkway by continuous overlapping rebar.

2) Connect to deck slab at top of stairs by continuous overlapping rebar.

# FAX

**To:** Frank Pita **Fax No.:** 425.486.6561

**From:** Les Bakar **Fax No.:** 520-579-8706

**Subject:** Skykomish Walkway

**Date:** 12/10/06 **No. of Pages:** 9

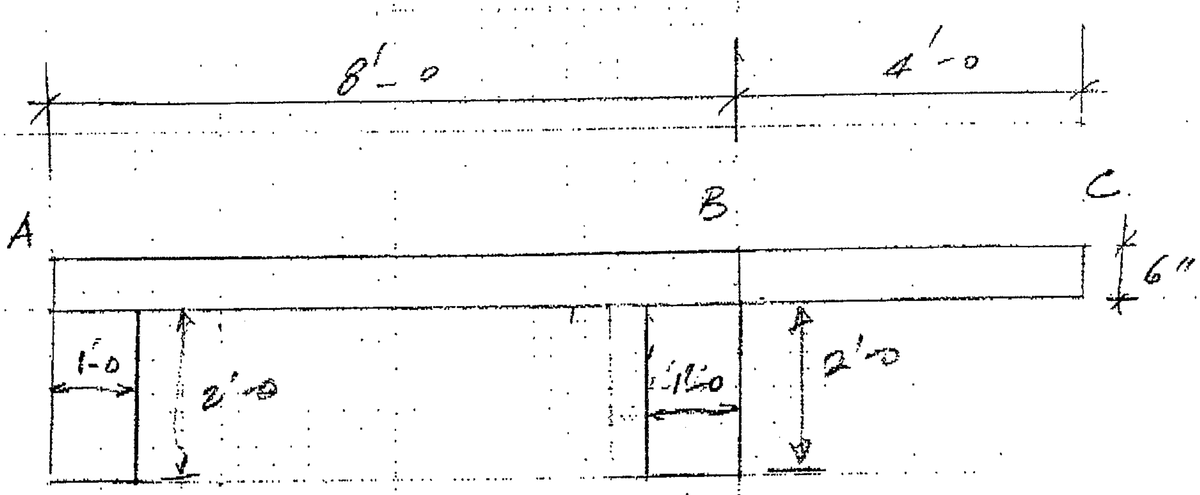
Frank

Attached are the calculation sheets for the design of the Skykomish walkway cantilever and walkway slab. The last page shows a sketch of the rebar details. I have assumed that the soil under the slab on grade could settle .causing the slab to span across the two grade beams. I have also made the beams 2 ft. deep in order to get below the frost line especially since the dike slopes down from the base of the cantilever.

I haven't done anything with the stairway. I am not sure how that ties in with the walkway. We can discuss that tomorrow.

Les Bakar

Skykomish Walk 12/9/06

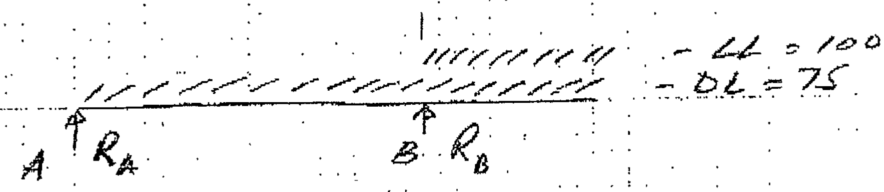



Assume 6" thick slab

$DL = \frac{6}{12} \times 150 = 75$ psf

$\boxed{LL = 100 \text{ psf}}$ snow = 25 psf

<u>Condition 1.</u> LL on cantilever only




$M_B$ DL $= 75 \times 4 \times \frac{4}{2} = 600$ lbft/ft width

$M_B$ LL $= 100 \times 4 \times \frac{4}{2} = 800$ lbft/ft

$V_{B\,DL} = 75 \times 4 = 300$ lb/ft

$V_{B\,LL} = 100 \times 4 = 400$ lb/ft

$R_{B\,DL} = \Sigma M_A / 8 = \frac{75 \times 12 \times 6}{8} = 675$ lbs

$R_{A\,DL} = 75 \times 12 - 675 = 225$ lbs

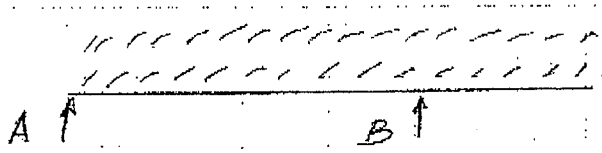
$R_{B\,LL} = \Sigma M_A / 8 = \frac{100 \times 4 \times 10}{8} = 500$ lbs

$R_{A\,LL} = 400 - 500 = -100$ lb uplift

# Skykomish Walk

pg 2
12/9/06

## Condition II LL across entire section

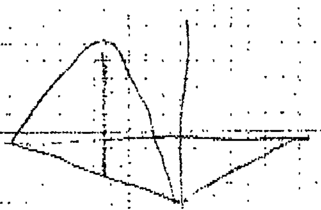


LL = 100 psf
DL = 75 psf

$M_B\ DL = 600$ lbft/ft
$M_B\ LL = 800$ lbft/ft
$V_{DL} = 300$ lb/ft
$V_{LL} = 400$ lb/ft

$R_{B\,DL} = \frac{\Sigma M_A}{8} = 675$ lb/ft
$R_{A\,DL} = 225$ lb/ft

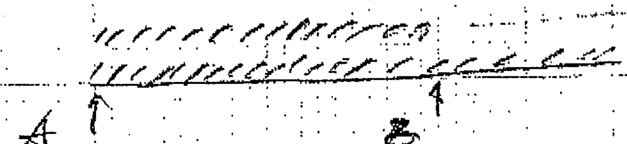
$R_{B\,LL} = \frac{\Sigma M_A}{8} = \frac{100 \times 12 \times 6}{8} = 900$ lbs/ft
$R_{A\,LL} = 1200 - 900$ lb $= 300$ lbs/ft



$M^{DL}_{Center\ span} = \frac{75 \times 8^2}{8} - \frac{600}{2} = 300$ lbft/ft

$M^{LL}_{center\ span} = \frac{100 \times 8^2}{8} - \frac{800}{2} = 400$ lbft/ft

## Condition III Live load on main walkway only



LL = 100 psf
DL = 75 psf

$M_{B\,DL} = 600$ lbft/ft
$V_{DL} = 300$ lb/ft

Skykomish Walk pg 3 12/9/06

Condition III continued

$M_{DL}$ center span = 300 lb/ft/ft

$M_{LL}$ center span = $\frac{100 \times 8^2}{8}$ = 800 lb/ft/ft

$R_{B_{DL}}$ = 675 lb/ft

$R_{A_{DL}}$ = 225 lb/ft

$R_{B_{LL}}$ = $\frac{100 \times 8}{2}$ = 400 lb/ft

$R_{A_{LL}}$ = 400 lbs/ft

Check Worst Condition

At cantilever

Factored M

$M_{DL}$ = 600 × 1.4 = 840 lb ft/ft

$M_{LL}$ = 800 × 1.7 = 1360

Cantilever $V_{DL}$ = 300 × 1.4 = 420 lbs/ft

$V_{LL}$ = 400 × 1.7 = 680 lbs/ft

Interior at support $V_{DL}$ = (675 − 300) × 1.4 = 525 lbs/ft

$V_{LL}$ = (900 − 400) × 1.7 = 850 lb/ft

$M_{D+L}$ = 2200 lb ft/ft

$V_{D+L}$ = 1375 lbs/ft

Skykomish Walk pg 7 12/9/06

Worst Condition

at Center Span (Assume soil settles from under slab)

Factored $M_{DL} = 300 \times 1.4 = 400$ lb ft/ft

$M_{LL} = 800 \times 1.7 = 1360$ lb ft/ft

$M_{D+L} = 1760$ lb ft/ft

Design for Center Span $M = 1760$ lb ft/ft

Cantilever $M = 2200$ lb ft/ft

$V_{max} = 1375$ lbs/ft

Assume 3000 psi Concrete

$f_y = 60{,}000$ psi rebars

$t = 6''$

$d = 6/2 = 3''$

$\phi V_c = 2\phi\sqrt{f_c'}\, bd$

$= 2(0.85)\sqrt{3000}\ 12 \times 3$

$= 3352$ lbs/ft $> 1375$ ok.

Skykomish

12/9/06

Check −ve M = 2200 lb ft / ft
@ Cantilever

$f'_c = 3000$ psi
$f_y = 60,000$ psi
$\beta_1 = 0.85$

$$\rho_B = \frac{0.85 f'_c \beta_1}{f_y}\left(\frac{87000}{87000+f_y}\right) = 0.0214$$

$$R_n = \frac{M_n}{\phi b d^2} = \frac{2200\times 12}{0.9(12)3^2} = 271.6$$

$$\rho_{min} = \frac{200}{f_y} = 0.0033$$

$$m = \frac{f_y}{0.85 f'_c} = \frac{60}{0.85\times 3} = 23.53$$

$$\rho = \frac{1}{m}\left(1-\sqrt{1-\frac{2mR_n}{f_y}}\right)$$

$$= \frac{1}{23.53}\left(1-\sqrt{1-\frac{2(23.53)(271.6)}{60,000}}\right)$$

$$= 0.0048$$

$A_s$ reqd = $0.0048(12\times 3)$ = 0.17 in²/ft

Use #4 @ 12"

$A_s$ provided = 0.20

ok

Skykomish Walk 12/9/06

Check +ve Moment @ Center Span

$\rho_B = 0.0214$

$d = 6 - 2 - \frac{1}{2}$
$= 3\frac{1}{2}$

$R_n = \dfrac{1760 \times 12}{0.9(12)(3.0)^2} = 217.3$

$\rho_{min} = 0.0033$

$m = \dfrac{f_y}{0.85 f_c'} = 23.53$

$\rho = \dfrac{1}{m}\left(1 - \sqrt{1 - \dfrac{2 m R_n}{f_y}}\right)$

$= \dfrac{1}{23.53}\left(1 - \sqrt{1 - \dfrac{2(23.53)(217.3)}{60,000}}\right)$

$= 0.0038 > \rho_{min}$

$A_s = 0.0038(12)(3.0) = 0.14 \text{ in}^2/ft$

Use #4 @ 12

$A_s$ provided = 0.20 in²

Temp steel $A_{st} = 0.002(12)(6)$
$= 0.144 \text{ in}^2$ Use #4 @ 18

$A_s$ provided = 0.15 in²

Check bearing under Support B

Condit II Max $R_B$ D+L = 675+900
= 1575 lbs/ft

wt of concrete support Block
= 1.0 × 2.0 × 150 = 300 lb/ft

total $R_B$ = 1575 + 300 = 1875 lbs

brg pressure = $\frac{1875}{1.0}$ = 1875 psf < 3000 psf
Ok

Cond III $R_A$ D+L = 225 + 400 = 625 lbs

wt of support block = 1.0 × 2 × 150 = 300 lb/ft

total $R_A$ = 925 lb/ft

brg pressure = $\frac{925}{1.0}$ = 925 psf < 3 ksf
Ok

Use min steel for support beam on grade

$\rho_{min}$ = 0.002

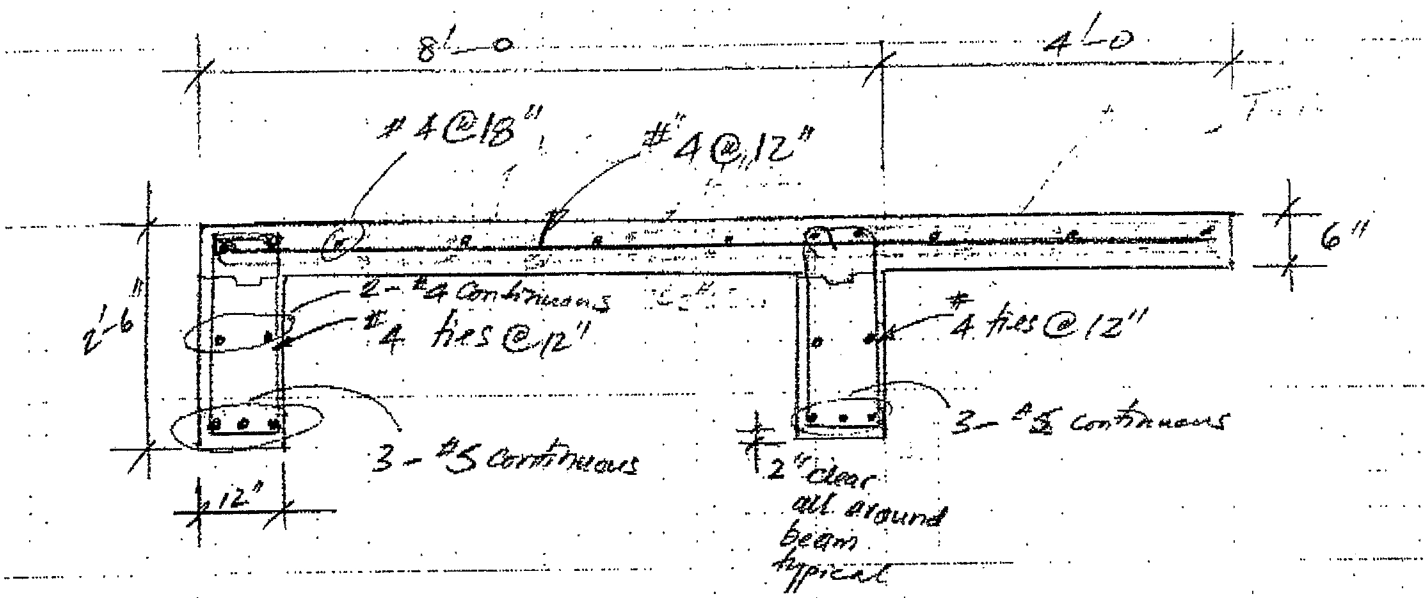
$A_s$ = 0.002(12)(24) = 0.576 in²

use - 3 #5 @ bottom

use #4 ties @ 12"

FROM : LES BAKAR PHONE NO. : 520 579 8706 Dec. 10 2006 06:57PM P9

Skykomish Walk 12/8/06



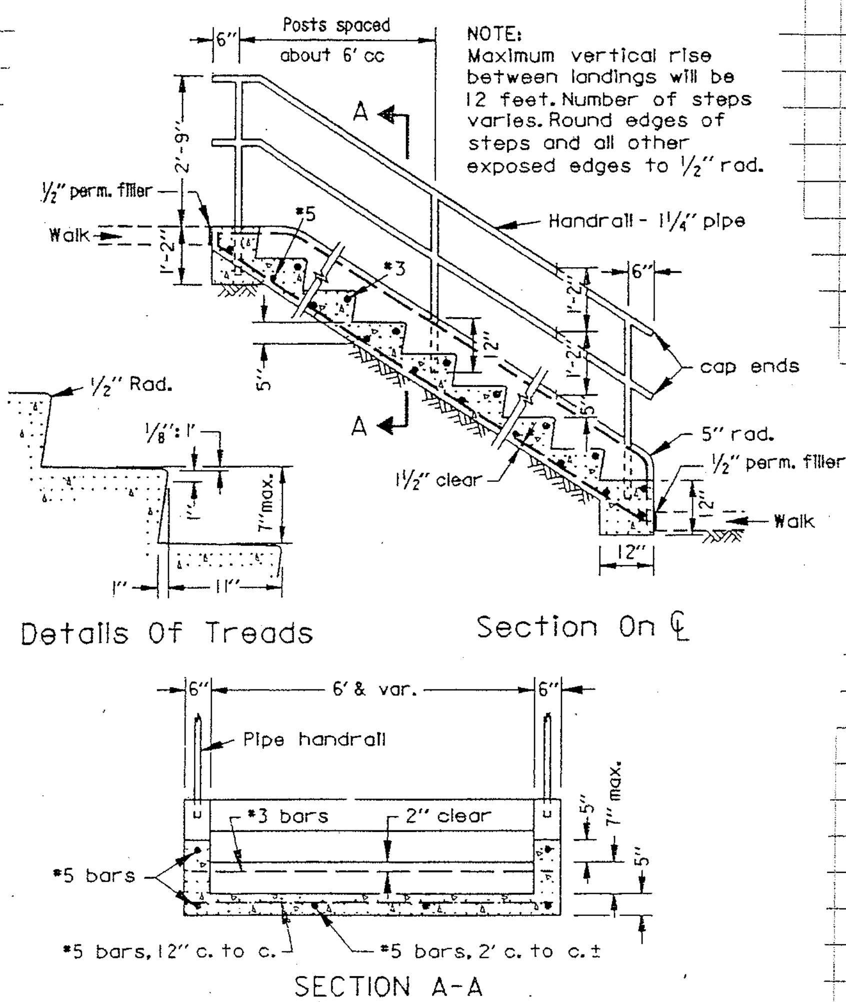
# APPENDIX F

## Concrete Stairway Sketches & Details

# Milbor-Pita & Associates, Inc.

| | |
|---|---|
| Sheet 1 of 1 | |
| Job # 1600 | |
| Project Sky Wall | |
| Designed by F.R. | Date 26 Dec 06 |
| Checked by | Date |

## CONCRETE STAIRWAY




Notes: 1) Approved railing may be attached as shown or plates/bolts used.

2) Sides may be placed against blocks.

17270 Woodinville-Redmond Road, Suite 703 Woodinville, WA 98072 Phone (425) 486-6561 Fax (425) 488-2660
www.milbor-pita.com

Milbor-Pita & Associates, Inc.

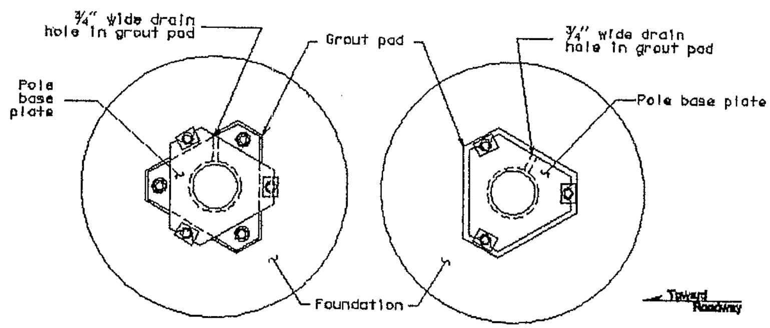
# APPENDIX G

## Light Base Sketches & Details

Milbor-Pita & Associates, Inc.

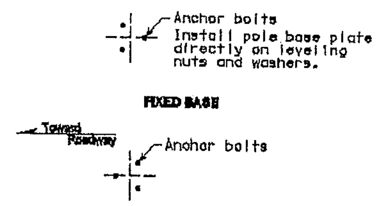
# APPENDIX G

## Light Base Sketches & Details

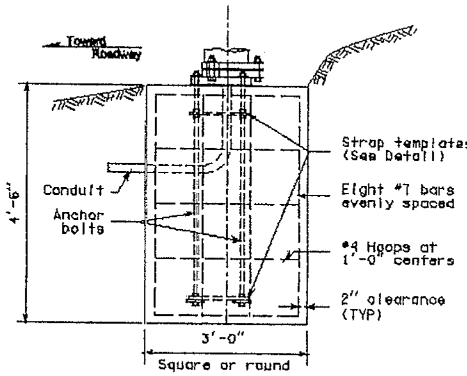



**SLIP BASE**
PLAN

**FIXED BASE**
PLAN

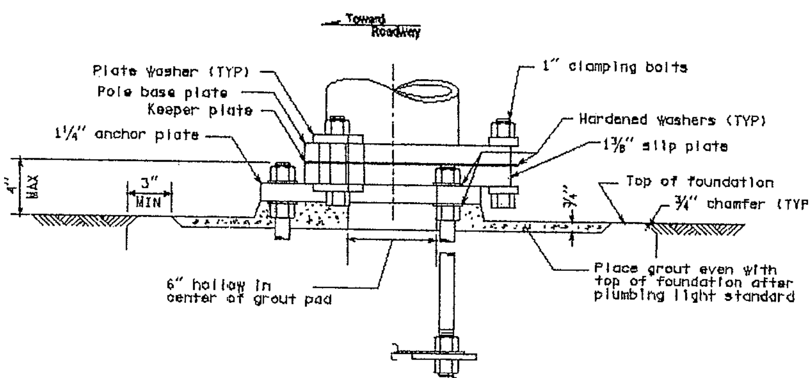



**ANCHOR BOLT LAYOUT**

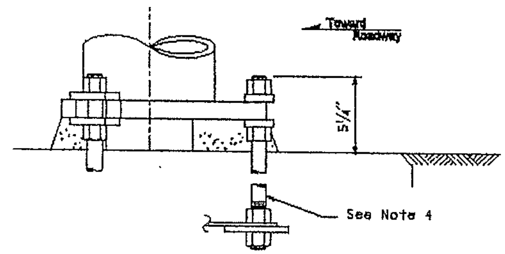



**FOUNDATION DETAIL**
(See Note 1)


**LIGHT STANDARD ORIENTATION**

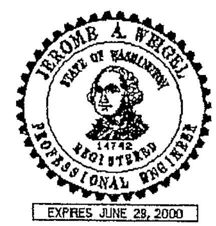



**SLIP BASE**
ELEVATION




**FIXED BASE**
ELEVATION

Details similar to slip base except where noted




# STEEL LIGHT STANDARD BASE DETAILS
## STANDARD PLAN J-1b

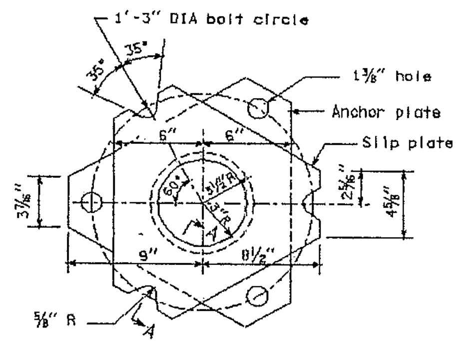
SHEET 1 OF 3 SHEETS

| | | |
|---|---|---|
| 10-99 | | TVB |
| DATE | REVISION | BY |

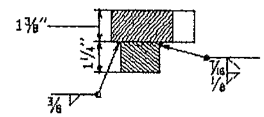
APPROVED FOR PUBLICATION

Clifford E. Mansfield 10/08/99
DEPUTY STATE DESIGN ENGINEER DATE

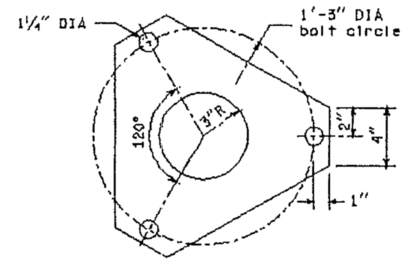
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIA, WASHINGTON



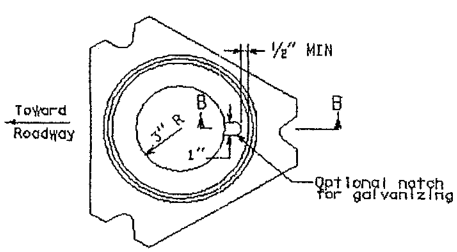

**SLIP/ANCHOR PLATES DETAIL**
Smooth finish top, bottom, and notched surfaces



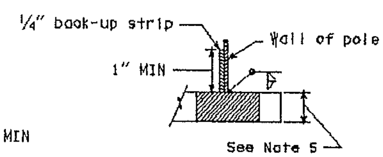

**SECTION A-A**




**KEEPER PLATE**
Place between pole base plate and slip plate on top of middle washers.




**POLE BASE PLATE**
Smooth finish top, bottom, and notched surfaces




**SECTION B-B**

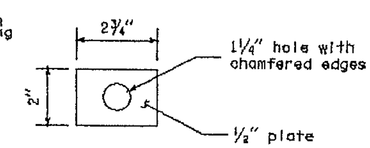
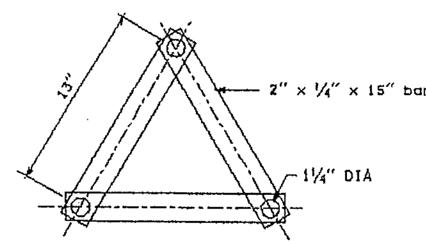



**PLATE WASHER**




**STRAP TEMPLATE ASSEMBLY DETAIL**
Place over anchor bolts (See Note 4)


EXPIRES JUNE 29, 2000

**STEEL LIGHT STANDARD BASE DETAILS**

**STANDARD PLAN J-1b**

SHEET 2 OF 3 SHEETS

| DATE | REVISION | BY |
|---|---|---|
| 10-99 | REVISED SECTION B-B. | TYG |

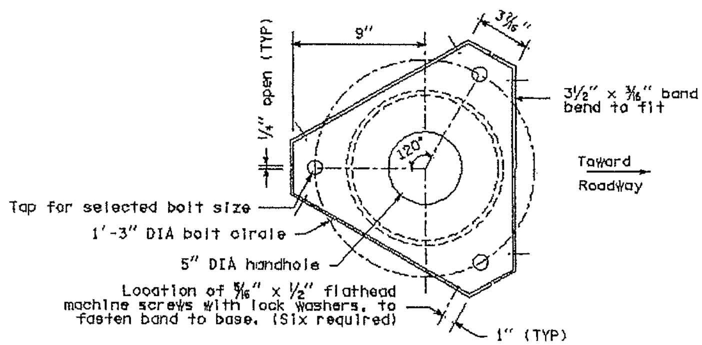
APPROVED FOR PUBLICATION

Clifford E. Mansfield 10/08/99
DEPUTY STATE DESIGN ENGINEER — DATE

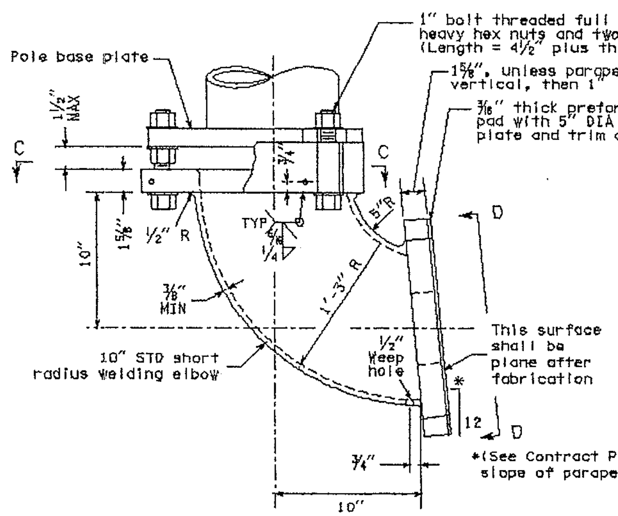
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIA, WASHINGTON

NOTES

1. See Standard Plan C-8b for base plate and foundation requirements when light standards are mounted on concrete barrier.
2. Round and smooth all edges along wire-way to protect conductors. See Standard Plan J-1e for wiring details.
3. The top of the anchor rod shall be both threaded and galvanized a minimum of 12". The bottom of the anchor rod shall be threaded a minimum of 3". Galvanizing shall be in accordance with AASHTO M111 after threading. Hooked anchor bolts are not allowed.
4. Strap templates shall be held in place by nuts 6" from the top of the foundation, and at bottom of anchor bolts resting on 4" x ⅜" square washers.
5. Pole base plate for a slip base design shall be 1¼" AASHTO M223 Gr. 345. Pole base plate for a fixed base design may be either 1¼" AASHTO M223 Gr. 345 or 1½" AASHTO M183.
6. Installation of a 50' pole with double mast arms on a slip base is not allowed.



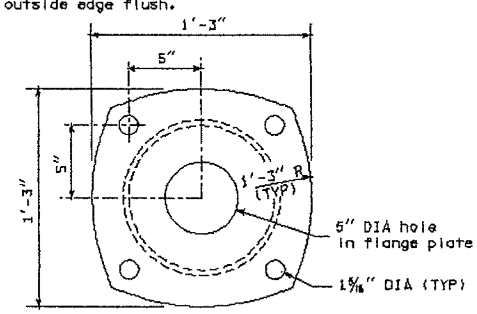

**SECTION C-C**




**ELEVATION**

**LIGHTING BRACKET DETAIL**

For light standards with single arm 12' or less and double arms 8' or less mounted on bridges or retaining walls.




**VIEW D-D**

JEROME A. WEIGEL
STATE OF WASHINGTON
14742
REGISTERED PROFESSIONAL ENGINEER
EXPIRES JUNE 29, 2000

**STEEL LIGHT STANDARD BASE DETAILS**

**STANDARD PLAN J-1b**

SHEET 3 OF 3 SHEETS

| DATE | REVISION | BY |
|---|---|---|
| 10-99 | REVISED NOTES 1, 2 & 5; ADDED NOTE 6. | TYB |

APPROVED FOR PUBLICATION

Clifford E. Mansfield 10/08/99

DEPUTY STATE DESIGN ENGINEER DATE

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
OLYMPIA, WASHINGTON

# SKYKOMISH LEVEE REMEDIATION PROJECT

## LEVEE PLANTING PLAN AND MONITORING PROGRAM

PREPARED FOR:

**THE RETEC GROUP, INC.,**
**ON BEHALF OF THE BNSF RAILWAY COMPANY**
1011 SW KLICKITAT WAY, SUITE 207
SEATTLE, WA 98134-1162

PREPARED BY:


**GRETTE ASSOCIATES, LLC**
151 SOUTH WORTHEN STREET, SUITE 101
WENATCHEE, WA 98801

2111 NORTH 30TH STREET
TACOMA, WA 98403


REFERENCE NUMBER: 200500328

DECEMBER 2005

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

## TABLE OF CONTENTS

1.0 INTRODUCTION ........................................................ 1

1.1 Background ........................................................ 1
1.2 Project Description ........................................................ 1

2.0 PLANTING PLAN ........................................................ 1

2.1 Goals and Objectives ........................................................ 1
2.2 Levee Design ........................................................ 2
2.3 Plant Schedule and Zones ........................................................ 2
*2.2.1 Shoreline Zone* ........................................................ 3
*2.2.2 Levee Zone* ........................................................ 3
*2.2.3 Planting Approach* ........................................................ 4
2.4 Plant Installation ........................................................ 4

3.0 MONITORING PROGRAM ........................................................ 5

3.1 Installation Monitoring ........................................................ 5
3.2 Post-construction Inspection ........................................................ 5
3.3 Long-term Monitoring ........................................................ 5
*3.3.1 Monitoring Methods* ........................................................ 6
3.4 Performance Standards ........................................................ 6
3.5 Contingency Plan ........................................................ 7
3.6 Reporting ........................................................ 7

4.0 REFERENCES ........................................................ 8

## LIST OF FIGURES

Figure 1. Existing and Final Levee Contours
Figure 2. Skykomish Levee Remediation Final Sections
Figure 3. LWD Cluster Plan View
Figure 4. LWD Cluster Section
Figure 5. Landscape details/plant placement

## LIST OF APPENDICES

Appendix A Plant Installation Specifications

## 1.0 INTRODUCTION

This Planting Plan and Monitoring Program (Plan) describes the revegetation measures that will be implemented as part of the Skykomish Levee Remediation Project (Project). The Plan describes the specific elements of replanting the remediated levee, as well as the post-construction and long-term monitoring of the completed project.

### 1.1 Background

The Skykomish Levee Remediation Project is part of a MTCA interim action to stop seepage of diesel and bunker C fuel oil into the South Fork of the Skykomish River that will be performed pursuant to an Agreed Order between BNSF and Washington State Department of Ecology (Ecology) (RETEC 2005).

### 1.2 Project Description

The Project will entail removing and then replacing the existing levee with a new flood control levee, which will address petroleum product seeps that currently enter the South Fork of the Skykomish River. The existing levee material and adjacent river sediments will be excavated down to design depth, with all contaminated material loaded onto trucks and removed off site for disposal at a suitable disposal facility. The excavation area will then be filled with both stockpiled and imported clean material, and the face of the levee will be reconstructed. The reconstructed levee will be replanted using native vegetation. Further project description details are presented in the JARPA prepared for the Project (RETEC 2005).

## 2.0 PLANTING PLAN

### 2.1 Goals and Objectives

The primary goal of levee revegetation is to provide a level of habitat function at or above that which existed prior to levee remediation. Planting of vegetation along the toe of the levee and along the waterward edge of the levee benches will provide cover for a variety of fish and wildlife species. This overhanging vegetation will also provide shade that will protect lower water temperatures within the river. Planting vegetation along the face of the levee will provide nesting and foraging habitat for songbirds. The trees and shrubs along the levee face will also screen portions of the shoreline from human activity south of the levee. Levee benching and placement of LWD clusters along the levee face will also provide habitat complexity for both terrestrial and aquatic species.

## 2.2 Levee Design

During reconstruction, benches will be constructed along the waterward base of the levee (Figure 1). These benches will be more or less level, and will be located at the toe of the reconstructed levee. The waterward edge of the levee benches will provide a vertical drop of approximately 2 feet down to the river channel. This edge will be formed by large riprap or boulder substrates (Figure 2). The benches will also provide a convoluted shoreline edge, contributing to habitat complexity along the reconstructed levee.

The benches will be distributed in areas where the slope of the reconstructed levee allows the benches to remain within the footprint of the existing levee (Figure 1).

In addition to the large substrate along the shoreline edge, five large woody debris (LWD) clusters will be buried/anchored beneath the toe of the levee in areas where levee benching is not present (Figure 1). Each LWD cluster will consist of six pieces, and will be composed of Douglas fir (*Pseudotsuga menziesii*) or western red cedar (*Thuja plicata*) (King County 1993). The LWD pieces within each cluster will be oriented at different angles, with the upstream LWD piece oriented at an upstream angle (Figure 3). Each LWD piece will be embedded approximately 15 feet into the levee such that the root end of the log protrudes 5 to 10 feet from the shoreline edge (Figure 4). Further detailed guidance on installation of LWD can be found in King County's *Guidelines for Bank Stabilization Projects in the Riverine Environments of King County* (1993).

Several design considerations were evaluated for placement of the LWD clusters. A recreational kayak launch is planned immediately upstream of the levee near the 5th Street bridge. To direct kayakers around the upstream LWD cluster after launching, the cluster will be placed approximately 160 feet downstream of the bridge (Figure 1). Immediately upstream of this cluster boulders will be placed within the river channel and arranged such that river flows along the south bank are directed north of and around the LWD cluster (Figure 5).

Another design consideration is the location of the viewing platform, which is located in an area where levee benches will not be present (Figure 1). Therefore, a LWD cluster will be placed in this area, allowing for an open view corridor above the LWD. Additionally, portions of the levee without benches will likely contain less overhanging riparian vegetation than areas containing benches. LWD placed in these areas will provide additional overhanging cover.

## 2.3 Plant Schedule and Zones

The remediated levee will be replanted with a mix of native trees and shrubs. Guidance on plant species selection and planting location was referenced from King County's *Guidelines for Bank Stabilization Projects in the Riverine Environments of King County* (1993). Table 1 below lists the proposed species to be used for levee revegetation.

**Table 1. Proposed species for levee revegetation**

| Species | USFWS Indicator Status[1] | Condition | Spacing[2,3] |
|---|---|---|---|
| Shoreline Zone | | | |
| *Cornus stolonifera*, Red-osier dogwood | FACW | cuttings | 8 ft OC |
| *Physocarpus capitatus*, Pacific ninebark | FACW | cuttings | 8 ft OC |
| *Rubus spectabilis*, Salmonberry | FAC+ | cuttings | 5 ft OC |
| *Salix lucida* var. *lucida*, Pacific willow | FACW+ | cuttings | 8 ft OC |
| *Salix sitchensis*, Sitka willow | FACW | cuttings | 8 ft OC |
| Levee Zone[4] | | | |
| *Acer macrophyllum*, Bigleaf maple | FACU | 2-gal | 10 ft OC |
| *Cornus nuttallii*, Pacific dogwood | NL | 2-gal | 8 ft OC |
| *Mahonia nervosa*, Oregon grape | UPL | 1-gal | 5 ft OC |
| *Polystichum munitum* var. *munitum*, Sword fern | FACU | 1-gal | 5 ft OC |
| *Symphoricarpos albus*, Snowberry | FACU | 1-gal | 5 ft OC |
| *Tsuga heterophylla*, Western hemlock | FACU+ | 2-gal | 10 ft OC |

[1] Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL). Vegetation is considered non-hydrophytic when there is an indicator status of facultative upland (FACU) or obligate upland (UPL). A positive (+) sign indicates plants are more frequently found in wetlands than the category indicates. An indicator of NL represents insufficient information to determine status.
[2] Plant spacing is based on specific planting locations within each zone, not over the entire site.
[3] OC = On Center
[4] Condition of Levee Zone plantings will be refined based on discussions with The RETEC Group, Inc.

