

**B&L Woodwaste Site
Pierce County, Washington**

Engineering Design Report (EDR)

Appendix D Critical Areas Study

FINAL

B&L Woodwaste Site

Critical Areas Study

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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AMEC	AMEC Geomatrix, Inc.
Asarco	ASARCO, LLC
bgs	Below ground surface
CAP	Cleanup Action Plan
CAS	Critical Areas Study
Consent Decree	B&L Landfill Consent Decree
dtw	Depth to water table
Ecology	Washington State Department of Ecology
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FMC	City of Fife Municipal Code
FWS	Free water surface
Landfill	B&L Woodwaste Landfill
MMC	City of Milton Municipal Code
Murray	Murray Pacific Corporation
NWI	National Wetlands Inventory
OBL	Obligate wetland
PLP	Potentially liable party
Project Team	Floyd Snider and AMEC Geomatrix, Inc.
SEPA	State Environmental Policy Act
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WDWP	Wetlands Delineation Work Plan
WDFW	Washington State Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

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1.0 Introduction

On May 7, 2008, Floyd|Snider and AMEC Geomatrix, Inc. (AMEC, the Project Team), conducted an investigation to determine the presence and extent of critical areas in the vicinity of the existing B&L Woodwaste Landfill (Landfill). The area extends over several parcels located within the cities of Milton and Fife and in unincorporated Pierce County. Parcel addresses include 552 through 817 Fife Way, in Milton and Fife, Washington. The Landfill property is located in Township 20 North, Range 4 East, Section 5, in Pierce County (Figure 1). The Landfill was used from the mid-1970s until the early 1980s. Wood waste originating from log sort yards in Commencement Bay, mixed with soil and Asarco, Inc. (Asarco) smelter slag (used as a base material for the log sort yards), were taken to the Landfill for disposal. The Asarco slag leached arsenic into soils and groundwater.

In 1992, the Washington State Department of Ecology (Ecology) issued an Enforcement Order requiring Asarco, and other potentially responsible parties (Murray Pacific, Louisiana-Pacific, and Executive Bark) to consolidate the wood waste into an 11-acre landfill, construct a multilayer capping system, and install and operate a groundwater monitoring well system. In the years following implementation of this remedy, an extensive study of the wetland area north of the landfill was conducted. The study found that dissolved arsenic levels in the groundwater in the wetland were greater than applicable cleanup standards and required additional evaluation.

In the meantime, Asarco filed for bankruptcy and Murray Pacific Corporation (Murray) stepped in as lead potentially liable party (PLP) for the site. As part of the B&L Woodwaste Site Consent Decree (Consent Decree) currently under public review, Murray has agreed to perform certain elements of the remedial action defined in the 2008 Final Cleanup Action Plan (CAP). Upon completion of these elements, the State of Washington will assume responsibility for the site, including the operation, maintenance, and monitoring requirements of the remedy, which comprise the remaining remedial actions specified in the CAP.

Implementation of the remedial action specified in the CAP will occur in three major phases, with MURRAY performing Phases 1 and 2. Phase 3, to be performed by Ecology, includes operation, maintenance, and monitoring of the remedy after completion of all work required to be performed by Murray under the Consent Decree.

Phase 1 includes design and construction of the physical containment and in-situ treatment components of the remedy. Work to be completed includes investigations necessary to complete the design and permitting processes, and an archaeological assessment of the site. Phase 1 construction is comprised of three major elements that will be performed concurrently:

1. Pilot testing, design, and implementation of the remedy needed for the area at the leading end of the arsenic plume.
2. Design, permitting, and construction of a barrier wall and upgradient interceptor trench to contain the area immediately beneath the Landfill.
3. Design, permitting, and construction of an interim system to recover and treat groundwater from the hotspot area within the wetlands.

This approach will complete the physical containment for the landfill, will treat the leading edge of the plume to reduce arsenic concentration and mobility, and will include an expedited mass-removal action to begin remediation of the wetlands. The End-of-Plume remedial action will allow downgradient restoration projects by others (for example, relocation of Hylebos Creek) to proceed independent of remediation work for the B&L Woodwaste Site.

Phase 2 will include additional hydrogeologic studies to fully characterize Site groundwater and support design of the hydraulic control components specified in the CAP. Phase 2 work will commence as Phase 1 work is completed. Phase 2 construction will include the following:

1. Permitting and excavation of contaminated sediments in the ditches designated in the CAP, followed by restoration of the ditches.
2. Permitting and construction of a groundwater recovery and collection system beneath the landfill in the areas defined in the CAP as the "Halo".
3. Permitting and construction of a groundwater remediation system for the wetlands area immediately north of the Landfill.
4. Permitting and construction of a groundwater treatment system capable of removing groundwater contaminants to regulatory levels.
5. Permitting and construction of a system for infiltration and/or discharge of treated groundwater.

