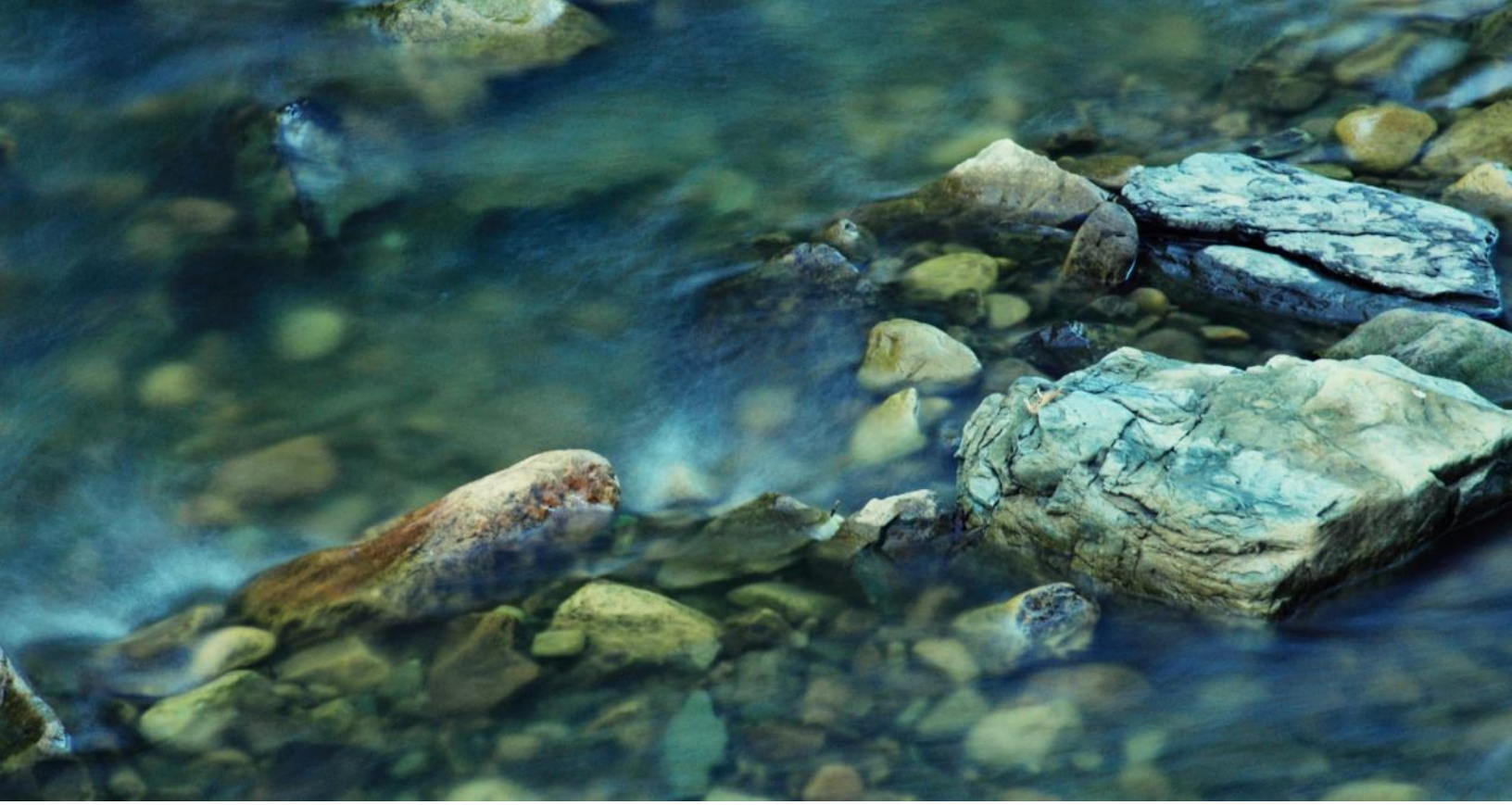

March 2021
Pioneer Aggregates Mine Expansion (South Parcel) Project

ANCHOR QEA

Wetland Mitigation Plan

Prepared for CalPortland

March 2021
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Wetland Mitigation Plan

Add any state permit application numbers (e.g. VCP, Reclamation)

Prepared for
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ABBREVIATIONS

cfs	cubic feet per second
City	City of DuPont
DMC	DuPont Municipal Code
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
m^2	square meter
PAB	palustrine aquatic bed
PEM	palustrine emergent
PSS	palustrine scrub-shrub
RCW	Revised Code of Washington
USACE	U.S. Army Corps of Engineers
WDFW	Washington Department of Fish and Wildlife

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This mitigation plan, the attachments and appendices was prepared by Anchor QEA. John Small was the project manager for all work related to this plan and the supporting documents, including the wetland delineation report and functional analyses.

Parties Responsible for Monitoring, Long-Term Maintenance, and Contingency Plans:

- CalPortland
- Anchor QEA
- Sound Native Plants

Add any state permit application numbers (e.g. VCP, Reclamation)

1 Executive Summary

CalPortland is in the process of expanding the existing sand and gravel mine operations at the Pioneer Aggregates Mine in DuPont, Washington. Mining will result in the unavoidable removal of a 1.78-acre kettle wetland. Mitigation for the wetland impacts will include wetland and buffer creation consistent with the requirements of the City of DuPont's Sensitive Area Ordinance (DuPont Municipal Code [DMC] Section 25.105) and the State Water Pollution Control Act (Revised Code of Washington [RCW] 90.48). The mitigation wetland will be 3.4 acres and will be a depressional wetland system, fed by groundwater. Mining will create a series of springs where perched groundwater enters the side of the new mine. This clean, cool water will be conveyed to the wetland in open channels. The wetland complex will consist of a series of ponded depressional outflow wetlands vegetated with several different communities of native wetland species. After reclamation and development of the site, the spring water will be mixed with stormwater from developed areas. Water from both sources (springs and stormwater) will be infiltrated into the gravels underlying the mine, eventually reaching Puget Sound as groundwater or tidal spring water.

CalPortland has made a long-term commitment to the project and the community, and operations at the Pioneer Aggregates Mine are expected to continue for 14 years. CalPortland will continue to monitor the impacts of the project and the success of the mitigation site for a minimum of 10 years from substantial completion of the wetland mitigation site construction.

The Kettle Wetland does not communicate hydraulically with Waters of the United States and does not fall under the jurisdiction of the U.S. government, as recently confirmed by the U.S. Army Corps of Engineers (USACE) in a Jurisdictional Determination letter (Appendix A). Washington's surface waters, including the Kettle wetland, are protected by the Washington State Department of Ecology's (Ecology's) antidegradation policy, as guided by RCW 90.48, Water Pollution Control Act, and RCW 90.54, Water Resources Act of 1971. The Kettle wetland is also protected by DMC 25.105, Critical Areas. This plan demonstrates compliance with those policies, including that all known, available, and reasonable methods are used to protect the waters of State of Washington.

This plan was developed to be consistent with the format and content recommended in *Wetland Mitigation in Washington State, Part 2: Developing Mitigation Plans*, Ecology Publication No. 06-06-011b, Version 1 (Ecology et al. 2006). This meets the requirements of the RCW, and DMC 25.105.050.1(d) and (e).

This plan includes a description of the wetland impacts and mitigation. The wetland mitigation goals, objectives, and performance standards have been developed to ensure no net loss of wetland function as a result of the project. A detailed monitoring plan and an adaptive management plan (Section 7 and 8, respectively) are also included, to further demonstrate and guarantee the success of

the project. Appendix B contains a mitigation checklist that references where in this report specific information may be found.

2 Proposed Development Project

The proposed project includes a 177-acre expansion of the DuPont Aggregates Mine, which will extend the period of active mining by approximately 14 years (depending on market conditions), increasing the available sand and gravel resources by 30 to 40 million tons. The Expansion Area is located within a Mineral Resource Overlay applied by the City of DuPont's Comprehensive Plan. The purpose of the overlay is to conserve mineral resources of long-term commercial significance, as required by the Grown Management Act.

Mining of the South Parcel would involve six primary activities: logging, clearing and topsoil removal, groundwater management, extraction, processing and transport, and reclamation. Mining would proceed segmentally and these activities could overlap as mining advances. Location and Description of the Development Site

The proposed mining Expansion Area is located just southeast of the existing Pioneer Aggregates Mine, in the City of DuPont (City), southwestern Pierce County; Sections 22, 23, 26, and 27; Township 19 North; Range 1 East of the Willamette Meridian (Figure 2-1). The proposed Expansion Area is bordered to the northwest by the existing Pioneer Aggregates Mine, to the east by an Amazon fulfillment center and other warehouse operations, and to the south by the Creekside Village DuPont residential development and Sequalitchew Creek ravine (Figure 2-2). The proposed Expansion Area is owned by Weyerhaeuser and is leased to CalPortland. The site is located in the Chambers-Clover subbasin of Water Resource Inventory Area 12.

2.1 Schedule

Initial work on the project could start as early as 2020, but work in close proximity to the existing wetland would not occur before 2021.