### *2.2.1 Shoreline Zone*

Vegetation planting areas on the levee will be separated into two zones: the Shoreline Zone and the Levee Zone (Figure 2). The Shoreline Zone will occupy the levee benches along the toe of the reconstructed levee up to an elevation 2 ft above the levee bench. The Shoreline Zone will consist of native tree and shrub species typically adapted to wet conditions. Vegetation planted near the shoreline edge will be planted such that, when mature, woody material will overhang the shoreline edge. Species to be planted within this zone include red-osier dogwood, Pacific ninebark, salmonberry, Pacific willow, and Sitka willow.

### *2.2.2 Levee Zone*

The Levee Zone will occupy the face of the new levee immediately above the Shoreline Zone to the top of the levee, and will consist of native trees and shrubs adapted to dry conditions (Figure 2). As it is expected that the face of the new levee will consist of coarse material, species were chosen based on their ability to thrive in coarse soil textures. Species to be planted within this zone include bigleaf maple, Pacific dogwood, Oregon grape, sword fern, snowberry, and western hemlock.

### 2.2.3 *Planting Approach*

Red-osier dogwood and Pacific ninebark will be planted in the areas closest to the shoreline edge, as these species are particularly hydrophytic and are typically found overhanging river banks throughout the region (Figure 5). These species will be planted on 8-foot centers. Pacific willow and Sitka willow will be planted throughout the Shoreline Zone, and will also be planted on 8-foot centers. These species are also typically hydrophytic, yet would also be expected to survive further away from the shoreline. Salmonberry will also be planted on 5-foot centers throughout the Shoreline Zone and will provide a layered understory. It is expected that some areas along the levee will contain different concentrations of the varying species depending on site-specific constraints.

The dogwood and ninebark will provide cover and foraging opportunities for a variety of small birds and mammals, while also providing cover over the river bank for fish. The taller willow species will provide nesting and perching opportunities for songbirds, while also providing screening of the shoreline from human activities south of the levee.

Within the Levee Zone, bigleaf maple and western hemlock will be planted on 10-foot centers (Figure 5). These species will be planted throughout the upper portions of the Levee Zone except directly beneath or adjacent to the proposed viewing platform. Pacific dogwood will be planted on 8-foot centers throughout the lower portions of this zone, while Oregon Grape, snowberry, and sword fern are planted on 5-foot centers throughout the zone.

The larger maple and hemlock will provide perching and roosting habitat for raptors, while the snowberry and Oregon grape provide foraging opportunities for small mammals and songbirds.

## 2.4 Plant Installation

Plant installation will be performed in accordance with the specifications outlined in Appendix A. Any alterations to the planting plan due to site conditions will require prior approval from the project biologist or landscape architect. Planting should occur as soon as possible upon completion of levee construction to provide erosion protection. However, it is recommended that plant installation occur during the late fall (October to mid-December) or early spring (mid-February to April) to ensure plants do not dry out upon planting (King County 1993). Plant installation during the summer months may require artificial irrigation to ensure plant survival.

All plant materials to be used on the site will be nursery grown stock from a reputable, local dealer. Only native species are to be used; no hybrids will be allowed. All plant material shall be inspected by the project biologist or landscape architect upon delivery. Plant material not conforming to specifications will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

No fertilizers or organic mulches are to be used, as these may be washed downstream in the event of high flows shortly after planting.

Cuttings will be installed to a minimum depth of four-fifths of the length of the cutting. The cuttings will be installed at a right angle to the planting surface.

# 3.0 MONITORING PROGRAM

## 3.1 Installation Monitoring

Installation monitoring will involve coordination between the project biologist, landscape architect, and landscaping personnel in order to ensure that the plantings are installed in an appropriate manner. A project biologist or landscape architect will be present on site during installation to ensure that the plantings are conducted as outlined in the planting plan. The biologist or landscape architect will inspect and approve the planting stock, and review the plans with the field crew to ensure they both recognize the species selected for installation and understand the planting design. The biologist or landscape architect will assist the planting contractor in making any final adjustments in the planting schedule, as needed, in response to field conditions.

## 3.2 Post-construction Inspection

Compliance monitoring will consist of evaluating the levee immediately after plant installation to confirm the plan was followed and plants were installed appropriately. Surveyors will conduct an "as-built survey", including planted woody vegetation and measurements of final grade and elevation, to verify that all design features have been correctly and fully implemented, and that any changes made in the field are consistent with the overall objective of the levee design. Several fixed points will be established within each planting zone to be used for photo-point documentation during long-term monitoring. The fixed points will be permanently staked in the field.

Following completion of the post-construction compliance monitoring, a summary technical memorandum will be prepared by the project biologist verifying that all design features have been correctly implemented. Any changes to the planting plan will also be discussed in the compliance memorandum. The memorandum will be submitted to the U.S. Army Corps of Engineers (Corps) within 30 days following installation of the plants and final survey. The Corps will be the agency responsible for inspecting and approving the as-built reports.

## 3.3 Long-term Monitoring

Long-term monitoring will be conducted over a five-year period with observations conducted each year during the month of August. The purpose of the long-term monitoring program will be to evaluate the establishment and maintenance of the plant communities within the planting zones. Photographs will be taken at each fixed point during each monitoring year to document the status of the plantings. Photographs will be taken facing the same direction each year to document plant growth and development.

Monitoring will be conducted using the procedures described below to document the survival and relative health and growth of plant material. A technical memorandum will be submitted to the Corps within 60 days following each monitoring visit, and will describe the status of plant survival, growth and development. The Corps will be the agency responsible for inspecting and approving the monitoring reports.

### *3.3.1 Monitoring Methods*

Vegetation surveys will be conducted in accordance with the monitoring schedule to compare results against the performance standards. Inspection of the planted material to determine health and vigor of the installation will occur during each monitoring visit. A walk-through inspection will be conducted during each visit and notes regarding plant health and vigor, presence of seed or flowers, and signs of vandalism will be recorded.

In addition to vegetation monitoring, visual observations of all fish and wildlife species and wildlife sign observed during the monitoring will be recorded. Birds, mammals, fish, amphibians, and reptiles observed on-site will be identified, and observations of any breeding or nesting activity within the revegetation area will be recorded. Observations will be limited to the annual monitoring inspections.

Permanent photo-points will be established during the post-construction compliance monitoring in order to obtain representative photographs of the project. Photographs will be taken to document vegetation survival and growth, and will be taken facing the same direction from year to year.

## 3.4 Performance Standards

Short-term success of the planting plan in terms of species richness and enhancement of wildlife habitat will be based upon a 100% survival rate for each planted tree and shrub at the end of Year 3. Volunteer native, non-invasive species will be included as acceptable components of the planting plan, upon approval by the Corps. Success of the overall planting plan will be demonstrated by an 80% survival rate of each planted tree and shrub at the end of the monitoring period (Year 5).

Dead plantings observed during each walk-through survey will be counted. That number will be compared to the total number of original plantings to determine the percent survival of the original plantings.

Cover within both planting zones will consist of less than 15% cover of undesirable vegetation, including non-native blackberry varieties (*Rubus* sp.), reed canary grass (*Phalaris arundinacea*), knotweed (*Polygonum* sp.), etc.

### 3.5 Contingency Plan

A contingency plan may be implemented if necessary. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. Coverage of greater than 15% of invasive or non-native species may also require implementation of a contingency plan.

If the monitoring results of Year 3 and Year 5 indicate that the performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria (100% survival for 3 years; 80% survival after 5 years; less than 15% cover by invasive species), a contingency plan will be developed and implemented with Corps approval. Such plans are prepared on a case-by-case basis to reflect the failed site characteristics.

Contingency/maintenance activities may include, but are not limited to:

1. Replacing all plants lost to vandalism, drought, or disease, as necessary.
2. Replacing any plant species with a 20% or greater mortality rate after five growing seasons with the same species or similar species approved by the Corps.
3. Irrigating the planting zones only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water.
4. Hydroseeding exposed soil as necessary if erosion or sedimentation occurs.
5. Removing all trash or undesirable debris from the planting areas as necessary.
6. Removal of invasive or non-native vegetation.

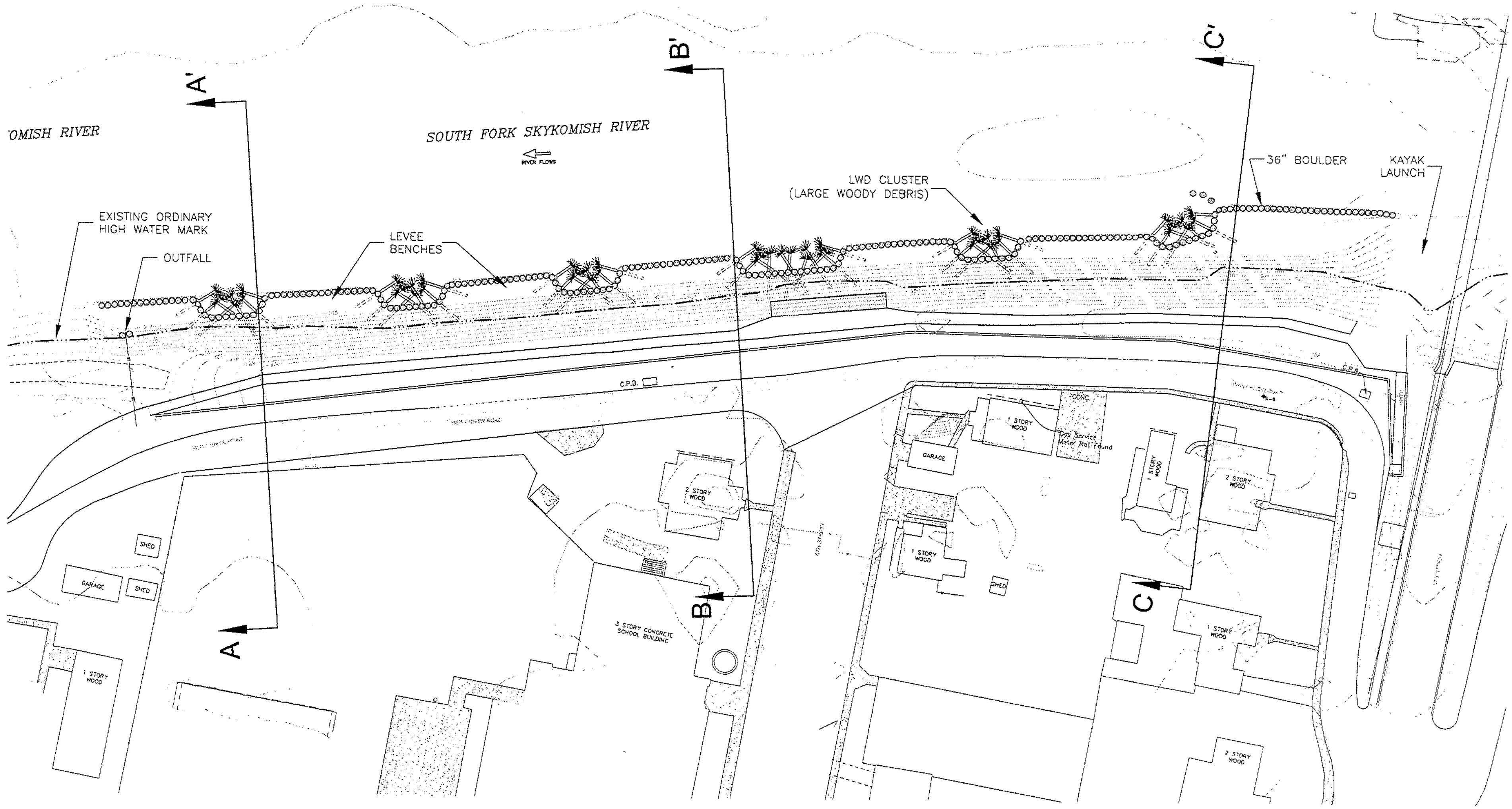
### 3.6 Reporting

Technical memoranda will be prepared for each site visit conducted, and will summarize the results of each monitoring visit. The memoranda will be submitted to the Corps within 60 days following completion of each monitoring effort. The technical memoranda will document the percent survival within the planted zones and make recommendations for improvements and/or corrective measures for any problems noted during the monitoring visits.

## 4.0 REFERENCES

Johnson, A.W. and J.M. Stypula. eds. 1993. Guidelines for Bank Stabilization Projects in the Riverine Environments of King County. King County Department of Public Works, Surface Water Management Division, Seattle, Washington.

The RETEC Group, Inc. (RETEC). 2005. Joint Aquatic Resources Permit Application for the Skykomish Levee Remediation Project. Resubmitted December, 2005.

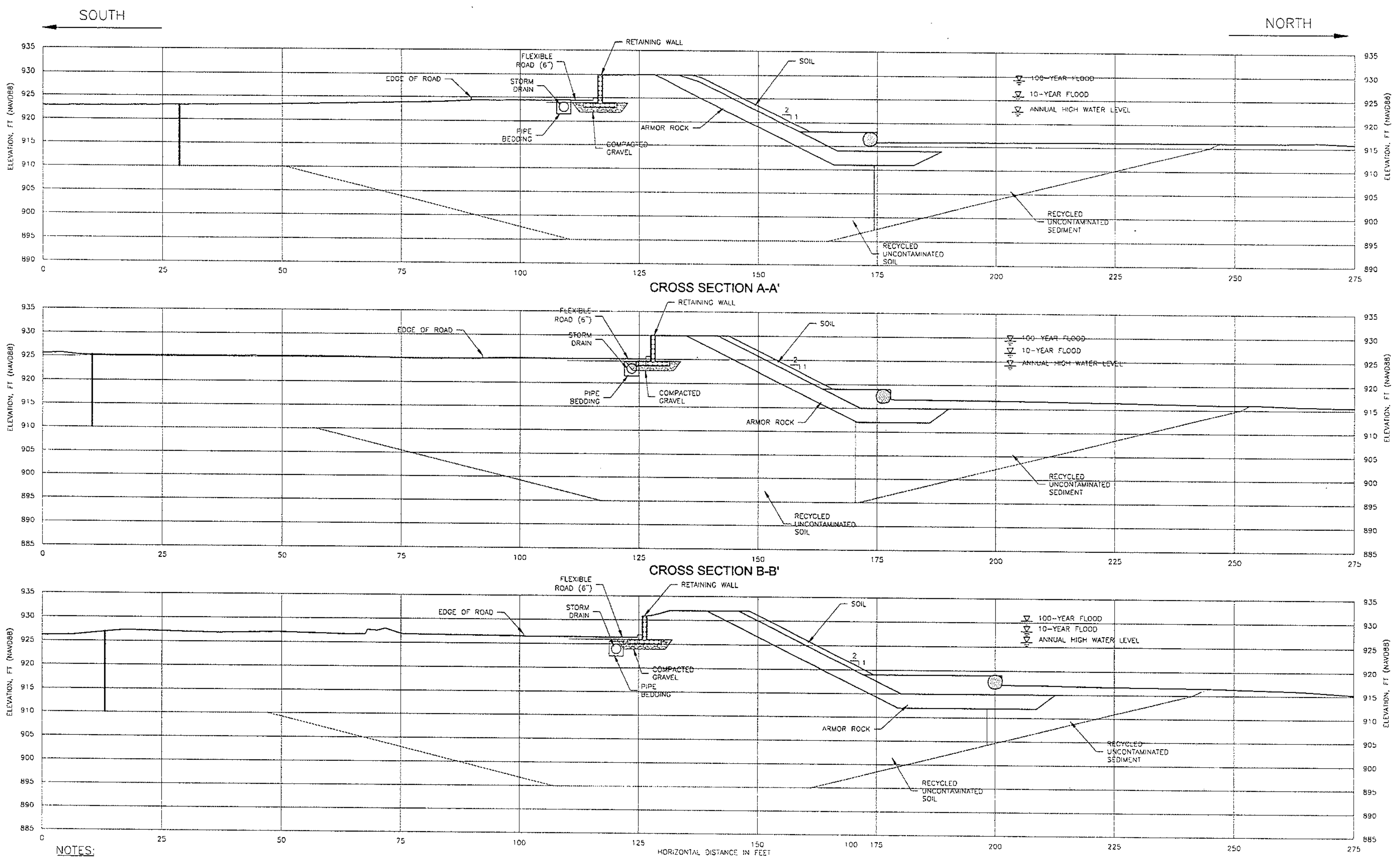



NOTES:

1. INSTALL ROW OF 36-INCH ROCK TO FORM 2-FOOT TOE LEDGE (SEE DETAIL C-18).
2. FINAL LEVEE CONTOURS ARE SHOWN AT APPROXIMATELY 2:1 SLOPE

RETEC

| | |
|---|---|
| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | EXISTING AND FINAL LEVEE CONTOURS |
| DATE: 12/20/05 DRWN. A.S./SEA | FIGURE 1 |




CROSS SECTION A-A'

CROSS SECTION B-B'

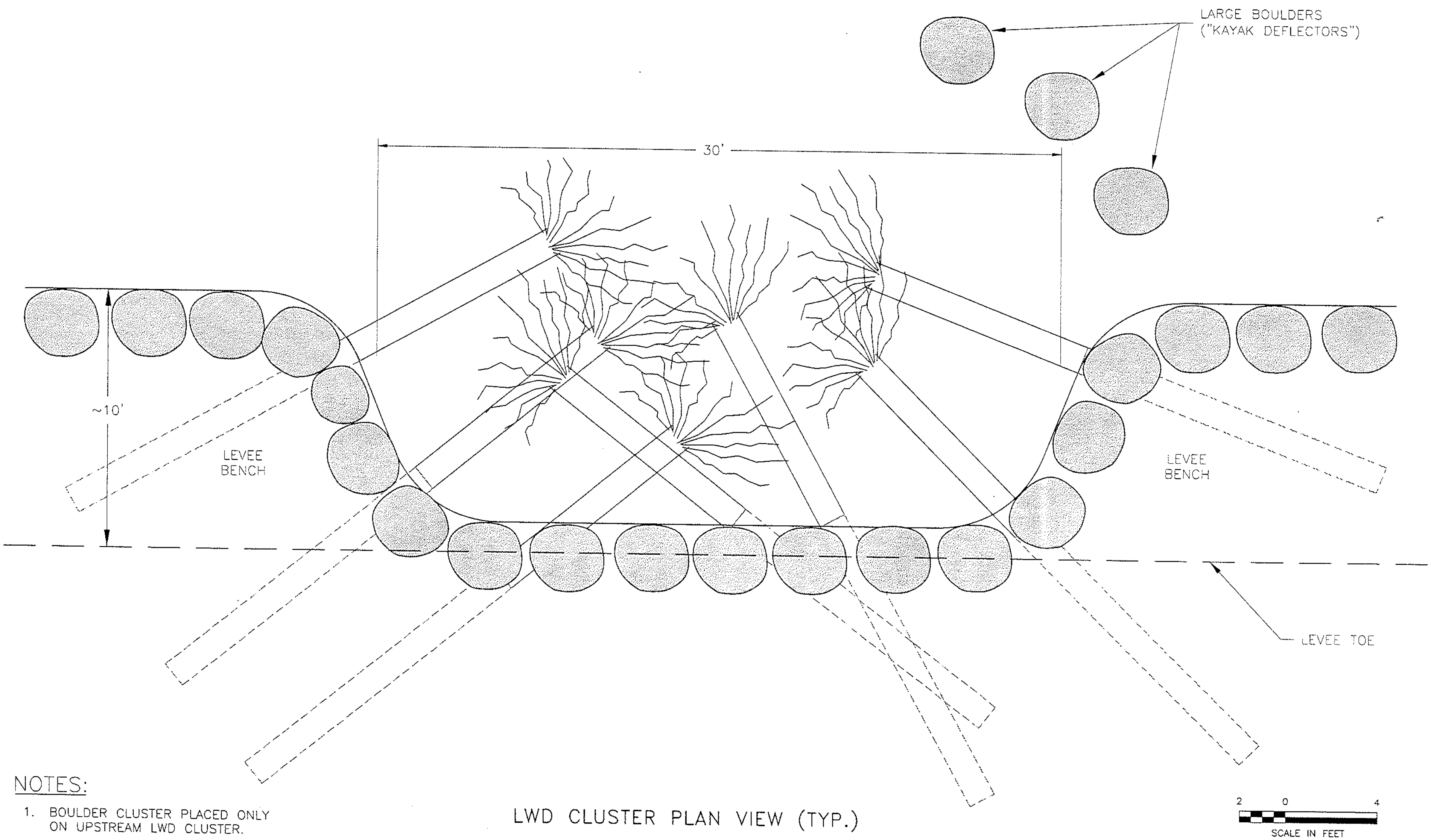
CROSS SECTION C-C'

NOTES:

1. SOIL IS MATERIAL EXCAVATED FROM UNDER LEVEE
2. SEDIMENT IS MATERIAL EXCAVATED FROM UNDER RIVER

RETEC

| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | FINAL SECTIONS |
|---|---|
| DATE: 12/20/05 DRWN: A.S./SEA | FIGURE 2 |




LWD CLUSTER PLAN VIEW (TYP.)

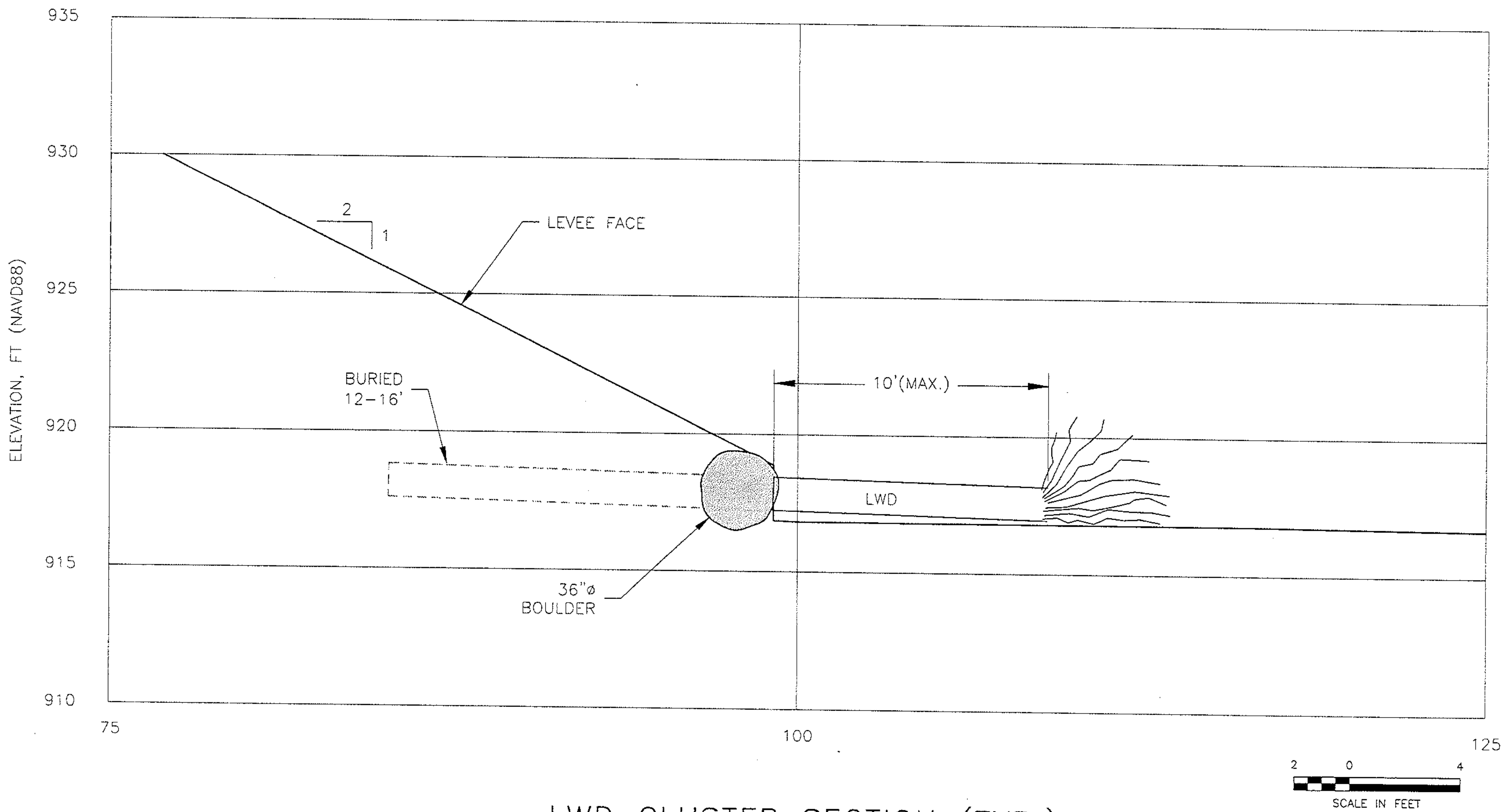
NOTES:

1. BOULDER CLUSTER PLACED ONLY ON UPSTREAM LWD CLUSTER.

RETEC

| | |
|---|---|
| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | LWD CLUSTER DETAIL<br>(PLAN VIEW) |
| DATE: 12/20/05 DRWN: A.S./SEA | FIGURE 3 |

File: H:\16423\DESIGN SET\PLANTINGS\16423L001.dwg Layout: FIGURE 3 User: astenberg Plotted: Dec 20, 2005 - 4:19pm Xref's: SK18-RETEC

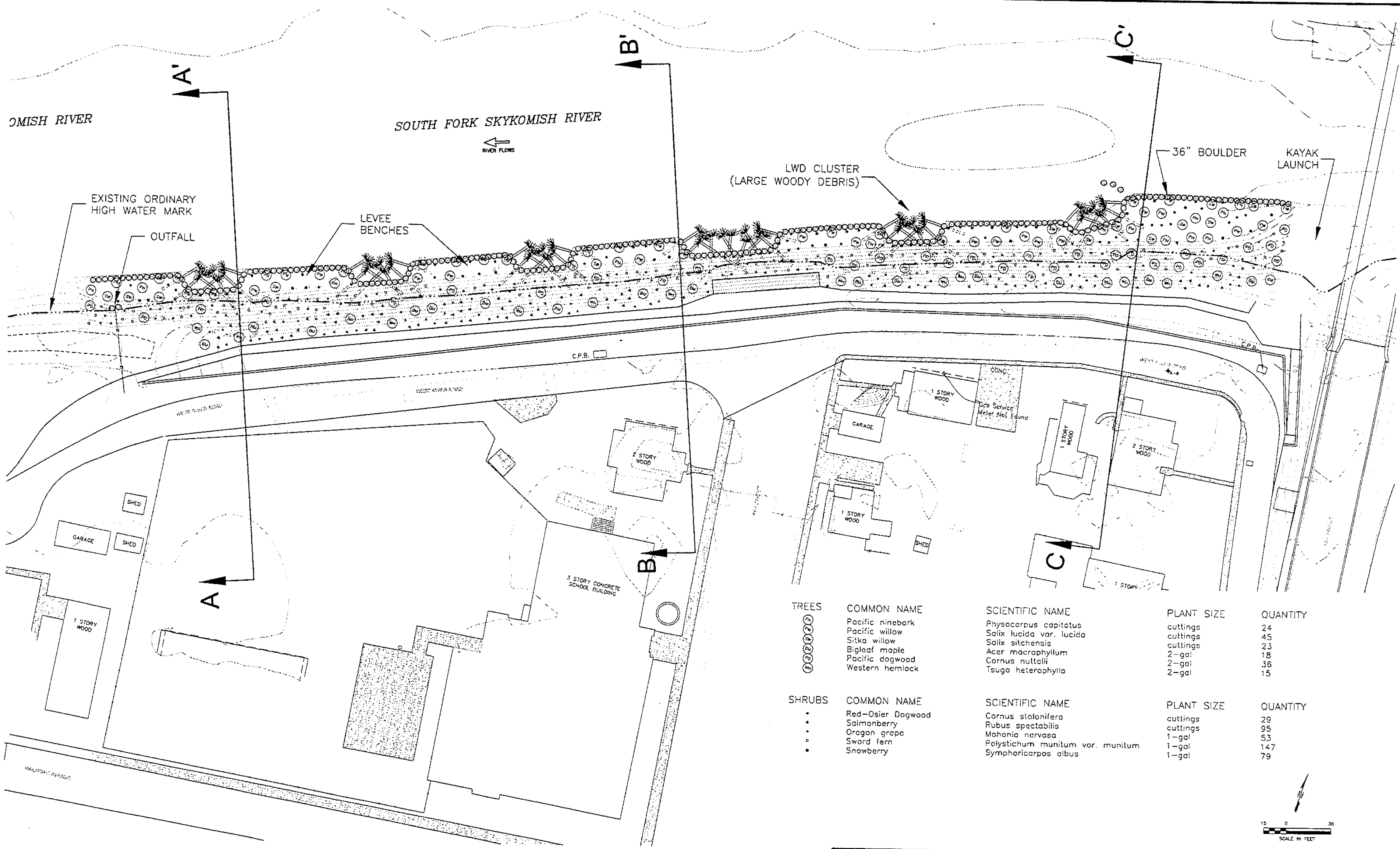



LWD CLUSTER SECTION (TYP.)

| | |
|---|---|
| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | LWD CLUSTER DETAIL<br>(SECTION VIEW) |
| DATE: 12/20/05 DRWN: A.S./SEA | FIGURE 4 |

RETEC

File: H:\16423\DESIGN SET\PLANTINGS\16423L001.dwg Layout: FIGURE 4 User: ostenberg Plotted: Dec 20, 2005 - 4:19pm Xref's: SK18-RETEC




| TREES | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| | Pacific ninebark | Physocarpus capitatus | cuttings | 24 |
| | Pacific willow | Salix lucida var. lucida | cuttings | 45 |
| | Sitka willow | Salix sitchensis | cuttings | 23 |
| | Bigleaf maple | Acer macrophyllum | 2-gal | 18 |
| | Pacific dogwood | Cornus nuttallii | 2-gal | 36 |
| | Western hemlock | Tsuga heterophylla | 2-gal | 15 |

| SHRUBS | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| | Red-Osier Dogwood | Cornus stolonifera | cuttings | 29 |
| | Salmonberry | Rubus spectabilis | cuttings | 95 |
| | Oregon grape | Mahonia nervosa | 1-gal | 53 |
| | Sword fern | Polystichum munitum var. munitum | 1-gal | 147 |
| | Snowberry | Symphoricarpos albus | 1-gal | 79 |

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THE BNSF RAILWAY COMPANY
SKYKOMISH, WASHINGTON
BN050-16423-520

DATE: 12/20/05 DRWN: A.S./SEA

**LANDSCAPE DETAILS/PLANT PLACEMENT**

**FIGURE 5**

# Appendix A  Plant Installation Specifications

***Plant Materials***

All plant materials to be used on the site will be nursery grown stock from a reputable, local dealer. Only native species are to be used; no hybrids will be allowed.

Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely-developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. Plants held in storage will be rejected if they show signs of growth.

Container stock shall have been grown in its delivery container for not less than six months but not more than two years. Plants shall not exhibit rootbound conditions. Under no circumstances shall container stock be handled by their trunks, stems, or tops.

Willow cuttings must be alive with any side branches cleanly removed and bark intact. The butt ends should be cleanly cut at an angle for easy insertion into the soil. The top should be cut square or blunt. The cuttings should be 1/2 inch to 1-1/2 inch in diameter and 24 inches to 42 inches long. Cuttings must be fresh and must be kept moist after they have been cut to the appropriate lengths. They must be prepared and installed within a 48-hour period.

The seed mixture used for Hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is to be mixed to the specified proportions indicated above in Table 1 by weight and tested to minimum percentages of purity and germination.

All plant material shall be inspected by the project biologist or landscape architect upon delivery. Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

Fertilizer will be in the form of Agroform plant tabs or an approved like form. Mulch will consist of sterile wheat straw or clean recycled wood chips approximately 1/2 inch to 1 inch in size and 1/2 inch thick, and will be applied around the base of the plantings to prevent them from drying out.

***Product Handling, Delivery and Storage***

Fertilizer should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. They should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the project biologist or landscape architect. Plants, fertilizer, and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent wind burn.

***Preparation and Installation of Plant Materials***

The planting contractor shall verify the location of all elements of the landscape plan prior to installation. The project biologist or landscape architect shall reserve the right to adjust the locations of landscape elements during the installation period as appropriate. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the project biologist or landscape architect.

Circular plant pits with vertical sides will be excavated for all container stock (salmonberry and crabapple). The pits should be at least 12 inches in diameter, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of 4 inches.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plant pits thoroughly midway through backfilling and add Agroform tablets. Water again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 2-1/2 inch layer of mulch around the base of each container plant.

Willow cuttings will be installed to a minimum depth of 32 inches, ensuring that four-fifths of the length of the cutting is tamped into the soil. The cuttings will be installed at a right angle to the planting surface. Tamping the cutting is best accomplished with a dead blow hammer. Do not split the cuttings during tamping; cuttings that split shall be removed and replaced.

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

**MEMORANDUM**

To: The RETEC Group, Inc. June 29, 2007

From: Grette Associates LLC, Glenn Grette File No.: 300.009

Re: Skykomish Levee

## Recommendations

The purpose of this memorandum is to recommend measures to improve erosion-resistance on portions of the riprap/topsoil slope at the Skykomish Levee. For that purpose, it is recommended that coir matting be used as a slope/soil stabilization method. This matting should be installed as soon as possible. Hydroseeding should then occur over the top of the coir matting immediately after placement of the matting to promote substantial root development before high flows in the fall and winter. Planting could then occur through the coir matting in the fall. Materials and installation details are presented below.

## Materials

A. Material would consist of coir matting. Coir matting would be made of 100 percent natural coir fiber twine woven into high strength mats.

B. Two different weights of coir matting should be used on the slope. Type 1 is a lower weight mat that would be used in the upper portion of the slope, and Type 2 is a higher weight mat would be used in the lower portion of the slope. See Table 1 for specifications.

C. Wood stakes would be used to secure the coir matting. Wood stakes should be a minimum of 18 inches long and tapered.

**Table 1. Coir Matting specifications by type**

| Property | Test Method | Values<br>Type 1 | <br>Type 2 |
|---|---|---|---|
| Weight (grams/sq/m) | ASTM D3776 | 400 | 900 |
| Thickness (mils) | ASTM D1777 | 290 | 300 |
| Tensile Strength (lbs/ft) | | 420 x 130 | 1,560 x 650 |
| Flow Velocity (ft/sec) | | 9 | 16 |

**Installation**

A. Roll out Type 2 coir matting over the soil surface from the bottom of topsoil placement up to 1 ft above the Ordinary High Water Mark (OHWM). It is expected that the greater soil protection offered by heavier matting is necessary in this lower portion due to higher stream energy. Type 1 coir matting would then overlap the Type 2 matting 1 ft and extend up to the top of the bank, at 5 ft above OHWM. Roll ends and sides would be overlapped a minimum of 1 ft.

B. Secure matting with wooden stakes driven at a minimum rate of two stakes per square yard. At the ends of rolls (top, bottom, sides), one stake would be placed per lineal foot.