Following construction, the recovery, treatment, and discharge systems will be commissioned and started up to confirm that the systems meet design specifications and achieve design requirements. After systems have been proven operable and the requirements specified in the Consent Decree have been met and approved by Ecology, Phase 3, which consists of long-term operation and maintenance, will commence.

The remediation area that will potentially be affected by implementation of the CAP remedy is shown in Figure 3. Phase 1 work is projected for completion in the fall of 2009 and Phase 2 work is projected for completion by the end of 2012. Since designs have not been completed, it is not possible to identify the full nature of the work that will be performed and, consequently, the area that must be disturbed. However, the areas that will be disturbed this year for completing the pre-design studies have been determined. This Critical Areas Study (CAS) describes the identified wetland locations and boundaries, and characterizes wetlands located within the remediation area that will be affected by work to be completed in 2008; this area has been designated the 2008 work area for the purposes of this report.

The Project Team delineated four wetlands within the 2008 work area and identified two wetland areas from the National Wetland Inventory (NWI) that are close to but outside of the remediation area. The wetlands located within the 2008 work area are classified as Category I, III, and IV wetlands in accordance with the Ecology wetland rating system. The delineated wetland outside of the remediation area is likely classified as Category II wetland (Hruby 2004). Hylebos Creek, a Type F stream, is located to the northwest of the remediation area (Washington State Department of Natural Resources 2008).

As described in the Web Soil Survey for Township 20 North, Range 4 East, Section 5, Washington (Natural Resource Conservation Service 2008), most of the soils of the properties

within the 2008 work area are mapped as Semiahmoo muck. Soils in the southwestern portion of the area are mapped as Shalar muck, Sultan silt loam, and Tisch silt. The Semiahmoo and Shalar muck series are very poorly-drained hydric soils, with a depth to water (dtw) of 0 to 12 inches. The Sultan silt loam series is a moderately well-drained non-hydric soil, with a dtw of 18 to 24 inches. The Tisch silt series is a very poorly-drained non-hydric soil, with a dtw of 0 to 12 inches.

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2.0 Methods

2.1 DELINEATION

Project Team scientists delineate wetlands based on best professional judgment, existing site conditions during field analysis, and information from previous environmental site investigations. Wetland boundaries were delineated using the Routine Determinations method described in the U.S. Army Corps of Engineers (USACE) Wetland Determination Manual (USACE 1987), to comply with Pierce County and federal regulations. USACE requires that three characteristics be present for an area to be identified as a wetland: (1) hydrophytic vegetation, (2) hydric soil, and (3) wetland hydrology. The methods used to determine the presence of each characteristic are described in Appendix A. A total of six test plots (TP1, TP2, etc.) were used to describe the wetland and upland characteristics. Test plots consist of a 10- to 30-foot circular plot centered on an 18-inch-deep pit. The circular plot is used to characterize the dominant plant species in the area. The pit is used to characterize the soil and hydrologic characteristics of the area. Delineated and surveyed wetland boundaries are subject to verification and approval by jurisdictional agencies.

2.2 WETLAND RATING

Project Team scientists determined wetland ratings using the Washington State Wetland Rating System for Western Washington (Hruby 2004) to assess the resource value of the identified wetlands. This rating system is based on the wetland functions and values, sensitivity to disturbance, rarity, and irreplaceability.

Category I wetlands are generally considered uncommon wetlands that have one or more of the following characteristics:

- Provide life support for threatened or endangered species
- Are on file in databases maintained by state agencies
- Are not hydrologically isolated (e.g., connected to estuarine water or tidal fresh water)
- Represent a high-quality example of a rare wetland; are rare within a given region
- Are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime

Examples of Category I wetlands are mature forested wetlands, estuarine wetlands, kelp beds, bogs, and fens.

Category II wetlands have one or more of the following characteristics:

- Occur more commonly than Category I wetlands
- Provide habitat for very sensitive or important wildlife or plant species

- Are partially or completely hydrologically isolated
- Are difficult to replace
- Provide very high functions, particularly for wildlife

Examples of Category II wetlands are bogs and fens less than 0.5 acre in size and wetlands with high wildlife functions but have human-related disturbances such as diking, ditching, or grazing.

Category III wetlands have one or more of the following characteristics

- Provide habitat for a variety of wildlife
- Occur more commonly than Category I or II wetlands
- Are smaller, less diverse, and more hydrologically isolated than Category II wetlands

Examples of Category III wetlands are hydrologically-isolated scrub-shrub or emergent wetlands with moderate wildlife functions.