2.2 Site Zoning and Land Use

The City amended its Comprehensive Plan in 2006, to include the Expansion Area within its Mineral Resource Overlay. As identified by the DuPont Comprehensive Plan Land Use and Zoning Maps, the Expansion Area contains the following underlying zoning designations: the southern portion (approximately 164 acres) is designated for Manufacturing and Research use; the northern portion (approximately 36 acres), located within the future Sequalitchew Village, is designated both Residential-4 Residential (approximately 14 acres) and Residential Reserve (approximately 22 acres). The northern portion of the city is zoned primarily for Industrial and Manufacturing/Research Park, with some Residential and Residential Reserve in and adjacent to Sequalitchew Village, and Military in the northeast corner of the city. The proposed mitigation site is zoned Community Park, and the buffer is zoned Open Space/Sensitive Areas, Community Park, Manufacturing and Research, and Residential-4.

2.3 Existing Wetlands

There is one wetland within the project area, referred to here as the Kettle Wetland (Figure 2-3). The Kettle Wetland was delineated by Anchor Environmental in 2007 and that delineation was confirmed by Anchor QEA in 2018 (Appendix C). The Kettle Wetland is an enclosed depressional wetland containing palustrine emergent (PEM) and palustrine scrub-shrub (PSS) wetland vegetation. The interior of the wetland is dominated with palustrine emergent (PEM) vegetation and has PSS vegetation along the wetland boundary. Dominant PEM vegetation includes creeping spike-rush (*Eleocharis palustris*), giant bur-reed (*Sparganium eurycarpum*), water parsnip (*Sium suave*), water lady's thumb (*Polygonum amphibium*), mild water pepper (*Polygonum hydropiperoides*), skunk cabbage (*Lysichiton americanus*), and inflated sedge (*Carex vesicaria*). Along the wetland boundary, PSS vegetation consists of Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), Sitka willow (*Salix sitchensis*), red-osier dogwood (*Cornus sericea*), and hardhack (*Spiraea douglasii*). Some palustrine aquatic bed (PAB) plants, such as common duckweed (*Lemna minor*), were observed but did not provide enough cover to meet the criteria of a PAB wetland system.

Inundation levels within the Kettle Wetland were at or near the wetland boundary. Water levels observed during the December 2017 site visit were anticipated to be near annual peak levels, based on the time of year of the site visit.

Soils within the Kettle Wetland were 16 to 20 inches of black peat (1 chroma) above a layer of lower-permeability silty clay.

Under Ecology's 2014 wetland rating system (Hruby 2014), the Kettle Wetland meets the criteria of Category III wetland. Water quality and hydrologic function potential for the Kettle Wetland are rated high for removal of sediments, nutrients, and toxics, and reduction in peak flows and downstream erosion. Potential for the wetland to provide these functions is minimal due to the small drainage area (entire catchment area is less than 10 acres) and minimal upgradient disturbance. Water quality and hydrologic improvement functions are rated low because the wetland does not have surface water connections to downstream aquatic resources.

The wetland has moderate potential habitat functions, based on the plant communities and species variation, the variety of hydroperiods provided, and the habitat features present. The wetland has a low landscape potential due to the land use activities in the vicinity of the wetland. The wetland has a high habitat value because the wetland is identified by the Washington Department of Fish and Wildlife (WDFW) as providing habitat for WDFW priority species (native bats). The 2014 Ecology wetland rating forms are included in Appendix C.

The Kettle Wetland is more than 1/2 mile from a Water of the United States and has no surface water connection to any other waterbody. On April 17, 2019, USACE issued a determination that the Kettle Wetland is not a water of the United States (USACE 2019).

2.4 Other Aquatic Resources

There are no other aquatic resources within the existing mine or proposed development. The Nisqually Reach of Puget Sound is located approximately 400 feet from the existing mine, 650 feet from the proposed mitigation site, and 1/2 mile from the Kettle Wetland. Sequalitchew Creek is approximately 500 to 700 feet from the existing mine, approximately 650 feet from the mitigation site, and more than 1/2 mile from the Kettle Wetland.

3 Impacts to Existing Wetlands

The entire 1.78-acre Kettle Wetland will be excavated to allow mining. The Kettle Wetland is a Category III wetland under the rating system used by both the State and the City (Hruby 2014). The wetland is encircled by a forested buffer that is 150 feet or greater. Wetland soils and some vegetation will be retained for use at the mitigation site. Additional information about the Kettle Wetland hydrology, soils and vegetation can be found in the attached wetland delineation report (Appendix C). Table 3-1 summarizes the wetland functional analysis performed as part of the wetland rating process. A detailed description of the Kettle Wetland, including data sheets and rating scores, may be found in Appendix C.

Table 3-1
Kettle Wetland Functions and Values[1]

	Water Quality	Hydrology	Habitat
Site Potential	High	High	High
Landscape Potential	Medium	Medium	Low
Value	Low	Low	High

Note:
1. Based on Hruby 2014.

4 Mitigation Approach

4.1 Mitigation Sequencing

The Pioneer Aggregates facility includes millions of dollars of infrastructure to efficiently wash, sort, and crush aggregate and load it onto barges. The South Parcel expansion would allow the mine to continue operating for approximately 14 additional years and would yield 30 to 40 million tons of material. There are no other available facilities, planned or built, on Puget Sound that would produce similar material and allow for efficient barge loading. Currently, approximately 80% of the aggregate exported from the site is delivered by barge; conversion to an upland site would have significant environmental impacts, including impacts to aquatic resources, from trucking in the region of the mine. These impacts would include truck emissions, increased traffic, and increased wear on roads. Conversion to truck transport would adversely affect water resources by increasing polluted runoff and emissions. Creation of a new barge-loading facility would adversely affect water resources directly, through creation of a new dock and loading facility. Extending the life of the existing plant and infrastructure would supply the state with a substantial source of aggregates with fewer environmental impacts, including to aquatic resources, than developing another site could.

4.1.1 Avoidance

Avoiding impacts to the Kettle Wetland would preclude mining of the South Parcel. Left intact, the Kettle Wetland would lose wetland hydrology because of unavoidable changes in the groundwater hydrology. Maintaining adequate aggregate supply would necessitate development of a new mine elsewhere. No available existing sites with similar resource and an existing barge-loading capacity exist on Puget Sound or adjacent waterways that could provide a navigable connection to the locations currently served by the mine. Development of a new mine site and barge-loading facility would result in greater aquatic resources damage than extending the life of the existing mine and providing compensatory mitigation for the impacts to the Kettle Wetland.

4.1.2 Minimization

The Kettle Wetland hydrology is almost entirely supplied by groundwater. Any significant additional mining near the Kettle Wetland will intercept this groundwater and result in a loss of wetland hydrology; therefore, there is no practicable alternative that minimizes impacts to the Kettle Wetland.

4.1.3 Compensatory Mitigation

The value of the mineral resources and the associated infrastructure costs of developing a new mine site make avoiding or minimizing impacts to the Kettle Wetland impracticable. The functions and values of the Kettle Wetland have been well studied and can be replicated by creating a new wetland fed by the same groundwater source in a new location on the mine floor. Soils and vegetation from

the existing Kettle Wetland would be salvaged and used to help increase the likelihood of successfully replacing all lost wetland functions and values.

4.2 Project-Specific Goals

The design of the mitigation wetland complex is intended to create aquatic, wetland, riparian, and upland forest habitat by using groundwater intercepted within the Pioneer Aggregates Mine. Specific goals include the following:

- Create a constructed palustrine depressional wetland complex consisting of forested, scrub-shrub, emergent, and aquatic bed wetland areas at least 3.4 acres in size
- Provide adequate wetland acreage, functions, and values to mitigate all project-related wetland impacts to the Kettle Wetland
- Construct a vegetated buffer at least 100 feet around the boundary of the wetland

4.3 Mitigation Strategy

Reclamation of the existing mine includes placement of compacted silty material on the floor and side slopes of the mine. This process creates a very low-permeability layer. The mitigation wetland will be constructed in the southeast corner of the mine. This location is significantly closer to Puget Sound and Sequalitchew Creek than the existing Kettle Wetland. Fine silty material has been placed and compacted in this location. Additional grading and compaction of that material would occur in preparation for construction of the mitigation wetland.

4.3.1 Source of Wetland Hydrology

An existing aquifer is present in the sands and gravels to be mined in the South Parcel. Wells would be installed and pumped in advance of mining to intercept groundwater and dry out the gravels for mining. Initial mining of the South Parcel would create a deep trough along the east and south edges of the mine. This trough would minimize the time required to actively dewater the mine using extraction wells. Once mining of each section of trough is completed, the adjacent wells can be turned off, allowing groundwater to passively seep from the stable mine slope and flow by gravity to the mitigation wetland and/or infiltration galleries that would be constructed on the floor of the existing mine. After mining the trough along the perimeter, gravel would be extracted from the interior area. Dewatering the South Parcel involves four steps, occurring over very different time scales, as follows:

1. **Short-Term Pumping Test:** The initial step is a 60-day pumping test, which is completely reversible (i.e., no gravel would be extracted during the test) and which would be used to collect data on the effects of pumping. The results of the test would be analyzed and evaluated, and plans adjusted, as necessary, prior to commencing the next phase.