Attn Jim McGool

Frontier

1406 East F Street
Moscow, ID 83843

October 3, 2007

JB Instantlawn
14020 NE 124th Street
Redmond, WA 98052

Re: Skykomish, Erosion Protection-TruGreen Lawn Care

With this letter, we are certifying the seed listed below meets the specifications and quality standards specified for the order.

| % Requested | Species or Seed Type |
|---|---|
| 2 | Cow Parsnip |
| 1 | Salal |
| 5 | Big-leaf Lupine |
| 2 | Tapered Rush |
| 3 | Slender Rush |
| 10 | Western Mannagrass |
| 15 | Western Fescue |
| 20 | Meadow Barley |
| 20 | Blue Wildrye |
| 2 | Inflated sedge |
| 20 | Sterile wheatgrass |

We further certify that this seed will meet all requirements of the Federal Seed Act and comply with the State Seed laws for the State of Washington. Purity and germination information for each species will be listed on the analysis tags, which will be attached to each bag at the time seed is delivered.

Thank you for your business.

Sincerely,

Jolyn Hollingsworth

Jolyn Hollingsworth
Account Executive
Frontier Seeds

Corporate: 208-883-7611
Office: 208-798-4683
Fax: 208-798-4683

NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.
*"Helping to Protect the Environment"*
21000 77th Avenue South
Kent, WA 98032
(253) 872-0244 • (800) 729-6954
FAX: (253) 872-0245
www.northwestlinings.com

# PermeaTex™ Coir

## PRODUCT DESCRIPTION

The **PermeaTex™** Coir is made from 100% coir fiber twine woven into high strength mats for extreme slope stabilization, protection of high velocity stream banks and high velocity intermittent flow channels.

| | | Coir 400 | Coir 700 | Coir 900 |
|---|---|---|---|---|
| PROPERTY | METHOD | UNITS | UNITS | UNITS |
| Roll Width | | 9.84', 13.12' | 9.84', 13.12' | 9.84', 13.12' |
| Roll Length | | 165' | 165' | 165' |
| Roll Square Feet | | 1623/2160 | 1623/2160 | 1623/2160 |
| Roll Square Yards | | 180/240 | 180/240 | 180/240 |
| Weight grams/sq/m(oz/SY) | ASTM D 3776 | 400(11.86) | 700(20.70) | 900(26.62) |
| Thickness Mils (mm) | ASTM D 1777 | 297.80 (7.45) | 300 (7.5) | 338.30 (8.46) |
| Open Area (%) | | 65 | 50 | 38 |
| Recommend Flow Velocity | | 8.2 ft/sec | 10 ft/sec | 15.5 ft/sec |
| Recommended Shear Stress | | 3.12 lbs/ft2 | 4.50 lbs/ft2 | 4.91 lbs/ft2 |
| "C" Factor, 1.5:1 slope | | .003 | .003 | .002 |
| Warp Ends/Per 10cm | | 4.60 | 11.00 | 13.00 |
| Weft Picks/Per 10cm | | 4.00 | 7.00 | 7.00 |
| DRY-Ultimate Strength lbs/in<br>RD(Roll Machine Direction)<br>XD(Cross Machine Direction) | ASTM D 4595 | 58.8<br>55.3 | 115.8<br>64.1 | 164.9<br>66.4 |
| DRY-Ultimate Strain %<br>RD<br>XD | ASTM D 4595 | 37.2<br>30.6 | 52.9<br>37.9 | 68.6<br>38.0 |
| WET-Ultimate Strength lbs/in<br>RD(Roll Machine Direction)<br>XD(Cross Machine Direction) | ASTM D 4595 | 45.10<br>42.30 | 104.70<br>58.40 | 124.40<br>60.30 |
| WET-Ultimate Strain %<br>RD<br>XD | ASTM D 4595 | 35.00<br>34.20 | 64.30<br>49.20 | 83.00<br>49.60 |

# TECHNICAL MEMORANDUM

To: Sarah Albano, AECOM — November 10, 2008

From: Grette Associates LLC; Jay Dirkse — File No.: 300.009

Re: Skykomish Levee Remediation Project Plant Installation As-Built Report

This memorandum has been prepared to describe planting activities completed as part of the Levee Zone Interim Action for Cleanup as required initially under Agreed Order No. DE3279 between the BNSF Railway Company at the direction of the Washington State Department of Ecology. On October 19, 2007, the BNSF Railway Company and the Washington State Department of Ecology entered into a Consent Decree, State of Washington v. BNSF Railway Company, King County Case No. 07-2-33672-9SEA, that incorporated the outstanding obligations under the Agreed Order. The Skykomish Levee Remediation Project Levee Planting Plan and Monitoring Program (Plan; Attachment A) was prepared as part of the Joint Aquatic Resources Permit Application submitted to the U.S. Army Corps of Engineers in application for a Nationwide #38 Section 404 Permit (200500328). Per the Plan, the levee was revegetated after remediation measures were performed at the site. Revegetation was to occur October 22-24, 2007. The upper portion of the levee zone was planted at this time, but due to rising river levels the lower levee zone (shoreline zone) could not be planted. These species were planted during the 2008 growing season, as described below.

This memo is intended to satisfy the requirements in the Planting Plan that a biologist monitor revegetation activities. Per the Plan, monitoring entailed plant material inspection, plant installation monitoring, and post-installation inspection. Additionally, photo points were established to monitor vegetation development over the monitoring program (Attachments B and C). Monitoring activities are described in detail below.

***Plant Material Inspection***

Upon arrival of all plant material to the site in Skykomish, a Grette Associates biologist inspected the plant material and verified that the material met the requirements of the Plan. Specifically, plant material was inspected to ensure that all material appeared healthy and free from defect, exhibited no rootbound conditions, were transported appropriately and were of appropriate sizes and planting forms (e.g. container stock, live stakes, etc.; see Appendix A: Plant Installation Specifications, for specifications of planted material). Grette Associates verified that all specimens conformed with these specifications. The following exceptions should be noted:

- Pacific willow, Sitka willow, and red-osier dogwood live stake cuttings were initially rejected due to the diameter of cuttings being too narrow. The Planting Plan calls for cuttings to be between ½- and 1½-inches in diameter, and the majority of cuttings of each of these species that arrived on site were less than ½-inch diameter. Live stakes that were actually installed were of the specified diameter.

- Pacific ninebark and salmonberry, though specified in the Plan as live stakes, were installed as container stock. Container stock is the typical planting form for these species, and live stakes were unavailable.

***Installation Monitoring***

Per the Planting Plan, a Grette Associates biologist was on site for plant installation to ensure that planting personnel install the plants in an appropriate manner, recognize the species to be planted and understand the planting design.

Prior to plant installation, per the Planting Plan (p. 5), Grette Associates staff consulted with a Town of Skykomish representative and the planting contractor to mark locations for planted trees (Pacific dogwood, western hemlock, and big leaf maple). Trees were located to preserve view corridors associated with the view platforms/stations installed on the top of the levee. Some trees were moved from their location as marked on the planting figure (Attachment B). If moved, the distance the trees were moved was minimized. Trees remained in the general location depicted on Figure 1 and remained in their appropriate planting zones. Generally, if tree locations were moved, they were moved up-slope. The number of trees installed did not change.

Upon arrival of plant material, species were identified and counted. The Plan was discussed with the planting contractor and personnel to ensure understanding of the planting design so that plants were installed in the appropriate zones. Grette Associates staff also ensured that plants were installed appropriately so as to maximize survival, with proper installation techniques such as appropriate watering, dispersal of roots, live stake installation and care in handling material.

The Plan specified two planting zones: the levee zone and the shoreline zone. Plants scheduled to be planted in the levee zone were those typically found in upland locations (e.g. snowberry, swordfern), and plants scheduled to be planted in the shoreline zone were those typically found near water (e.g. Pacific ninebark, willows). See Table 1 for a list of species planted by zone.

The levee zone was planted on October 22-24, 2007 (Photographs 1-11), including all levee species listed in Table 1. During the planting, the South Fork Skykomish River rose and inundated the levee benches. Installation of shoreline zone plants (Pacific willow, Sitka willow, red-osier dogwood, salmonberry, and ninebark) did not occur at this time, as it was determined that planting would likely result in poor survival of these plants due to the high water level. Installation of these species was delayed until the 2008 growing season.

By June 5, 2008, after the river level had dropped low enough to allow shoreline zone plantings to occur, salmonberry were installed (Photographs 12-15). Due to the water level, they were installed in the upper edge of the shoreline zone, in patches of soil or sand between riprap at or below the levee toe. Also, due to contractor error, Pacific ninebark, which were expected to be installed at the same time as salmonberry, were not installed at this time. On July 17, 2008, Pacific ninebark was installed in the shoreline zone (Photographs 16-19). The river had dropped further by this time, and Pacific ninebark were planted further waterward on the levee benches than salmonberry. On October 10, 2008, Pacific willow, Sitka willow, and red-osier dogwood were installed as live stakes (Photographs 20-23). Live stakes could not be installed until fall 2008 because live stakes must be harvested during the plant's dormancy period (late fall through winter) and either installed immediately or kept in cold storage until installation. They were not harvested during the dormancy of 2007-2008 and were thus not available until fall 2008.

**Table 1. Plant species installed by zone, date**

| Planting Zone | Common Name | Scientific Name | Installed As | Installed On |
|---|---|---|---|---|
| Levee | Pacific dogwood | *Cornus nuttallii* | Container | 10-22-07 |
| | Western hemlock | *Tsuga heterophylla* | Container | 10-22-07 |
| | Big-leaf maple | *Acer macrophyllum* | Container | 10-22-07 |
| | Snowberry | *Symphoricarpos albus* | Container | 10-22-07 |
| | Oregon grape | *Mahonia nervosa* | Container | 10-22-07 |
| | Sword fern | *Polystichum munitum* | Container | 10-22-07 |
| Shoreline | Salmonberry | *Rubus spectabilis* | Container | 6-5-08 |
| | Pacific ninebark | *Physocarpus capitatus* | Container | 7-15-08 |
| | Red-osier dogwood | *Cornus sericea* | Live Stake | 10-10-08 |
| | Pacific willow | *Salix lucida var. lasiandra* | Live Stake | 10-10-08 |
| | Sitka willow | *Salix sitchensis* | Live Stake | 10-10-08 |

### *Post-Installation Inspection*

At the conclusion of each planting effort, Grette Associates staff was on-site to confirm that the Planting Plan was followed and all plants were installed properly and in the proper location. The locations of some species were adjusted slightly based on field conditions. For example, the planting figure calls for willow and dogwood live stakes to be installed throughout the shoreline benches, from the toe of the levee out to the waterward extent of the benches. However, the biologist determined that the live stakes would not likely survive if installed at the waterward extent of the benches. This was determined based on the fact that several volunteer willows have taken root near the toe of the levee, but no volunteers had taken root out on the benches where live stakes were scheduled. Additionally, the levee benches are underwater approximately 10 months of the year. Thus, live stakes were planted mostly in the upper shoreline zone, where volunteers have rooted and demonstrated the high potential of success.

Salmonberry was mis-labeled in the planting figure (Attachment A). It is shown in the upper levee zone, though the text of the report calls for it to be installed in the shoreline zone. Salmonberry typically grows near water rather than in upland conditions. Thus, salmonberry was installed in the shoreline zone, according to Table 1 of the Planting Plan.

### *Photo Points*

As part of post-installation monitoring, Grette Associates staff established eight photo points at representative locations along the levee and one on the Skykomish Bridge for on-going monitoring vegetation development on the levee. These photo points were selected to show both vegetation and large woody debris structures at the site. Due to the success of hydroseeding and the small size of the majority of levee plants (e.g. sword fern, Oregon grape), they are difficult to see in the photographs. The Planting Plan called for these locations to be permanently staked; however, due to the public access of the new levee features, permanent photo point stakes were not practicable. Instead, photo points were established at readily identifiable landmarks on the levee that will remain in place in perpetuity as part of maintenance of the public access features (e.g. sitting rocks). See Attachment B for the locations of photo points, and see Attachment C for the photos.

Final as-built photographs were taken from these locations on October 31, 2008, facing in the direction indicated in the photograph footnote. Additional photographs documenting planting efforts as they occurred are also included in Attachment C.

# Attachment A.

# Levee Planting Plan and Monitoring Program

# SKYKOMISH LEVEE REMEDIATION PROJECT

## LEVEE PLANTING PLAN AND MONITORING PROGRAM

PREPARED FOR:

**THE RETEC GROUP, INC.,**
**ON BEHALF OF THE BNSF RAILWAY COMPANY**
1011 SW KLICKITAT WAY, SUITE 207
SEATTLE, WA 98134-1162

PREPARED BY:

**GRETTE ASSOCIATES, LLC**
151 SOUTH WORTHEN STREET, SUITE 101
WENATCHEE, WA 98801

2111 NORTH 30TH STREET
TACOMA, WA 98403

REFERENCE NUMBER: 200500328

DECEMBER 2005

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

## TABLE OF CONTENTS

1.0 INTRODUCTION ..... 1
 1.1 Background ..... 1
 1.2 Project Description ..... 1
2.0 PLANTING PLAN ..... 1
 2.1 Goals and Objectives ..... 1
 2.2 Levee Design ..... 2
 2.3 Plant Schedule and Zones ..... 2
  *2.2.1 Shoreline Zone* ..... 3
  *2.2.2 Levee Zone* ..... 3
  *2.2.3 Planting Approach* ..... 4
 2.4 Plant Installation ..... 4
3.0 MONITORING PROGRAM ..... 5
 3.1 Installation Monitoring ..... 5
 3.2 Post-construction Inspection ..... 5
 3.3 Long-term Monitoring ..... 5
  *3.3.1 Monitoring Methods* ..... 6
 3.4 Performance Standards ..... 6
 3.5 Contingency Plan ..... 7
 3.6 Reporting ..... 7
4.0 REFERENCES ..... 8

## LIST OF FIGURES

Figure 1. Existing and Final Levee Contours
Figure 2. Skykomish Levee Remediation Final Sections
Figure 3. LWD Cluster Plan View
Figure 4. LWD Cluster Section
Figure 5. Landscape details/plant placement

## LIST OF APPENDICES

Appendix A Plant Installation Specifications

# 1.0 INTRODUCTION

This Planting Plan and Monitoring Program (Plan) describes the revegetation measures that will be implemented as part of the Skykomish Levee Remediation Project (Project). The Plan describes the specific elements of replanting the remediated levee, as well as the post-construction and long-term monitoring of the completed project.

## 1.1 Background

The Skykomish Levee Remediation Project is part of a MTCA interim action to stop seepage of diesel and bunker C fuel oil into the South Fork of the Skykomish River that will be performed pursuant to an Agreed Order between BNSF and Washington State Department of Ecology (Ecology) (RETEC 2005).

## 1.2 Project Description

The Project will entail removing and then replacing the existing levee with a new flood control levee, which will address petroleum product seeps that currently enter the South Fork of the Skykomish River. The existing levee material and adjacent river sediments will be excavated down to design depth, with all contaminated material loaded onto trucks and removed off site for disposal at a suitable disposal facility. The excavation area will then be filled with both stockpiled and imported clean material, and the face of the levee will be reconstructed. The reconstructed levee will be replanted using native vegetation. Further project description details are presented in the JARPA prepared for the Project (RETEC 2005).

# 2.0 PLANTING PLAN

## 2.1 Goals and Objectives

The primary goal of levee revegetation is to provide a level of habitat function at or above that which existed prior to levee remediation. Planting of vegetation along the toe of the levee and along the waterward edge of the levee benches will provide cover for a variety of fish and wildlife species. This overhanging vegetation will also provide shade that will protect lower water temperatures within the river. Planting vegetation along the face of the levee will provide nesting and foraging habitat for songbirds. The trees and shrubs along the levee face will also screen portions of the shoreline from human activity south of the levee. Levee benching and placement of LWD clusters along the levee face will also provide habitat complexity for both terrestrial and aquatic species.

## 2.2 Levee Design

During reconstruction, benches will be constructed along the waterward base of the levee (Figure 1). These benches will be more or less level, and will be located at the toe of the reconstructed levee. The waterward edge of the levee benches will provide a vertical drop of approximately 2 feet down to the river channel. This edge will be formed by large riprap or boulder substrates (Figure 2). The benches will also provide a convoluted shoreline edge, contributing to habitat complexity along the reconstructed levee.

The benches will be distributed in areas where the slope of the reconstructed levee allows the benches to remain within the footprint of the existing levee (Figure 1).

In addition to the large substrate along the shoreline edge, five large woody debris (LWD) clusters will be buried/anchored beneath the toe of the levee in areas where levee benching is not present (Figure 1). Each LWD cluster will consist of six pieces, and will be composed of Douglas fir (*Pseudotsuga menziesii*) or western red cedar (*Thuja plicata*) (King County 1993). The LWD pieces within each cluster will be oriented at different angles, with the upstream LWD piece oriented at an upstream angle (Figure 3). Each LWD piece will be embedded approximately 15 feet into the levee such that the root end of the log protrudes 5 to 10 feet from the shoreline edge (Figure 4). Further detailed guidance on installation of LWD can be found in King County's *Guidelines for Bank Stabilization Projects in the Riverine Environments of King County* (1993).

Several design considerations were evaluated for placement of the LWD clusters. A recreational kayak launch is planned immediately upstream of the levee near the 5$^{th}$ Street bridge. To direct kayakers around the upstream LWD cluster after launching, the cluster will be placed approximately 160 feet downstream of the bridge (Figure 1). Immediately upstream of this cluster boulders will be placed within the river channel and arranged such that river flows along the south bank are directed north of and around the LWD cluster (Figure 5).

Another design consideration is the location of the viewing platform, which is located in an area where levee benches will not be present (Figure 1). Therefore, a LWD cluster will be placed in this area, allowing for an open view corridor above the LWD. Additionally, portions of the levee without benches will likely contain less overhanging riparian vegetation than areas containing benches. LWD placed in these areas will provide additional overhanging cover.

## 2.3 Plant Schedule and Zones

The remediated levee will be replanted with a mix of native trees and shrubs. Guidance on plant species selection and planting location was referenced from King County's *Guidelines for Bank Stabilization Projects in the Riverine Environments of King County* (1993). Table 1 below lists the proposed species to be used for levee revegetation.

**Table 1. Proposed species for levee revegetation**

| *Species* | USFWS Indicator Status[1] | Condition | Spacing[2,3] |
|---|---|---|---|
| <u>*Shoreline Zone*</u> | | | |
| *Cornus stolonifera*, Red-osier dogwood | FACW | cuttings | 8 ft OC |
| *Physocarpus capitatus*, Pacific ninebark | FACW | cuttings | 8 ft OC |
| *Rubus spectabilis*, Salmonberry | FAC+ | cuttings | 5 ft OC |
| *Salix lucida* var. *lucida*, Pacific willow | FACW+ | cuttings | 8 ft OC |
| *Salix sitchensis*, Sitka willow | FACW | cuttings | 8 ft OC |
| <u>*Levee Zone*[4]</u> | | | |
| *Acer macrophyllum*, Bigleaf maple | FACU | 2-gal | 10 ft OC |
| *Cornus nuttallii*, Pacific dogwood | NL | 2-gal | 8 ft OC |
| *Mahonia nervosa*, Oregon grape | UPL | 1-gal | 5 ft OC |
| *Polystichum munitum* var. *munitum*, Sword fern | FACU | 1-gal | 5 ft OC |
| *Symphoricarpos albus*, Snowberry | FACU | 1-gal | 5 ft OC |
| *Tsuga heterophylla*, Western hemlock | FACU+ | 2-gal | 10 ft OC |

[1] Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL). Vegetation is considered non-hydrophytic when there is an indicator status of facultative upland (FACU) or obligate upland (UPL). A positive (+) sign indicates plants are more frequently found in wetlands than the category indicates. An indicator of NL represents insufficient information to determine status.
[2] Plant spacing is based on specific planting locations within each zone, not over the entire site.
[3] OC = On Center
[4] Condition of Levee Zone plantings will be refined based on discussions with The RETEC Group, Inc.

### *2.2.1 Shoreline Zone*

Vegetation planting areas on the levee will be separated into two zones: the Shoreline Zone and the Levee Zone (Figure 2). The Shoreline Zone will occupy the levee benches along the toe of the reconstructed levee up to an elevation 2 ft above the levee bench. The Shoreline Zone will consist of native tree and shrub species typically adapted to wet conditions. Vegetation planted near the shoreline edge will be planted such that, when mature, woody material will overhang the shoreline edge. Species to be planted within this zone include red-osier dogwood, Pacific ninebark, salmonberry, Pacific willow, and Sitka willow.

### *2.2.2 Levee Zone*

The Levee Zone will occupy the face of the new levee immediately above the Shoreline Zone to the top of the levee, and will consist of native trees and shrubs adapted to dry conditions (Figure 2). As it is expected that the face of the new levee will consist of coarse material, species were chosen based on their ability to thrive in coarse soil textures. Species to be planted within this zone include bigleaf maple, Pacific dogwood, Oregon grape, sword fern, snowberry, and western hemlock.

### *2.2.3 Planting Approach*

Red-osier dogwood and Pacific ninebark will be planted in the areas closest to the shoreline edge, as these species are particularly hydrophytic and are typically found overhanging river banks throughout the region (Figure 5). These species will be planted on 8-foot centers. Pacific willow and Sitka willow will be planted throughout the Shoreline Zone, and will also be planted on 8-foot centers. These species are also typically hydrophytic, yet would also be expected to survive further away from the shoreline. Salmonberry will also be planted on 5-foot centers throughout the Shoreline Zone and will provide a layered understory. It is expected that some areas along the levee will contain different concentrations of the varying species depending on site-specific constraints.

The dogwood and ninebark will provide cover and foraging opportunities for a variety of small birds and mammals, while also providing cover over the river bank for fish. The taller willow species will provide nesting and perching opportunities for songbirds, while also providing screening of the shoreline from human activities south of the levee.

Within the Levee Zone, bigleaf maple and western hemlock will be planted on 10-foot centers (Figure 5). These species will be planted throughout the upper portions of the Levee Zone except directly beneath or adjacent to the proposed viewing platform. Pacific dogwood will be planted on 8-foot centers throughout the lower portions of this zone, while Oregon Grape, snowberry, and sword fern are planted on 5-foot centers throughout the zone.

The larger maple and hemlock will provide perching and roosting habitat for raptors, while the snowberry and Oregon grape provide foraging opportunities for small mammals and songbirds.

## 2.4 Plant Installation

Plant installation will be performed in accordance with the specifications outlined in Appendix A. Any alterations to the planting plan due to site conditions will require prior approval from the project biologist or landscape architect. Planting should occur as soon as possible upon completion of levee construction to provide erosion protection. However, it is recommended that plant installation occur during the late fall (October to mid-December) or early spring (mid-February to April) to ensure plants do not dry out upon planting (King County 1993). Plant installation during the summer months may require artificial irrigation to ensure plant survival.

All plant materials to be used on the site will be nursery grown stock from a reputable, local dealer. Only native species are to be used; no hybrids will be allowed. All plant material shall be inspected by the project biologist or landscape architect upon delivery. Plant material not conforming to specifications will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

No fertilizers or organic mulches are to be used, as these may be washed downstream in the event of high flows shortly after planting.

Cuttings will be installed to a minimum depth of four-fifths of the length of the cutting. The cuttings will be installed at a right angle to the planting surface.

## 3.0 MONITORING PROGRAM

### 3.1 Installation Monitoring

Installation monitoring will involve coordination between the project biologist, landscape architect, and landscaping personnel in order to ensure that the plantings are installed in an appropriate manner. A project biologist or landscape architect will be present on site during installation to ensure that the plantings are conducted as outlined in the planting plan. The biologist or landscape architect will inspect and approve the planting stock, and review the plans with the field crew to ensure they both recognize the species selected for installation and understand the planting design. The biologist or landscape architect will assist the planting contractor in making any final adjustments in the planting schedule, as needed, in response to field conditions.

### 3.2 Post-construction Inspection

Compliance monitoring will consist of evaluating the levee immediately after plant installation to confirm the plan was followed and plants were installed appropriately. Surveyors will conduct an "as-built survey", including planted woody vegetation and measurements of final grade and elevation, to verify that all design features have been correctly and fully implemented, and that any changes made in the field are consistent with the overall objective of the levee design. Several fixed points will be established within each planting zone to be used for photo-point documentation during long-term monitoring. The fixed points will be permanently staked in the field.

Following completion of the post-construction compliance monitoring, a summary technical memorandum will be prepared by the project biologist verifying that all design features have been correctly implemented. Any changes to the planting plan will also be discussed in the compliance memorandum. The memorandum will be submitted to the U.S. Army Corps of Engineers (Corps) within 30 days following installation of the plants and final survey. The Corps will be the agency responsible for inspecting and approving the as-built reports.

### 3.3 Long-term Monitoring

Long-term monitoring will be conducted over a five-year period with observations conducted each year during the month of August. The purpose of the long-term monitoring program will be to evaluate the establishment and maintenance of the plant communities within the planting zones. Photographs will be taken at each fixed point during each monitoring year to document the status of the plantings. Photographs will be taken facing the same direction each year to document plant growth and development.

Monitoring will be conducted using the procedures described below to document the survival and relative health and growth of plant material. A technical memorandum will be submitted to the Corps within 60 days following each monitoring visit, and will describe the status of plant survival, growth and development. The Corps will be the agency responsible for inspecting and approving the monitoring reports.

### *3.3.1 Monitoring Methods*

Vegetation surveys will be conducted in accordance with the monitoring schedule to compare results against the performance standards. Inspection of the planted material to determine health and vigor of the installation will occur during each monitoring visit. A walk-through inspection will be conducted during each visit and notes regarding plant health and vigor, presence of seed or flowers, and signs of vandalism will be recorded.

In addition to vegetation monitoring, visual observations of all fish and wildlife species and wildlife sign observed during the monitoring will be recorded. Birds, mammals, fish, amphibians, and reptiles observed on-site will be identified, and observations of any breeding or nesting activity within the revegetation area will be recorded. Observations will be limited to the annual monitoring inspections.

Permanent photo-points will be established during the post-construction compliance monitoring in order to obtain representative photographs of the project. Photographs will be taken to document vegetation survival and growth, and will be taken facing the same direction from year to year.

## 3.4 Performance Standards

Short-term success of the planting plan in terms of species richness and enhancement of wildlife habitat will be based upon a 100% survival rate for each planted tree and shrub at the end of Year 3. Volunteer native, non-invasive species will be included as acceptable components of the planting plan, upon approval by the Corps. Success of the overall planting plan will be demonstrated by an 80% survival rate of each planted tree and shrub at the end of the monitoring period (Year 5).

Dead plantings observed during each walk-through survey will be counted. That number will be compared to the total number of original plantings to determine the percent survival of the original plantings.

Cover within both planting zones will consist of less than 15% cover of undesirable vegetation, including non-native blackberry varieties (*Rubus* sp.), reed canary grass (*Phalaris arundinacea*), knotweed (*Polygonum* sp.), etc.

### 3.5 Contingency Plan

A contingency plan may be implemented if necessary. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. Coverage of greater than 15% of invasive or non-native species may also require implementation of a contingency plan.

If the monitoring results of Year 3 and Year 5 indicate that the performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria (100% survival for 3 years; 80% survival after 5 years; less than 15% cover by invasive species), a contingency plan will be developed and implemented with Corps approval. Such plans are prepared on a case-by-case basis to reflect the failed site characteristics.

Contingency/maintenance activities may include, but are not limited to:

1. Replacing all plants lost to vandalism, drought, or disease, as necessary.
2. Replacing any plant species with a 20% or greater mortality rate after five growing seasons with the same species or similar species approved by the Corps.
3. Irrigating the planting zones only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water.
4. Hydroseeding exposed soil as necessary if erosion or sedimentation occurs.
5. Removing all trash or undesirable debris from the planting areas as necessary.
6. Removal of invasive or non-native vegetation.

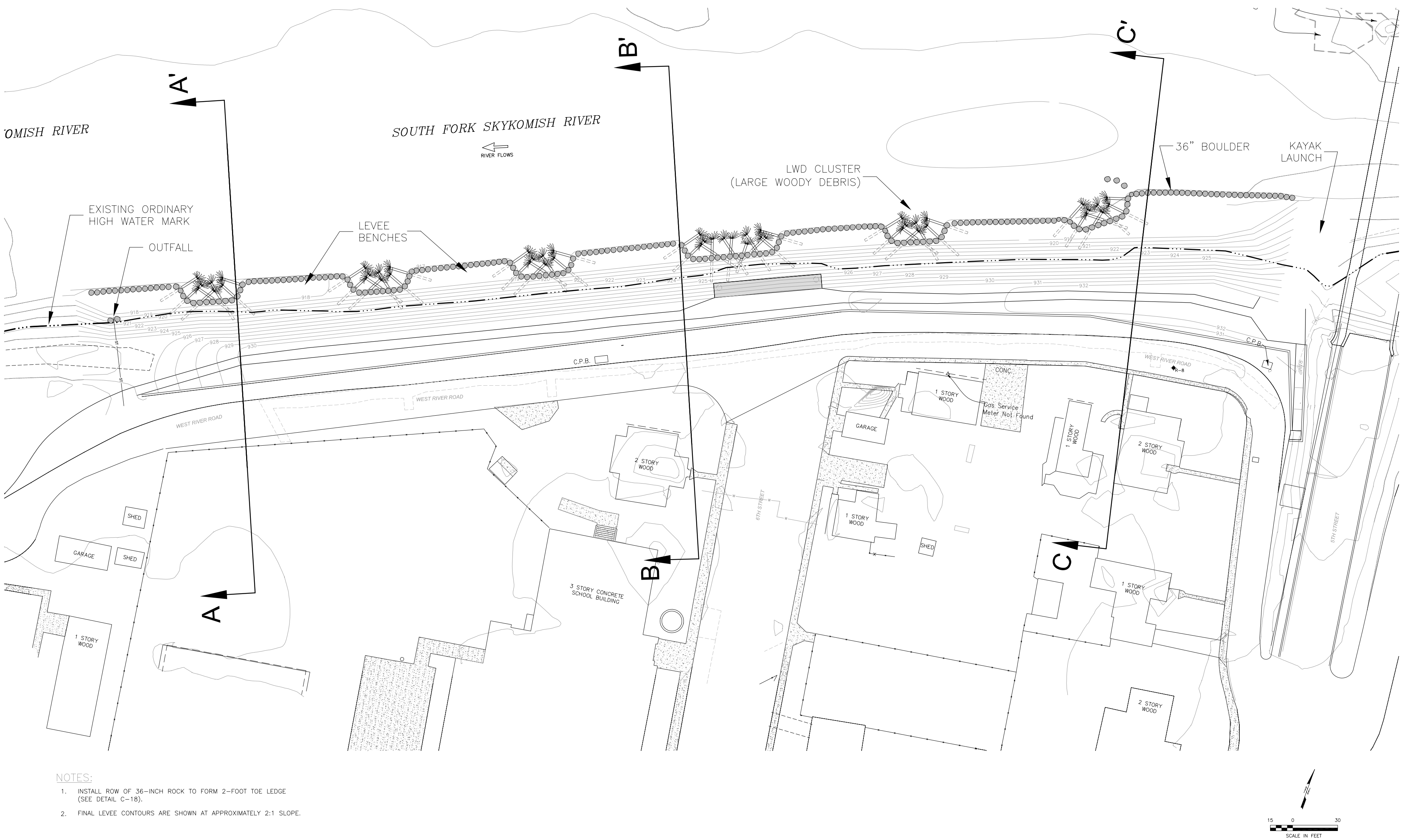
### 3.6 Reporting

Technical memoranda will be prepared for each site visit conducted, and will summarize the results of each monitoring visit. The memoranda will be submitted to the Corps within 60 days following completion of each monitoring effort. The technical memoranda will document the percent survival within the planted zones and make recommendations for improvements and/or corrective measures for any problems noted during the monitoring visits.

## 4.0 REFERENCES


Johnson, A.W. and J.M. Stypula. eds. 1993. Guidelines for Bank Stabilization Projects in the Riverine Environments of King County. King County Department of Public Works, Surface Water Management Division, Seattle, Washington.

The RETEC Group, Inc. (RETEC). 2005. Joint Aquatic Resources Permit Application for the Skykomish Levee Remediation Project. Resubmitted December, 2005.




NOTES:

1. INSTALL ROW OF 36-INCH ROCK TO FORM 2-FOOT TOE LEDGE (SEE DETAIL C-18).
2. FINAL LEVEE CONTOURS ARE SHOWN AT APPROXIMATELY 2:1 SLOPE.