Category IV wetlands have the following characteristics

- Are less than 1 acre in size with one dominant vegetation class by one species
- Are less than 2 acres in size with one dominant vegetation class by one species by invasive or exotic species
- Are hydrologically isolated

Examples of Category IV wetlands are hydrologically-isolated wetlands dominated by reed canarygrass.

3.0 Results

3.1 WETLANDS

The areas identified as wetlands met all three jurisdictional wetland criteria (hydrophytic vegetation, hydric soils, and wetland hydrology). The wetland determination forms and wetland rating forms supporting this determination are provided in Appendices B and C, respectively. Table 1 lists the plant species found in the wetlands and their associated wetland indicator status (Reed 1988; Reed et al. 1993). Figure 2 presents the location and extent of wetlands. Site photographs are provided in Appendix D.

3.1.1 Wetland A

Wetland A, approximately 0.2 acre in area, is located just east of the southeast corner of the Landfill (Figure 2). All of Wetland A is within the 2008 work area. The southwestern corner of Wetland A drains into an unnamed ditch, which is connected to the ditch that runs along the Interurban Trail. The ditch that runs along the Interurban Trail drains into the Surprise Lake Drain, which discharges into Hylebos Creek, a “Water of the U.S.,” as defined by USACE. Thus, there is a surface water connection between Wetland A and a “Water of the U.S.”

Wetland A is classified as a seasonally-saturated, emergent wetland with persistent vegetation (PEM1R), per the Cowardin classification system (Cowardin et al. 1979). As described in the Ecology rating system, this wetland is a Category IV wetland (Table 2; Appendix C). Test Plot 1 (TP1) is representative of Wetland A, which is dominated by soft rush (*Juncus effusus*), fox sedge (*Carex vulpinoidea*), velvetgrass (*Holcus lanatus*), Pacific willow (*Salix lucida*), Scouler’s willow (*Salix scouleriana*), white clover (*Trifolium repens*), and red fescue (*Festuca rubra*). Because more than 50 percent of the dominant plant species have an indicator status of facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL), vegetation in Wetland A meets the wetland vegetation criterion (Table 1).

One soil test pit was dug in Wetland A. The surface horizon (A horizon) extends to 18 inches and is a saturated, dark grayish brown (10YR 4/2) sand with gravel (highly compacted fill material) and very few, small, distinct, yellowish brown (10YR 5/6) mottles. A low chroma value (i.e., the last digit of the Munsell™ soil color is a 1 without mottles or a 2 with mottles) in soil 2 inches below the A horizon is a positive indicator of hydric soils, thus meeting the hydric soils criterion.

Primary indicators of wetland hydrology observed included areas of 1 to 2 inches of inundation and saturated soils at the surface. Secondary indicators of wetland hydrology observed included a positive FAC neutral test, water-stained vegetation, and drainage patterns. A positive FAC neutral test is defined as when the number of species with indicator status of FACW- or wetter is greater than the number of species with indicator status of facultative upland (FACU)+ or drier. The presence of two primary and three secondary indicators meets the wetland hydrology criterion.

The wetland boundary was identified based on the defined contour of the drainage pattern, and a distinct vegetation shift from soft rush and white clover dominated vegetation (characteristic of wetland habitat) to the presence of red clover (*Trifolium pratense*) and hairy cat's ear (*Hypochaeris radicata*) (characteristic of upland habitat).

3.1.2 Wetland B

Wetland B, approximately 0.7 acre in area, is located northeast of Wetland A, just east of the northeast corner of the landfill (Figure 2). All of Wetland B is within the 2008 work area. The northern end of Wetland B drains via a stormwater pond with stand pipe into the ditch that runs along the Interurban Trail. Thus, there is a surface water connection between Wetland B and a "Water of the U.S."

Wetland B is classified as a seasonally-saturated, emergent wetland with persistent vegetation (PEM1R), according to the Cowardin classification system (Cowardin et al. 1979). In accordance with the Ecology rating system, this wetland is a Category III wetland (Table 2; Appendix C). Test Plot 4 (TP4) is representative of Wetland B. Wetland B is dominated by soft rush, black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), hooker willow (*Salix hookeriana*), red clover, reedtop (*Agrostis gigantea*), reed canarygrass (*Phalaris arundinacea*), and unidentified grass. Because more than 50 percent of the dominant plant species have an indicator status of FAC, FACW, or OBL, vegetation in Wetland B meets the wetland vegetation criterion (Table 1).