2. **Longer-Term Pumping:** The second step involves installing and pumping dewatering wells to lower water levels in the first mine segment, in preparation for mining. This step would last approximately 6 months and functions as a greatly expanded pumping test. As with the first step, it is also completely reversible.
3. **Active Dewatering During Mining:** The third step involves mining the trough. Additional dewatering wells would be installed and pumped as mining progresses. Mining would begin near the northwest corner of the South Parcel and proceed slowly south. Completing the trough would require 5 to 8 years, depending on market conditions and the success in meeting predicted groundwater levels. Water extracted from the wells would be piped to the wetland mitigation site, and surplus water would be conveyed to an infiltration pond. This would allow ample opportunity to monitor and adapt to the conditions observed before mining proceeds into each dewatered segment.
4. **Passive Dewatering:** The final step begins when mining of the trough is complete and the last dewatering well is turned off. Passive dewatering represents the groundwater condition that would continue in perpetuity. Groundwater, no longer intercepted by wells, would form seeps at the toe of the eastern mine slope. This spring water would flow by gravity through an open channel to the mitigation wetland complex at the bottom of the existing mine and eventually to the infiltration pond. Once this step has begun, further mining activities in the interior of the South Parcel would not affect groundwater elevations.

4.3.2 Source of Wetland Soils

Soils from the existing Kettle Wetland consist of 16 to 20 inches of black peat near the wetland boundary (this material may be deeper near the center). This soil would be excavated and placed above the compacted silty subgrade in the wetland mitigation complex to establish finished grades.

4.3.3 Source of Wetland Vegetation

Vegetation for the mitigation site would be grown on site from sources in the Kettle Wetland and elsewhere in Puget lowlands. Most vegetation would be started in containers and then planted, but some transplanting from the Kettle wetland directly to the mitigation site may occur if is determined to be feasible and advantageous for success at the time.

5 Proposed Mitigation Site

5.1 Location, Ownership, and Zoning

The proposed mitigation site is located on the floor of the existing Pioneer Aggregates Mine. It is located in the City of DuPont, southwestern Pierce County, Section 22, Township 19 North, Range 1 East of the Willamette Meridian (Figure 2-1). The proposed mitigation site is bordered to the south and west by the slopes of the existing Pioneer Aggregates Mine. The proposed mitigation site is owned by Weyerhaeuser Company and is leased to CalPortland. The underlying zoning of the site is Community Park. The site is generally flat and has undergone some reclamation by placement of level, compacted silty material, but it is otherwise undeveloped and devoid of vegetation and aquatic resources. The mitigation site is approximately 3,000 feet west-southwest of the Kettle Wetland, and approximately 125 lower in elevation. The southern and western buffer areas are steeply sloped toward the mitigation site and have undergone planting as part of the mine reclamation. These plantings would remain and be augmented as necessary to meet the goals and objectives of this plan.

5.2 Mitigation Site Design Criteria

The design would result in a wetland complex that fully compensates for lost functions and values of the Kettle Wetland. The mitigation design strategy is to create a mosaic of depressional flow through wetlands connected in series (Figures 5-1 and 5-2). Each depression would be surrounded by low berms and connected to the next wetland downstream by a small weir. These weirs would be adjustable and used during establishment of the wetland. Once the ideal water surface elevations are determined the weirs would be buried at the elevation of the highest stop log. Then, as the stop logs decompose, their function would maintained by the soils and gravels placed between each depression. The drop in water surface elevation between each depression in the series would be minimal, to prevent headcutting and resultant changes in hydrology. The intent of using a series of smaller depressions rather than a single larger depression is to mitigate risk: unanticipated changes in water surface elevation are less likely to affect large areas if each depression is controlled independently.

5.2.1 Mitigation Site Hydrology

The source of water for the mitigation wetland is the Vashon Aquifer. Initially, water would be withdrawn from wells and piped to the mitigation site. Once the initial mining has fully intercepted the Vashon aquifer, open channels would be constructed to convey the water from the Vashon aquifer from springs along the mine slopes to the wetland mitigation site and to infiltration galleries near the perimeter of the mine (Figures 5-3 and 5-4). This would provide a permanent source of hydrology to the mitigation site, utilizing the same source as the impacted wetland. The flows from

the springs in the mine are anticipated to generate around 7 cubic feet per second (cfs) of flow, with minor seasonal fluctuation.

Flow into the wetland complex would be adjusted to provide only what is required to maintain wetland hydrology through the majority of the year. This would allow minor annual fluctuation in the water surface elevations in the wetland during periods of high evapotranspiration in the summer. Once the hydrologic connections are adjusted to meet the needs of the maturing wetland vegetation, the system of channels and weirs should not require further adjustment. Maintaining a relatively static water surface elevation throughout the year would minimize stress on establishing wetland vegetation. This technique would also be used to limit habitat suitable for invasive species, such as reed canary grass, and improve the reproductive success of amphibians using the site.

5.2.2 Mitigation Site Soils

Soils for the mitigation site would be salvaged from the Kettle Wetland. These soils have ideal characteristics and contain a seed source of suitable vegetation. It is not currently anticipated that these soils would require any amendment, but they would be evaluated further during construction and may be amended as needed to maximize the successful establishment of wetland and buffer vegetation. Soil would be placed in two lifts. The first lift, of 4 to 6 inches, would be tilled together with the underlying silt to blend the materials. The second lift, of 4 to 6 inches, would be placed over the first (Figures 5-5 and 5-6). Additional lifts would be added until the suitable material from the Kettle Wetland is exhausted.

5.2.3 Mitigation Site Vegetation

Seeds and cuttings from the Kettle Wetland would be collected and propagated for use in the mitigation wetland. This approach would help ensure that the specimens used in the mitigation site are adapted to local conditions. At this time, it is anticipated that propagation would occur on site, and to the extent possible in situ within the mitigation site. Some specimens would be propagated in containers and then planted once they are well established. Additional vegetation would be imported from local nurseries. All plant material would be sourced from Puget Lowlands genetic stocks.

5.3 Performance Standards

To achieve the goals, performance standards have been developed that correspond to design criteria and define measurable criteria that are evaluated to predict when a mitigation element has been successfully implemented or accomplished. Table 5-1 contains site-specific information on how the mitigation goals (design objectives) are met by the design criteria and the final performance standards that will be used to determine if the goals have been met. Impacts to the Kettle Wetland would be mitigated at the ratio of 1.9 acres of creation for each acre of impact.

Table 5-1
Mitigation Goals with Associated Design Objectives, Design Criteria, and Final Performance Standards

Design Objectives	Design Criteria	Final Performance Standards
Mitigation Goal 1: Intercept groundwater from springs on the excavated face of the east side of the mine, which will occur at or near the contact between the Vashon recessional outwash (upper aquifer zone) and the Vashon Advance outwash (lower aquifer zone) and provide an adequate portion of that flow the Mitigation Wetland		
Initial objective: Provide a consistent discharge of water extracted from the Vashon Aquifer to the mitigation site	Water will be piped from the wells, through a dynamic system that will adapt to wells being commissioned and decommissioned as mining proceeds.	A consistent discharge to the mitigation site that fully offsets the losses due to evapotranspiration and infiltration
Final objective: Collect water from seeps and convey it to wetlands at the toe of slope without causing erosion or excessive mixing with stormwater	Install drainage systems, weirs, and channels to convey water. The use of culverts will be minimized to allow interception of runoff from the slope above.	Seep wetland hydrology is maintained, and slopes are stable A consistent discharge to the mitigation site that fully offsets the losses due to evapotranspiration and infiltration is maintained
Mitigation Goal 2: Create a Category III depressional flow through wetland complex consisting of forested, scrub-shrub, emergent, and aquatic bed wetland areas		
Create at least 3.4 acres of wetland consisting of forested, scrub-shrub, and emergent wetland classes	Place wetland soils from the Kettle Wetland over compacted fines to establish a finish grade that supports appropriate hydrology for each of the wetland vegetation types planned. Amend soils and build required grade controls. Plant trees on centers not greater than 15 feet, shrubs on centers not greater than 8 feet, and herbaceous perennials at 3 feet.	After 10 years, at least 3.4 acres of new Category II or III wetland will be created and determined through delineation and meeting the vegetation, soils, and hydrology criteria for wetlands; and review of the wetland rating (Hruby 2014).
Mitigation Goal 3: Provide adequate wetland acreage, functions, and values to mitigate all project-related wetland impacts to the Kettle Wetland, including temporal losses		
Monitor for and record the functions and values of the mitigation site for 10 years using the Washington State Wetland Rating System for Western Washington (Hruby 2014)	Establish a mitigation wetland with an equal or greater **total** score as the Kettle Wetland (51 acre-points) based on the Mitigation Credits and Debits calculator (Hruby 2012).	No net loss of wetland function; no net loss of wetland area

Design Objectives	Design Criteria	Final Performance Standards
Mitigation Goal 4: Construct stable, vegetated slopes above the wetland mitigation site and a minimum of a 100-foot vegetated buffer around the wetland		
Establish a 100-foot-wide forest sapling buffer around the mitigation wetland complex	Stabilize slopes with hydroseed or other bioengineering techniques. Amend soils and plant trees on centers not greater than 15 feet, shrubs on centers not greater than 8 feet.	After 10 years, greater than 60% cover by native species
Prevent sediment deposition from reaching the mitigation site	Establish hydroseed for initial slope stabilization on slopes above mitigation site. Establish forest communities for permanent slope stabilization on slopes above creek.	After 10 years, no evidence of mass wasting

6 Goals, Objectives, and Performance Standards

6.1 Goals and Objectives

The initial goal is to create a 3.4-acre depression of wetland soils that are above a strata of low-permeability, compacted fines. This depression would then be wetted, creating a mosaic of pools, saturated soils, and hummocks. Initially, water from the Vashon Aquifer would be pumped from wells and conveyed through a system of pipes to the wetland. This system would, by necessity, adapt to commissioning of new wells and decommissioning of wells that are no longer needed for mining. Once mining has proceeded to expose a continuous cut along the eastern and southern boundary of the mine, all wells would be decommissioned (as described in Section 4.3.1). Prior to decommissioning the final wells, a surface conveyance from a spring-fed source of hydrology would be established. The mine would receive approximately 7 cfs of groundwater from springs near the bottom of the Vashon Aquifer. A portion of this flow would be directed to the mitigation site through open channels. At least two culverts would be required to provide access to development planned within the mine after the entire mine site is reclaimed. Open channels would be established in all areas where an overcrossing is not required. Flow controls would be established to allow an appropriate fraction of flow to enter the wetland. The design intent is to deliver an amount of water similar enough to the total loss of the wetland from evapotranspiration and infiltration. During high-precipitation events, water would be discharged from the wetland to infiltration galleries in the mine, and during periods of extreme evapotranspiration water levels would be allowed to drop slightly. During establishment of vegetation in the wetland, the water level would be maintained at as static an elevation as possible to avoid plant stress.