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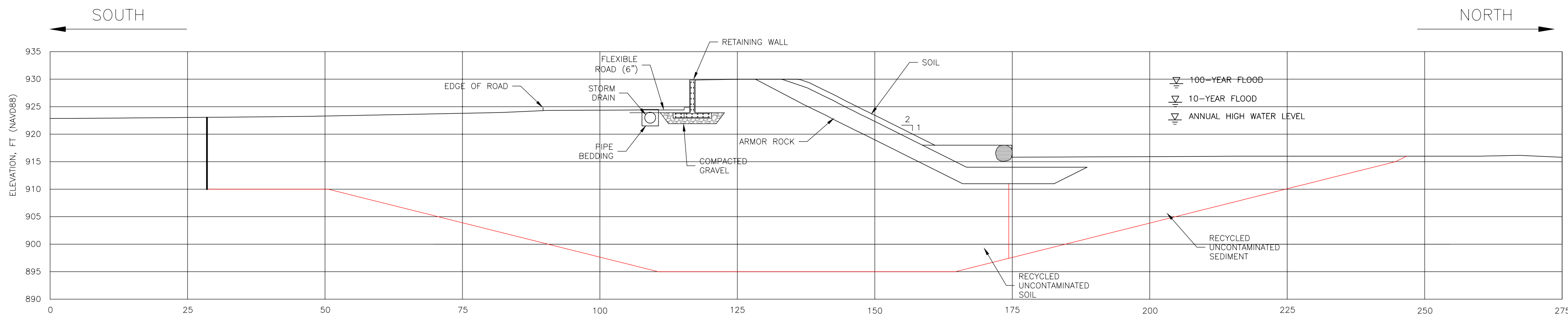
SKYKOMISH, WASHINGTON
BN050-16423-520

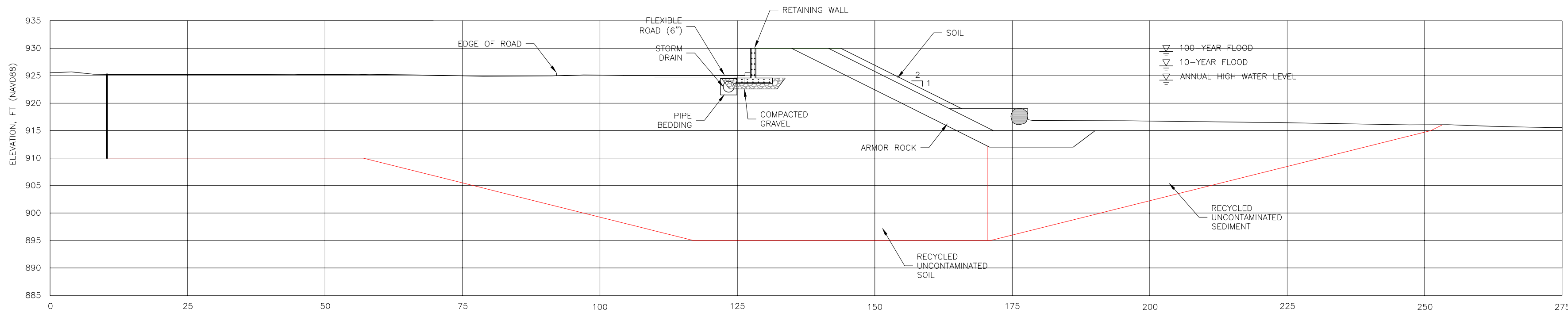
DATE: 12/20/05 | DRWN: A.S./SEA

**EXISTING AND FINAL LEVEE CONTOURS**

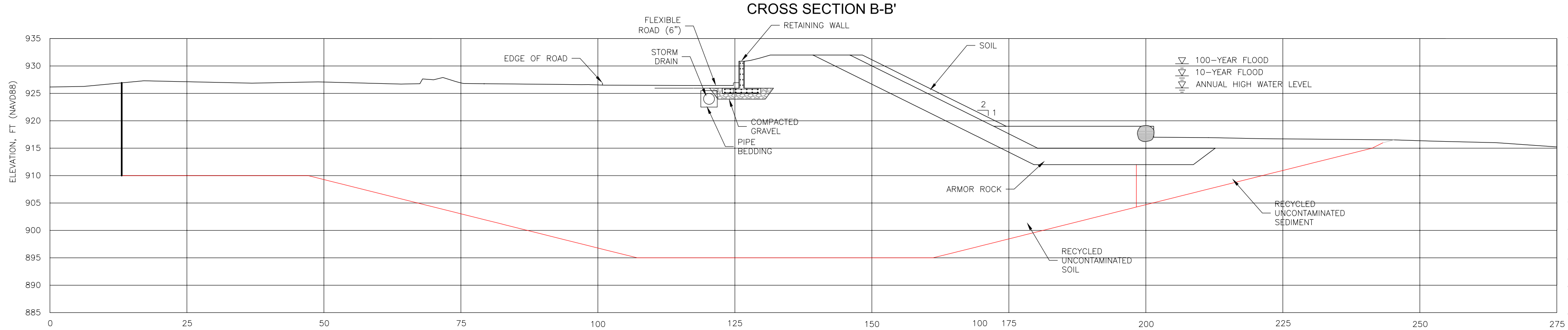
**FIGURE 1**




CROSS SECTION A-A'




CROSS SECTION B-B'



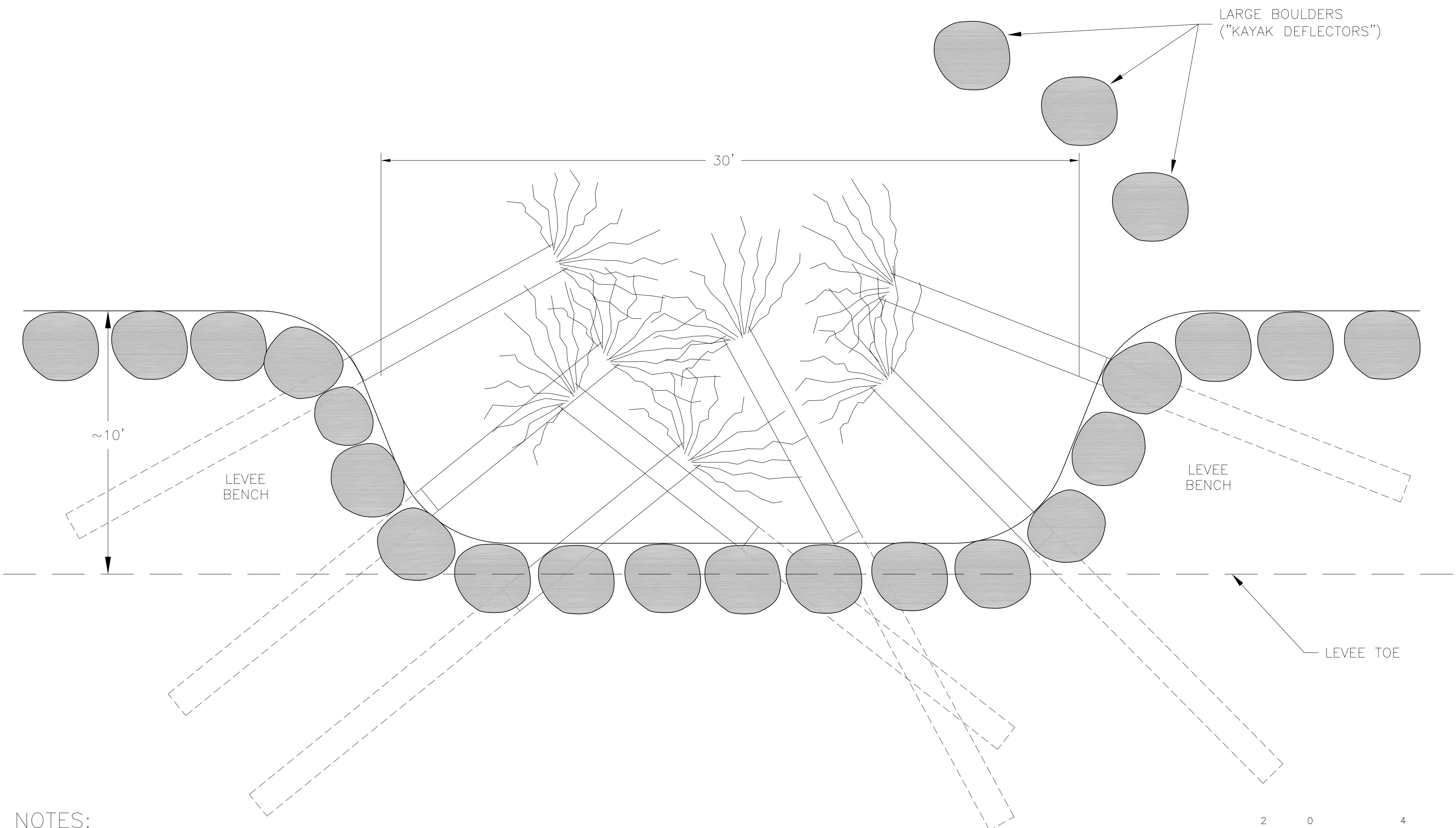

CROSS SECTION C-C'

NOTES:

1. SOIL IS MATERIAL EXCAVATED FROM UNDER LEVEE
2. SEDIMENT IS MATERIAL EXCAVATED FROM UNDER RIVER

RETEC

| | |
|---|---|
| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | FINAL SECTIONS |
| DATE: 12/20/05 DRWN: A.S./SEA | FIGURE 2 |




LWD CLUSTER PLAN VIEW (TYP.)

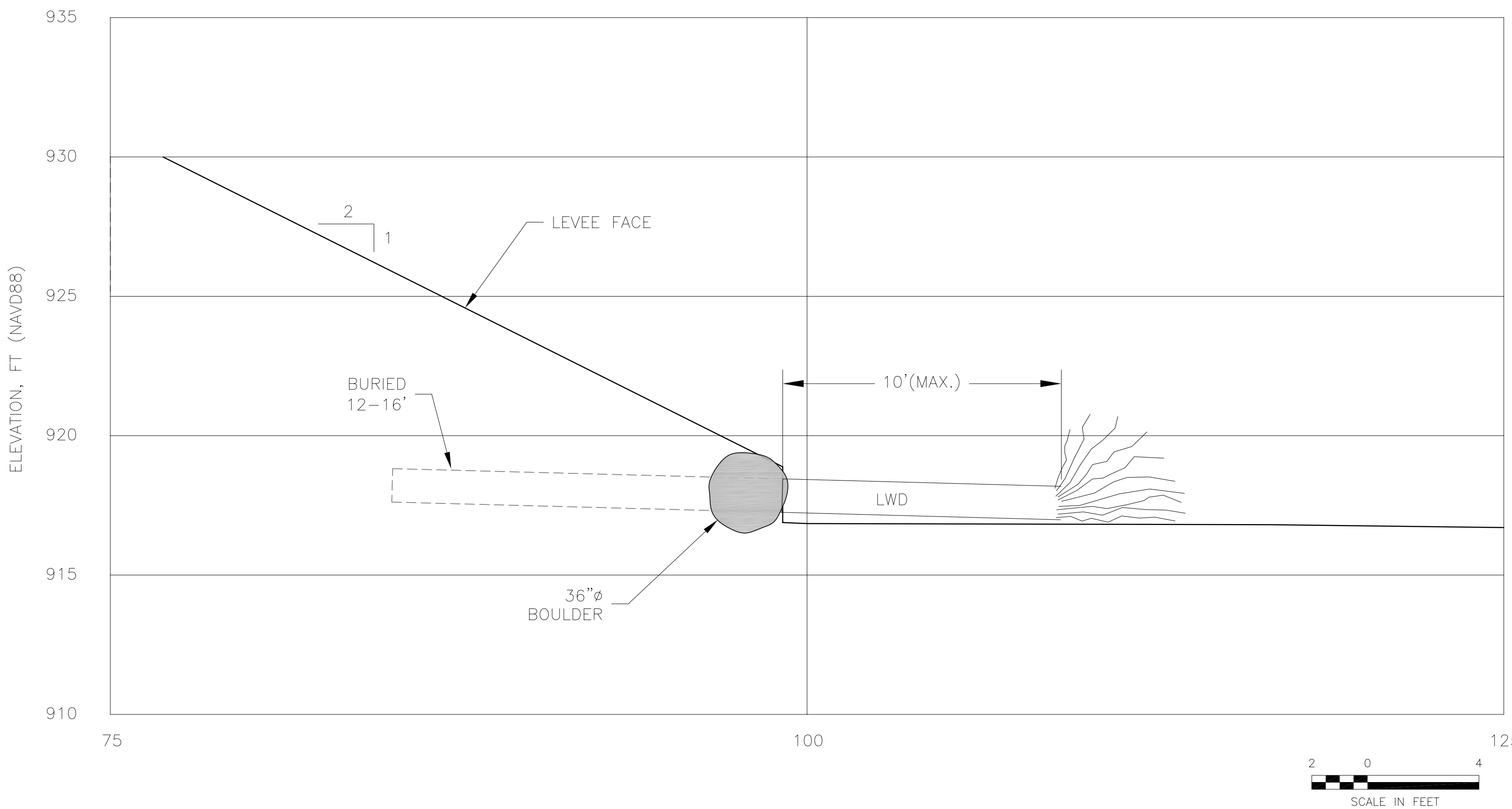
NOTES:

1. BOULDER CLUSTER PLACED ONLY ON UPSTREAM LWD CLUSTER.

RETEC

| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | LWD CLUSTER DETAIL<br>(PLAN VIEW) |
|---|---|
| DATE: 12/20/05 DRWN: A.S./SEA | FIGURE 3 |

File: H:\16423\DESIGN SET\PLANTINGS\16423L001.dwg Layout: FIGURE 3 User: astenberg Plotted: Dec 20, 2005 - 4:19pm Xref's: SKY8-RETEC

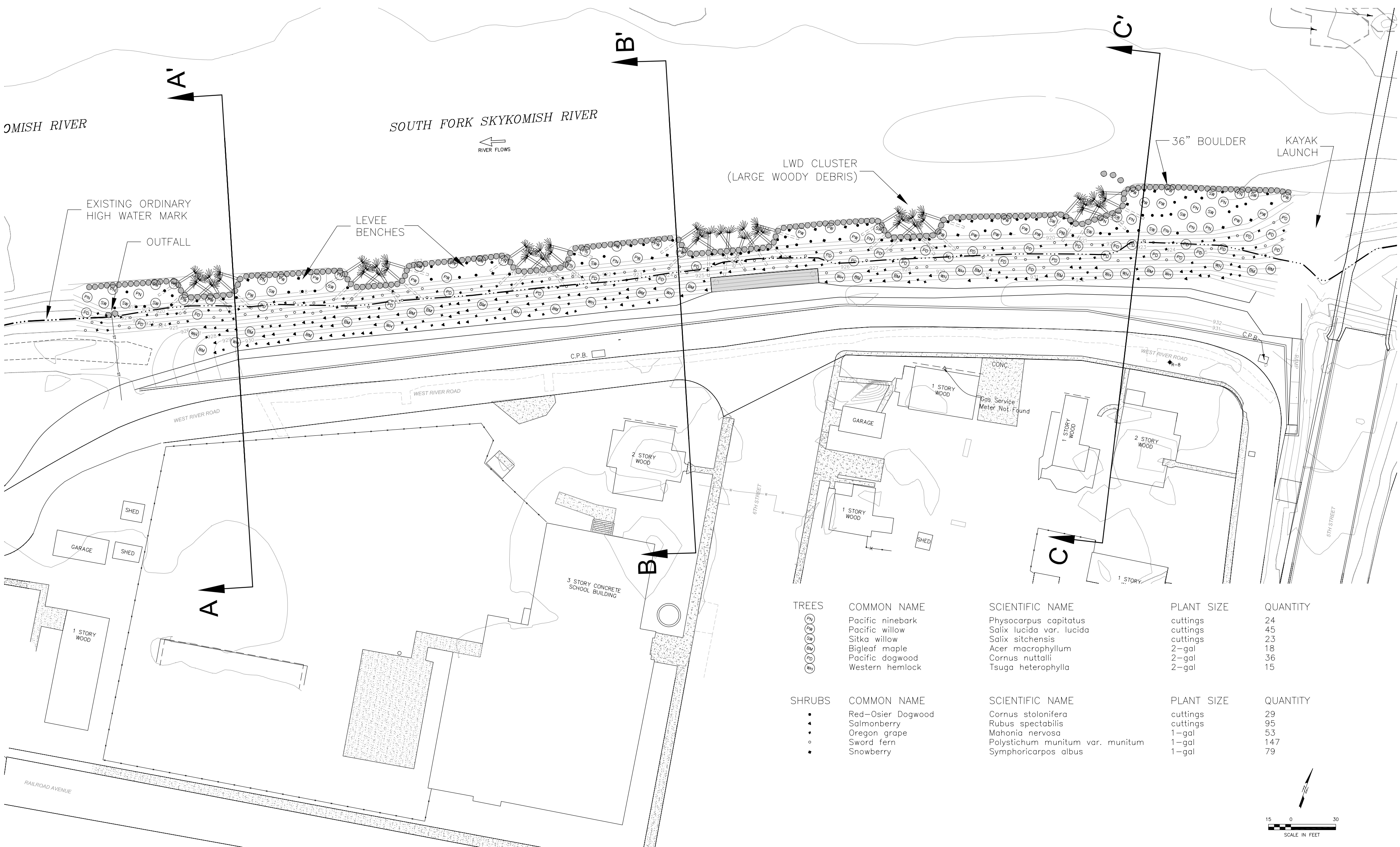



# LWD CLUSTER SECTION (TYP.)

| | |
|---|---|
| THE BNSF RAILWAY COMPANY<br>SKYKOMISH, WASHINGTON<br>BN050-16423-520 | **LWD CLUSTER DETAIL<br>(SECTION VIEW)** |
| DATE: 12/20/05 DRWN: A.S./SEA | **FIGURE 4** |

RETEC

File: H:\16423\DESIGN SET\PLANTINGS\16423L001.dwg Layout: FIGURE 4 User: astenberg Plotted: Dec 20, 2005 – 4:19pm Xref's: SKY8-RETEC




| TREES | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| PN | Pacific ninebark | Physocarpus capitatus | cuttings | 24 |
| PW | Pacific willow | Salix lucida var. lucida | cuttings | 45 |
| SW | Sitka willow | Salix sitchensis | cuttings | 23 |
| BM | Bigleaf maple | Acer macrophyllum | 2-gal | 18 |
| PD | Pacific dogwood | Cornus nuttallii | 2-gal | 36 |
| WH | Western hemlock | Tsuga heterophylla | 2-gal | 15 |

| SHRUBS | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| | Red-Osier Dogwood | Cornus stolonifera | cuttings | 29 |
| | Salmonberry | Rubus spectabilis | cuttings | 95 |
| | Oregon grape | Mahonia nervosa | 1-gal | 53 |
| | Sword fern | Polystichum munitum var. munitum | 1-gal | 147 |
| | Snowberry | Symphoricarpos albus | 1-gal | 79 |

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BN050-16423-520

DATE: 12/20/05 | DRWN: A.S./SEA

**LANDSCAPE DETAILS/PLANT PLACEMENT**

**FIGURE 5**

File: H:\16423\DESIGN SET\PLANTINGS\16423L002.dwg Layout: FIGURE 5 User: astenberg Plotted: Dec 20, 2005 - 4:41pm Xref's: BN050-16423-CE-ST-B003, storm-system, NEW-BERM-2-CONST

# Appendix A  Plant Installation Specifications

***Plant Materials***

All plant materials to be used on the site will be nursery grown stock from a reputable, local dealer.  Only native species are to be used; no hybrids will be allowed.

Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely-developed branches and vigorous, fibrous root systems.  Plants will be sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation.  Plants held in storage will be rejected if they show signs of growth.

Container stock shall have been grown in its delivery container for not less than six months but not more than two years.  Plants shall not exhibit rootbound conditions.  Under no circumstances shall container stock be handled by their trunks, stems, or tops.

Willow cuttings must be alive with any side branches cleanly removed and bark intact.  The butt ends should be cleanly cut at an angle for easy insertion into the soil.  The top should be cut square or blunt.  The cuttings should be 1/2 inch to 1-1/2 inch in diameter and 24 inches to 42 inches long.  Cuttings must be fresh and must be kept moist after they have been cut to the appropriate lengths.  They must be prepared and installed within a 48-hour period.

The seed mixture used for Hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is to be mixed to the specified proportions indicated above in Table 1 by weight and tested to minimum percentages of purity and germination.

All plant material shall be inspected by the project biologist or landscape architect upon delivery.  Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor.  Rejected plant materials shall be immediately removed from the site.

Fertilizer will be in the form of Agroform plant tabs or an approved like form.  Mulch will consist of sterile wheat straw or clean recycled wood chips approximately 1/2 inch to 1 inch in size and 1/2 inch thick, and will be applied around the base of the plantings to prevent them from drying out.

***Product Handling, Delivery and Storage***

Fertilizer should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer.  They should be stored in a manner to prevent wetting and deterioration.  All precautions customary in good trade practice shall be taken in preparing plants for moving.  Workmanship that fails to meet industry standards will be rejected.  Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out.  If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the project biologist or landscape architect. Plants, fertilizer, and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent wind burn.

***Preparation and Installation of Plant Materials***

The planting contractor shall verify the location of all elements of the landscape plan prior to installation. The project biologist or landscape architect shall reserve the right to adjust the locations of landscape elements during the installation period as appropriate. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the project biologist or landscape architect.

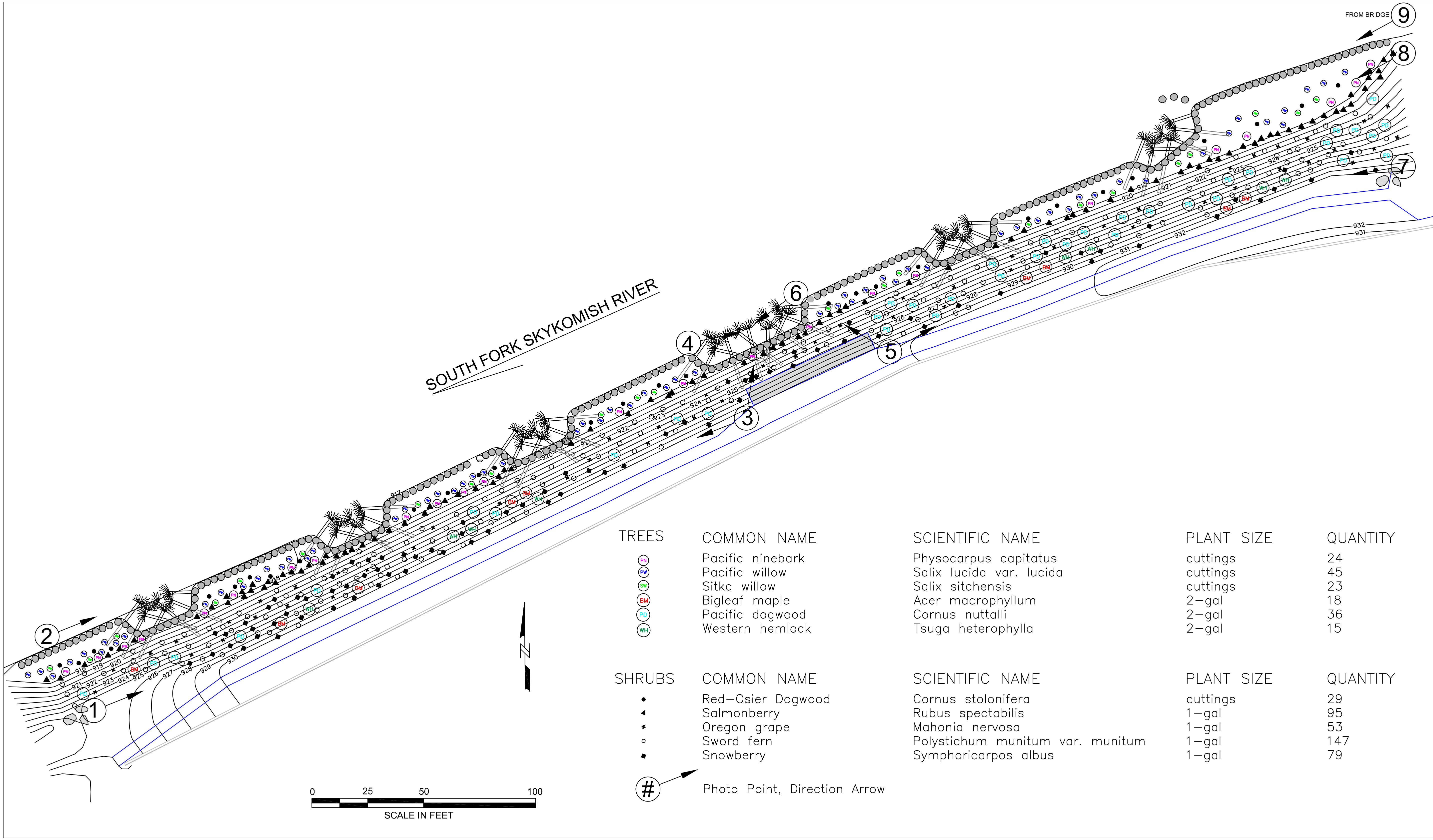
Circular plant pits with vertical sides will be excavated for all container stock (salmonberry and crabapple). The pits should be at least 12 inches in diameter, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of 4 inches.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plant pits thoroughly midway through backfilling and add Agroform tablets. Water again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 2-1/2 inch layer of mulch around the base of each container plant.

Willow cuttings will be installed to a minimum depth of 32 inches, ensuring that four-fifths of the length of the cutting is tamped into the soil. The cuttings will be installed at a right angle to the planting surface. Tamping the cutting is best accomplished with a dead blow hammer. Do not split the cuttings during tamping; cuttings that split shall be removed and replaced.

# Attachment B.

## As-Built Planting Figure, Photo points




| TREES | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| PN | Pacific ninebark | Physocarpus capitatus | cuttings | 24 |
| PW | Pacific willow | Salix lucida var. lucida | cuttings | 45 |
| SW | Sitka willow | Salix sitchensis | cuttings | 23 |
| BM | Bigleaf maple | Acer macrophyllum | 2-gal | 18 |
| PD | Pacific dogwood | Cornus nuttalli | 2-gal | 36 |
| WH | Western hemlock | Tsuga heterophylla | 2-gal | 15 |

| SHRUBS | COMMON NAME | SCIENTIFIC NAME | PLANT SIZE | QUANTITY |
|---|---|---|---|---|
| | Red-Osier Dogwood | Cornus stolonifera | cuttings | 29 |
| | Salmonberry | Rubus spectabilis | 1-gal | 95 |
| | Oregon grape | Mahonia nervosa | 1-gal | 53 |
| | Sword fern | Polystichum munitum var. munitum | 1-gal | 147 |
| | Snowberry | Symphoricarpos albus | 1-gal | 79 |

# Photo Point, Direction Arrow

FIGURE 1. SKYKOMISH LEVEE AS-BUILT FIGURE, PHOTO POINT LOCATIONS

# ATTACHMENT C.

# PHOTO LOG

## OCTOBER 31, 2008 – FINAL LEVEE PLANTING

**Photograph 1. Photo Point 1, top of levee, facing upstream.**

**Photograph 2. Photo Point 2, bottom of levee, facing upstream.**

**Photograph 3. Photo Point 3, top of levee, facing downstream.**

**Photograph 4. Photo Point 3, top of levee, facing LWD structures below view platform.**

**Photograph 5. Photo Point 4, facing upstream.**

**Photograph 6. Photo Point 5, facing downstream toward LWD structures below view platform.**

**Photograph 7. Photo Point 5, facing upstream.**

**Photograph 8. Photo Point 6, facing downstream.**


**Photograph 9. Photo Point 7, facing downstream.**

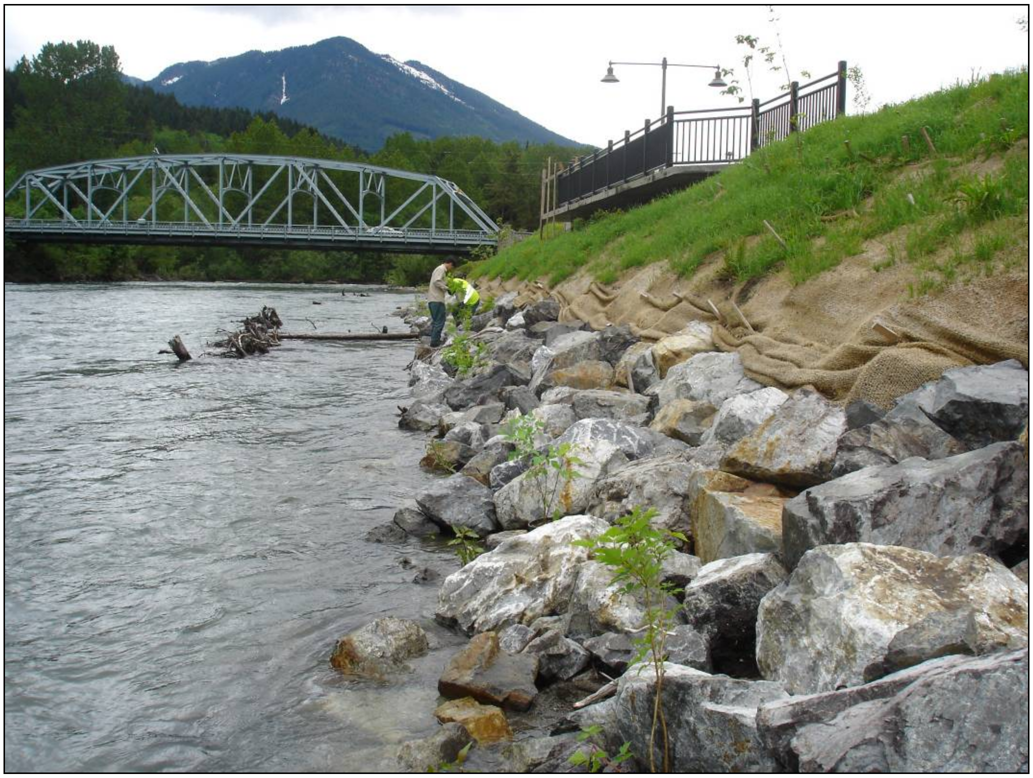

**Photograph 10. Photo Point 8, facing downstream.**

**Photograph 11. Photo Point 9, on Skykomish River Bridge, facing downstream.**

## JUNE 5, 2008 - SALMONBERRY INSTALLATION

**Photograph 12. Salmonberry installation on June 5, 2008; facing west/downstream.**

**Photograph 13. Salmonberry installation on June 5, 2008; facing northeast/upstream.**


**Photograph 14. Salmonberry installation on June 5, 2008; facing east/upstream.**


**Photograph 15. Salmonberry installation on June 5, 2008; facing west/downstream.**

## July 17, 2008 – Pacific Ninebark Installation

Photograph 16. Ninebark installation on July 17, 2008; facing west/downstream.

Photograph 17. Ninebark installation on July 17, 2008; facing west/downstream.

**Photograph 18. Ninebark installation on July 17, 2008; facing levee bench.**

**Photograph 19. Ninebark installation on July 17, 2008; facing west/downstream.**

## OCTOBER 10, 2008 – PACIFIC WILLOW, SITKA WILLOW, AND RED OSIER DOGWOOD LIVE STAKE INSTALLATION

**Photograph 20. Typical live stakes installed 10-10-08**

**Photograph 21. Live stakes installed 10-10-08, facing upstream/east**

**Photograph 22. Typical live stakes (foreground) installed 10-10-08, facing downstream/west**

**Photograph 23. Typical live stakes.**

sapa:

PRESENTS:

# SKYKOMISH LEVEE
## WILDER CONSTRUCTION

## RAILING SUBMITTAL PACKAGE
## INITIAL RELEASE

GENERAL NOTES:

1. MATERIAL TYPE: 6005-T5 ALUMINUM
2. FINISH: BRONZE ANNODIZED
3. ALL DIMENSIONS SHOWN TO OTHER WORK TO BE VERIFIED IN FIELD PRIOR TO FABRICATION.
4. NO BACK CHARGES WILL BE ACCEPTED WITHOUT PRIOR AUTHORIZATION IN WRITING.
5. BALUSTER PANELS FOR AREAS WHERE RAILING POSTS SIT IN EXISTING SLEEVES WILL BE MANUFACTURED ASSUMING 6'-0" CENTER TO CENTER OF POSTS. DUE TO ALIGNMENT OF EXISTING SLEEVES, BALUSTER PANEL TOP AND BOTTOM RAIL SPLICE GAPS MAY VARY FROM 1/8" TO 1 1/2"

| MAT'L | PARTS | MATERIAL SPECIFICATIONS |
|---|---|---|
| ALUMINUM | EXTRUDED PIPE | ASTM B221, 6005-T5 |
| | EXTRUDED CHANNELS | ASTM B221, 6005-T5 |
| | COVER PLATES | ASTM B221, 6005-T5 |
| STEEL | ANCHOR BOLTS NUTS & WASHERS | ASSHTO M164, GALVANIZED or ZINC PLATED IN ACCORDANCE WITH SPECIFICATIONS M232 |
| | PLATES | ASSHTO M183 |
| STAINLESS STEEL | EXPANSION PINS | ASTM A-276, TYPE 302 STAINLESS STEEL |

ARCHITECT AND CONTRACTOR NOTES:

THESE SHOP DRAWINGS, WHEN APPROVED, SHALL BE DEEMED AS AN ACCURATE INTERPRETATION OF THE PROJECT REQUIREMENTS, AND SUCH APPROVAL SHALL CONSTITUTE AUTHORIZATION TO PROCEED WITH THE SHOP FABRICATION. ANY CHANGES REQUESTED SUBSEQUENT TO THE APPROVAL DATE MUST BE SUBMITTED IN WRITING AND ARE SUBJECT TO THE APPROVAL OF SAPA.

SAPA ASSUMES NO RESPONSIBILITY FOR WORK AND/OR ERRORS INCURRED BY OTHER TRADES THROUGH THE USE OF THESE SHOP DRAWINGS.

SHOP DRAWINGS NOT TO BE SCALED FOR CRITICAL DIMENSIONS. ALL DIMENSIONS AND BUILDING MATERIALS ARE TO BE VERIFIED AND COORDINATED BY THE GC WITH APPLICABLE ARCHITECTURAL AND STRUCTURAL DRAWINGS.