One soil test pit was dug in Wetland B. The surface horizon (A horizon) extends to 6 inches and is a saturated, very dark gray (7.5YR 3/1) sand with many fine root masses and without mottles. The B horizon extends from 6 to 18 inches and is a saturated, dark gray (2.5Y 4/1) sand with a little gravel and without mottles. A low chroma value (i.e., the last digit of the Munsell™ soil color is a 1 without mottles or a 2 with mottles) in soil 2 inches below the A horizon is a positive indicator of hydric soils, thus meeting the hydric soils criterion.

Primary indicators of wetland hydrology observed included areas of 1 to 2 inches of inundation, saturated soils at the surface, and free water at the surface in the test pit. Secondary indicators of wetland hydrology observed included a positive FAC neutral test, local soil survey characteristics, and drainage patterns. The presence of two primary and three secondary indicators meets the wetland hydrology criterion.

The wetland boundary was identified based on the defined contour of the inundation and saturated surface soils, drainage pattern, and a distinct vegetation shift from soft rush dominated vegetation (characteristic of wetland habitat) to the presence of red clover and hairy cat's ear (characteristic of upland habitat).

3.1.3 Wetland C

Wetland C, approximately 59 acres in area, is located north of the Landfill and the Interurban Trail. Approximately 7 acres of Wetland C is within the 2008 work area. The 12th Street E. unimproved road grade bisects Wetland C (Figure 2). Hylebos Creek flows west along the northern and western edges of the wetland before crossing west under Interstate 5. A ditch

flows north along the southwestern edge of Wetland C and discharges into Hylebos Creek, where it flows under Interstate 5. A small portion of Wetland C located northeast of the lower section was designated on the NWI, as noted on Figure 2. This area appears contiguous with the wetland that continues to the north of 12th Street E.

Wetland C is classified as a seasonally-saturated, scrub-shrub, emergent wetland with persistent vegetation (PSS/EM1R) (Cowardin et al. 1979). Under the Ecology rating system, this wetland is a Category I wetland (Table 2; Appendix C). Test Plot 5 (TP5) is representative of Wetland C. Wetland C is dominated by reed canarygrass, Sitka willow (*Salix sitchensis*), and Pacific willow. Because more than 50 percent of the dominant plant species have an indicator status of FAC, FACW, or OBL, vegetation in Wetland C meets the wetland vegetation criterion (Table 1).

One soil test pit was dug in Wetland C. The surface horizon (A horizon) extends to 8 inches and is a saturated, very dark gray (7.5YR 3/1), silt loam without mottles. The B horizon extends from 8 to 17 inches and is a saturated, very dark gray (7.5YR 3/1), silt loam with common, medium, distinct gray (5YR 5/1) mottles. The C horizon extends from 17 to 18 inches and is a saturated, very dark grayish brown (10YR 3/2) loam with peat. A low chroma value (i.e., the last digit of the Munsell™ soil color is a 1 without mottles or a 2 with mottles) in soil 2 inches below the A horizon is a positive indicator of hydric soils, thus meeting the hydric soils criterion.

Primary indicators of wetland hydrology observed included areas of more than 6 inches of inundation, saturated soils at the surface, and free water at the surface in the test pit. Secondary indicators of wetland hydrology observed included a positive FAC neutral test, local soil survey characteristics, watermarks, local soils survey characteristics, water-stained leaves, and drainage patterns. The presence of the two primary and the five secondary indicators meets the wetland hydrology criterion.

The northern, eastern, and southern wetland boundaries were identified on-site based on the drainage pattern (i.e., slopes associated with the Interurban Trail and 12th Street E. road grade). The western wetland boundary was not identified because the wetland continued west, off site.

3.1.4 Wetland D

For purposes of this report, a wetland originally identified and designated as Wetland D was merged into Wetland C and therefore does not appear in this CAS.

3.1.5 Wetland E

Wetland E, approximately 4.25 acres in area, is located north of Wetland B, northeast of the Landfill, and south of the ditch that runs along the Interurban Trail (Figure 2). All of Wetland E is outside of the remediation area. A portion of Wetland E was identified by the NWI (Figure 2). Wetland delineation flagging dated 12/15/2005 was observed hanging on vegetation along the southwest and northwest edges of the wetland.

Wetland E is classified as a seasonally-saturated, forested and emergent wetland with persistent vegetation (PFO/EM1R) (Cowardin et al. 1979). Under the Ecology rating system, this wetland is a Category II wetland (Table 2; Appendix C). Because Wetland E is off-site, no test plot was established. Dominant vegetation was based on observations made from the Interurban Trail. Wetland E is dominated by black cottonwood, willow, and hawthorne (*Crataegus douglasii*). Because more than 50 percent of the dominant plant species have an indicator status of FAC, FACW, or OBL, vegetation in Wetland E meets the wetland vegetation criterion (Table 1).