After approximately 10 years, vegetation would be well established, and the wetland would have functions and values similar to those lost from excavation of the Kettle Wetland. Impacts to the Kettle Wetland would be mitigated at the ratio of 1.9 acres of creation for each acre of impact. To verify that the functions and values of the mitigation wetland adequately replace those lost from excavation of the Kettle Wetland, the *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington* (Hruby 2012) method would be used (Appendix D). The initial goal is to provide an equal total number of acre-points to those lost from excavation of the Kettle Wetland. Once development of the mine site begins (current zoning is primarily for light industrial and residential land uses), the value of the mitigation wetland would be increased. This is due to changes in the landscape potential for hydrologic and habitat potential. A moderate increase to the habitat score is anticipated to occur as high-intensity land use (mining) is replaced by a mix of land use. A similar increase to the hydrologic score is anticipated as runoff from development is introduced as a new source of water to the channel feeding the wetland.

6.2 Performance Standards

To achieve the goals, performance standards have been developed that correspond to design criteria and define measurable criteria that are evaluated to predict when a mitigation element has been successfully implemented or accomplished. Table 6-1 contains site-specific information on how the mitigation goals (design objectives) would be met by the design criteria and the final performance standards that would be used to determine if the goals have been met. Interim performance standards are described in Section 8. Interim performance standards would be used to determine if the establishment of wetland functions and values is on a trajectory that would meet the final performance standards at the end of the monitoring period.

7 Monitoring Plan

Monitoring would occur for a minimum of 10 years, and until performance standards are met. Monitoring activities would focus on the collection of soil conditions, vegetation health and vigor, and wildlife use data to evaluate wetland function and compliance with the performance standards summarized in Table 7-1 and outlined in more detail in Table 8-1. Monitoring would also include photographic documentation of site features and the development of habitat on the site. Monitoring reports would be submitted annually to Ecology and the City.

In addition to the annual report, an as-built report would be completed following construction and planting of the mitigation wetland and buffer (i.e., Year 0) and submitted for review and approval. The as-built report would define existing conditions in the mitigation areas (e.g., topography, water levels, and plant communities including specific species planted). It would serve as the baseline from which achievement of mitigation objectives can be measured. Each monitoring report would document project success relative to the mitigation performance standards.

Most monitoring activities would be completed along permanent transects and fixed points established and marked during the as-built survey; however, as determined in the field, additional monitoring may be needed to document unique conditions not present at pre-established sampling locations. All monitoring would use standard ecological techniques to sample, measure, or describe vegetation, hydrologic and soil conditions, and wildlife habitat. These techniques include walk-through surveys, line-intercept sampling along transects, plot sampling, and pertinent wetland delineation procedures (Environmental Laboratory 1987).

Table 7-1
Wetland Monitoring Methods and Reporting Schedule

Design Objective	Performance Standard	Method	Month	Frequency
Forest Sapling/ Scrub-Shrub Wetland, Buffer Vegetation, Revegetation Areas	In-kind replacement ratios	Aerial photographic[1] or ground-based mapping	Aug.	Years 0, 1, 2, 3, 5, 7, and 10
	Species composition	Walk-through surveys to document all plant species present	Aug.	Years 1, 2, and 5
	Tree/shrub density	Measure by line-intercept method along transects	Aug.	Years 1, 2, and 5
	Plant growth	Walk-through surveys to estimate annual shoot growth and survival rates	Aug.	Years 1, 2, and 5
	Vegetation structure	Describe from walk-through surveys, incorporating data from above analysis, as available	Aug.	Years 1, 2, 3, 5, 7, and 10
Emergent/Aquatic Bed Wetland Vegetation, Revegetation Areas	In-kind replacement ratios	Aerial photographic or ground-based mapping	Aug.	Years 0, 1, 2, 3, 5, 7, and 10
	Species composition	Walk-through surveys to document all plant species present	Aug.	Years 1, 2, and 5
	Herbaceous plant coverage/density	Measure by plot sampling method along transects	Aug.	Years 1, 2, and 5
	Plant growth	Walk-through surveys to estimate annual shoot growth and survival rates	Aug.	Years 1, 2, and 5
	Vegetation structure	Describe from walk-through surveys, incorporating data from above analysis, as available	Aug.	Years 1, 2, 3, 5, 7, and 10
Wetland Hydrology and Soils	Soil saturation	Depth from the soil surface to groundwater measured at permanent sampling stations in forested and scrub-shrub wetland zones	Feb., Aug.	Years 1, 2, and 5
	Surface water depth	Water depths measured at permanent sampling stations in emergent and aquatic bed wetland zones	Feb., Aug.	Years 1, 2, and 5
Wildlife	Habitat structure	Description of habitat structure from walk-through surveys	Feb., Aug.	Years 1, 2, and 5
	Wildlife usage	Conduct surveys to record wildlife species and activities on site	Feb., Aug.	Years 1, 2, and 5

Note:

1. CalPortland frequently (at least annually) obtains high-resolution aerial imaging of the entire mine site that is well suited to this task.

7.1 Hydrology and Soil Conditions

Traditional wetland delineation methods would be used to evaluate soil and hydrologic conditions in the restored wetland area. Surface water depths, groundwater depths, and soil saturation would be measured by digging soil test pits at permanent sampling stations twice per year during the designated monitoring years to understand the consistency and seasonal variation of conditions.

7.2 Vegetation Structure

Planted and naturally colonizing vegetation would be monitored to measure both the success of the planting efforts and interspersion of wetland classes, as defined by Cowardin et al. (1979).

Permanent vegetation sampling and photographic points would be established within planted areas representative of the community being sampled. At least one sampling and one photographic point would be established for each 0.5 acre of each wetland type constructed. At each sampling point, either a 3.0-square-meter (m^2) quadrat for emergent or 6.0-m^2 quadrat for shrub/tree vegetation would be used to measure the following:

- All plant species, in the order of dominance, based on relative percentage cover of each species within the vegetative strata
- The species composition (i.e., percentage of each species, exotic or native, planted or colonized)
- Average height and general health of each planted species

7.3 Hydrology and Vegetation

Understanding factors that influence wetland plant survival and establishment is important to adding to the knowledge base of wetland mitigation success. Wetland hydrology is one factor that influences plant survival and establishment. Specifically, water depth, frequency of inundation, and duration of inundation are critical factors for plant survival during the first year after planting. Many plantings fail due to the mistaken notion that wetland plants need or can survive in deep water (Hammer 1997). Small and recently planted bare-root plants lack extensive root, stem, and leaf systems with aerenchyma channels to transport oxygen to the roots. Consequently, flooding and deep water inundation prevents access to air above the water surface by portions of the plant and can cause more problems for wetland plants during the first growing season than too little water.

The monitoring program for the wetland mitigation (not including buffer area) would provide an opportunity to measure wetland plant survival and growth and correlate plant survival and growth with groundwater levels to evaluate the relative success of planted wetland communities. Specifically, permanent sampling points would be established. Surface water depths, groundwater levels, elevation, percent cover of vegetation, plant height, and species wetland indicator status would be measured at these fixed sampling points along the permanent transect.

7.4 Fauna

Any wildlife species or evidence of wildlife use in the mitigation and buffer areas observed during monitoring visits would be documented.

7.5 Reporting

Annual monitoring reports would be submitted to the City of DuPont and Ecology by October 1 of each monitoring year.

7.6 Site Protection

The mitigation areas are within the Pioneer Aggregates Mine and closed to the public. Once mining and reclamation of the site are complete, CalPortland would turn the site over to the owner, Weyerhaeuser Company, for eventual redevelopment consistent with the City of DuPont's zoning, sensitive areas ordinance, and other regulations. CalPortland would be responsible for implementing this plan through the monitoring period, and protecting the site from trespass and vandalism while occupying the site. The site is within the City's Comprehensive Plan Community Park Zone. This zoning precludes redevelopment of the site.

8 Adaptive Management and Contingency Plan

The contingency plan is flexible so that modifications can be made to subsequent years' construction if portions of the previous year's construction do not produce the desired results; however, all contingencies cannot be anticipated. Problems or potential problems would be evaluated by a qualified wetland ecologist and the City, in coordination with Ecology. Specific contingency actions would be developed, agreed to by consensus, and implemented based on all scientifically and economically feasible recommendations. Contingencies may include the following:

- Modifying topography relative to stream elevation
- Modifying soils
- Additional plantings or changing species selections to correct excessive mortality
- Additional monitoring or unscheduled monitoring during Years 1 through 5

If, during the monitoring program, other maintenance needs are identified as necessary to ensure the success of the mitigation project, they would be implemented, unless generated by third parties or acts of nature. Table 8-1 contains specific contingency actions relative to interim performance standards.