ALL MATERIALS PROVIDED BY OTHERS TO WHICH SAPA'S RAILS ARE TO BE ANCHORED MUST BE STRUCTURALLY SOUND AND CAPABLE OF SUPPORTING THE WEIGHTS AND REACTIONS OF THE BALCONY RAILING SYSTEM UNDER MAXIMUM DESIGN LOADS.



sapa:
FABRICATED COMPONENTS
7320 NE 55TH AVE PORTLAND OR 97218
PHONE (800) 540-7090
FAX (503) 288-0528

| REV.# | ACTION | BY / DATE |
|---|---|---|
| 3 | --- | --- |
| 2 | --- | --- |
| 1 | CHANGE NOTES & FINISH, SHOW GRABRAIL | TIM C – 10/24/07 |

PROJECT: SKYKOMISH LEVEE

CONTRACTOR: WILDER CONSTRUCTION

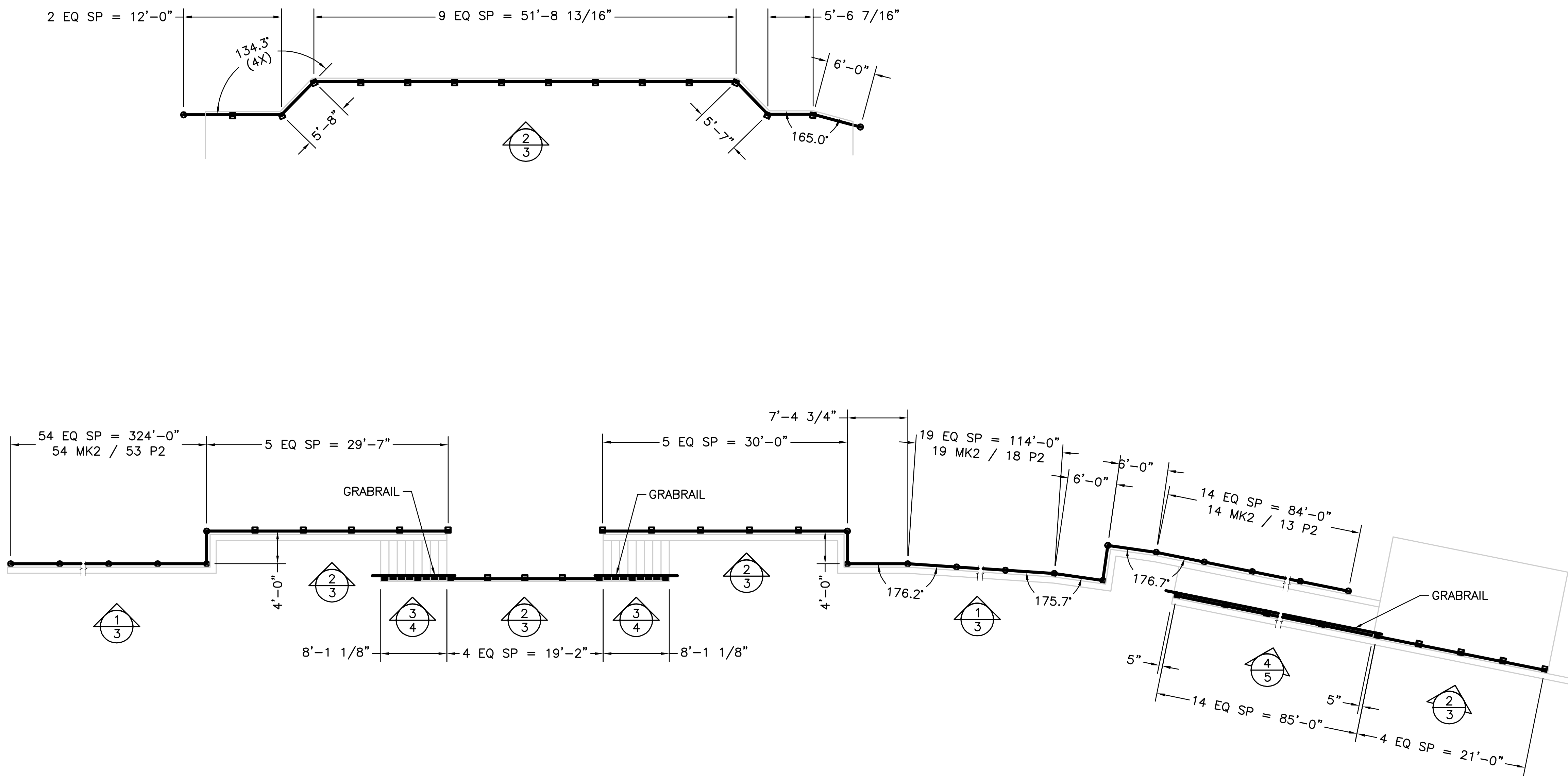
DATE: 10/05/07

SCALE: AS NOTED

DRAWN BY: TJC

PHR (PED) RAIL

W.O. NO. 17465



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FABRICATED COMPONENTS
7320 NE 55TH AVE PORTLAND OR 97218
PHONE (800) 540-7090 • FAX (503) 288-0528

| REV.# | ACTION | BY / DATE |
|---|---|---|
| 3 | --- | --- |
| 2 | --- | --- |
| 1 | CHANGE NOTES & FINISH, SHOW GRABRAIL | TIM C – 10/24/07 |

PROJECT: SKYKOMISH LEVEE

CONTRACTOR: WILDER CONSTRUCTION

DATE: 10/05/07

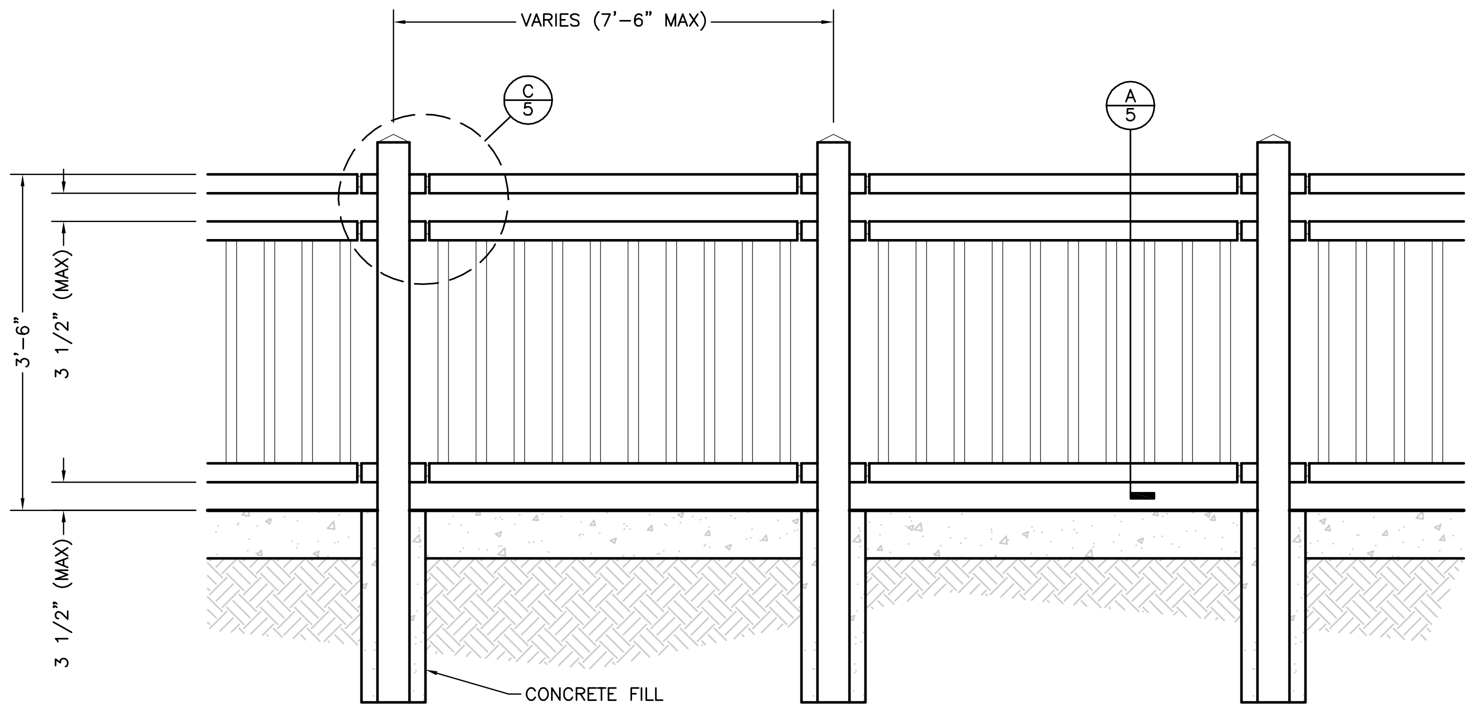
SCALE: AS NOTED

DRAWN BY: TJC

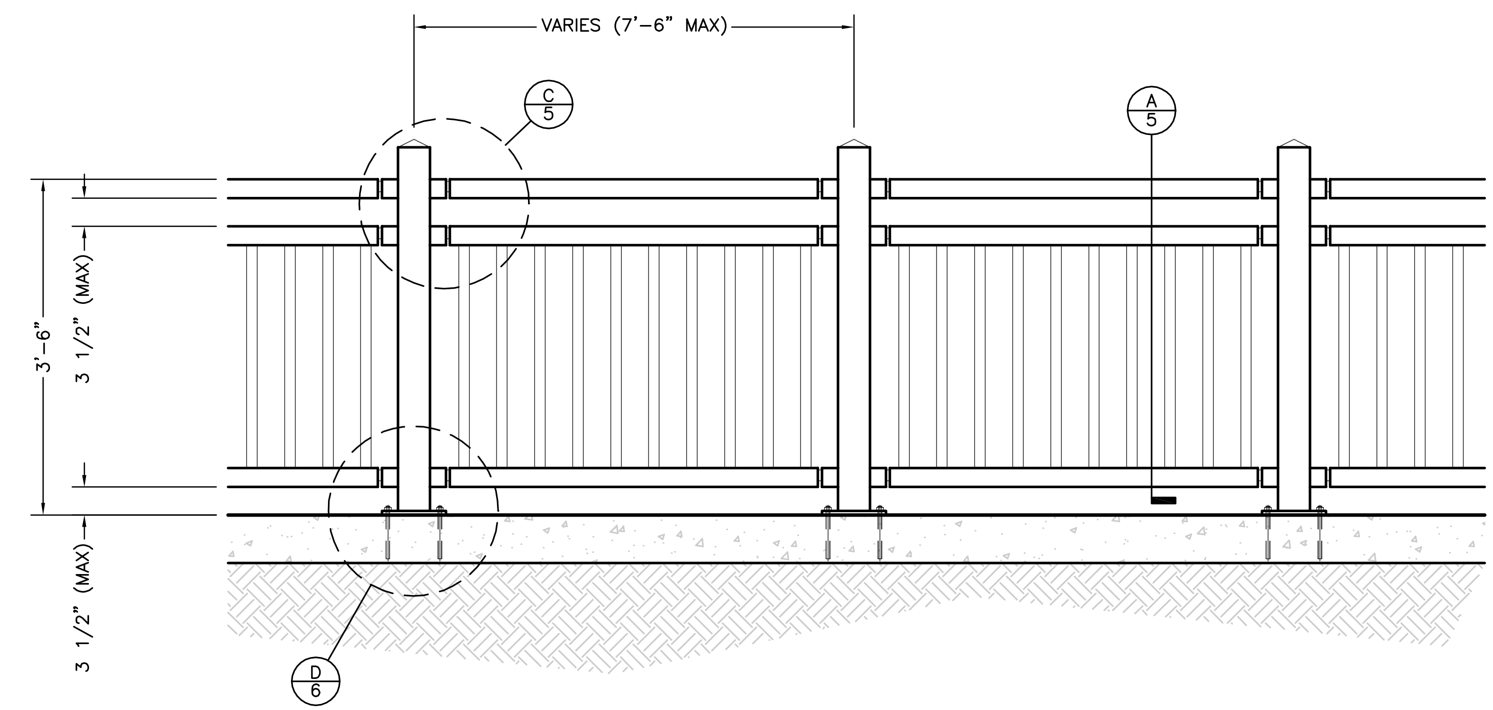
PHR (PED) RAIL

W.O. NO. 17465

SHEET NO. 2 OF 8




1 RAILING ELEVATION
1/2"=1'-0"




2 RAILING ELEVATION
1/2"=1'-0"



sapa:
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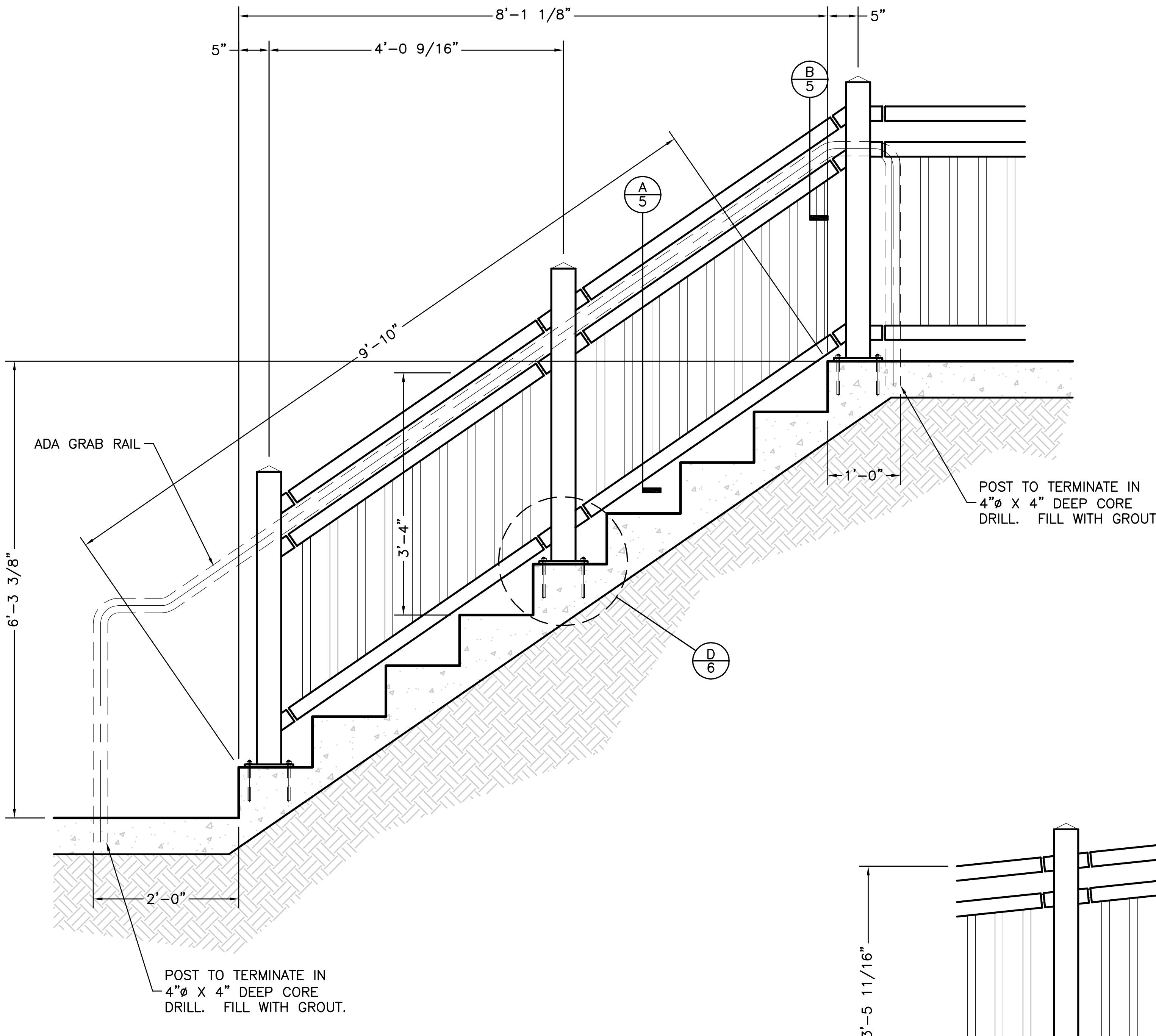
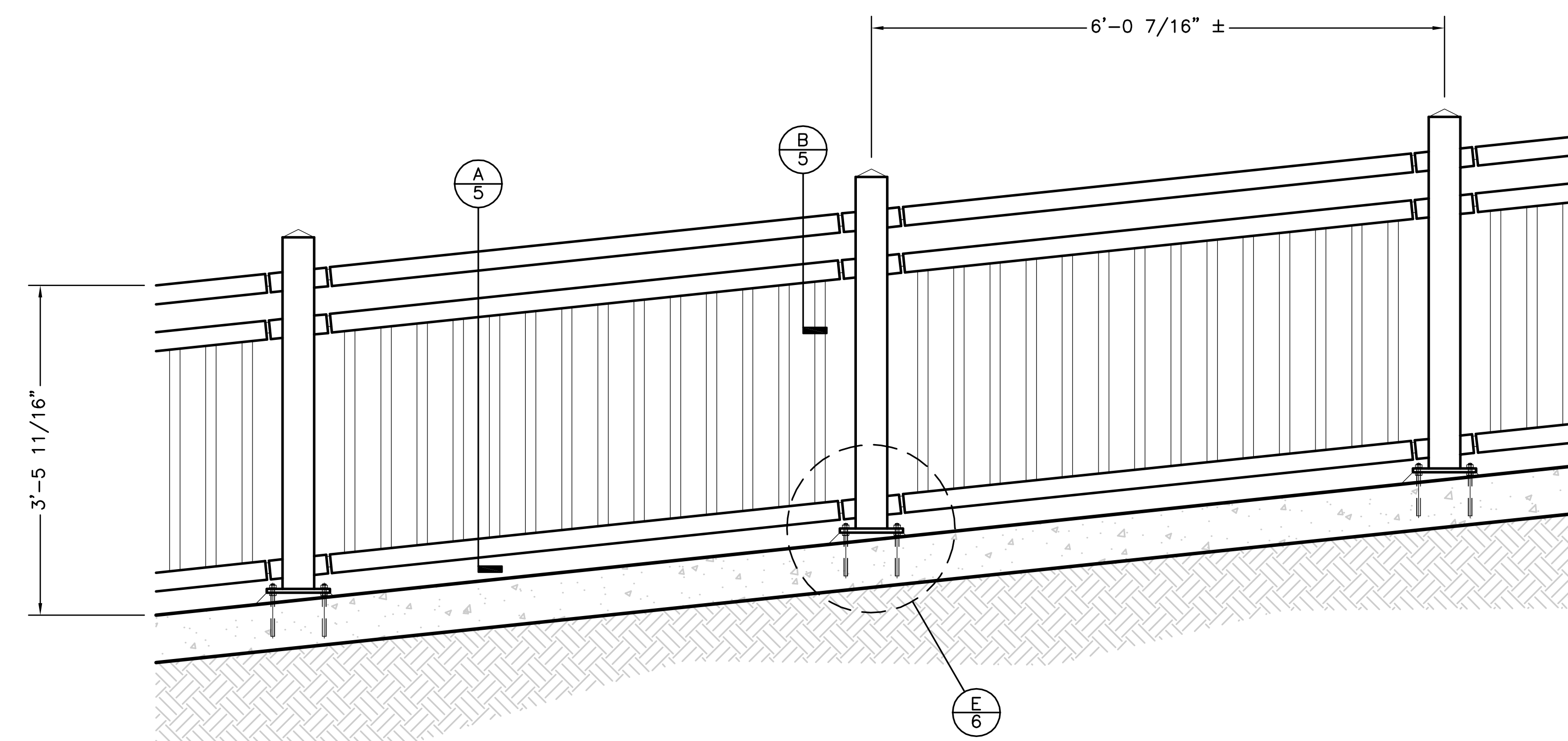
CONTRACTOR: WILDER CONSTRUCTION

DATE: 10/05/07
SCALE: AS NOTED
DRAWN BY: TJC

PHR (PED) RAIL
W.O. NO. 17465
SHEET NO. 3 OF 8




3 ELEVATION – RAILING WITH ADA GRAB RAIL
1/2"=1'-0"




4 ELEVATION – RAMP RAILING (ADA GRAB RAIL NOT SHOWN)
1/2"=1'-0"



sapa:
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7320 NE 55TH AVE PORTLAND OR 97218
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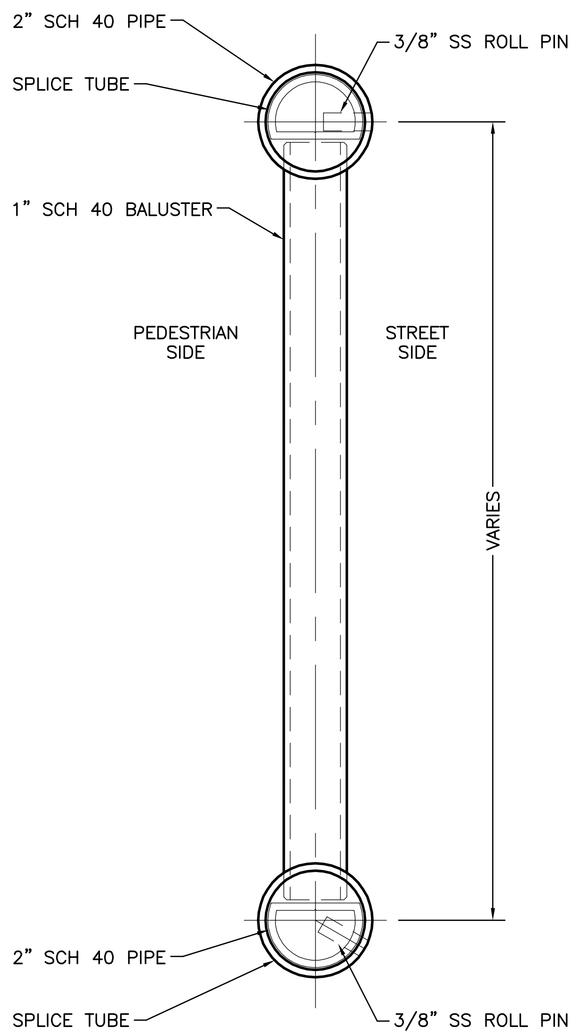
| | |
|---|---|
| PROJECT | SKYKOMISH LEVEE |
| CONTRACTOR | WILDER CONSTRUCTION |
| DATE: | 10/05/07 |
| SCALE: | AS NOTED |
| DRAWN BY: | TJC |

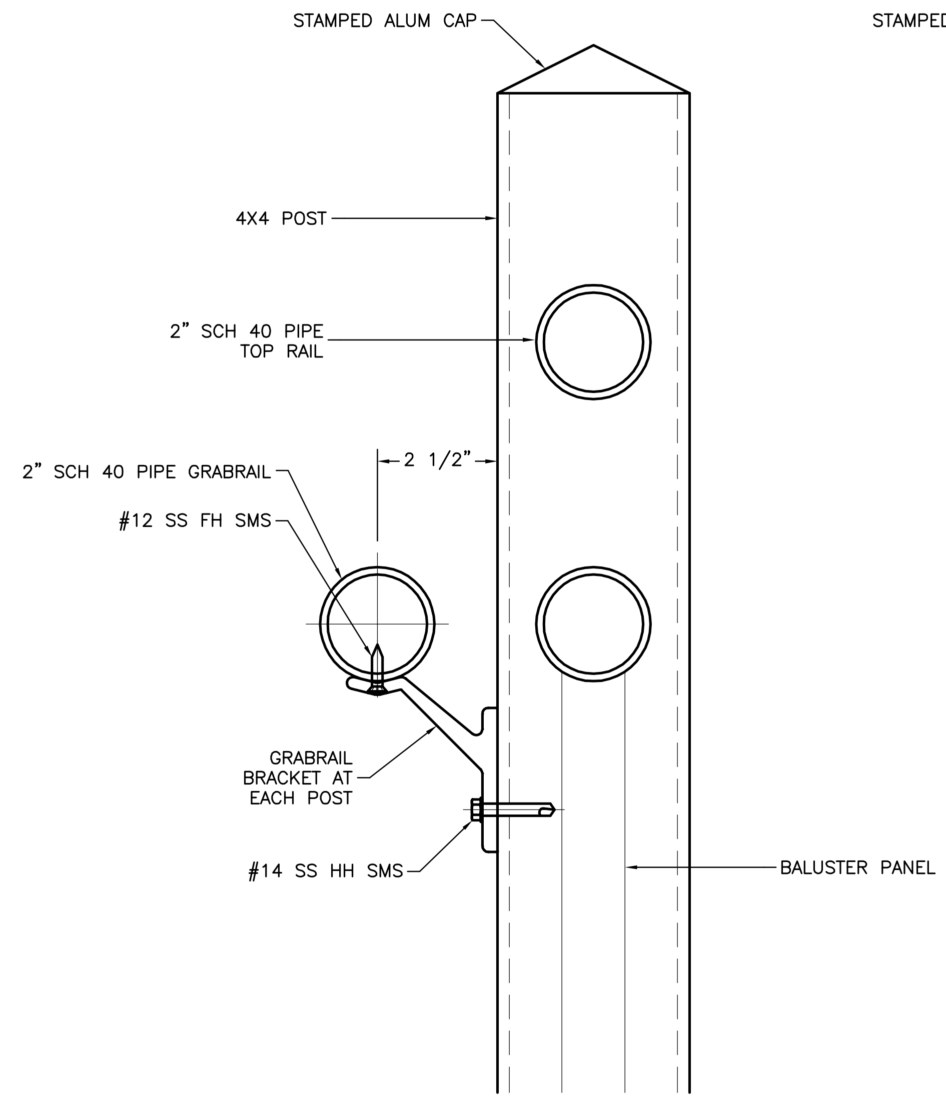
PHR (PED) RAIL

W.O. NO. 17465

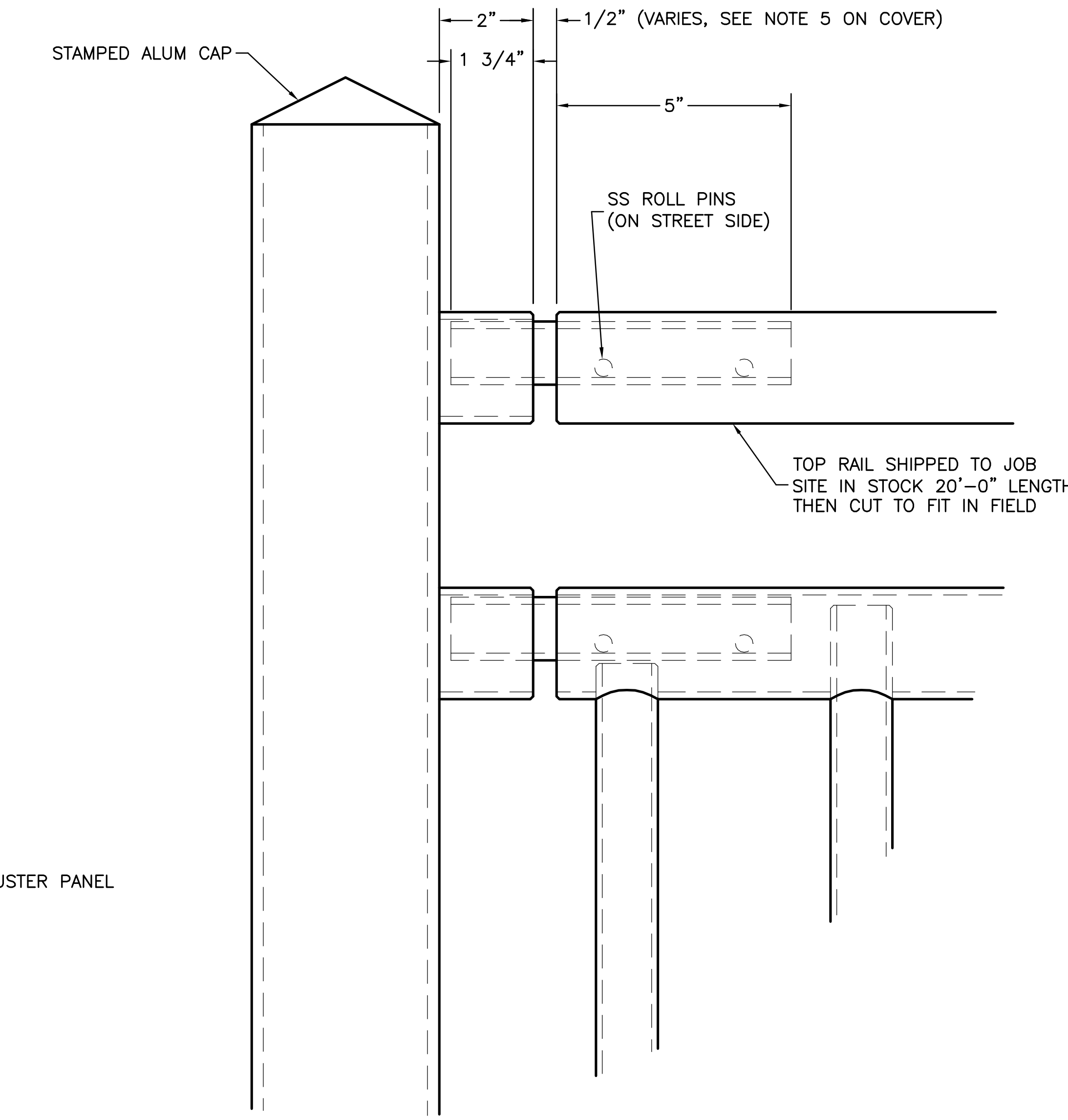
SHEET NO. 4 OF 8




A SECTION 3"=1'-0"




B SECTION 3"=1'-0"




C DETAIL 3"=1'-0"



sapa:
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PROJECT: SKYKOMISH LEVEE

CONTRACTOR: WILDER CONSTRUCTION

DATE: 10/05/07

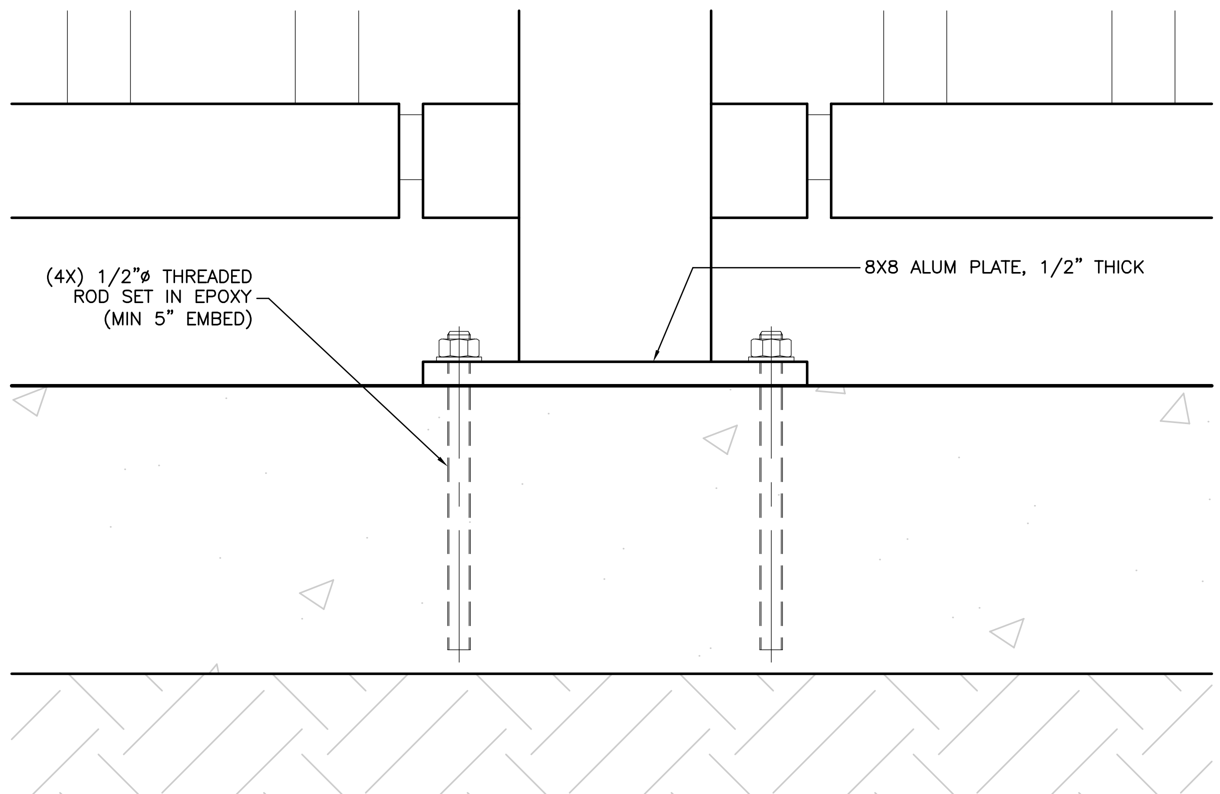
SCALE: AS NOTED

DRAWN BY: TJC

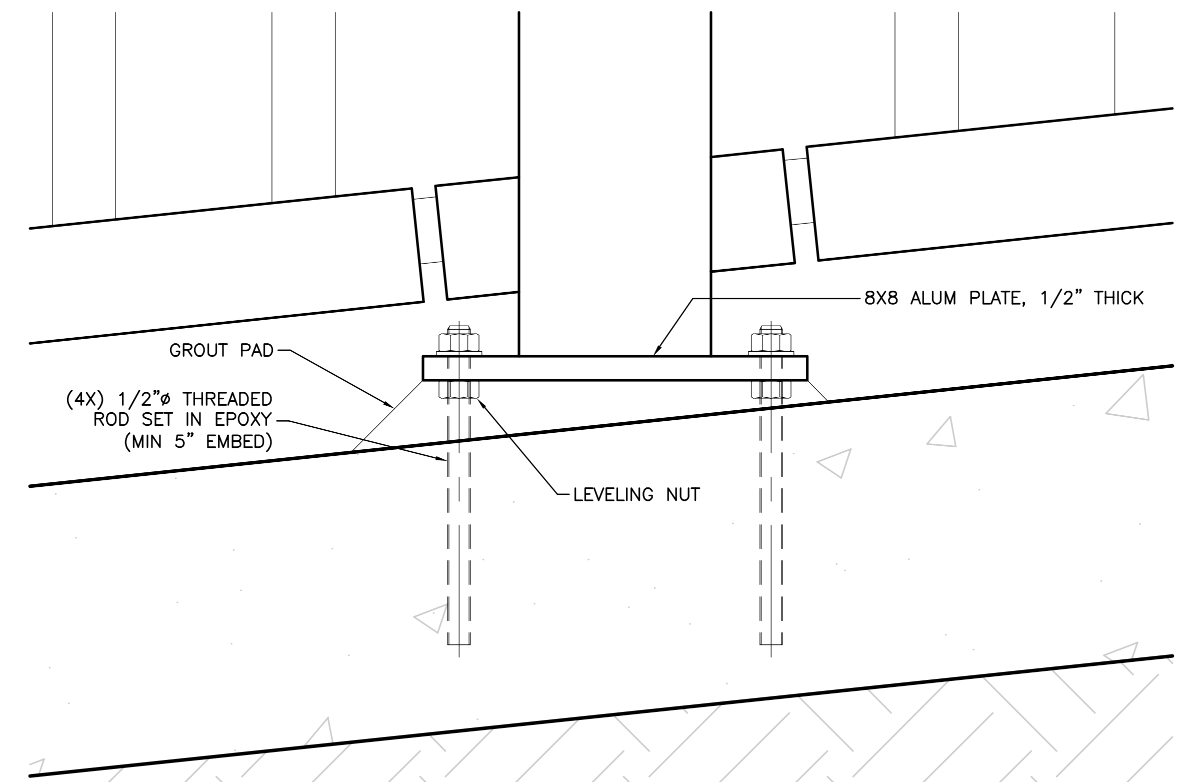
PHR (PED) RAIL

W.O. NO. 17465

SHEET NO. 5 OF 8




D DETAIL 3"=1'-0"




E DETAIL 3"=1'-0"



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7320 NE 55TH AVE PORTLAND OR 97218
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DATE: 10/05/07

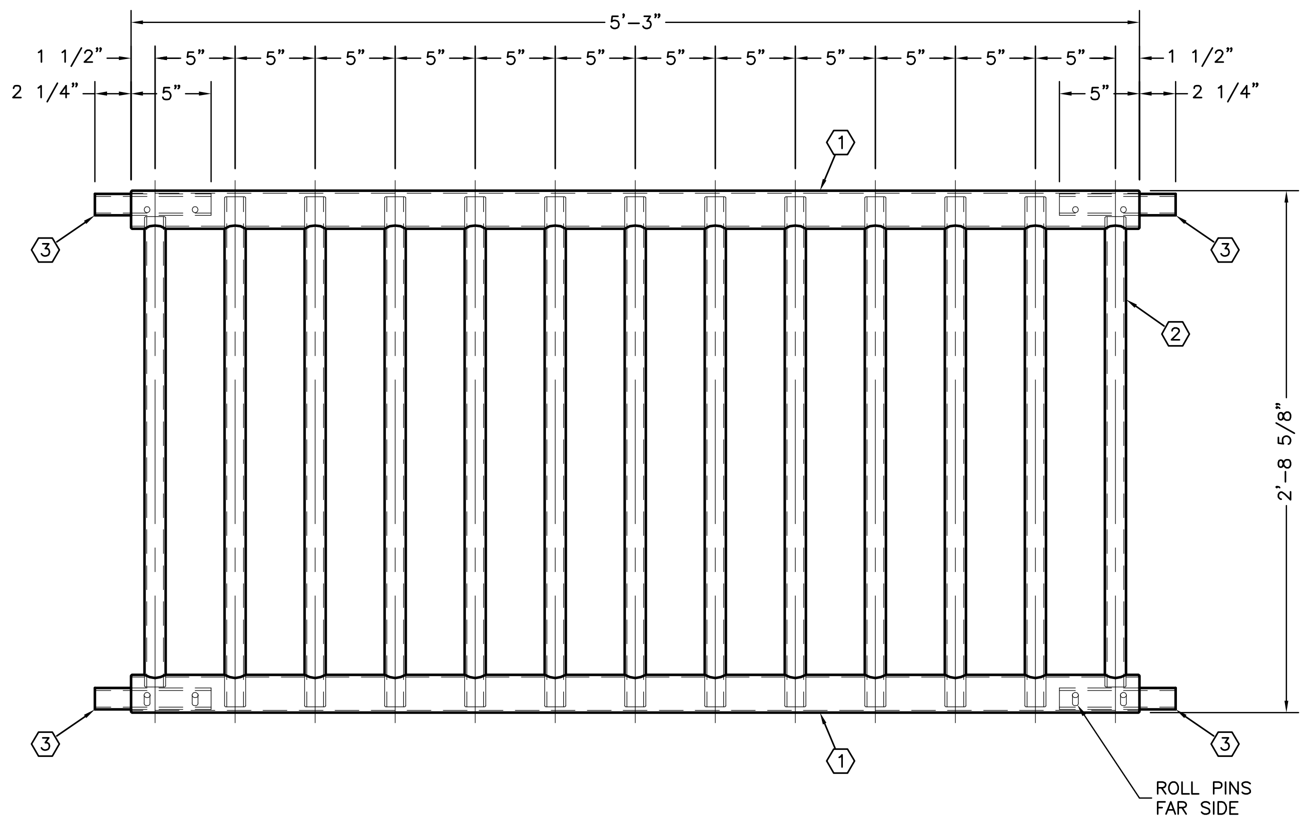
SCALE: AS NOTED

DRAWN BY: TJC

PHR (PED) RAIL

W.O. NO. 17465

SHEET NO. 6 OF 8




| PART MARK | MK2 | BILL OF MATERIALS | | | |
|---|---|---|---|---|---|
| LENGTH | 5'-3" | | | | |
| QUANTITY | 97 | | LENGTH | | |
| ITEM | QTY | DESCRIPTION | FT | INCH | REMARKS |
| 1 | 2 | 2" SCH 40 PIPE | 5 | 3 | – |
| 2 | 13 | 1" SCH 40 PIPE | 2 | 7 7/8 | – |
| – | 3 | SPLICE SLEEVE (DIE 16015) | 0 | 7 1/4 | SHIP 1 LOOSE |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| BUY OUT ITEMS | | | | | |
| A | 12 | 3/8"ø SS ROLL PIN | – | – | A-276 TYPE 302 |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| FINISH TO BE BRONZE ANNO | | | | | |



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CONTRACTOR: WILDER CONSTRUCTION