No soil test pit was dug in Wetland E. According to the Web Soil Survey for Township 20 North, Range 4 East, Section 5, Washington (NRCS, 2008), Wetland E soils are mapped as Semiahmoo muck, a hydric soil. Because of the observed inundation, observed wetland delineation flagging, observed hydrophytic vegetation, and the area being mapped as a hydric soil, it is assumed the hydric soils criterion is met.

Primary indicators of wetland hydrology observed included areas of up to 8 inches of inundation and saturated soils at the surface. Secondary indicators of wetland hydrology observed included a positive FAC neutral test, local soils survey characteristics, water-stained leaves, and drainage patterns. The presence of two primary and four secondary indicators meets the wetland hydrology criterion.

Because the wetland is located off site, only the wetland boundaries along the southwestern and northwestern side could be estimated. The southwestern and northwestern wetland boundaries were identified on-site based on the existing wetland delineation flagging observed and the drainage pattern (i.e., slopes associated with the Interurban Trail and an access road along the landfill). The eastern and southern wetland boundaries were not identified because the entire wetland is off site.

3.1.6 Wetland F

Wetland F, approximately 0.05 acre in area, is located just west of the northwest corner of the Landfill (Figure 2). All of Wetland F is within the remediation area. The northern edge of Wetland F is adjacent to the ditch that runs along the Interurban Trail and the eastern edge is adjacent to the unnamed ditch. Thus, there is a surface water connection between Wetland F and a "Water of the U.S."

Wetland F is located mostly within an agricultural field. The edge is classified as a seasonally-saturated, emergent wetland with persistent vegetation (PEM1R), per the Cowardin classification system (Cowardin et al. 1979). Under the Ecology rating system, this wetland is a Category IV wetland (Table 2; Appendix C). Test Plot 8 (TP8) is representative of Wetland F. Wetland F is dominated by reed canarygrass, field bindweed (*Convolvulus arvensis*), and stinging nettle (*Urtica dioica*). Because more than 50 percent of the dominant plant species have an indicator status of FAC, FACW, or OBL, vegetation in Wetland F meets the wetland vegetation criterion (Table 1).

One soil test pit was dug in Wetland F. The surface horizon (A horizon) extends to 6 inches and is a moist, very dark grayish brown (10YR 3/2), silt loam with common, small, faint, brown (7.5YR 4/4) mottles. The B horizon extends from 6 to 18 inches and is a moist, very dark

grayish brown (10YR 3/2), silt loam with many, small to medium, faint, dark brown (7.5YR 3/4) mottles. A low chroma value (i.e., the last digit of the Munsell™ soil color is a 1 without mottles or a 2 with mottles) in soil 2 inches below the A horizon is a positive indicator of hydric soils, thus meeting the hydric soils criterion.

No primary indicators of wetland hydrology were observed. Secondary indicators of wetland hydrology observed included oxidized rhizospheres, a positive FAC neutral test, and drainage patterns. The presence of three secondary indicators meets the wetland hydrology criterion.

The wetland is bounded to the north and east by agricultural ditches. Due to the lack of vegetation, the southern wetland boundary was based on the presence (characteristic of wetland habitat) or the absence (characteristic of upland habitat) of mottles within the top 12 inches of soil.

3.2 DITCHES

3.2.1 Unnamed Ditch

A small ditch flows west from the western edge of Wetland A into an agricultural ditch. This agricultural ditch drains into the ditch that runs along the Interurban Trail near the northwestern corner of the Landfill. The ditch is approximately 3 to 5 feet wide and 6 feet deep. Water in the ditch was approximately 8 inches deep at the time of the survey.

3.2.2 Interurban Trail Ditch

The ditch that runs along the Interurban Trail is located on the southern edge of the Interurban Trail and flows westward into the Surprise Lake Drain. The ditch is approximately 6 to 10 feet wide and 4 to 5 feet deep. Water in the ditch was approximately 2 inches deep at the time of the survey.

3.2.3 Surprise Lake Drain

The Surprise Lake Drain, which flows from Surprise Lake into Hylebos Creek on the west side of Interstate 5, is a tributary to Hylebos Creek. Within and near the remediation area, the Surprise Lake Drain is about 8 feet wide and 6 feet deep. Water in the Drain was approximately 4 to 6 inches deep at the time of the survey. The Surprise Lake Drain is designated as a Type F stream (Washington State Department of Natural Resources [DNR] 2008).