Table 8-1
Contingency Measures for the Wetland Mitigation Site

Design Feature	Monitoring Year(s)	Interim Performance Standards	Contingency Action
Tree, Shrub Wetland, Buffer, Revegetation Plantings	1 to 2	Greater than 70% survival of planted stock	None
		60% to 70% survival	Evaluate reason(s) for mortality and address; replant to achieve performance standard
		Less than 60% survival	Evaluate reason(s) for mortality; consider species suitability for site conditions; replant with the same or alternate species; undertake additional monitoring
	5	Greater than 70% cover of native species	None
		60% to 70% cover of native species	Evaluate reason(s) for mortality and replant to achieve performance standard
		Less than 60% survival	Evaluate reason(s) for mortality; consider species suitability for site conditions; replant with the same or alternate species; undertake additional monitoring
Emergent and Wetland Vegetation, Buffer, Revegetation	1	Total cover 20% and at least 10% cover by planted emergent wetland species	None
		Total cover less than 20% and less than 10% cover by planted emergent wetland species	Re-evaluate the suitability of the plant species for site conditions and re-establish if necessary; consider composition of cover species and if functioning, do nothing; consider use of fertilizers or alternate species; undertake additional monitoring
	2	Total cover 40% and at least 20% cover by planted emergent wetland species	None
		Total cover less than 40% and less than 20% cover by the emergent wetland species planted	Re-evaluate the suitability of the plant species for site conditions and re-establish if necessary; consider composition of cover species and if functioning, do nothing; consider use of fertilizers or alternate species; undertake additional monitoring
Buffer	1 to 2 and 5	Same standards as tree, shrub wetland	Same contingency actions as tree, shrub wetlands

Design Feature	Monitoring Year(s)	Interim Performance Standards	Contingency Action
Human Restrictions	1 to 2 and 5	No evidence of human intrusion	None
		Some evidence of human intrusion, but no damage to wetlands and buffers	Check fencing, and install signage to help educate people about critical areas
		Significant evidence of human intrusion and damage to wetlands and buffers	Check fencing, install additional or alternative structure to keep people out, post additional signage

8.1 Contingency Planning and Response

This contingency plan identifies a planning process for selecting appropriate actions to address specific mitigation actions. In order to maintain the flexibility needed to respond effectively and appropriately to biological and/or physical conditions, this plan does not present a specific list of actions that would be taken to remedy specific types of mitigation. CalPortland is committed to ensuring the success of the mitigation efforts at the Pioneer Aggregates Mine, and would undertake additional appropriate actions as may be deemed necessary by Ecology or the City to ensure complete mitigation of impacts that occur as a result of the project. The contingency planning procedure consists of three elements: 1) problem recognition; 2) contingency planning; and 3) contingency response.

8.1.1 Problem Recognition

The problem recognition process is an integral part of the monitoring program. As monitoring data are collected, they would be examined and interpreted relative to the performance standards. The purpose of the process is to conduct a rational and deliberate determination of whether there is a problem area, and if so, the nature, extent, and root cause(s) of the problem. Figure 8-1 outlines this process and shows potential outcomes of the problem recognition step.

8.1.2 Contingency Planning and Response Process

The purpose of the contingency planning process is to develop contingency actions that may be necessary, depending on the results of the monitoring program and problem recognition step. Figure 8-1 outlines the contingency planning and response process.

The contingency planning process could result in implementation of an approved response action. Alternatively, it could result in agreement on an approach or set of criteria for taking further action, depending on the results of future monitoring and whether the goal of no net loss is being achieved. In the case of a failure to meet performance standards, the result would depend largely on the reasons for the failure, and the degree to which CalPortland can predict or control the conditions that contribute to the failure in meeting a specific standard for performance.

CalPortland, Ecology, and the City would make a final determination on an appropriate response, based on available information and scientifically and economically feasible recommendations. Potential responses include, but are not limited to, one or more of the following:

- Concluding that the situation does not require further action
- Expanding or modifying the monitoring program
- Developing more specific criteria to evaluate the data
- Initiating a corrective action

If CalPortland, Ecology, and the City cannot reach a consensus, then Ecology and the City would determine the response. If modified or continued monitoring is not an adequate response, the contingency planning and response process would begin as shown in Figure 8-1.

9 References

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USACE (U.S. Army Corps of Engineers), 2019. Letter from Kristina Tong, USACE Seattle District, to Pete Stoltz, CalPortland. Reference NWS-2018-1114.

Figures

LEGEND:

- South Parcel Expansion Area (188 ac)
- South Parcel Mineral Resource Area Expansion
- Mining Limits (existing and proposed, 620 ac)
- Pioneer Aggregates Property (791 ac)
- Kettle Wetland
- Other Wetlands (NWI)
- Streams and Canals

NOTES:
Imagery: 2017 USDA NAIP

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Figure 2-1
Vicinity Map
Wetland Mitigation Plan
Pioneer Aggregates South Parcel Project

LEGEND:

- South Parcel Expansion Area (188 ac)
- South Parcel Mineral Resource Area Expansion
- Mining Limits (existing and proposed, 620 ac)
- Pioneer Aggregates Property (791 ac)
- Kettle Wetland
- Wetland C

NOTES:
Imagery: 2017 USDA NAIP

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ANCHOR QEA

Figure 2-2
Pioneer Aggregates Mine Plan Map
Wetland Mitigation Plan
Pioneer Aggregates South Parcel Project

LEGEND:

- South Parcel Expansion Area (188 ac)
- South Parcel Mineral Resource Area Expansion
- Mining Limits (existing and proposed, 620 ac)
- Pioneer Aggregates Property (791 ac)
- Kettle Wetland

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Imagery: 2017 USDA NAIP

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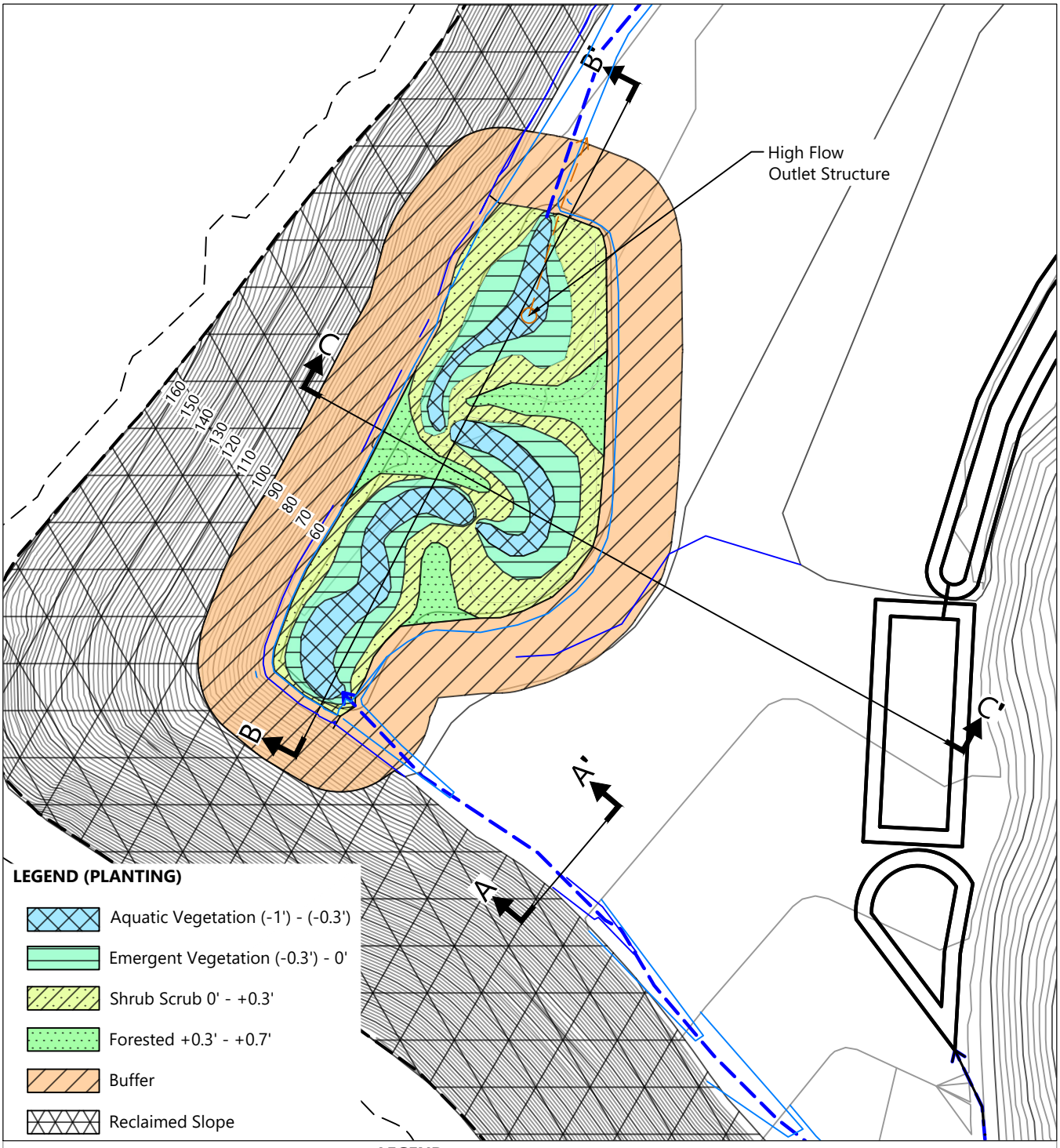
Figure 2-3
Kettle Wetland - Existing Conditions Map
Wetland Mitigation Plan
Pioneer Aggregates South Parcel Project