DATE: 10/05/07

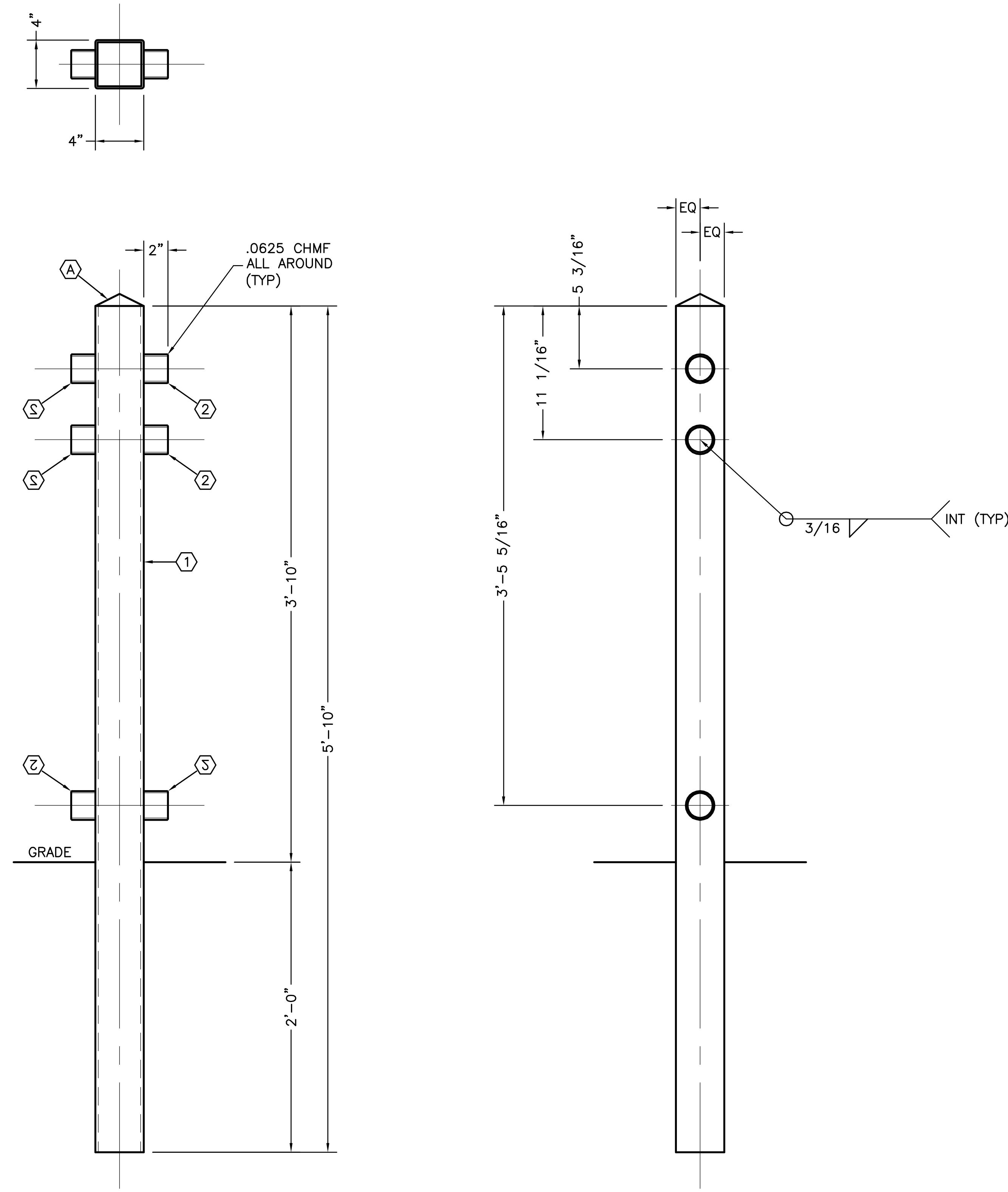
SCALE: AS NOTED

DRAWN BY: TJC

PHR (PED) RAIL

W.O. NO. 17465

SHEET NO. 7 OF 8




| PART MARK | P2 | BILL OF MATERIALS | | | |
|---|---|---|---|---|---|
| LENGTH | 5'-10" | | | | |
| QUANTITY | 84 | | LENGTH | | |
| ITEM | QTY | DESCRIPTION | FT | INCH | REMARKS |
| 1 | 1 | 4X4 POST (DIE 13394) | 5 | 10 | – |
| 2 | 6 | 2" SCH 40 PIPE | 0 | 2 | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| BUY OUT ITEMS | | | | | |
| A | 1 | WAGNER POST CAP #5121 | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| – | – | – | – | – | – |
| FINISH TO BE BRONZE ANNO | | | | | |



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DRAWN BY: TJC

PHR (PED) RAIL

W.O. NO. 17465

SHEET NO. 8 OF 8

ANALYTICAL CHEMISTS
and
BACTERIOLOGISTS
Approved by State of California

SOIL CONTROL LAB

42 HANGAR WAY
WATSONVILLE
CALIFORNIA
95076
USA

Tel: 831 724-5422
FAX: 831 724-3188

Soil Control Lab
42 Hangar Way
Watsonville CA 95076
www.compostlab.com

Account No.:
7030002 3/4 2192
Group: Mar.07.A No.21

Cedar Grove Compost Inc.
17825 Cedar Grove Rd. SE
Maple Valley, WA 98038
Attn: Leslie Credgington

DATE RECEIVED: 01 Mar. 07
SAMPLE ID: ESC07.10
SAMPLE ID. No.: 3/4 7030002

| | Result | WA DOT Specs. | |
|---|---|---|---|
| pH value (pH units) | 7.46 | 6.0-8.5 | Pass |
| Moisture (% wet wt) | 36.1 | — | — |
| Organic Matter (% dry wt) | 19.9 | >40 | Fail |
| Ash (% dry wt) | 80.1 | <60 | Fail |
| Respiration Rate (mg CO2-C/g OM/day) | 2.5 | < 7 | Pass |
| Cucumber Bioassay | | | |
| Germination (% of control) | 100 | > 80 | Pass |
| Vigor (% of control) | 100 | > 80 | Pass |
| Inerts by % dry wt (sum of foreign material) | <0.5 | <1.0 | Pass |
| Inerts by % volume (sum of foreign material) | <0.5 | <1.0 | Pass |
| Soluble salts (mmhos/cm) | 1.720 | < 4mmhos/cm | Pass |

Size distribution

| Inches | MM | % Passing (dry wt. basis) | % Passing Limits Coarse | % Passing Limits Fine |
|---|---|---|---|---|
| 3" | 76.2 | 100.0 | 100 | 100 |
| 2" | 50.8 | 100.0 | — | 100 |
| 1" | 25.4 | 100.0 | 90-100 | 99-100 |
| 3/4" | 19.0 | 97.1 | 70-100 | — |
| 1/2" | 12.7 | 93.9 | — | 90-100 |
| 1/4" | 6.3 | 86.5 | 40-60 | 75-100 |
| > 6" | 152.4 | 100.0 | 100 | 100 |

Analyst: Kate Kurtz

**Sarah Albano/Seattle/RETEC**
05/23/2007 01:40 PM

To "Bardy, Louise (ECY)" <LBAR461@ECY.WA.GOV>
cc "Halah Voges" <HVoges@retec.com>, "Mike Byers" <mbyers@retec.com>, "Timm, Ronald W. (ECY)" <rtim461@ECY.WA.GOV>, Winston
bcc
Subject RE: Skykomish, Topsoil, Please Respond

Louise and Ron,

Here are the physical parameters for the Cedar Grove Top Soil.  Please let us know if you have any questions.

EV Topsoil Mix Handout 2007.doc   Topsoil Lab.pdf   Everett Solid Waste Permit.pdf

Sarah Albano
Environmental Engineer
The RETEC Group, Inc.- Merged with ENSR in 2007
1011 S.W. Klickitat Way, Suite 207
Seattle, WA 98134

phone: (206) 624-9349 x207
fax: (206) 624-2839
"Bardy, Louise (ECY)" <LBAR461@ECY.WA.GOV>

**"Bardy, Louise (ECY)" <LBAR461@ECY.WA.GOV>**
05/23/2007 07:58 AM

To "Sarah Albano" <SAlbano@retec.com>
cc "Mike Byers" <mbyers@retec.com>, "Halah Voges" <HVoges@retec.com>, "Timm, Ronald W. (ECY)" <rtim461@ECY.WA.GOV>
Subject RE: Skykomish, Topsoil, Please Respond

Good Morning Sarah,

Ecology approves this material only for the chemical analyses described in the data package we received from TestAmerica on May 18, 2007.  Ecology has not received any physical parameter data on C:N values, pH, temperature, Solvita results, etc., so we cannot approve the material for these parameters. I am available this morning to review any of this data.

It should be clear that even if Ecology approves the Cedar Grove material, the responsibility for restoration success is still BNSF's.

Thank you.

Louise Bardy
Department of Ecology
3190 160th Ave. SE
Bellevue, WA  98008
(425) 649-7209

**From:** Sarah Albano [mailto:SAlbano@retec.com]
**Sent:** Tuesday, May 22, 2007 3:30 PM
**To:** Bardy, Louise (ECY)
**Cc:** Mike Byers; Halah Voges
**Subject:** Skykomish, Topsoil, Please Respond

Hi Louise,

I wanted to summarize our phone conversation from this morning regarding residential topsoil up in Skykomish. After your review of the data (attached), you determined that the chemical make-up of the Cedar Grove material is typical of commercially available top soils. While the material does not meet the site-specific cleanup level of 22 mg/kg NWPTH-Dx, the TPH concentration is significantly lower than the direct contact criteria of 3,400 mg/kg NWTPH-Dx. You raised concerns about the long term nutrients in the soil and the temperature of the compost when it is applied.

BNSF needs written approval from Ecology to import and apply this material on residential properties in Skykomish. Please reply back to this message and let us know if you approve the Cedar Grove material for use in Skykomish.

Sarah Albano
Environmental Engineer
The RETEC Group, Inc.- Merged with ENSR in 2007
1011 S.W. Klickitat Way, Suite 207
Seattle, WA 98134

phone: (206) 624-9349 x207
fax: (206) 624-2839

"Bardy, Louise (ECY)" <LBAR461@ECY.WA.GOV>

05/24/2007 04:53 PM

To "Sarah Albano" <SAlbano@retec.com>

cc "Halah Voges" <HVoges@retec.com>, "Mike Byers" <mbyers@retec.com>, "Timm, Ronald W. (ECY)" <rtim461@ECY.WA.GOV>, "Winston Chen"

bcc

Subject RE: Skykomish, Topsoil, Please Respond

Hello Sarah,

As Halah and I discussed by phone this morning, the Cedar Grove topsoil described in the attached lab report is approved for landscaping in Skykomish. These type of amendments require follow-up fertilization several times per year until the yards are well established.

Louise Bardy
Department of Ecology
3190 160th Ave. SE
Bellevue, WA  98008
(425) 649-7209

---

**From:** Sarah Albano [mailto:SAlbano@retec.com]
**Sent:** Wednesday, May 23, 2007 12:41 PM
**To:** Bardy, Louise (ECY)
**Cc:** Halah Voges; Mike Byers; Timm, Ronald W. (ECY); Winston Chen
**Subject:** RE: Skykomish, Topsoil, Please Respond

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Seattle, WA 98134

phone: (206) 624-9349 x207
fax: (206) 624-2839

"Bardy, Louise (ECY)" <LBAR461@ECY.WA.GOV>

05/23/2007 07:58 AM

To "Sarah Albano" <SAlbano@retec.com>

cc "Mike Byers" <mbyers@retec.com>, "Halah Voges" <HVoges@retec.com>, "Timm, Ronald W. (ECY)" <rtim461@ECY.WA.GOV>

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(425) 649-7209

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**Sent:** Tuesday, May 22, 2007 3:30 PM
**To:** Bardy, Louise (ECY)
**Cc:** Mike Byers; Halah Voges
**Subject:** Skykomish, Topsoil, Please Respond

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1011 S.W. Klickitat Way, Suite 207
Seattle, WA 98134

phone: (206) 624-9349 x207
fax: (206) 624-2839

SNOHOMISH
HEALTH
DISTRICT

**ENVIRONMENTAL HEALTH DIVISION**
3020 Rucker Avenue, Suite 104
Everett, WA 98201-3900
425.339.5250 FAX: 425.339.5254
Deaf/Hard of Hearing: 425.339.5252 (TTY)

# SOLID WASTE FACILITY PERMIT #SW-182

Issued by the Snohomish Health District in accordance with the provisions of Chapter 70.95 of the Revised Code of Washington (RCW), Chapter 173-350 of the Washington Administrative Code (WAC) and the Snohomish Health District Sanitary Code, Chapters 3.1 and 3.2 (Adopted text of WAC 173-350).

## PERMIT PERIOD: JULY 1, 2006 TO JUNE 30, 2007

### PERMITTEE AND ADMINISTRATIVE INFORMATION

| | |
|---|---|
| NAME OF FACILITY: | Cedar Grove Composting |
| FACILITY LOCATION: | 3620 36th Place NE, Everett, Washington 98201 |
| FACILITY OWNER: | Cedar Grove, Inc. |
| FACILITY OPERATOR: | Jerry Bartlett |
| PHONE: | 206.832.3000 |
| PERMIT TYPE: | Waste Recycling / Composting |
| ANNUAL FEE: | $2246.00 |

The conditions of this permit are contained on the following pages. This permit is the property of the Snohomish Health District and may be suspended or revoked upon violation of any rules and regulations applicable hereto. This permit is not transferable to a different site, and must be renewed annually. This permit or a legible copy must be displayed or stored in a manner, which allows easy access by operating personnel.

Aran Egger, R.S.
Solid Waste and Toxics Section
Environmental Health Division

Date of Issuance

# Cedar Grove Composting
# Compost Quality Assurance Program 2007

### Two Way Topsoil Mix 2007

On February 11, 2004 the Washington State Department of Ecology imposed new minimum functional standards for all composting facilities. WAC 173-350-220 specifically defines compost manufacturing and product quality standards. Cedar Grove Composting meets these required standards. *(The new standards replace The Interim Guidelines for Grade AA Compost Quality.)*

As required, based on our production schedule at Cedar Grove, we sample every 10,000 yards of Type 1* and every 5,000 yards of Type 3* feedstock and send the samples to outside laboratories for the following **required** tests. Chart 1, Tables A & B below details the State Standards and Cedar Grove results.

In addition, on a quarterly basis, Cedar Grove tests the current compost sales inventory for moisture, nutrients and trace elements, salts, organic matter, and chlopyralid. Chart 2, Table C on the next page outlines our additional **voluntary** testing protocol.

**Chart 1. Washington Administrative Code (WAC) – Solid Waste Handling Standards**
***(Chapter 173-350 Section 220, page 29 & 30)***

| **REQUIRED TESTING** | | *As of 2-11-2004* **WAC 173-350-220 Standard** | **Cedar Grove Topsoil** |
|---|---|---|---|
| **Table A** | | **Limit** | **As of 3/01/07** |
| **Metals** | | ***(mg/kg dry weight)*** | |
| Arsenic | *parts per million dry weight* | **<=20** | 4 |
| Cadmium | | **<=10** | 2 |
| Copper | | **<=750** | 36 |
| Lead | | **<=150** | 15 |
| Mercury | | **<=8** | <1 |
| Molybdenum | | **<=9** | 2 |
| Nickel | | **<=210** | 36 |
| Selenium | | **<=18** | <1 |
| Zinc | | **<=1400** | 98 |

| **Table B** | | | |
|---|---|---|---|
| **Other Parameters** | | **Limit** | **Cedar Grove** |
| pH | | **5-10 (range)** | 7.46 |
| Salmonella | *CFU /g dry wt* | **< 3 Most Probable Number per 4 grams of total solids** | <3 |
| Sharps | | **0 percent** | 0 |
| Manufactured Inerts | | **< 1 percent** | <0.5 |
| Total Nitrogen | *% dry basis* | **report every 10,000 yds** | 0.71 |
| Stability | *Respiration rate (mgCO2-C/gOM/day)* | **Very Stable, Stable, or Moderately Unstable** | Stable |

**Type 1 Feedstock as defined by the WAC means source separated yard and garden waste, wood wastes, agricultural crop residue, wax-coated cardboard, and pre-consumer food wastes.*Type 3 Feedstock as defined by WAC means meat and post-consumer source separated food wastes.*

## Chart 2. Cedar Grove Composting Voluntary Testing
### *(Performed Quarterly by Outside Laboratory)*

| VOLUNTARY TESTING | | |
|---|---|---|
| **Table C** | | **As of 3/1/07** |
| **Nutrients -Primary & Secondary** | | |
| Ammonia | *(parts per million dry weight)* | 19 |
| Nitrate | | 276 |
| Phosphorus | | 1360 |
| Potassium | | 4602 |
| Sulfate | | 121 |
| Calcium | *(percent dry weight)* | 0.86 |
| Magnesium | | 0.92 |
| **Trace Elements** | | |
| Copper | *(parts per million dry weight)* | 36 |
| Zinc | | 98 |
| Boron | | 1 |
| **Salts, Bulk Density, Etc.** | | |
| Sodium | *(percent dry weight)* | 0.03 |
| Chloride | | 0.11 |
| Organic Nitrogen | | 0.68 |
| Organic Matter | | 19.9 |
| Organic Carbon | | 10.5 |
| Moisture | *(Percent)* | 36.1 |
| Total Solids | | 93.9 |
| Bulk Density | *(lb/cu ft)* | 44 |
| Carbon to Nitrogen Ratio | *(Ratio)* | 15 |
| Electrical Conductivity | *(dS/m = mmhos/cm)* | 1.72 |
| **Particle Size** | **Percent Retained** | **Percent Passing** |
| >2.0 inches | 0.0 | 100 |
| 1.0 to 2.0 in. | 0.0 | 100 |
| 0.64 to 1.0 in. | 0.0 | 100 |
| 0.38 to0.64 in. | 0.0 | 97.1 |
| 0.25 to 0.38 in. | 1.2 | 93.9 |
| 0.16 to 0.25 in. | 6.2 | 86.6 |
| 0.08 to 0.16 in. | 15.5 | 60.3 |
| <0.08 | 77.1 | |

Additional Requirements by Department of Ecology:

In addition, the organic material shall have the following physical characteristics:

1. Shall be screened using a sieve no finer than 7/16" and no greater than 3/4".

2. Shall pass a standard cress test for seed germination (90% germination compared to standard). Alternatively, compost shall score a number 5 or above on the Solvita Compost Maturity Test.

3. Shall have a pH from 5.5 to 7.5.

4. Shall have a maximum electrical conductivity of 3.0 mhos/cm. (Other states allow as much as 10)

5. Shall have a maximum carbon to nitrogen ratio of 15:1.

6. Shall be certified by the Process to Further Reduce Pathogens (PFRP) guideline for hot composting as established by the United States Environmental Protection Agency.

TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

May 18, 2007

Sarah Albano
The RETEC Group, Inc.
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

RE: BNSF-Skykomish Levee

Enclosed are the results of analyses for samples received by the laboratory on 05/07/07 16:10. The following list is a summary of the Work Orders contained in this report, generated on 05/18/07 17:18.

If you have any questions concerning this report, please feel free to contact me.

| Work Order | Project | ProjectNumber |
|---|---|---|
| BQE0096 | BNSF-Skykomish Levee | BN050-19390-220 |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| Sky-Topsoil-Cedar | BQE0096-01 | Soil | 05/07/07 14:00 | 05/07/07 16:10 |

| | | | |
|---|---|---|---|
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# Analytical Case Narrative

TestAmerica - Seattle, WA

## BQE0096

SAMPLE RECEIPT

The samples were received May 8th, 2007 by TestAmerica - Seattle. The temperature of the samples at the time of receipt was 6.0 degrees Celsius. The Silica Gel Clean-up for NWPTH-Dx was added 05/10/07 by The RETEC Group, Inc.

PREPARATIONS AND ANALYSIS

Volatile Petroleum Products by NWTPH-Gx: No anomalies were associated with the sample preparation and analysis. All criteria for acceptable QC measurements were met.

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up): No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Total Metals by EPA 6000/7000 Series Methods: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Organochlorine Pesticides by EPA Method 8081A: The calibration verification standard for all endrin ketone in the blank spike was above the method established acceptance criteria. A high bias may be indicated. The result was qualified and reported. No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Free-Acid Herbicides by EPA Method 8151A: The calibration verification standard for all analytes qualified with a C7 qualifier was below the method established acceptance criteria due to matrix interference carried over from analytical samples. The matrix interference was confirmed by reanalysis with the same result. All analytes affected were qualified and reported. No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.

Semivolatile Organic Compounds by EPA Method 8270C: No additional anomalies, discrepancies, or issues were associated with sample preparation, analysis and quality control other than those already qualified in the data and described in the Notes and Definitions page at the end of the report.



Kate Haney

Kate Haney, Project Manager

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## Volatile Petroleum Products by NWTPH-Gx

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| Gasoline Range Hydrocarbons | NWTPH-Gx | ND | ----- | 6.82 | mg/kg dry | 1x | 7E07056 | 05/07/07 18:01 | 05/08/07 08:21 | |
| *Surrogate(s): 4-BFB (FID)* | | | *93.6%* | | *50 - 150 %* | *"* | | | *"* | |

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## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

TestAmerica - Seattle, WA

| Analyte | | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01RE1 (Sky-Topsoil-Cedar)** | | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| **Diesel Range Hydrocarbons** | | NWTPH-Dx | **160** | ----- | 66.8 | mg/kg dry | 2x | 7E08040 | 05/08/07 11:40 | 05/09/07 12:40 | Q6 |
| **Lube Oil Range Hydrocarbons** | | " | **1220** | ----- | 167 | " | " | " | " | " | |
| *Surrogate(s):* | *2-FBP* | | | *91.9%* | | *54 - 148 %* | *"* | | | *"* | |
| | *Octacosane* | | | *182%* | | *62 - 142 %* | *"* | | | *"* | *ZX* |

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## Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up

TestAmerica - Seattle, WA

| Analyte | | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01** | **(Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| **Diesel Range (SGCU)** | | NWTPH-Dx | **44.6** | ----- | 33.4 | mg/kg dry | 1x | 7E08040 | 05/08/07 11:40 | 05/11/07 01:19 | **Q6** |
| **Lube Oil Range (SGCU)** | | " | **346** | ----- | 83.5 | " | " | " | " | " | |
| *Surrogate(s):* | *2-FBP (SGCU)* | | *74.7%* | | | *54 - 148 %* | *"* | | | *"* | |
| | *Octacosane (SGCU)* | | *149%* | | | *62 - 142 %* | *"* | | | *"* | ***ZX*** |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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|---|---|---|---|
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# Total Metals by EPA 6000/7000 Series Methods

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| Antimony | EPA 6020 | ND | ----- | 1.94 | mg/kg dry | 1x | 7E07055 | 05/07/07 17:50 | 05/08/07 08:21 | |
| **Arsenic** | " | **3.30** | ----- | 0.646 | " | " | " | " | 05/08/07 13:13 | |
| Beryllium | " | ND | ----- | 0.646 | " | " | " | " | " | |
| Cadmium | " | ND | ----- | 0.646 | " | " | " | " | " | |
| **Chromium** | " | **39.3** | ----- | 0.646 | " | " | " | " | " | |
| **Copper** | " | **33.0** | ----- | 0.646 | " | " | " | " | " | |
| **Lead** | " | **15.3** | ----- | 0.646 | " | " | " | " | " | |
| Mercury | EPA 7471A | ND | ----- | 0.133 | " | " | 7E08032 | 05/08/07 11:24 | 05/08/07 14:14 | |
| **Nickel** | EPA 6020 | **36.1** | ----- | 0.646 | " | " | 7E07055 | 05/07/07 17:50 | 05/08/07 13:13 | |
| Selenium | " | ND | ----- | 0.646 | " | " | " | " | " | |
| Silver | " | ND | ----- | 0.646 | " | " | " | " | " | |
| Thallium | " | ND | ----- | 0.646 | " | " | " | " | " | |
| **Zinc** | " | **91.8** | ----- | 6.46 | " | " | " | " | " | |

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## Organochlorine Pesticides by EPA Method 8081A

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | **RL1** |
| Aldrin [2C] | EPA 8081A | ND | ----- | 26.3 | ug/kg dry | 20x | 7E08038 | 05/08/07 11:38 | 05/16/07 08:21 | |
| alpha-BHC [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| beta-BHC [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | C7 |
| delta-BHC [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| gamma-BHC (Lindane) [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| alpha-Chlordane [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| gamma-Chlordane [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| 4,4´-DDD [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| 4,4´-DDE [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| 4,4´-DDT [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | C7 |
| Dieldrin [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Endosulfan I [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| Endosulfan II [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Endosulfan sulfate [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Endrin [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Endrin aldehyde [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Endrin ketone [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | C7 |
| Heptachlor [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| Heptachlor epoxide [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| Hexachlorobenzene [2C] | " | ND | ----- | 26.3 | " | " | " | " | " | |
| Methoxychlor [2C] | " | ND | ----- | 52.6 | " | " | " | " | " | |
| Toxaphene [2C] | " | ND | ----- | 1310 | " | " | " | " | " | |
| *Surrogate(s): TCX [2C]* | | | *101%* | | *52 - 129 %* | *"* | | | *"* | |
| *Decachlorobiphenyl* | | | *114%* | | *40 - 158 %* | *"* | | | *"* | |

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## Volatile Organic Compounds by EPA Method 8260B

TestAmerica - Seattle, WA

| Analyte | | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01** | **(Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | **A-01** |
| Benzene | | EPA 8260B | ND | ----- | 0.0207 | mg/kg dry | 1x | 7E08006 | 05/08/07 11:20 | 05/08/07 13:11 | |
| Ethylbenzene | | " | ND | ----- | 0.104 | " | " | " | " | " | |
| Toluene | | " | ND | ----- | 0.104 | " | " | " | " | " | |
| Total Xylenes | | " | ND | ----- | 0.311 | " | " | " | " | " | |
| *Surrogate(s):* | *1,2-DCA-d4* | | | *98.6%* | | *75 - 125 %* | *"* | | | *"* | |
| | *Toluene-d8* | | | *100%* | | *75 - 125 %* | *"* | | | *"* | |
| | *4-BFB* | | | *106%* | | *75 - 125 %* | *"* | | | *"* | |

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## Semivolatile Organic Compounds by EPA Method 8270C

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| Acenaphthene | EPA 8270C | ND | ----- | 1.10 | mg/kg dry | 1x | 7E08039 | 05/08/07 11:39 | 05/09/07 20:37 | |
| Acenaphthylene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Aniline | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Anthracene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Benzo (a) anthracene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Benzo (a) pyrene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Benzo (b) fluoranthene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Benzo (k) fluoranthene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Benzo (ghi) perylene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Benzoic Acid | " | ND | ----- | 3.34 | " | " | " | " | " | |
| Benzyl alcohol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Bis(2-chloroethoxy)methane | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Bis(2-chloroethyl)ether | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Bis(2-chloroisopropyl)ether | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Bis(2-ethylhexyl)phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| 4-Bromophenyl phenyl ether | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Butyl benzyl phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Carbazole | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 4-Chloroaniline | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 4-Chloro-3-methylphenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Chloronaphthalene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Chlorophenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 4-Chlorophenyl phenyl ether | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 3 & 4-Methylphenol (m,p-Cresols) | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Methylphenol (o-Cresol) | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Chrysene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Di-n-butyl phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Dibenz (a,h) anthracene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Dibenzofuran | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 1,2-Dichlorobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 1,3-Dichlorobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 1,4-Dichlorobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 3,3´-Dichlorobenzidine | " | ND | ----- | 16.7 | " | " | " | " | " | I |
| 2,4-Dichlorophenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Diethyl phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2,4-Dimethylphenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Dimethyl phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 4,6-Dinitro-2-methylphenol | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 2,4-Dinitrophenol | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 2,4-Dinitrotoluene | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 2,6-Dinitrotoluene | " | ND | ----- | 1.67 | " | " | " | " | " | |
| N-Nitrosodiphenylamine | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Fluoranthene | " | ND | ----- | 1.10 | " | " | " | " | " | |

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## Semivolatile Organic Compounds by EPA Method 8270C

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| Fluorene | EPA 8270C | ND | ----- | 1.10 | mg/kg dry | 1x | 7E08039 | 05/08/07 11:39 | 05/09/07 20:37 | |
| Hexachlorobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Hexachlorobutadiene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Hexachlorocyclopentadiene | " | ND | ----- | 1.67 | " | " | " | " | " | |
| Hexachloroethane | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Isophorone | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 1-Methylnaphthalene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Methylnaphthalene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Naphthalene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Nitroaniline | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 3-Nitroaniline | " | ND | ----- | 1.67 | " | " | " | " | " | |
| 4-Nitroaniline | " | ND | ----- | 1.67 | " | " | " | " | " | |
| Nitrobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2-Nitrophenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 4-Nitrophenol | " | ND | ----- | 1.67 | " | " | " | " | " | |
| N-Nitrosodi-n-propylamine | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Di-n-octyl phthalate | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| Pentachlorophenol | " | ND | ----- | 1.67 | " | " | " | " | " | |
| Phenanthrene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Phenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| Pyrene | " | ND | ----- | 1.10 | " | " | " | " | " | I |
| 1,2,4-Trichlorobenzene | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2,4,5-Trichlorophenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| 2,4,6-Trichlorophenol | " | ND | ----- | 1.10 | " | " | " | " | " | |
| *Surrogate(s): 2-FBP* | | *99.6%* | | | *27 - 126 %* | *"* | | | *"* | |
| *2-FP* | | *96.4%* | | | *16 - 121 %* | *"* | | | *"* | |
| *Nitrobenzene-d5* | | *96.2%* | | | *26 - 125 %* | *"* | | | *"* | |
| *Phenol-d6* | | *62.9%* | | | *10 - 120 %* | *"* | | | *"* | |
| *p-Terphenyl-d14* | | *98.7%* | | | *26 - 150 %* | *"* | | | *"* | *I* |
| *2,4,6-TBP* | | *98.7%* | | | *10 - 152 %* | *"* | | | *"* | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish Levee | |
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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Physical Parameters by APHA/ASTM/EPA Methods

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| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | |
| **Dry Weight** | BSOPSPL003R08 | **75.1** | ----- | 1.00 | % | 1x | 7E07051 | 05/07/07 16:58 | 05/08/07 00:00 | |

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Free-Acid Herbicides by EPA Method 8151A

TestAmerica - Seattle, WA

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Batch | Prepared | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **BQE0096-01 (Sky-Topsoil-Cedar)** | | **Soil** | | | **Sampled: 05/07/07 14:00** | | | | | **RL1** |
| 2,4-D | EPA 8151A | ND | ----- | 334 | ug/kg dry | 5x | 7E08041 | 05/08/07 11:41 | 05/18/07 14:10 | |
| 2,4-DB | " | ND | ----- | 334 | " | " | " | " | " | |
| 2,4,5-T | " | ND | ----- | 334 | " | " | " | " | " | |
| 2,4,5-TP (Silvex) | " | ND | ----- | 334 | " | " | " | " | " | |
| Dalapon | " | ND | ----- | 668 | " | " | " | " | " | |
| Dicamba | " | ND | ----- | 334 | " | " | " | " | " | |
| Dichloroprop | " | ND | ----- | 334 | " | " | " | " | " | |
| Dinoseb | " | ND | ----- | 334 | " | " | " | " | " | |
| MCPA | " | ND | ----- | 33400 | " | " | " | " | " | |
| MCPP | " | ND | ----- | 33400 | " | " | " | " | " | |
| Pentachlorophenol | " | ND | ----- | 334 | " | " | " | " | " | |
| *Surrogate(s): 2,4-DCAA* | | | *65.5%* | | *18 - 138 %* | " | | | " | ***R10*** |

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Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Volatile Petroleum Products by NWTPH-Gx - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E07056** **Soil Preparation Method: EPA 5030B (P/T)**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E07056-BLK1)** | | | | | | | | | Extracted: 05/07/07 18:01 | | | | | |
| Gasoline Range Hydrocarbons | NWTPH-Gx | ND | --- | 5.00 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 07:16 | |
| *Surrogate(s): 4-BFB (FID)* | | *Recovery: 87.3%* | | *Limits: 50-150%* | | " | | | | | | | *05/08/07 07:16* | |
| **LCS (7E07056-BS1)** | | | | | | | | | Extracted: 05/07/07 18:01 | | | | | |
| Gasoline Range Hydrocarbons | NWTPH-Gx | 46.3 | --- | 5.00 | mg/kg wet | 1x | -- | 50.0 | 92.6% | (75-125) | -- | -- | 05/08/07 07:48 | |
| *Surrogate(s): 4-BFB (FID)* | | *Recovery: 93.3%* | | *Limits: 50-150%* | | " | | | | | | | *05/08/07 07:48* | |
| **Duplicate (7E07056-DUP1)** | | | | QC Source: BQE0096-01 | | | | | Extracted: 05/07/07 18:01 | | | | | |
| Gasoline Range Hydrocarbons | NWTPH-Gx | ND | --- | 6.82 | mg/kg dry | 1x | ND | -- | -- | -- | 24.2% | (40) | 05/08/07 08:52 | |
| *Surrogate(s): 4-BFB (FID)* | | *Recovery: 91.9%* | | *Limits: 50-150%* | | " | | | | | | | *05/08/07 08:52* | |
| **Matrix Spike (7E07056-MS1)** | | | | QC Source: BQE0096-01 | | | | | Extracted: 05/07/07 18:01 | | | | | |
| Gasoline Range Hydrocarbons | NWTPH-Gx | 70.0 | --- | 6.94 | mg/kg dry | 1x | 1.62 | 69.4 | 98.5% | (42-125) | -- | -- | 05/08/07 09:25 | |
| *Surrogate(s): 4-BFB (FID)* | | *Recovery: 106%* | | *Limits: 50-150%* | | " | | | | | | | *05/08/07 09:25* | |

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| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish Levee | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08040** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E08040-BLK1)** | | | | | | | | | **Extracted: 05/08/07 11:40** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | ND | --- | 10.0 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 22:27 | |
| Lube Oil Range Hydrocarbons | " | ND | --- | 25.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery: 78.5%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/08/07 22:27* | |
| *Octacosane* | | *91.2%* | | *62-142%* | | *"* | | | | | | | *"* | |
| **LCS (7E08040-BS1)** | | | | | | | | | **Extracted: 05/08/07 11:40** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 68.3 | --- | 10.0 | mg/kg wet | 1x | -- | 66.7 | 102% | (78-129) | -- | -- | 05/08/07 22:56 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 83.4%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/08/07 22:56* | |
| *Octacosane* | | *93.0%* | | *62-142%* | | *"* | | | | | | | *"* | |
| **Duplicate (7E08040-DUP2)** | | | | **QC Source: BQE0096-01RE1** | | | | | **Extracted: 05/08/07 11:40** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 157 | --- | 66.6 | mg/kg dry | 2x | 160 | -- | -- | -- | 1.89% | (40) | 05/09/07 11:41 | |
| Lube Oil Range Hydrocarbons | " | 1180 | --- | 166 | " | " | 1220 | -- | -- | -- | 3.33% | " | " | |
| *Surrogate(s): 2-FBP* | | *Recovery: 89.9%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/09/07 11:41* | |
| *Octacosane* | | *181%* | | *62-142%* | | *"* | | | | | | | *"* | ***ZX*** |
| **Matrix Spike (7E08040-MS2)** | | | | **QC Source: BQE0096-01RE1** | | | | | **Extracted: 05/08/07 11:40** | | | | | |
| Diesel Range Hydrocarbons | NWTPH-Dx | 225 | --- | 66.8 | mg/kg dry | 2x | 160 | 89.1 | 73.0% | (46-155) | -- | -- | 05/09/07 12:11 | |
| *Surrogate(s): 2-FBP* | | *Recovery: 89.6%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/09/07 12:11* | |
| *Octacosane* | | *168%* | | *62-142%* | | *"* | | | | | | | *"* | ***ZX*** |