3.2.4 Landfill Ditch

Along the base of the Landfill Cap, a ditch collects surface water runoff. This ditch discharges into a primary stormwater detention pond located along the northern edge of the Landfill (Figure 2). When surface water in the primary detention pond is high enough, it overflows into a secondary detention pond northeast of the Landfill and to the ditch along the Interurban Trail. Flow from the secondary detention pond is via a stand pipe located in the western portion of the pond. The Landfill cap drainage ditch is approximately 3 to 4 feet wide and 2 feet deep. No

water was observed in the ditch at the time of the survey. The cap drainage system, comprised of the ditch and the two detention ponds, is designed to keep the cap ditches dry except during extreme rainfall conditions.

3.3 STREAMS

Hylebos Creek flows southward along Interstate 5 just northwest of the remediation area before crossing beneath the freeway. Riparian conditions along the creek are dominated by reed canarygrass. This section of Hylebos Creek is on the Washington State 303(d) list for fecal coliform (Ecology, 2004). Hylebos Creek is designated as a Type F stream (DNR 2008). Fall Chinook, fall chum, coho, pink salmon, and winter steelhead are known to use Hylebos Creek (Washington State Department of Fish and Wildlife 2008).

3.4 UPLANDS

The upland areas lack indicators of hydrophytic vegetation, hydric soils, and/or wetland hydrology. Three test plots were evaluated in upland areas (Figure 2).

Test Plot 2 (TP2) is located south of TP1 (Wetland A). TP2 is dominated by red clover, white clover, velvetgrass, hairy cat's ear, reedtop, and Himalayan blackberry (*Rubus armeniacus*). Because less than 50 percent of the dominant vegetation has an indicator status of FAC, FACW, or OBL, the hydrophytic vegetation criterion is not met. The surface horizon (A horizon) extends to 18 inches and is a dark grayish brown (2.5Y 4/2), sandy loam with gravel (compacted fill material) and without mottles. There are no indicators of hydric soils 10 inches below ground surface (bgs); therefore, the hydric soil criterion is not met. Primary indicators of wetland hydrology included saturated soils in the top 3 inches in the test pit. Below 3 inches, soils were moist to dry. No secondary indicators were observed. The wetland hydrology criterion is not met. Because all three wetland criteria were not met, the area represented by TP2 is considered upland.

Test Plot 3 (TP3) is located northeast of TP2, on the north side of the access road off of Fife Way. TP3 is dominated by red clover, white clover, velvetgrass, hairy cat's ear, reedtop, and soft rush. Because more than 50 percent of the dominant vegetation has an indicator status of FAC, FACW, or OBL, the hydrophytic vegetation criterion is met. The surface horizon (A horizon) extends to 7 inches and is a gray (2.5Y 5/1), sandy loam with gravel (compacted fill material) and with many distinct, medium to large, strong brown (7.5YR 4/6) mottles. The B horizon extends from 7 to 18 inches and is a grayish brown (10YR 5/2) sand with gravel (compacted fill material) and without mottles. There are no indicators of hydric soils 2 inches below the A horizon; therefore, the hydric soil criterion is not met. Primary indicators of wetland hydrology were not observed. One secondary indicator, oxidized rhizospheres, was observed. The wetland hydrology criterion is not met. Because all three wetland criteria were not met, the area represented by TP3 is considered upland.

Test Plot 6 (TP6) is located along the 12th Street E unimproved road grade, north of the landfill. TP6 is dominated by red clover, white clover, reed canarygrass, common tansy (*Tanacetum vulgare*), reedtop, Douglas spiraea (*Spiraea douglasii*), black cottonwood, Himalayan blackberry, and yellow sweetclover (*Melilotus* sp.). Because more than 50 percent of the dominant

vegetation has an indicator status of FAC, FACW, or OBL, the hydrophytic vegetation criterion is met. The surface horizon (A horizon) extends to 18 inches and is a brown (10YR 5/3) sand with gravel and cobbles (very compacted fill material) and without mottles. There are no indicators of hydric soils 10 inches bgs; therefore, the hydric soil criterion is not met. No primary or secondary indicators of wetland hydrology were observed. Therefore, the wetland hydrology criterion is not met. Because all three wetland criteria were not met, the area represented by TP6 is considered upland.

Test Plot 7 (TP7) is located at the edge of an agricultural field, just south of the south-central edge of the landfill. TP7 is dominated by reed canarygrass, field bindweed, field horsetail (*Equisetum arvense*), giant horsetail (*Equisetum telmateia*), and common vetch (*Vicia sativa*). Because more than 50 percent of the dominant vegetation has an indicator status of FAC, FACW, or OBL, the hydrophytic vegetation criterion is met. The surface horizon (A horizon) extends to 18 inches and is a slightly moist to dry, dark brown (7.5YR 3/2), silt loam without mottles. There are no indicators of hydric soils 10 inches or more bgs; therefore, the hydric soil criterion is not met. No primary indicators of wetland hydrology were observed. Secondary indicators of wetland hydrology included drainage patterns and a positive FAC neutral test. Because all three wetland criteria were not met, the area represented by TP7 is considered upland.