SOURCE: Survey by Barghausen Consulting Engineers, dated February 2010. Design from Aspect Consulting.
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

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Filepath: K:\Projects\0217-CalPortland\DuPont Aggregates South Parcel\Wetland Mitigation Plan Report Figures\0217-WK-004_Mitigation Hydrology.dwg Figure 5-1

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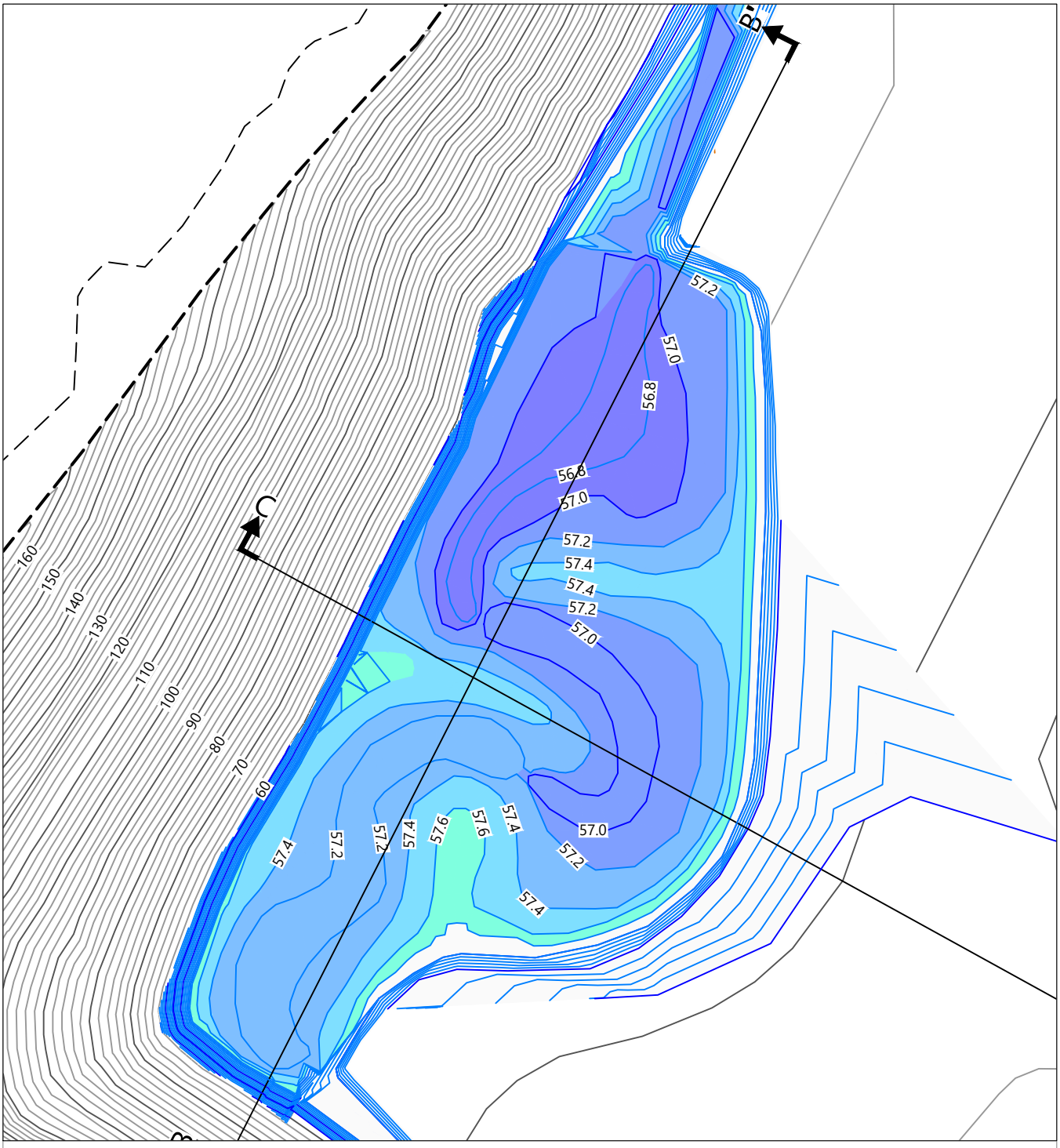
Figure 5-1
Planting Plan

Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project



SOURCE: Survey by Barghausen Consulting Engineers, dated February 2010. Design from Aspect Consulting.
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

LEGEND:

- Proposed Contour (2' and 10' Interval)
- Proposed Contour (Anchor QEA, 2' and 10' Interval)
- Proposed Channel

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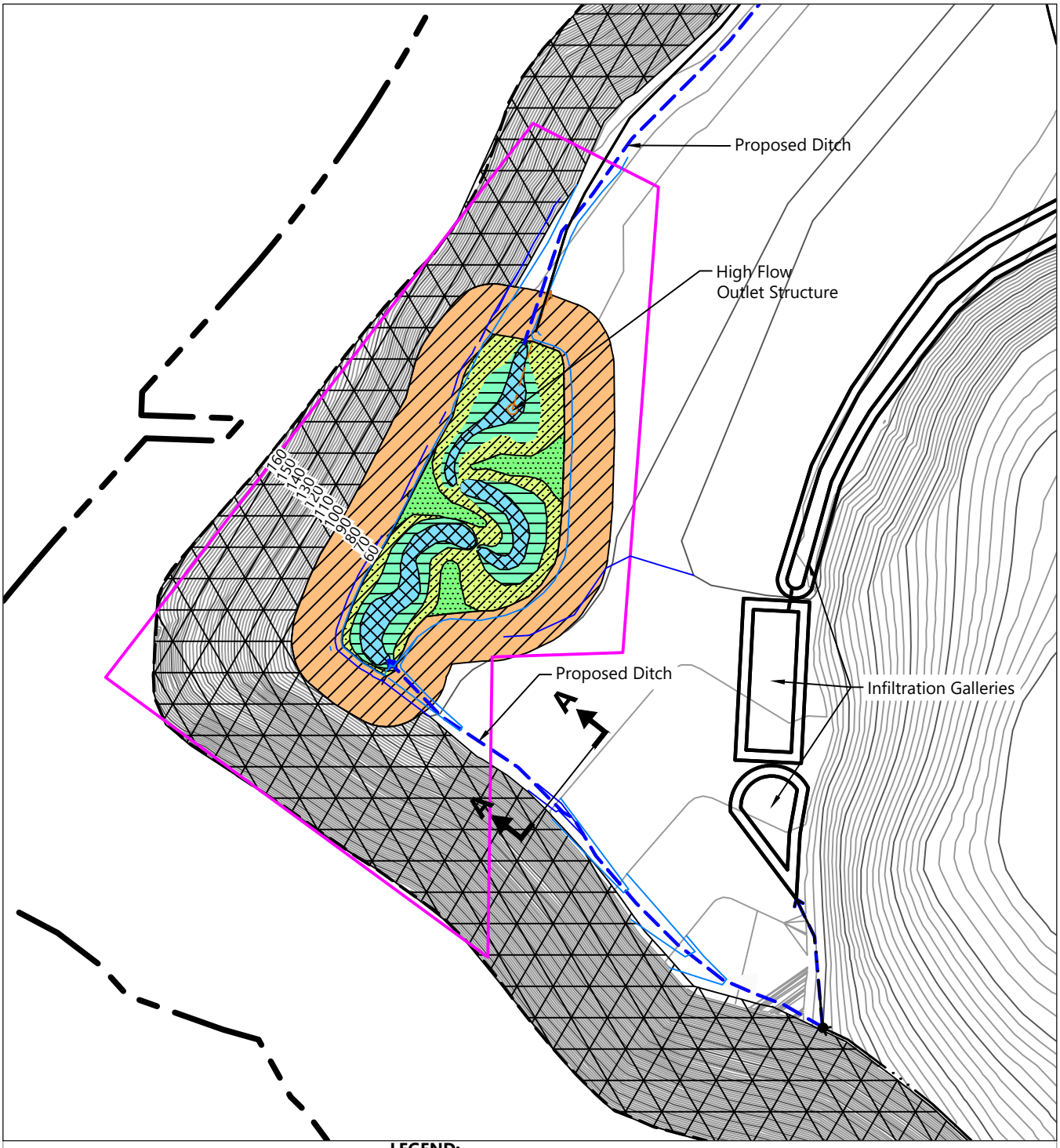
Figure 5-2
Topography Plan

Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project



SOURCE: Survey by Barghausen Consulting Engineers, dated February 2010. Design from Aspect Consulting.
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