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Semivolatile Petroleum Products by NWTPH-Dx with Acid/Silica Gel Clean-up - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08040** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E08040-BLK2)** | | | | | | | | | | Extracted: 05/08/07 11:40 | | | | |
| Diesel Range (SGCU) | NWTPH-Dx | ND | --- | 10.0 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/10/07 23:22 | |
| Lube Oil Range (SGCU) | " | ND | --- | 25.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 2-FBP (SGCU)* | | *Recovery: 77.1%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/10/07 23:22* | |
| *Octacosane (SGCU)* | | *93.3%* | | *62-142%* | | *"* | | | | | | | *"* | |
| **LCS (7E08040-BS2)** | | | | | | | | | | Extracted: 05/08/07 11:40 | | | | |
| Diesel Range (SGCU) | NWTPH-Dx | 65.7 | --- | 10.0 | mg/kg wet | 1x | -- | 66.7 | 98.5% | (78-129) | -- | -- | 05/10/07 23:51 | |
| *Surrogate(s): 2-FBP (SGCU)* | | *Recovery: 82.2%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/10/07 23:51* | |
| *Octacosane (SGCU)* | | *92.0%* | | *62-142%* | | *"* | | | | | | | *"* | |
| **Duplicate (7E08040-DUP3)** | | | | QC Source: BQE0096-01 | | | | | | Extracted: 05/08/07 11:40 | | | | |
| Diesel Range (SGCU) | NWTPH-Dx | 37.2 | --- | 33.3 | mg/kg dry | 1x | 44.6 | -- | -- | -- | 18.1% | (50) | 05/11/07 00:20 | |
| Lube Oil Range (SGCU) | " | 295 | --- | 83.2 | " | " | 346 | -- | -- | -- | 15.9% | " | " | |
| *Surrogate(s): 2-FBP (SGCU)* | | *Recovery: 64.7%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/11/07 00:20* | |
| *Octacosane (SGCU)* | | *128%* | | *62-142%* | | *"* | | | | | | | *"* | |
| **Matrix Spike (7E08040-MS3)** | | | | QC Source: BQE0096-01 | | | | | | Extracted: 05/08/07 11:40 | | | | |
| Diesel Range (SGCU) | NWTPH-Dx | 111 | --- | 33.4 | mg/kg dry | 1x | 44.6 | 89.1 | 74.5% | (46-155) | -- | -- | 05/11/07 00:49 | |
| *Surrogate(s): 2-FBP (SGCU)* | | *Recovery: 77.6%* | | *Limits: 54-148%* | | *"* | | | | | | | *05/11/07 00:49* | |
| *Octacosane (SGCU)* | | *141%* | | *62-142%* | | *"* | | | | | | | *"* | |

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Total Metals by EPA 6000/7000 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E07055** **Soil Preparation Method: EPA 3050B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E07055-BLK1)** | | | | | | | | | | **Extracted: 05/07/07 17:50** | | | | |
| Lead | EPA 6020 | ND | --- | 0.500 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 12:43 | |
| Nickel | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Copper | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chromium | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Cadmium | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Thallium | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Antimony | " | ND | --- | 1.50 | " | " | -- | -- | -- | -- | -- | -- | 05/08/07 07:58 | |
| Beryllium | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | 05/08/07 12:43 | |
| Arsenic | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Silver | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Zinc | " | ND | --- | 5.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Selenium | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| **LCS (7E07055-BS1)** | | | | | | | | | | **Extracted: 05/07/07 17:50** | | | | |
| Zinc | EPA 6020 | 43.4 | --- | 5.00 | mg/kg wet | 1x | -- | 40.0 | 108% | (80-120) | -- | -- | 05/08/07 12:49 | |
| Nickel | " | 44.1 | --- | 0.500 | " | " | -- | " | 110% | " | -- | -- | " | |
| Cadmium | " | 43.9 | --- | 0.500 | " | " | -- | " | 110% | " | -- | -- | " | |
| Chromium | " | 44.0 | --- | 0.500 | " | " | -- | " | 110% | " | -- | -- | " | |
| Copper | " | 44.5 | --- | 0.500 | " | " | -- | " | 111% | " | -- | -- | " | |
| Thallium | " | 41.6 | --- | 0.500 | " | " | -- | " | 104% | " | -- | -- | " | |
| Selenium | " | 41.8 | --- | 0.500 | " | " | -- | " | 104% | " | -- | -- | " | |
| Antimony | " | 34.0 | --- | 1.50 | " | " | -- | 30.0 | 113% | " | -- | -- | 05/08/07 08:02 | |
| Lead | " | 42.6 | --- | 0.500 | " | " | -- | 40.0 | 106% | " | -- | -- | 05/08/07 12:49 | |
| Silver | " | 44.2 | --- | 0.500 | " | " | -- | " | 110% | " | -- | -- | " | |
| Arsenic | " | 43.1 | --- | 0.500 | " | " | -- | " | 108% | " | -- | -- | " | |
| Beryllium | " | 43.7 | --- | 0.500 | " | " | -- | " | 109% | " | -- | -- | " | |
| **Duplicate (7E07055-DUP1)** | | | | | **QC Source: BQE0096-01** | | | | | **Extracted: 05/07/07 17:50** | | | | |
| Copper | EPA 6020 | 26.4 | --- | 0.600 | mg/kg dry | 1x | 33.0 | -- | -- | -- | 22.2% | (30) | 05/08/07 13:07 | |
| Selenium | " | ND | --- | 0.600 | " | " | ND | -- | -- | -- | NR | " | " | |
| Nickel | " | 28.1 | --- | 0.600 | " | " | 36.1 | -- | -- | -- | 24.9% | " | " | |
| Chromium | " | 22.5 | --- | 0.600 | " | " | 39.3 | -- | -- | -- | 54.4% | " | " | R9 |
| Cadmium | " | ND | --- | 0.600 | " | " | ND | -- | -- | -- | 11.8% | " | " | R4 |
| Beryllium | " | ND | --- | 0.600 | " | " | ND | -- | -- | -- | 20.3% | " | " | R4 |
| Antimony | " | ND | --- | 1.80 | " | " | ND | -- | -- | -- | 29.0% | " | 05/08/07 08:16 | R4 |
| Zinc | " | 78.2 | --- | 6.00 | " | " | 91.8 | -- | -- | -- | 16.0% | " | 05/08/07 13:07 | |
| Lead | " | 12.3 | --- | 0.600 | " | " | 15.3 | -- | -- | -- | 21.7% | " | " | |
| Arsenic | " | 2.98 | --- | 0.600 | " | " | 3.30 | -- | -- | -- | 10.2% | " | " | |
| Silver | " | ND | --- | 0.600 | " | " | ND | -- | -- | -- | 13.6% | (50) | " | R4 |

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|---|---|---|---|
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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Total Metals by EPA 6000/7000 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E07055 Soil Preparation Method: EPA 3050B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Duplicate (7E07055-DUP1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/07/07 17:50 | | | | | | |
| Thallium | EPA 6020 | ND | --- | 0.600 | mg/kg dry | 1x | ND | -- | -- | -- | NR | (30) | 05/08/07 13:07 | |
| **Matrix Spike (7E07055-MS1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/07/07 17:50 | | | | | | |
| Thallium | EPA 6020 | 43.3 | --- | 0.616 | mg/kg dry | 1x | ND | 49.3 | 87.8% | (75-120) | -- | -- | 05/08/07 13:01 | |
| Antimony | " | 16.6 | --- | 1.85 | " | " | 0.381 | 37.0 | 43.8% | (10-120) | -- | -- | 05/08/07 08:12 | |
| Lead | " | 64.7 | --- | 0.616 | " | " | 15.3 | 49.3 | 100% | (29-166) | -- | -- | 05/08/07 13:01 | |
| Nickel | " | 86.5 | --- | 0.616 | " | " | 36.1 | " | 102% | (35-150) | -- | -- | " | |
| Selenium | " | 50.0 | --- | 0.616 | " | " | ND | " | 101% | (61-120) | -- | -- | " | |
| Beryllium | " | 52.5 | --- | 0.616 | " | " | 0.142 | " | 106% | (72-122) | -- | -- | " | |
| Arsenic | " | 54.0 | --- | 0.616 | " | " | 3.30 | " | 103% | (57-125) | -- | -- | " | |
| Copper | " | 82.1 | --- | 0.616 | " | " | 33.0 | " | 99.6% | (20-148) | -- | -- | " | |
| Cadmium | " | 52.1 | --- | 0.616 | " | " | 0.304 | " | 105% | (80-120) | -- | -- | " | |
| Chromium | " | 84.4 | --- | 0.616 | " | " | 39.3 | " | 91.5% | (30-163) | -- | -- | " | |
| Silver | " | 43.9 | --- | 0.616 | " | " | 0.110 | " | 88.8% | (54-126) | -- | -- | " | |
| Zinc | " | 137 | --- | 6.16 | " | " | 91.8 | " | 91.7% | (20-160) | -- | -- | " | |
| **Post Spike (7E07055-PS1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/07/07 17:50 | | | | | | |
| Cadmium | EPA 6020 | 0.0959 | --- | | ug/ml | 1x | 0.000456 | 0.100 | 95.4% | (75-125) | -- | -- | 05/09/07 09:11 | |
| Nickel | " | 0.152 | --- | | " | " | 0.0542 | 0.0995 | 98.3% | " | -- | -- | " | |
| Copper | " | 0.157 | --- | | " | " | 0.0495 | 0.101 | 106% | " | -- | -- | " | |
| Silver | " | 0.0965 | --- | | " | " | 0.000165 | 0.100 | 96.3% | " | -- | -- | " | |
| Chromium | " | 0.162 | --- | | " | " | 0.0590 | " | 103% | " | -- | -- | " | |
| Thallium | " | 0.0845 | --- | | " | " | 0.0000194 | " | 84.5% | " | -- | -- | " | |
| Antimony | " | 0.0388 | --- | | " | " | 0.000573 | 0.0500 | 76.5% | " | -- | -- | 05/08/07 08:07 | |
| Lead | " | 0.107 | --- | | " | " | 0.0230 | 0.0995 | 84.4% | " | -- | -- | 05/09/07 09:11 | |
| Arsenic | " | 0.106 | --- | | " | " | 0.00496 | 0.100 | 101% | " | -- | -- | " | |
| Beryllium | " | 0.100 | --- | | " | " | 0.000214 | " | 99.8% | " | -- | -- | " | |
| Selenium | " | 0.0939 | --- | | " | " | 0.000252 | " | 93.6% | " | -- | -- | " | |
| Zinc | " | 0.236 | --- | | " | " | 0.138 | 0.0995 | 98.5% | " | -- | -- | " | |

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TestAmerica
ANALYTICAL TESTING CORPORATION

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

**The RETEC Group, Inc.**
1011 SW Klickitat Way, Suite 207
Seattle, WA 98134

Project Name: **BNSF-Skykomish Levee**
Project Number: BN050-19390-220
Project Manager: Sarah Albano

Report Created:
05/18/07 17:18

## Total Metals by EPA 6000/7000 Series Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08032** **Soil Preparation Method: EPA 7471A**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E08032-BLK1)** | | | | | | | | | | Extracted: 05/08/07 11:24 | | | | |
| Mercury | EPA 7471A | ND | --- | 0.100 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 13:20 | |
| **LCS (7E08032-BS1)** | | | | | | | | | | Extracted: 05/08/07 11:24 | | | | |
| Mercury | EPA 7471A | 0.666 | --- | 0.100 | mg/kg wet | 1x | -- | 0.667 | 99.9% | (80-120) | -- | -- | 05/08/07 13:22 | |
| **LCS Dup (7E08032-BSD1)** | | | | | | | | | | Extracted: 05/08/07 11:24 | | | | |
| Mercury | EPA 7471A | 0.658 | --- | 0.100 | mg/kg wet | 1x | -- | 0.667 | 98.7% | (80-120) | 1.21% | (20) | 05/08/07 13:25 | |
| **Duplicate (7E08032-DUP1)** | | | | QC Source: BQD0040-07 | | | | | | Extracted: 05/08/07 11:24 | | | | |
| Mercury | EPA 7471A | ND | --- | 0.120 | mg/kg dry | 1x | ND | -- | -- | -- | 9.43% | (30) | 05/08/07 13:51 | R4 |
| **Matrix Spike (7E08032-MS1)** | | | | QC Source: BQD0040-07 | | | | | | Extracted: 05/08/07 11:24 | | | | |
| Mercury | EPA 7471A | 0.897 | --- | 0.120 | mg/kg dry | 1x | 0.0374 | 0.802 | 107% | (70-130) | -- | -- | 05/08/07 13:27 | |

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Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Organochlorine Pesticides by EPA Method 8081A - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08038** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E08038-BLK1)** | | | | | | | | | **Extracted: 05/08/07 11:38** | | | | | |
| Aldrin | EPA 8081A | ND | --- | 1.00 | ug/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/15/07 12:23 | |
| alpha-BHC | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| beta-BHC | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| delta-BHC | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| gamma-BHC (Lindane) | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| alpha-Chlordane | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| gamma-Chlordane | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4,4′-DDD | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4,4′-DDE | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4,4′-DDT | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dieldrin | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endosulfan I | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endosulfan II | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endosulfan sulfate | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endrin | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endrin aldehyde | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Endrin ketone | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Heptachlor | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Heptachlor epoxide | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Hexachlorobenzene | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Methoxychlor | " | ND | --- | 2.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Toxaphene | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): TCX* | | *Recovery: 90.4%* | | *Limits: 52-129%* | | *"* | | | | | | | *05/15/07 12:23* | |
| *Decachlorobiphenyl* | | *87.6%* | | *40-158%* | | *"* | | | | | | | *"* | |
| **LCS (7E08038-BS1)** | | | | | | | | | **Extracted: 05/08/07 11:38** | | | | | |
| Aldrin | EPA 8081A | 3.81 | --- | 1.00 | ug/kg wet | 1x | -- | 4.17 | 91.4% | (73-125) | -- | -- | 05/15/07 12:43 | |
| alpha-BHC | " | 3.43 | --- | 1.00 | " | " | -- | " | 82.3% | (57-127) | -- | -- | " | |
| beta-BHC | " | 4.11 | --- | 2.00 | " | " | -- | " | 98.6% | (58-125) | -- | -- | " | |
| delta-BHC | " | 3.16 | --- | 1.00 | " | " | -- | " | 75.8% | (42-124) | -- | -- | " | |
| gamma-BHC (Lindane) | " | 3.51 | --- | 1.00 | " | " | -- | " | 84.2% | (65-125) | -- | -- | " | |
| alpha-Chlordane | " | 3.82 | --- | 1.00 | " | " | -- | " | 91.6% | (71-125) | -- | -- | " | |
| gamma-Chlordane | " | 3.57 | --- | 1.00 | " | " | -- | " | 85.6% | (72-125) | -- | -- | " | |
| 4,4′-DDD | " | 7.57 | --- | 2.00 | " | " | -- | 8.33 | 90.9% | (70-129) | -- | -- | " | |
| 4,4′-DDE | " | 7.91 | --- | 2.00 | " | " | -- | " | 95.0% | (70-125) | -- | -- | " | |
| 4,4′-DDT | " | 8.36 | --- | 2.00 | " | " | -- | " | 100% | (63-129) | -- | -- | " | |
| Dieldrin | " | 7.80 | --- | 2.00 | " | " | -- | " | 93.6% | (70-125) | -- | -- | " | |
| Endosulfan I | " | 3.89 | --- | 1.00 | " | " | -- | 4.17 | 93.3% | (34-162) | -- | -- | " | |
| Endosulfan II | " | 7.73 | --- | 2.00 | " | " | -- | 8.33 | 92.8% | (10-169) | -- | -- | " | |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Organochlorine Pesticides by EPA Method 8081A - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08038** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7E08038-BS1)** | | | | | | | | **Extracted: 05/08/07 11:38** | | | | | | |
| Endosulfan sulfate | EPA 8081A | 7.23 | --- | 2.00 | ug/kg wet | 1x | -- | 8.33 | 86.8% | (56-131) | -- | -- | 05/15/07 12:43 | |
| Endrin | " | 8.36 | --- | 2.00 | " | " | -- | " | 100% | (69-127) | -- | -- | " | |
| Endrin aldehyde | " | 6.30 | --- | 2.00 | " | " | -- | " | 75.6% | (10-172) | -- | -- | " | |
| Endrin ketone | " | 7.62 | --- | 2.00 | " | " | -- | " | 91.5% | (32-172) | -- | -- | " | |
| Heptachlor | " | 3.97 | --- | 1.00 | " | " | -- | 4.17 | 95.2% | (62-134) | -- | -- | " | |
| Heptachlor epoxide | " | 3.78 | --- | 1.00 | " | " | -- | " | 90.6% | (67-125) | -- | -- | " | |
| Hexachlorobenzene | " | 3.64 | --- | 1.00 | " | " | -- | 4.00 | 91.0% | (60-140) | -- | -- | " | |
| Methoxychlor | " | 39.5 | --- | 2.00 | " | " | -- | 41.7 | 94.7% | (10-170) | -- | -- | " | |
| *Surrogate(s): TCX* | | *Recovery: 87.9%* | | *Limits: 52-129%* | *"* | | | | | | | | *05/15/07 12:43* | |
| *Decachlorobiphenyl* | | *87.7%* | | *40-158%* | *"* | | | | | | | | *"* | |
| **Matrix Spike (7E08038-MS1)** | | | | **QC Source: BQE0096-01** | | | | **Extracted: 05/08/07 11:38** | | | | | | |
| Aldrin [2C] | EPA 8081A | 19.3 | --- | 13.4 | ug/kg dry | 10x | ND | 5.59 | 345% | (44-139) | -- | -- | 05/16/07 09:35 | M1 |
| alpha-BHC [2C] | " | ND | --- | 13.4 | " | " | ND | " | NR | (53-127) | -- | -- | " | M2 |
| beta-BHC [2C] | " | 1.98 | --- | 26.8 | " | " | ND | " | 35.4% | (20-161) | -- | -- | " | |
| delta-BHC [2C] | " | 4.64 | --- | 13.4 | " | " | ND | " | 83.0% | (35-125) | -- | -- | " | |
| gamma-BHC (Lindane) [2C] | " | ND | --- | 13.4 | " | " | ND | " | NR | (50-126) | -- | -- | " | M2 |
| alpha-Chlordane [2C] | " | 8.97 | --- | 13.4 | " | " | 7.57 | " | 25.0% | (26-161) | -- | -- | " | M2 |
| gamma-Chlordane [2C] | " | 8.89 | --- | 13.4 | " | " | ND | " | 159% | (39-150) | -- | -- | " | M1 |
| 4,4´-DDD [2C] | " | 12.3 | --- | 26.8 | " | " | 5.83 | 11.2 | 57.8% | (14-154) | -- | -- | " | |
| 4,4´-DDE [2C] | " | 18.3 | --- | 26.8 | " | " | 11.7 | " | 58.9% | (37-142) | -- | -- | " | |
| 4,4´-DDT [2C] | " | 15.7 | --- | 26.8 | " | " | ND | " | 140% | (29-179) | -- | -- | " | |
| Dieldrin [2C] | " | 17.3 | --- | 26.8 | " | " | 9.25 | " | 71.9% | (11-151) | -- | -- | " | |
| Endosulfan I [2C] | " | 5.08 | --- | 13.4 | " | " | ND | 5.59 | 90.9% | (16-162) | -- | -- | " | |
| Endosulfan II [2C] | " | 7.23 | --- | 26.8 | " | " | ND | 11.2 | 64.6% | (10-176) | -- | -- | " | |
| Endosulfan sulfate [2C] | " | 9.14 | --- | 26.8 | " | " | ND | " | 81.6% | (10-158) | -- | -- | " | |
| Endrin [2C] | " | 2.12 | --- | 26.8 | " | " | ND | " | 18.9% | (16-161) | -- | -- | " | |
| Endrin aldehyde [2C] | " | 3.91 | --- | 26.8 | " | " | ND | " | 34.9% | (10-172) | -- | -- | " | |
| Endrin ketone [2C] | " | 8.85 | --- | 26.8 | " | " | ND | " | 79.0% | (10-173) | -- | -- | " | |
| Heptachlor [2C] | " | 5.45 | --- | 13.4 | " | " | ND | 5.59 | 97.5% | (53-137) | -- | -- | " | |
| Heptachlor epoxide [2C] | " | 4.79 | --- | 13.4 | " | " | ND | " | 85.7% | (10-166) | -- | -- | " | |
| Hexachlorobenzene [2C] | " | 5.98 | --- | 13.4 | " | " | 2.60 | 5.36 | 63.1% | (50-150) | -- | -- | " | |
| Methoxychlor [2C] | " | 42.6 | --- | 26.8 | " | " | ND | 55.9 | 76.2% | (10-170) | -- | -- | " | |
| *Surrogate(s): TCX* | | *Recovery: 74.0%* | | *Limits: 52-129%* | *"* | | | | | | | | *05/16/07 09:35* | |
| *Decachlorobiphenyl* | | *116%* | | *40-158%* | *"* | | | | | | | | *"* | |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Organochlorine Pesticides by EPA Method 8081A - Laboratory Quality Control Results
TestAmerica - Seattle, WA

**QC Batch: 7E08038** **Soil Preparation Method: EPA 3550B**

**Matrix Spike Dup (7E08038-MSD1)** QC Source: BQE0096-01 Extracted: 05/08/07 11:38

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin [2C] | EPA 8081A | 16.6 | --- | 13.4 | ug/kg dry | 10x | ND | 5.59 | 297% | (44-139) | 15.0% | (35) | 05/16/07 09:55 | M1 |
| alpha-BHC [2C] | " | ND | --- | 13.4 | " | " | ND | " | NR | (53-127) | -- | " | " | M4 |
| beta-BHC [2C] | " | 1.99 | --- | 26.8 | " | " | ND | " | 35.6% | (20-161) | 0.504% | " | " | |
| delta-BHC [2C] | " | 3.23 | --- | 13.4 | " | " | ND | " | 57.8% | (35-125) | 35.8% | " | " | R3 |
| gamma-BHC (Lindane) [2C] | " | 4.02 | --- | 13.4 | " | " | ND | " | 71.9% | (50-126) | -- | " | " | |
| alpha-Chlordane [2C] | " | 8.95 | --- | 13.4 | " | " | 7.57 | " | 24.7% | (26-161) | 0.223% | " | " | M2 |
| gamma-Chlordane [2C] | " | 8.34 | --- | 13.4 | " | " | ND | " | 149% | (39-150) | 6.38% | " | " | |
| 4,4´-DDD [2C] | " | 12.7 | --- | 26.8 | " | " | 5.83 | 11.2 | 61.3% | (14-154) | 3.20% | " | " | |
| 4,4´-DDE [2C] | " | 16.1 | --- | 26.8 | " | " | 11.7 | " | 39.3% | (37-142) | 12.8% | " | " | |
| 4,4´-DDT [2C] | " | 16.1 | --- | 26.8 | " | " | ND | " | 144% | (29-179) | 2.52% | " | " | |
| Dieldrin [2C] | " | 14.9 | --- | 26.8 | " | " | 9.25 | " | 50.4% | (11-151) | 14.9% | " | " | |
| Endosulfan I [2C] | " | 4.64 | --- | 13.4 | " | " | ND | 5.59 | 83.0% | (16-162) | 9.05% | " | " | |
| Endosulfan II [2C] | " | 7.97 | --- | 26.8 | " | " | ND | 11.2 | 71.2% | (10-176) | 9.74% | " | " | |
| Endosulfan sulfate [2C] | " | 7.61 | --- | 26.8 | " | " | ND | " | 67.9% | (10-158) | 18.3% | " | " | |
| Endrin [2C] | " | 7.98 | --- | 26.8 | " | " | ND | " | 71.2% | (16-161) | 116% | " | " | R3 |
| Endrin aldehyde [2C] | " | 1090 | --- | 26.8 | " | " | ND | " | 9730% | (10-172) | 199% | " | " | R3, M1, E |
| Endrin ketone [2C] | " | 7.68 | --- | 26.8 | " | " | ND | " | 68.6% | (10-173) | 14.2% | " | " | |
| Heptachlor [2C] | " | 4.24 | --- | 13.4 | " | " | ND | 5.59 | 75.8% | (53-137) | 25.0% | " | " | |
| Heptachlor epoxide [2C] | " | 5.16 | --- | 13.4 | " | " | ND | " | 92.3% | (10-166) | 7.44% | " | " | |
| Hexachlorobenzene [2C] | " | 5.58 | --- | 13.4 | " | " | 2.60 | 5.36 | 55.6% | (50-150) | 6.92% | " | " | |
| Methoxychlor [2C] | " | 40.3 | --- | 26.8 | " | " | ND | 55.9 | 72.1% | (10-170) | 5.55% | " | " | |

| Surrogate(s): | | Recovery: | | Limits: | | Analyzed | Notes |
|---|---|---|---|---|---|---|---|
| | *TCX* | | *72.6%* | *52-129%* | *"* | *05/16/07 09:55* | |
| | *Decachlorobiphenyl* | | *207%* | *40-158%* | *"* | *"* | ***ZX*** |

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## Volatile Organic Compounds by EPA Method 8260B - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08006** **Soil Preparation Method: EPA 5030B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E08006-BLK1)** | | | | | | | | | | | | | **Extracted: 05/08/07 10:40** | |
| Benzene | EPA 8260B | ND | --- | 0.0200 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 12:15 | |
| Ethylbenzene | " | ND | --- | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Methyl tert-butyl ether | " | ND | --- | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Toluene | " | ND | --- | 0.100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Total Xylenes | " | ND | --- | 0.300 | " | " | -- | -- | -- | -- | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 102%* | | *Limits: 75-125%* | | *"* | | | | | | | *05/08/07 12:15* | |
| *Toluene-d8* | | *100%* | | *75-125%* | | *"* | | | | | | | *"* | |
| *4-BFB* | | *104%* | | *75-125%* | | *"* | | | | | | | *"* | |
| **LCS (7E08006-BS1)** | | | | | | | | | | | | | **Extracted: 05/08/07 10:40** | |
| Benzene | EPA 8260B | 2.28 | --- | 0.0200 | mg/kg wet | 1x | -- | 2.00 | 114% | (75-125) | -- | -- | 05/08/07 11:13 | |
| Ethylbenzene | " | 2.25 | --- | 0.100 | " | " | -- | " | 112% | " | -- | -- | " | |
| Methyl tert-butyl ether | " | 1.94 | --- | 0.100 | " | " | -- | " | 97.0% | (71-127) | -- | -- | " | |
| Toluene | " | 2.19 | --- | 0.100 | " | " | -- | " | 110% | (75-125) | -- | -- | " | |
| Total Xylenes | " | 6.70 | --- | 0.300 | " | " | -- | 6.00 | 112% | " | -- | -- | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 98.5%* | | *Limits: 75-125%* | | *"* | | | | | | | *05/08/07 11:13* | |
| *Toluene-d8* | | *101%* | | *75-125%* | | *"* | | | | | | | *"* | |
| *4-BFB* | | *100%* | | *75-125%* | | *"* | | | | | | | *"* | |
| **LCS Dup (7E08006-BSD1)** | | | | | | | | | | | | | **Extracted: 05/08/07 10:40** | |
| Benzene | EPA 8260B | 2.19 | --- | 0.0200 | mg/kg wet | 1x | -- | 2.00 | 110% | (75-125) | 4.03% | (20) | 05/08/07 11:44 | |
| Ethylbenzene | " | 2.26 | --- | 0.100 | " | " | -- | " | 113% | " | 0.443% | " | " | |
| Methyl tert-butyl ether | " | 1.92 | --- | 0.100 | " | " | -- | " | 96.0% | (71-127) | 1.04% | " | " | |
| Toluene | " | 2.14 | --- | 0.100 | " | " | -- | " | 107% | (75-125) | 2.31% | " | " | |
| Total Xylenes | " | 6.53 | --- | 0.300 | " | " | -- | 6.00 | 109% | " | 2.57% | (30) | " | |
| *Surrogate(s): 1,2-DCA-d4* | | *Recovery: 98.0%* | | *Limits: 75-125%* | | *"* | | | | | | | *05/08/07 11:44* | |
| *Toluene-d8* | | *102%* | | *75-125%* | | *"* | | | | | | | *"* | |
| *4-BFB* | | *100%* | | *75-125%* | | *"* | | | | | | | *"* | |

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Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish Levee** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Semivolatile Organic Compounds by EPA Method 8270C - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08039** **Soil Preparation Method: EPA 3550B**

**Blank (7E08039-BLK1)** **Extracted: 05/08/07 11:39**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | EPA 8270C | ND | --- | 0.330 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/09/07 18:23 | |
| Acenaphthylene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Aniline | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Anthracene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) anthracene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (a) pyrene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (b) fluoranthene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (k) fluoranthene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzo (ghi) perylene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzoic Acid | " | ND | --- | 1.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Benzyl alcohol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Bis(2-chloroethoxy)methane | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Bis(2-chloroethyl)ether | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Bis(2-chloroisopropyl)ether | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Bis(2-ethylhexyl)phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Bromophenyl phenyl ether | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Butyl benzyl phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Carbazole | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Chloroaniline | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Chloro-3-methylphenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Chloronaphthalene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Chlorophenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Chlorophenyl phenyl ether | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 3 & 4-Methylphenol (m,p-Cresols) | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylphenol (o-Cresol) | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Chrysene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Di-n-butyl phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenz (a,h) anthracene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dibenzofuran | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1,2-Dichlorobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1,3-Dichlorobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1,4-Dichlorobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 3,3´-Dichlorobenzidine | " | ND | --- | 5.00 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4-Dichlorophenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Diethyl phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4-Dimethylphenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dimethyl phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4,6-Dinitro-2-methylphenol | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4-Dinitrophenol | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |

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Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish Levee** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

**Semivolatile Organic Compounds by EPA Method 8270C - Laboratory Quality Control Results**
TestAmerica - Seattle, WA

**QC Batch: 7E08039** **Soil Preparation Method: EPA 3550B**

**Blank (7E08039-BLK1)** **Extracted: 05/08/07 11:39**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-Dinitrotoluene | EPA 8270C | ND | --- | 0.500 | mg/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/09/07 18:23 | |
| 2,6-Dinitrotoluene | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| N-Nitrosodiphenylamine | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluoranthene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Fluorene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Hexachlorobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Hexachlorobutadiene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Hexachlorocyclopentadiene | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Hexachloroethane | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Indeno (1,2,3-cd) pyrene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Isophorone | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1-Methylnaphthalene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Methylnaphthalene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Naphthalene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Nitroaniline | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 3-Nitroaniline | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Nitroaniline | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Nitrobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2-Nitrophenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 4-Nitrophenol | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| N-Nitrosodi-n-propylamine | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Di-n-octyl phthalate | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pentachlorophenol | " | ND | --- | 0.500 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenanthrene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Phenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pyrene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 1,2,4-Trichlorobenzene | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4,5-Trichlorophenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4,6-Trichlorophenol | " | ND | --- | 0.330 | " | " | -- | -- | -- | -- | -- | -- | " | |

| Surrogate(s) | Compound | | Recovery | | Limits | | Analyzed |
|---|---|---|---|---|---|---|---|
| *Surrogate(s):* | *2-FBP* | *Recovery:* | *90.1%* | *Limits:* | *27-126%* | *"* | *05/09/07 18:23* |
| | *2-FP* | | *88.3%* | | *16-121%* | *"* | *"* |
| | *Nitrobenzene-d5* | | *90.7%* | | *26-125%* | *"* | *"* |
| | *Phenol-d6* | | *58.0%* | | *10-120%* | *"* | *"* |
| | *p-Terphenyl-d14* | | *79.6%* | | *26-150%* | *"* | *"* |
| | *2,4,6-TBP* | | *80.8%* | | *10-152%* | *"* | *"* |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish Levee** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Semivolatile Organic Compounds by EPA Method 8270C - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08039** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LCS (7E08039-BS1)** | | | | | | | | **Extracted: 05/08/07 11:39** | | | | | | |
| Acenaphthene | EPA 8270C | 2.89 | --- | 0.330 | mg/kg wet | 1x | -- | 3.33 | 86.8% | (47-128) | -- | -- | 05/09/07 18:56 | |
| 4-Chloro-3-methylphenol | " | 2.95 | --- | 0.330 | " | " | -- | " | 88.6% | (49-130) | -- | -- | " | |
| 2-Chlorophenol | " | 2.88 | --- | 0.330 | " | " | -- | " | 86.5% | (51-120) | -- | -- | " | |
| 1,4-Dichlorobenzene | " | 2.72 | --- | 0.330 | " | " | -- | " | 81.7% | " | -- | -- | " | |
| 2,4-Dinitrotoluene | " | 2.91 | --- | 0.500 | " | " | -- | " | 87.4% | (51-135) | -- | -- | " | |
| 4-Nitrophenol | " | 3.45 | --- | 0.500 | " | " | -- | " | 104% | (32-155) | -- | -- | " | |
| N-Nitrosodi-n-propylamine | " | 2.79 | --- | 0.330 | " | " | -- | " | 83.8% | (51-120) | -- | -- | " | |
| Pentachlorophenol | " | 4.07 | --- | 0.500 | " | " | -- | " | 122% | (46-163) | -- | -- | " | |
| Phenol | " | 2.89 | --- | 0.330 | " | " | -- | " | 86.8% | (50-122) | -- | -- | " | |
| Pyrene | " | 2.82 | --- | 0.330 | " | " | -- | " | 84.7% | (45-138) | -- | -- | " | |
| 1,2,4-Trichlorobenzene | " | 2.92 | --- | 0.330 | " | " | -- | " | 87.7% | (47-120) | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery:* | *93.7%* | *Limits:* | *27-126%* | *"* | | | | | | | *05/09/07 18:56* | |
| *2-FP* | | | *91.0%* | | *16-121%* | *"* | | | | | | | *"* | |
| *Nitrobenzene-d5* | | | *91.6%* | | *26-125%* | *"* | | | | | | | *"* | |
| *Phenol-d6* | | | *58.3%* | | *10-120%* | *"* | | | | | | | *"* | |
| *p-Terphenyl-d14* | | | *87.4%* | | *26-150%* | *"* | | | | | | | *"* | |
| *2,4,6-TBP* | | | *99.1%* | | *10-152%* | *"* | | | | | | | *"* | |
| **Matrix Spike (7E08039-MS1)** | | | | **QC Source: BQE0096-01** | | | | **Extracted: 05/08/07 11:39** | | | | | | |
| Acenaphthene | EPA 8270C | 3.35 | --- | 1.10 | mg/kg dry | 1x | ND | 4.44 | 75.5% | (47-128) | -- | -- | 05/09/07 19:30 | |
| 4-Chloro-3-methylphenol | " | 3.56 | --- | 1.10 | " | " | ND | " | 80.2% | (45-130) | -- | -- | " | |
| 2-Chlorophenol | " | 3.57 | --- | 1.10 | " | " | ND | " | 80.4% | (48-120) | -- | -- | " | |
| 1,4-Dichlorobenzene | " | 3.44 | --- | 1.10 | " | " | ND | " | 77.5% | (50-120) | -- | -- | " | |
| 2,4-Dinitrotoluene | " | 3.25 | --- | 1.66 | " | " | ND | " | 73.2% | (34-154) | -- | -- | " | |
| 4-Nitrophenol | " | 3.23 | --- | 1.66 | " | " | ND | " | 72.7% | (17-164) | -- | -- | " | |
| N-Nitrosodi-n-propylamine | " | 3.55 | --- | 1.10 | " | " | ND | " | 80.0% | (49-120) | -- | -- | " | |
| Pentachlorophenol | " | 3.09 | --- | 1.66 | " | " | ND | " | 69.6% | (22-183) | -- | -- | " | |
| Phenol | " | 3.65 | --- | 1.10 | " | " | ND | " | 82.2% | (32-132) | -- | -- | " | |
| Pyrene | " | 4.41 | --- | 1.10 | " | " | ND | " | 99.3% | (31-147) | -- | -- | " | I |
| 1,2,4-Trichlorobenzene | " | 3.65 | --- | 1.10 | " | " | ND | " | 82.2% | (47-120) | -- | -- | " | |
| *Surrogate(s): 2-FBP* | | *Recovery:* | *86.9%* | *Limits:* | *27-126%* | *"* | | | | | | | *05/09/07 19:30* | |
| *2-FP* | | | *83.6%* | | *16-121%* | *"* | | | | | | | *"* | |
| *Nitrobenzene-d5* | | | *85.8%* | | *26-125%* | *"* | | | | | | | *"* | |
| *Phenol-d6* | | | *53.4%* | | *10-120%* | *"* | | | | | | | *"* | |
| *p-Terphenyl-d14* | | | *91.9%* | | *26-150%* | *"* | | | | | | | *"* | *I* |
| *2,4,6-TBP* | | | *89.9%* | | *10-152%* | *"* | | | | | | | *"* | |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