Test Plot 9 (TP9) is located in an agricultural field just south of Wetland F (TP8). TP9 is dominated by reed canarygrass, field bindweed, creeping buttercup (*Ranunculus repens*), Himalayan blackberry, and hairy cat's ear. Because less than 50 percent of the dominant vegetation has an indicator status of FAC, FACW, or OBL, the hydrophytic vegetation criterion is not met. The surface horizon (A horizon) extends to 3 inches and is a moist, very dark grayish brown (10YR 3/2), silt loam without mottles. The B horizon extends from 3 to 8 inches and is a moist to dry, brown (7.5YR 4/4), silt loam without mottles. Large portions of the B horizon soils are stained to a very dark grayish brown (10YR 3/2) by an unknown contaminant that smells like hydrocarbons and has a metallic sheen. The C horizon extends from 8 to 18 inches and is a dry, dark brown (7.5YR 3/2), silt loam without mottles. There are no indicators of hydric soils 2 inches below the A horizon; therefore, the hydric soil criterion is not met. No primary indicators of wetland hydrology were observed. Only one secondary indicator, drainage pattern, was observed. Therefore, the wetland hydrology criterion is not met. Because all three wetland criteria were not met, the area represented by TP9 is considered upland.

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4.0 REGULATORY CONSIDERATIONS

4.1 CITY OF MILTON

The City of Milton regulates wetlands, streams, and their buffers through the Milton Municipal Code (MMC) Title 18. As specified in the MMC, wetland categories are exempt from the City of Milton regulations as follows:

- Category I—no exemptions
- Category II—no exemptions
- Category III—wetlands less than 1,000 square feet, not part of a wetland mosaic or riparian area, and determined to be isolated
- Category IV—wetlands less than 1,000 square feet, not part of a wetland mosaic or riparian area, and determined to be isolated

None of the wetlands identified meet the exemption criteria and, therefore, are not exempt from the City of Milton regulations. For regulated wetlands, the City of Milton requires the following buffers for:

- Category I, II, or III—ranges from 60 to 300 feet, depending on adjacent land use and habitat function score
- Category IV—ranges from 40 to 50 feet, depending on adjacent land use

The 2008 work would impact only Wetland C, which is not located within the limits of the City of Milton. Although potential impacts cannot be determined at this point in the project, future work to be completed in 2009 and 2011-2012 may impact Wetlands A, B, C, and F and the buffers of Wetlands A, B, C, E, and F. Impacting regulated wetlands or their buffers may require mitigation. If mitigation is required, a conceptual mitigation plan would need to be prepared and accepted by The City of Milton prior to permits being issued.

The Washington Department of Natural Resources has defined Hylebos Creek as a Type F stream (DNR, 2008). MMC Code (18.16.640) requires a 150-foot buffer landward from ordinary high water on a Type F stream. Because the remediation area is approximately 500 feet away from Hylebos Creek, construction activities within the remediation area would not impact the Creek or its buffer.

4.2 CITY OF FIFE

The City of Fife regulates wetlands, streams, and their buffers through the Fife Municipal Code (FMC) Title 17. As specified in the FMC, wetland categories are exempt from the City Fife regulations as follows:

- Category I—no exemptions
- Category II—wetlands 2,500 square feet or less

- Category III—wetlands less than 2,500 square feet or less
- Category IV—wetlands less than 10,000 square feet or less

Wetlands A and F meet exemption criteria and, therefore, are exempt from the City of Fife regulations. For regulated wetlands, the City of Fife requires the following buffers for:

- Category I—150 feet
- Category II—100 feet
- Category III—50 feet
- Category IV—25 feet

The 2008 work would impact Wetland C, which is not located within limits of the City of Fife. Although potential impacts cannot be determined at this point in the project, future work to be completed in 2009 and 2011-2012 may impact Wetlands A, B, C, and F and the buffers of Wetlands A, B, C, E, and F. Impacting regulated wetlands or their buffers may require mitigation. If mitigation is required, a conceptual mitigation plan would need to be prepared and accepted by the City of Fife prior to permits being issued.

The Washington Department of Natural Resources has defined Hylebos Creek as a Type F stream (DNR 2008). FMC Code (17.15.050) states that “the width of the buffers shall be determined on a case-by-case basis by the community development director based on the required habitat assessment and on the criteria established in this chapter.” Because the remediation area is approximately 500 feet away from Hylebos Creek, construction activities within the remediation area would not impact the Creek or its buffer.