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| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish Levee | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Semivolatile Organic Compounds by EPA Method 8270C - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08039** **Soil Preparation Method: EPA 3550B**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Matrix Spike Dup (7E08039-MSD1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/08/07 11:39 | | | | | | |
| Acenaphthene | EPA 8270C | 3.37 | --- | 1.10 | mg/kg dry | 1x | ND | 4.44 | 75.9% | (47-128) | 0.595% | (24) | 05/09/07 20:03 | |
| 4-Chloro-3-methylphenol | " | 3.51 | --- | 1.10 | " | " | ND | " | 79.1% | (45-130) | 1.41% | (23) | " | |
| 2-Chlorophenol | " | 3.67 | --- | 1.10 | " | " | ND | " | 82.7% | (48-120) | 2.76% | (27) | " | |
| 1,4-Dichlorobenzene | " | 3.50 | --- | 1.10 | " | " | ND | " | 78.8% | (50-120) | 1.73% | (34) | " | |
| 2,4-Dinitrotoluene | " | 3.25 | --- | 1.66 | " | " | ND | " | 73.2% | (34-154) | 0.00% | (24) | " | |
| 4-Nitrophenol | " | 3.43 | --- | 1.66 | " | " | ND | " | 77.3% | (17-164) | 6.01% | (31) | " | |
| N-Nitrosodi-n-propylamine | " | 3.74 | --- | 1.10 | " | " | ND | " | 84.2% | (49-120) | 5.21% | " | " | |
| Pentachlorophenol | " | 3.14 | --- | 1.66 | " | " | ND | " | 70.7% | (22-183) | 1.61% | (26) | " | |
| Phenol | " | 3.67 | --- | 1.10 | " | " | ND | " | 82.7% | (32-132) | 0.546% | (31) | " | |
| Pyrene | " | 4.12 | --- | 1.10 | " | " | ND | " | 92.8% | (31-147) | 6.80% | (26) | " | |
| 1,2,4-Trichlorobenzene | " | 3.66 | --- | 1.10 | " | " | ND | " | 82.4% | (47-120) | 0.274% | (25) | " | |

| Surrogate(s): | | Recovery: | | Limits: | | Analyzed |
|---|---|---|---|---|---|---|
| | *2-FBP* | *87.6%* | | *27-126%* | *"* | *05/09/07 20:03* |
| | *2-FP* | *84.5%* | | *16-121%* | *"* | *"* |
| | *Nitrobenzene-d5* | *84.9%* | | *26-125%* | *"* | *"* |
| | *Phenol-d6* | *54.1%* | | *10-120%* | *"* | *"* |
| | *p-Terphenyl-d14* | *91.0%* | | *26-150%* | *"* | *"* |
| | *2,4,6-TBP* | *89.0%* | | *10-152%* | *"* | *"* |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Physical Parameters by APHA/ASTM/EPA Methods - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E07051** **Soil Preparation Method: Dry Weight**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (7E07051-BLK1)** | | | | | | | | | | **Extracted: 05/07/07 16:58** | | | | |
| Dry Weight | BSOPSPL003R08 | 100 | --- | 1.00 | % | 1x | -- | -- | -- | -- | -- | -- | 05/08/07 00:00 | |

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|---|---|---|---|
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| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Free-Acid Herbicides by EPA Method 8151A - Laboratory Quality Control Results
TestAmerica - Seattle, WA

**QC Batch: 7E08041 Soil Preparation Method: EPA 8151A**

### Blank (7E08041-BLK1)
**Extracted: 05/08/07 11:41**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-D | EPA 8151A | ND | --- | 50.0 | ug/kg wet | 1x | -- | -- | -- | -- | -- | -- | 05/18/07 09:06 | |
| 2,4-DB | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4,5-T | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| 2,4,5-TP (Silvex) | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dalapon | " | ND | --- | 100 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dicamba | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dichloroprop | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Dinoseb | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |
| MCPA | " | ND | --- | 5000 | " | " | -- | -- | -- | -- | -- | -- | " | |
| MCPP | " | ND | --- | 5000 | " | " | -- | -- | -- | -- | -- | -- | " | |
| Pentachlorophenol | " | ND | --- | 50.0 | " | " | -- | -- | -- | -- | -- | -- | " | |

*Surrogate(s): 2,4-DCAA Recovery: 83.8% Limits: 18-138% " 05/18/07 09:06*

### LCS (7E08041-BS1)
**Extracted: 05/08/07 11:41**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-D | EPA 8151A | 103 | --- | 50.0 | ug/kg wet | 1x | -- | 100 | 103% | (62-128) | -- | -- | 05/18/07 09:27 | |
| 2,4-DB | " | 531 | --- | 50.0 | " | " | -- | 500 | 106% | (72-146) | -- | -- | " | |
| 2,4,5-T | " | 97.7 | --- | 50.0 | " | " | -- | 100 | 97.7% | (63-125) | -- | -- | " | |
| 2,4,5-TP (Silvex) | " | 93.8 | --- | 50.0 | " | " | -- | " | 93.8% | (64-120) | -- | -- | " | |
| Dalapon | " | 409 | --- | 100 | " | " | -- | 500 | 81.8% | (29-164) | -- | -- | " | |
| Dicamba | " | 95.0 | --- | 50.0 | " | " | -- | 100 | 95.0% | (68-121) | -- | -- | " | |
| Dichloroprop | " | 103 | --- | 50.0 | " | " | -- | " | 103% | (53-144) | -- | -- | " | |
| Dinoseb | " | 74.3 | --- | 50.0 | " | " | -- | " | 74.3% | (36-174) | -- | -- | " | |
| MCPA | " | 9590 | --- | 5000 | " | " | -- | 10000 | 95.9% | (56-142) | -- | -- | " | |
| MCPP | " | 11400 | --- | 5000 | " | " | -- | " | 114% | (37-168) | -- | -- | " | |
| Pentachlorophenol | " | 94.2 | --- | 50.0 | " | " | -- | 100 | 94.2% | (74-116) | -- | -- | " | |

*Surrogate(s): 2,4-DCAA Recovery: 89.2% Limits: 18-138% " 05/18/07 09:27*

### Matrix Spike (7E08041-MS1)
**QC Source: BQE0096-01 Extracted: 05/08/07 11:41**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-D | EPA 8151A | 69.3 | --- | 670 | ug/kg dry | 10x | ND | 134 | 51.7% | (10-160) | -- | -- | 05/18/07 15:36 | M4 |
| 2,4-DB | " | 581 | --- | 670 | " | " | ND | 670 | 86.7% | (40-174) | -- | -- | " | M4 |
| 2,4,5-T | " | 53.6 | --- | 670 | " | " | ND | 134 | 40.0% | (10-138) | -- | -- | " | M4 |
| 2,4,5-TP (Silvex) | " | 60.3 | --- | 670 | " | " | ND | " | 45.0% | (10-157) | -- | -- | " | M4 |
| Dalapon | " | ND | --- | 1340 | " | " | ND | 670 | NR | (10-172) | -- | -- | " | M4 |
| Dicamba | " | 170 | --- | 670 | " | " | ND | 134 | 127% | (10-158) | -- | -- | " | M4, R1 |
| Dichloroprop | " | 71.5 | --- | 670 | " | " | ND | " | 53.4% | (10-170) | -- | -- | " | M4 |
| Dinoseb | " | 203 | --- | 670 | " | " | ND | " | 151% | (36-174) | -- | -- | " | M4 |
| MCPA | " | 10800 | --- | 67000 | " | " | ND | 13400 | 80.6% | (10-175) | -- | -- | " | M4 |
| MCPP | " | 21200 | --- | 67000 | " | " | ND | " | 158% | (10-184) | -- | -- | " | M4, R1 |
| Pentachlorophenol | " | 123 | --- | 670 | " | " | ND | 134 | 91.8% | (29-145) | -- | -- | " | M4 |

TestAmerica - Seattle, WA

Kate Haney

Kate Haney, Project Manager

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210

| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish Levee | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Free-Acid Herbicides by EPA Method 8151A - Laboratory Quality Control Results

TestAmerica - Seattle, WA

**QC Batch: 7E08041** **Soil Preparation Method: EPA 8151A**

| Analyte | Method | Result | MDL* | MRL | Units | Dil | Source Result | Spike Amt | % REC | (Limits) | % RPD | (Limits) | Analyzed | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Matrix Spike (7E08041-MS1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/08/07 11:41 | | | | | | |
| *Surrogate(s): 2,4-DCAA [2C]* | | *Recovery: 221%* | | *Limits: 18-138%* | | *10x* | | | | | | | *05/18/07 15:36* | ***ZX, R1*** |
| **Matrix Spike Dup (7E08041-MSD1)** | | | | QC Source: BQE0096-01 | | | | Extracted: 05/08/07 11:41 | | | | | | |
| 2,4-D | EPA 8151A | 73.7 | --- | 670 | ug/kg dry | 10x | ND | 134 | 55.0% | (10-160) | 6.15% | (40) | 05/18/07 15:57 | M4 |
| 2,4-DB | " | 509 | --- | 670 | " | " | ND | 670 | 76.0% | (40-174) | 13.2% | " | " | M4 |
| 2,4,5-T | " | 62.6 | --- | 670 | " | " | ND | 134 | 46.7% | (10-138) | 15.5% | " | " | M4 |
| 2,4,5-TP (Silvex) | " | 67.0 | --- | 670 | " | " | ND | " | 50.0% | (10-157) | 10.5% | " | " | M4 |
| Dalapon | " | ND | --- | 1340 | " | " | ND | 670 | NR | (10-172) | -- | " | " | M4 |
| Dicamba | " | 208 | --- | 670 | " | " | ND | 134 | 155% | (10-158) | 20.1% | " | " | M4, R1 |
| Dichloroprop | " | 78.2 | --- | 670 | " | " | ND | " | 58.4% | (10-170) | 8.95% | " | " | M4 |
| Dinoseb | " | 284 | --- | 670 | " | " | ND | " | 212% | (36-174) | 33.3% | " | " | M4 |
| MCPA | " | 23000 | --- | 67000 | " | " | ND | 13400 | 172% | (10-175) | 72.2% | " | " | M4, R1 |
| MCPP | " | 28700 | --- | 67000 | " | " | ND | " | 214% | (10-184) | 30.1% | " | " | M4 |
| Pentachlorophenol | " | 121 | --- | 670 | " | " | ND | 134 | 90.3% | (29-145) | 1.64% | " | " | M4 |
| *Surrogate(s): 2,4-DCAA [2C]* | | *Recovery: 214%* | | *Limits: 18-138%* | | *"* | | | | | | | *05/18/07 15:57* | ***ZX, R1*** |

TestAmerica - Seattle, WA

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| The RETEC Group, Inc. | Project Name: | BNSF-Skykomish Levee | |
|---|---|---|---|
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

## Notes and Definitions

Report Specific Notes:

| | | |
|---|---|---|
| A-01 | - | Aliquot for analysis taken from 4 ounce jar. |
| C7 | - | Calibration Verification recovery was below the method control limit due to matrix interference carried over from analytical samples. The matrix interference was confirmed by reanalysis with the same result. |
| E | - | Concentration exceeds the calibration range and therefore result is semi-quantitative. |
| I | - | Internal Standard recovery was outside of method limits. Matrix interference was confirmed by reanalysis. |
| M1 | - | The MS and/or MSD were above the acceptance limits due to sample matrix interference. See Blank Spike (LCS). |
| M2 | - | The MS and/or MSD were below the acceptance limits due to sample matrix interference. See Blank Spike (LCS). |
| M4 | - | The sample required a dilution due to matrix interference. Because of this dilution, the matrix spike concentrations in the sample were reduced to a level where the recovery calculation does not provide useful information. See Blank Spike (LCS). |
| Q6 | - | Results in the diesel organics range are primarily due to overlap from a heavy oil range product. |
| R1 | - | The RPD between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the higher value was reported. |
| R10 | - | The RPD between the primary and confirmatory analysis exceeded 40%. Per method 8000B, the lower value was reported due to apparent chromatographic problems. |
| R3 | - | The RPD exceeded the acceptance limit due to sample matrix effects. |
| R4 | - | Due to the low levels of analyte in the sample, the duplicate RPD calculation does not provide useful information. |
| R9 | - | Sample RPD exceeded the laboratory control limit. |
| RL1 | - | Reporting limit raised due to sample matrix effects. |
| ZX | - | Due to sample matrix effects, the surrogate recovery was outside the acceptance limits. |

Laboratory Reporting Conventions:

| | | |
|---|---|---|
| DET | - | Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only. |
| ND | - | Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate). |
| NR/NA | - | Not Reported / Not Available |
| dry | - | Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight. |
| wet | - | Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis. |
| RPD | - | RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries). |
| MRL | - | METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table. |
| MDL* | - | METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results. |
| Dil | - | Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data. |
| Reporting Limits | - | Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable. |

TestAmerica - Seattle, WA

Kate Haney, Project Manager

| | | | |
|---|---|---|---|
| **The RETEC Group, Inc.** | Project Name: | **BNSF-Skykomish Levee** | |
| 1011 SW Klickitat Way, Suite 207 | Project Number: | BN050-19390-220 | Report Created: |
| Seattle, WA 98134 | Project Manager: | Sarah Albano | 05/18/07 17:18 |

Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

BQE0096

# Chain of Custody Record

No 101497

The RETEC Group, Inc.
1011 S.W. Klickitat Way, Suite 207 • Seattle, WA 98134-1162
(206) 624-9349 Phone • (206) 624-2839 Fax
www.retec.com

RETEC

Project Name: Skykomish Levee
Send Report To: Sarah Albano
Address: see above
Phone:
Fax:

Project Number: BN00-19390-220
Sampler (Print Name): S Albano
Sampler (Print Name): —
Shipment Method: Courier
Airbill Number: —
Laboratory Receiving: TA

Page 1 of 1

Direct Bill BNSF

Purchase Order #: TT0100 G05

Analysis Requested

| Field Sample ID | Sample Date | Sample Time | Sample Matrix | Number of Containers | NWTPH-Dx | NWTPH-Gx | BTEX | Pesticides/herbicides | 8270 | 13 priority pollutant Metals | | | | | | Comments, Special Instructions, etc. | Lab Sample ID (to be completed by lab) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SKY-TOPSOIL-CEDAR | 5/7/07 | 1400 | S | | X | X | X | X | X | X | | | | | | | 01 |

| Relinquished by: (Signature) | Received by: (Signature) | Date: | Time: |
|---|---|---|---|
| Sarah Albano | [signature] | 5/7/07 | 1450 |
| Relinquished by: (Signature) | Received by: (Signature) | Date: | Time: |
| | [signature] | 8/7 | 1410 |
| Relinquished by: (Signature) | Received by: (Signature) | Date: | Time: |
| | | | |

Sample Custodian Remarks (Completed By Laboratory):

| QA/QC Level | Turnaround |
|---|---|
| Level I ☐ | Routine ☐ |
| Level II ☐ | 24 Hour ☒ |
| Level III ☐ | 1 Week ☐ |
| Other ☐ | Other ____ |

| Sample Receipt | |
|---|---|
| Total # Containers Received? | |
| COC Seals Present? | |
| COC Seals Intact? | |
| Received Containers Intact? | |
| Temperature? | |

White: Lab Copy    Yellow: PM Copy    Pink: Field Copy    Gold: PM/QA/QC Copy

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**The RETEC Group, Inc.**
**1011 SW Klickitat Way, Suite 207, Seattle, WA 98134-1162**
T **206.624.9349** F **206.624.2839** www.ensr.aecom.com

# Memorandum

Date: August 30, 2007

To:

From: Saad Moustafa

Subject: Effect of Construction Activities on Structural Condition of the Skykomish School

Distribution:

The Skykomish School is a three-story building situated close to the Skykomish River that houses both grade- and high- school facilities. In order to determine the effect of removal and replacement of contaminated soil adjacent to the river on the structural condition of the school building, two structural condition surveys were performed, the first at the start of construction and the second after completion of the work. Each survey was video recorded. The first survey was conducted on August 23rd, 2006 and the second survey was performed on June 27th, 2007. The school structural system consists of cast-in-place reinforced concrete exterior walls and wood frame interior. The first floor is a concrete slab on grade; the second and third floors are wood construction, as is the roof. The following is a brief summary of the structural condition of the building during the first survey.

## Summary of First Survey

The overall structural condition of the building is good, without any obvious structural defects. Several non-structural hairline cracks (shrinkage / thermal) were observed in the exterior walls. These types of cracks usually occur during or very shortly after construction. Black, red, and green markers were used to highlight the cracks for easy comparison later. Cracks in the exterior of the east and north walls were highlighted using black marker; cracks in the exterior of the west and south walls were highlighted using red marker. Green marker was used to highlight all interior cracks.

Signs of moisture migration through the cracks were observed in the first floor in the paint storage room and in the second level of the gymnasium. All other cracks appear to be quite harmless. Noticeable floor settlement was observed in the boiler room floor. The settlement appeared to have taken place over a period of time due the heavy floor load. Very few plaster cracks were observed in the interior finishes.

## Summary of Second Survey

The second survey consisted of a visual inspection with the object of identifying any changes (new cracks) in the structure. No changes (in width or length) in the cracks highlighted in black in the east

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wall; these appeared to be quite old and either were missed during the first survey or were covered with paint and had a chance to open during the last 10 months. Unfortunately, the red highlight either washed or faded away. However, a comparison of the cracks identified in the first survey video revealed no change in the cracks previously recorded and that no new cracks were found. Survey of the interior of the building indicated no change in the cracks highlighted in green, and no new cracks were found.

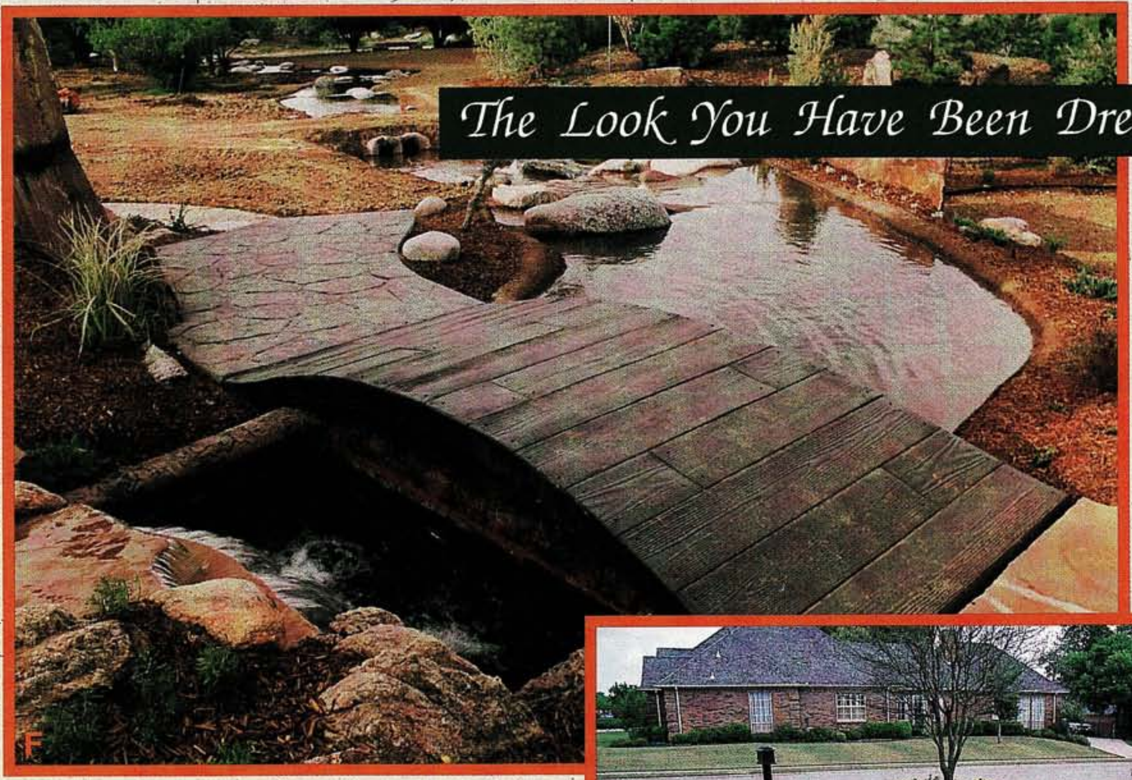
## Conclusion

Comparison of the results of the two condition surveys of the school structure indicated no change. It is, therefore, concluded that the construction activities taken place between August 23rd, 2006 and June 27th, 2007 did not cause any structural distress to the school building.


EXPIRES 5/25/ 2008

**Saad Moustafa. P.E.**

# *The Look You Have Been Dreaming Of.*



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# Patterns Available

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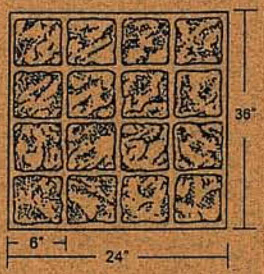
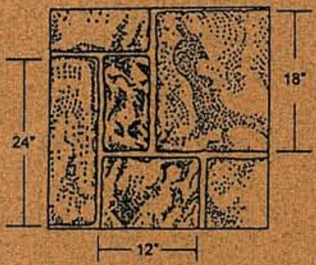
The following patterns shown are widely available, Specifiers are not limited to patterns shown. New custom patterns can be created at a reasonable cost. ***NOTE**: Drawings are not to scale.*



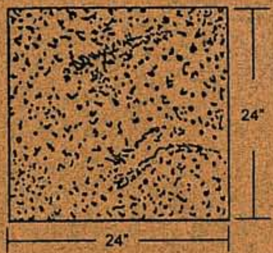

6"x6" Cobblestone


Board


12"x12" Slate

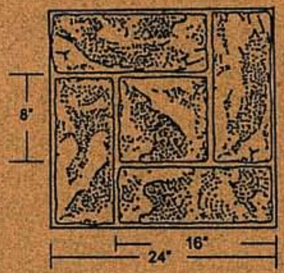



Yorkstone

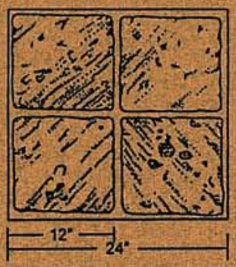



Keystone*

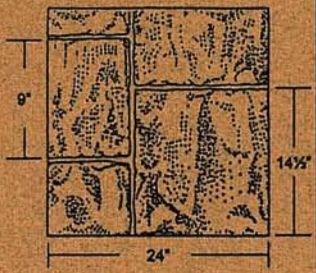

Fieldstone



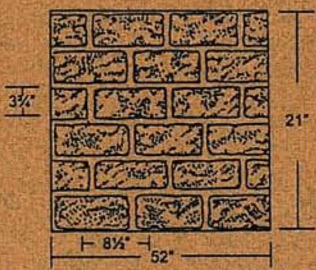

Chase Slate



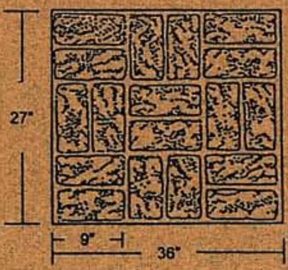

12"x12" Adoquin




Ashlar Slate




Old English Brick Running Bond*




Old English Brick Basketweave*


Old English Brick Herringbone*

***6" x 6" Cobblestone***
In a stacked bond formation, these square stones have a granite texture. (Medium texture with 3/8" wide x 1/4" deep joints.)

***Board***
This weathered authentic look comes complete with nail holes. (Light to medium texture with 1/4" joints.)

***12" x 12" Slate***
A stacked bond formation in a 12" x 12" grid. (Medium texture with 1/4" joints.)

***Yorkstone***
Varying sizes of stones from 12" x 6" to 30" x 30". No two applications are the same. (Light texture and 1/4" joints.)

***Keystone***
This square stone duplicates the actual sawed Keystone of the Florida Keys. Looks fabulous around pools. (Light to medium texture with 3/8" wide x 1/4" deep joints.)

***Fieldstone***
Molded from large pitted rocks found in fields across the Midwest. (Heavy texture with 1/2" - 3/4" wide x 1/4" deep joints.)

***Chase Slate***
Four slate-textured rectangular stones "chase" themselves around a square center stone to form this pattern. (Medium texture with 1/4" joints.)

***12" x 12" Adoquin***
As mined in Mexico, our 12" x 12" pattern authenticates the volcanic look, coarse with ridges, chisel marks and craters. (Medium to heavy texture with 1/4" joints.)

***Ashlar Slate***
Random pattern of slate rectangles. (Medium texture with 1/4" joints.)

***Old English Brick Running Bond***
Like old town red brick streets of America, this pattern complete with worn out identification stamps in the brick. (Heavy texture with 3/8"-1/2" wide x 1/4" deep joints)

***Old English Brick Basketweave***
A rugged looking pattern with a weave design. (Heavy texture with 1/2" - 5/8" wide x 1/4" deep joints.)

***Old English Brick Herringbone***
This pattern demonstrates the look of rustic, worn bricks in a herringbone design. (Heavy textured with 1/2" - 5/8" wide x 1/4" deep joints.)

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# Boring/Well Log

**Well #: 5-W-15**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259336.26** Easting: **1510254.05** | Ground Elevation: **925.36 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **925.15 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1110** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 1220** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description<br>Classification Scheme: | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Brown to grey-brown silt at 15 to 20 feet. |
| | | | | | 20 | | -20 | |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

| Date | Time | Depth (ft.) |
|---|---|---|
| **7/10/07** | **1311** | **7.33** |
| | | |
| | | |

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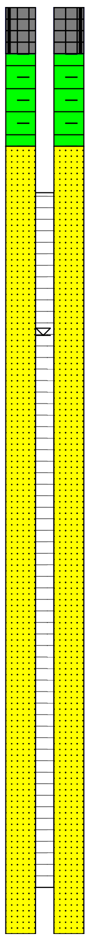
# Boring/Well Log

**Well #: 5-W-19**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259319.88** Easting: **1509980.30** | Ground Elevation: **924.55 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.35 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0825** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 0905** | Boring ID: **4.25 in.** | Seal: **Bentonite Chip** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme: ) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | |  | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Very faint TPH odor at bottom of boring, hardly detectable by olfactory. |
| | | | | | 20 | | -20 | Gray-brown to brown silt at bottom of boring. |

**Remarks and Datum Used:**


**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**


**Sample Type**

N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1428** | **7.08** |
| | | |
| | | |

# Boring/Well Log

ENSR | AECOM

**Well #: 5-W-18**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259341.20** Easting: **1510109.74** | Ground Elevation: **924.91 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.64 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1420** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 1510** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **Renee Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Very faint odor and small pinpoint blebs on gravel, slight sheen from 18 to 20 feet. |
| | | | | | 20 | | -20 | Sand and gravel at bottom. |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1522** | **7.11** |
| | | |
| | | |

# Boring/Well Log

ENSR | AECOM

**Well #: 5-W-17**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259385.28** Easting: **1510216.82** | Ground Elevation: **924.93 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.6 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0925** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 1040** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme: ) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Very slight sheen and Bunker C-like odor from 18 to 20 feet. |
| | | | | | 20 | | -20 | |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1550** | **6.91** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-16**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259405.44** Easting: **1510146.97** | Ground Elevation: **925.47 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **925.2 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1320** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 1400** | Boring ID: **4.25 in.** | Seal: **Bentonite Chip** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | |
| | | | | | 20 | | -20 | Sand and gravel at bottom. |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

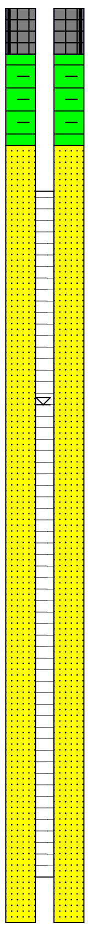
| Date | Time | Depth (ft.) |
|---|---|---|
| **7/10/07** | **1357** | **7.60** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-14**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259508.07** Easting: **1510412.68** | Ground Elevation: **926.85 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **926.59 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0800** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 0915** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description<br>Classification Scheme: | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | |  | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | |
| | | | | | 20 | | -20 | |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1213** | **8.67** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-20**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259270.34** Easting: **1509885.30** | Ground Elevation: **924.06 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **923.83 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **15 ft.** |
| Start Date & Time: **07/10/2007 1000** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/10/2007 1050** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in.** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme: ) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | Gravel with little sand and slight TPH odor from 12 to 15 feet. |
| | | | | | 15 | | -15 | Hit Boulder at 15 feet. |

**Remarks and Datum Used:**


**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**


**Sample Type**

N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

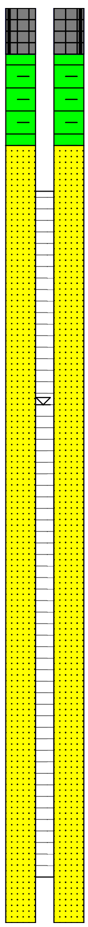
| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1454** | **6.69** |
| | | |
| | | |

# Boring/Well Log

**Well #: 5-W-14**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259508.07** Easting: **1510412.68** | Ground Elevation: **926.85 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **926.59 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0800** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 0915** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description<br>Classification Scheme: | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | |
| | | | | | 20 | | -20 | |



**Remarks and Datum Used:**


**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**


**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

| Date | Time | Depth (ft.) |
|---|---|---|
| **7/10/07** | **1213** | **8.67** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-15**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259336.26** Easting: **1510254.05** | Ground Elevation: **925.36 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **925.15 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1110** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 1220** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description<br>Classification Scheme: | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Brown to grey-brown silt at 15 to 20 feet. |
| | | | | | 20 | | -20 | |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

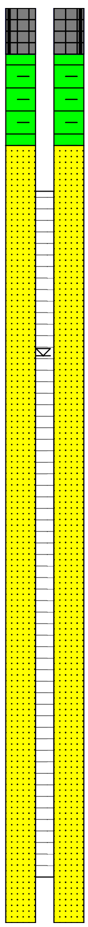
| Date | Time | Depth (ft.) |
|---|---|---|
| **7/10/07** | **1311** | **7.33** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-16**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259405.44** Easting: **1510146.97** | Ground Elevation: **925.47 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **925.2 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1320** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand Pack** |
| Finish Date & Time: **07/09/2007 1400** | Boring ID: **4.25 in.** | Seal: **Bentonite Chip** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | |  | | 0–20 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 to -20 | Sand and gravel at bottom. |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

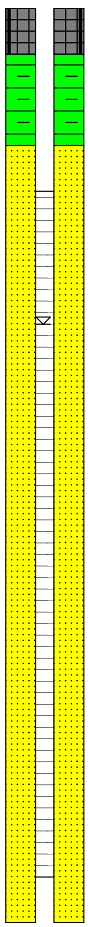
| Date | Time | Depth (ft.) |
|---|---|---|
| **7/10/07** | **1357** | **7.60** |
| | | |
| | | |

# Boring/Well Log

**Well #: 5-W-17**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259385.28** Easting: **1510216.82** | Ground Elevation: **924.93 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.6 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0925** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 1040** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | |
| | | | | | 20 | | -20 | Very slight sheen and Bunker C-like odor from 18 to 20 feet. |



**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

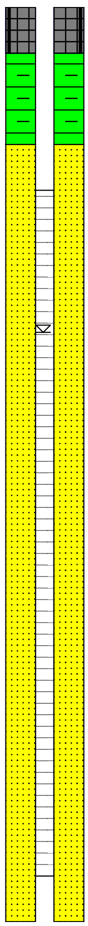
| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1550** | **6.91** |
| | | |
| | | |

ENSR | AECOM

# Boring/Well Log

**Well #: 5-W-18**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259341.20** Easting: **1510109.74** | Ground Elevation: **924.91 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.64 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 1420** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 1510** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **Renee Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | |  | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Very faint odor and small pinpoint blebs on gravel, slight sheen from 18 to 20 feet. |
| | | | | | 20 | | -20 | Sand and gravel at bottom. |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1522** | **7.11** |
| | | |
| | | |

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# Boring/Well Log

**Well #: 5-W-19**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259319.88** Easting: **1509980.30** | Ground Elevation: **924.55 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **924.35 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **20 ft.** |
| Start Date & Time: **07/09/2007 0825** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/09/2007 0905** | Boring ID: **4.25 in.** | Seal: **Bentonite Chip** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in. HSA** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme: ) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | |
| | | | | | 15 | | -15 | Very faint TPH odor at bottom of boring, hardly detectable by olfactory. |
| | | | | | 20 | | -20 | Gray-brown to brown silt at bottom of boring. |

**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

**Groundwater**

| Date | Time | Depth (ft.) |
|---|---|---|
| 7/10/07 | 1428 | 7.08 |
| | | |
| | | |

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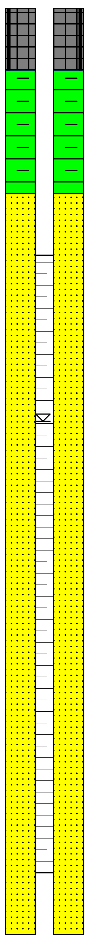
# Boring/Well Log

**Well #: 5-W-20**
**Sheet 1 of 1**

| | | |
|---|---|---|
| Project: **Compliance Well Installation** | Monument: **Flush Mount** | Stick Up: **-** |
| Project #: **01140-204-0340** | Northing: **259270.34** Easting: **1509885.30** | Ground Elevation: **924.06 ft.** |
| Location: **Skykomish, WA** | Drill Rig Type: **CME 75** | MP Elevation: **923.83 ft.** |
| Client: **BNSF** | Method: **HSA** | Total Depth: **15 ft.** |
| Start Date & Time: **07/10/2007 1000** | Casing ID: **2 in.** | Filter Pack: **10/20 Silica Sand** |
| Finish Date & Time: **07/10/2007 1050** | Boring ID: **4.25 in.** | Seal: **Bentonite Chips** |
| Contractor: **Cascade Drilling Inc.** | Bit Type: **4.25 in.** | Grout: **-** |
| Operator: **Andy Flagan** | Logged By: **R. Knecht** | Screen: **Schedule 40 PVC 0.020 inch** |

| Sample: Type & Number | Sample: Depth Range | Sample: % Rec | Well Completion Log | Graphic | Depth (ft.) | Soil and Rock Description (Classification Scheme:) | Elevation (ft.) | Comments & Samples |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | Lithology not logged, well installed within footprint of Interim Action 2006 excavation | 0 | |
| | | | | | 5 | | -5 | |
| | | | | | 10 | | -10 | Gravel with little sand and slight TPH odor from 12 to 15 feet. |
| | | | | | | | | Hit Boulder at 15 feet. |
| | | | | | 15 | | -15 | |



**Remarks and Datum Used:**

**AECOM - Environment**
**710 2nd Ave. Suite 1000**
**Seattle, WA 98104**
**Phone: (206) 624-9349**
**Fax: (206) 623-3793**

**Sample Type**
N = SPT
DP = Direct Push
SS = Split Spoon
C = Core

| Groundwater | | |
|---|---|---|
| Date | Time | Depth (ft.) |
| **7/10/07** | **1454** | **6.69** |
| | | |
| | | |