4.3 PIERCE COUNTY

Pierce County regulates wetlands, streams, and their buffers through the Pierce County Code Title 18. As specified in the County, the wetlands exemptions from Pierce County regulations are as follows:

- Category I—no exemptions
- Category II—no exemptions
- Category III—wetlands less than 2,500 square feet, not part of a wetland mosaic, and determined to be isolated
- Category IV—wetlands less than 10,000 square feet, not part of a wetland mosaic, and determined to be isolated

None of the wetlands identified meet exemption criteria and, therefore, are not exempt from Pierce County regulations. For regulated wetlands, Pierce County requires the following buffers:

- Category I—150 feet
- Category II—100 feet

- Category III—50 feet
- Category IV—25 feet

The 2008 work would impact Wetland C, which is located within the limits of Pierce County. Although potential impacts cannot be determined at this point in the project, future work to be completed in 2009 and 2011-2012 may impact Wetlands A, B, C, and F and the buffers of Wetlands A, B, C, E, and F. Impacting regulated wetlands or their buffers may require mitigation. If mitigation is required, a conceptual mitigation plan would need to be prepared and accepted by Pierce County prior to permits being issued.

The Washington Department of Natural Resources has defined Hylebos Creek as a Type F stream (DNR, 2008). Pierce County Code (18E.40.060) requires a 150-foot buffer landward from ordinary high water on a Type F stream. Because the remediation area is approximately 500 feet away from Hylebos Creek, construction activities within the remediation area would not impact the Creek or its buffer.

4.4 U.S. ARMY CORPS OF ENGINEERS

USACE has regulatory jurisdiction over “Waters of the U.S.” (33 CFR Part 328). Hylebos Creek is classified as a “Water of the U.S.”. The ditches and wetlands within the remediation area may also classify as “Waters of the U.S.”. A jurisdictional determination from USACE is required to determine which, if any, ditch or wetland is regulated by the USACE. Any alteration to a USACE jurisdictional wetland or ditch will require a federal permit from the USACE.

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5.0 REFERENCES

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B&L Woodwaste Site

Critical Areas Study

Tables

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TABLE 1
Plant Species Found on the Project Site

Cover Class	Common Name	Scientific Name	Wetland Indicator Status
Trees	black cottonwood	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	FAC
	Pacific willow	<i>Salix lucida</i>	FACW+
Shrubs	Douglas spiraea	<i>Spiraea douglasii</i>	FACW
	hawthorne	<i>Crataegus douglasii</i>	FAC
	Himalayan blackberry	<i>Rubus armeniacus</i>	FACU
	hooker willow	<i>Salix hookeriana</i>	FACW-
	Scouler's willow	<i>Salix scouleriana</i>	FAC
	Sitka willow	<i>Salix sitchensis</i>	FACW
	Herbs	common tansy	<i>Tanacetum vulgare</i>
common vetch		<i>Vicia sativa</i>	UPL
creeping buttercup		<i>Ranunculus repens</i>	FACW
field bindweed		<i>Convolvulus arvensis</i>	NI
field horsetail		<i>Equisetum arvense</i>	FAC
fox sedge		<i>Carex vulpinoidea</i>	OBL
giant horsetail		<i>Equisetum telmateia</i>	FACW
hairy cat's ear		<i>Hypochaeris radicata</i>	FACU*
red clover		<i>Trifolium pratense</i>	FACU
red fescue		<i>Festuca rubra</i>	FAC+
redtop		<i>Agrostis gigantea</i>	NI
reed canarygrass		<i>Phalaris arundinacea</i>	FACW
soft rush		<i>Juncus effusus</i>	FACW
stinging nettle		<i>Urtica dioica</i>	FAC+
unidentified grass			
velvetgrass		<i>Holcus lanatus</i>	FAC
white clover		<i>Trifolium repens</i>	FAC*
yellow sweetclover	<i>Melilotus</i> sp.	FACU	

+ A plus (+) sign or minus (-) sign is used with the facultative indicator categories to more specifically define the regional frequency of occurrence in wetlands. The + indicates a more frequent occurrence.

* An asterisk (*) identifies a tentative assignment based on limited information.

TABLE 2
WETLAND RATING SCORES

Wetland	Size (acre)	Functional Score			Total	Wetland Rating
		Water Quality	Hydrologic	Habitat		
A	0.2	14	4	10	28	IV
B	0.71	18	4	13	35	III
C	59	28	24	21	73	I
E	4.25	26	16	15	57	II
F	0.05	12	0	6	18	IV