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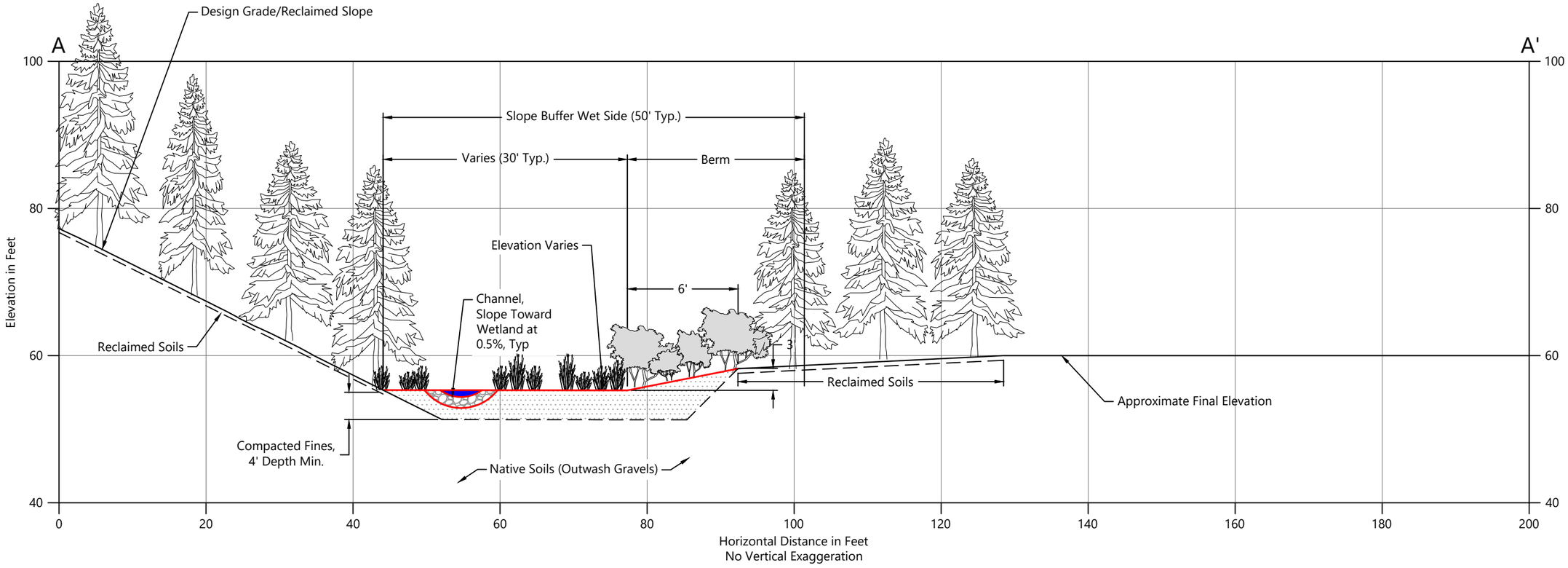
Figure 5-3
Generalized Topography and Hydrologic Connections

Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project



SOURCE: Survey by Barghausen Consulting Engineers, dated February 2010. Design from Aspect Consulting.
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

LEGEND:

- Design Grade
- Proposed Mitigation Site Grade
- Compacted Fines

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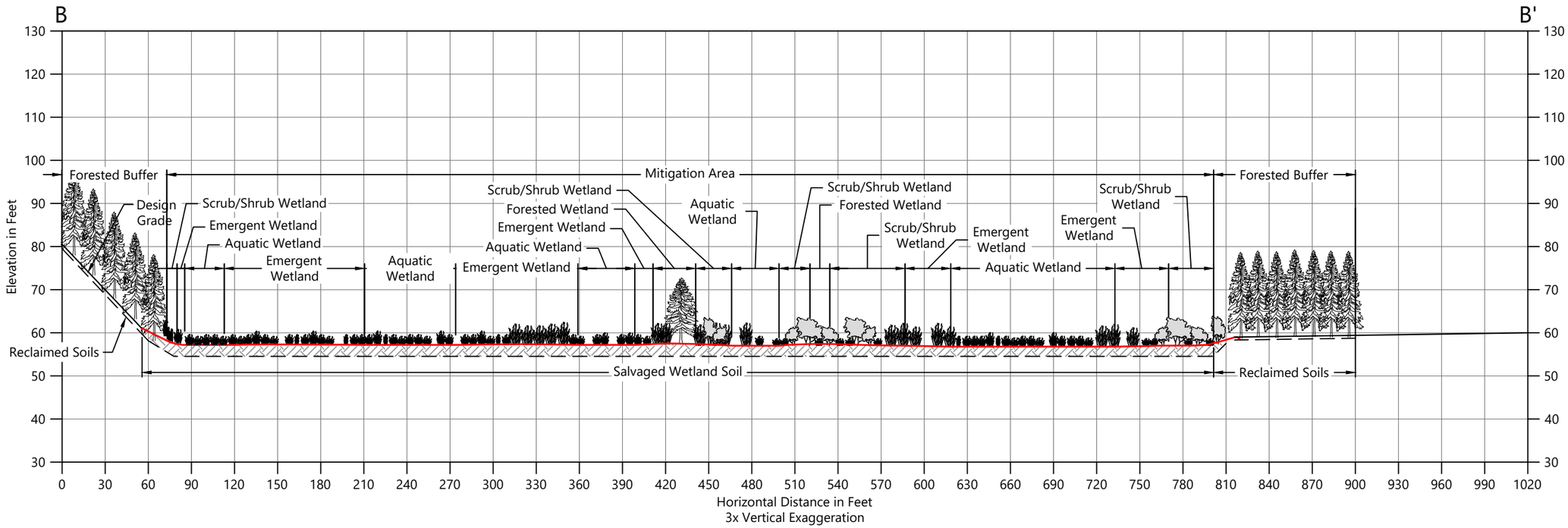
Figure 5-4
Cross Section A-A'

Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project



SOURCE: Survey by Barghausen Consulting Engineers, dated February 2010. Design from Aspect Consulting.
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

LEGEND:

- Design Grade
- Proposed Mitigation Site Grade
- Compacted Fines
- Salvaged Wetland Soil

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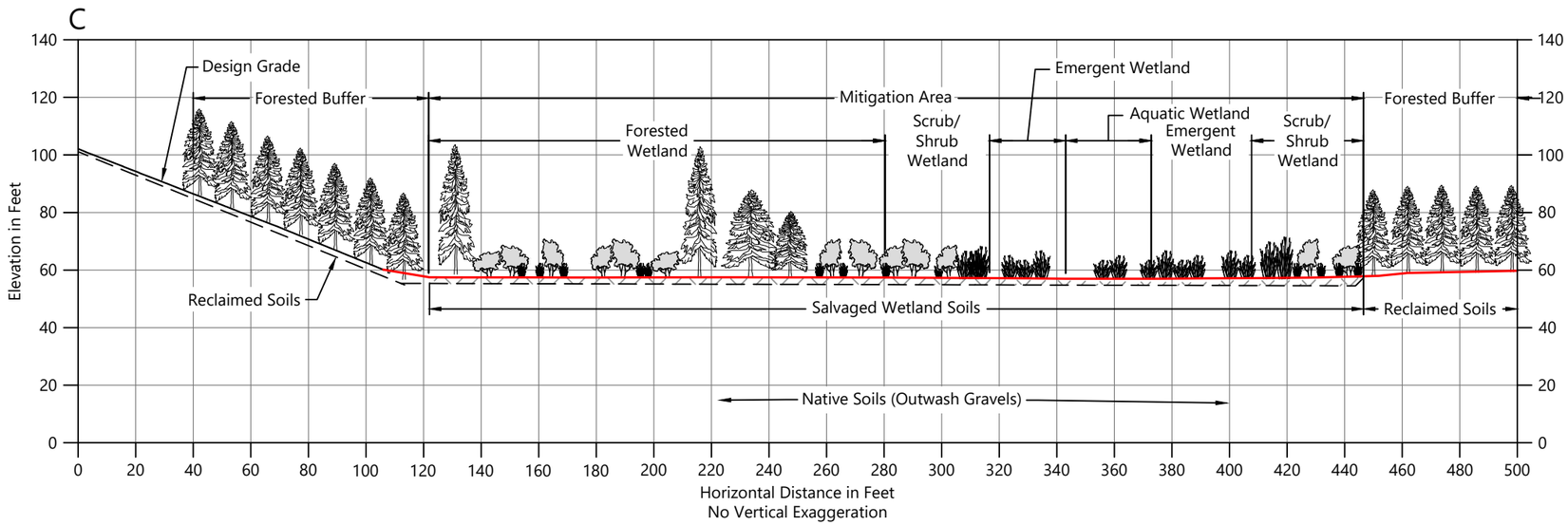
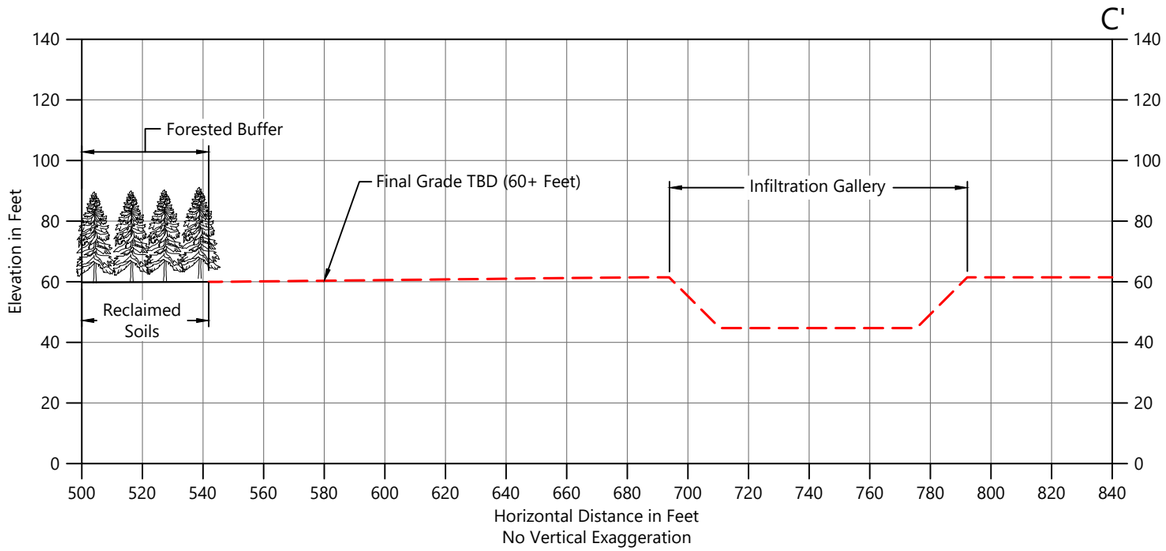
Figure 5-5
Cross Section B-B'

Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project





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VERTICAL DATUM: North American Vertical Datum of 1988 (NAVD88)

LEGEND:

- Design Grade
- Proposed Mitigation Site Grade
- Post-Reclamation Grades to be Determined
- Compacted Fines
- Salvaged Wetland Soil

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Figure 5-6
Cross Section C-C'
Wetland Mitigation Plan
Pioneer Aggregates Mine Expansion (South Parcel) Project

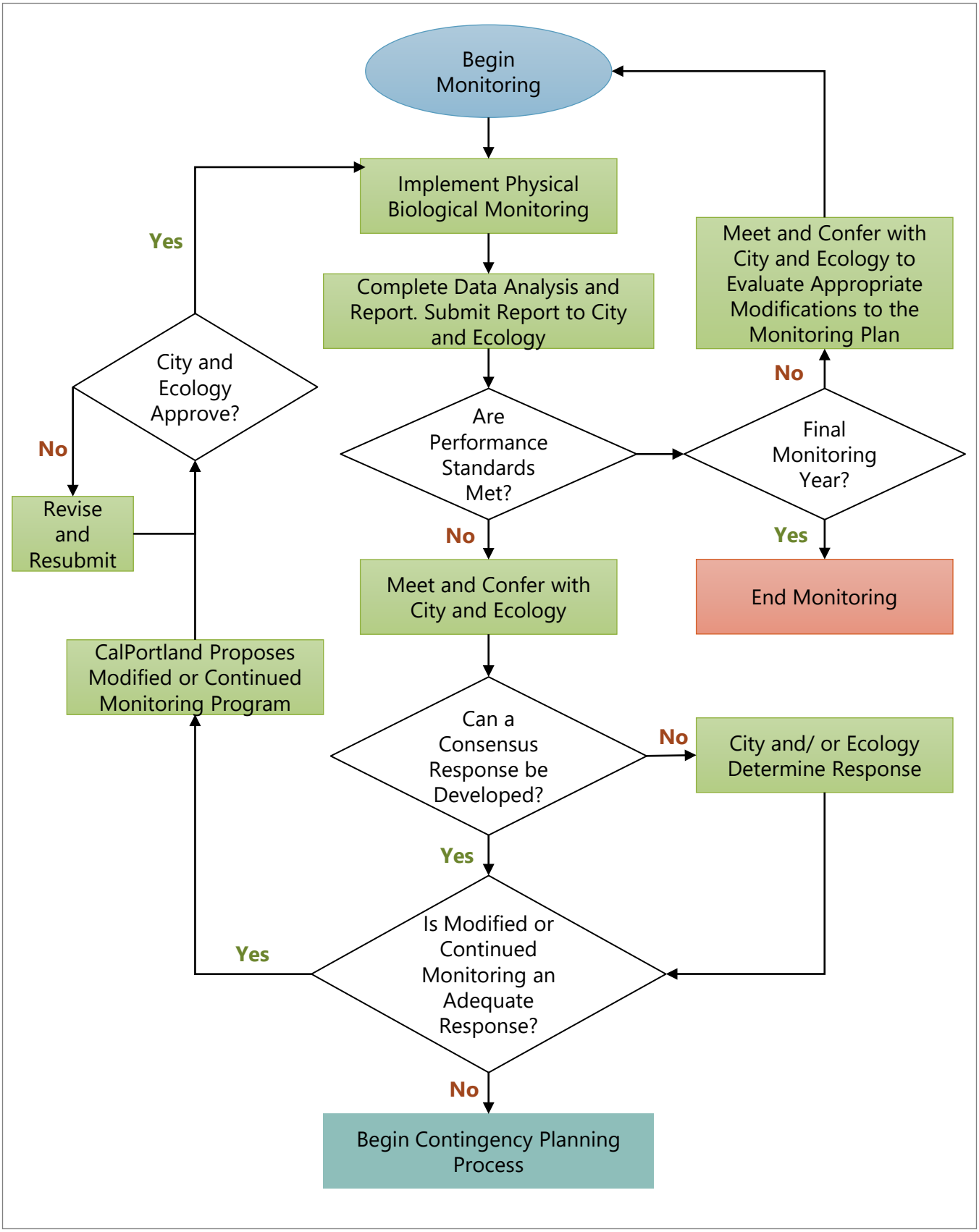

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Figure 8-1
Problem Recognition Process
Wetland Mitigation Pan
Pioneer Aggregates Mine Expansion (South Parcel) Project

Appendix A
Kettle Wetland Jurisdictional Determination

Regulatory Program

INTERIM APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers
This form should be completed by following the instructions provided
in the Interim Approved Jurisdictional Determination Form User Manual.

SECTION I: BACKGROUND INFORMATION

A. COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (AJD): 16-Apr-2019

B. ORM NUMBER IN APPROPRIATE FORMAT (e.g., HQ-2015-00001-SMJ): NWS-2018-1114

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State:Washington County/parish/borough: Pierce County City: DuPont
Center coordinates of site (lat/long in degree decimal format): Lat. 47.119763, Long. -122.64934.
Map(s)/diagram(s) of review area (including map identifying single point of entry (SPOE) watershed and/or potential jurisdictional areas where applicable) is/are: ☒ attached ☒ in report/map titled .
☐ Other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with this action and are recorded on a different jurisdictional determination (JD) form. List JD form ID numbers (e.g., HQ-2015-00001-SMJ-1): .

D. REVIEW PERFORMED FOR SITE EVALUATION:
☒ Office (Desk) Determination Only. Date: 4/4/2019.
☐ Office (Desk) and Field Determination. Office/Desk Dates: Field Date(s): .

SECTION II: DATA SOURCES

Check all that were used to aid in the determination and attach data/maps to this AJD form and/or references/citations in the administrative record, as appropriate.
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant. Title/Date: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Data sheets/delineation report are sufficient for purposes of AJD form. Title/Date: "Data Form 1" for Plots K1 through K6 dated 7/31/2007 .
☐ Data sheets/delineation report are not sufficient for purposes of AJD form. Summarize rationale and include information on revised data sheets/delineation report that this AJD form has relied upon: .
Revised Title/Date: .
☐ Data sheets prepared by the Corps. Title/Date: .
☐ Corps navigable waters study. Title/Date: .
☒ CorpsMap ORM map layers. Title/Date: "Maps, Photos and Other Supporting Information" package dated April 4, 2019.
☐ USGS Hydrologic Atlas. Title/Date: .
☐ USGS, NHD, or WBD data/maps. Title/Date: .
☐ USGS 8, 10 and/or 12 digit HUC maps. HUC number: .
☐ USGS maps. Scale & quad name and date: .
☒ USDA NRCS Soil Survey. Citation: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.
☒ USFWS National Wetlands Inventory maps. Citation: https://www.fws.gov/wetlands/data/Mapper.html.
☐ State/Local wetland inventory maps. Citation: .
☐ FEMA/FIRM maps. Citation: .
☐ Photographs: ☐ Aerial. Citation: . or ☐ Other. Citation: .
☐ LiDAR data/maps. Citation: .
☐ Previous JDs. File no. and date of JD letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .

☐ Other information (please specify): .

SECTION III: SUMMARY OF FINDINGS

Complete ORM "Aquatic Resource Upload Sheet" or Export and Print the Aquatic Resource Screen from ORM for All Waters and Features, Regardless of Jurisdictional Status – Required

A. RIVERS AND HARBORS ACT (RHA) SECTION 10 DETERMINATION OF JURISDICTION:

☐ "*navigable waters of the U.S.*" within RHA jurisdiction (as defined by 33 CFR part 329) in the review area.

- **Complete Table 1 - Required**

NOTE: If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Section 10 navigable waters list, DO NOT USE THIS FORM TO MAKE THE DETERMINATION. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Section 10 RHA navigability determination.

B. CLEAN WATER ACT (CWA) SECTION 404 DETERMINATION OF JURISDICTION: "*waters of the U.S.*" within CWA jurisdiction (as defined by 33 CFR part 328.3) in the review area. **Check all that apply.**

☐ (a)(1): All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide. (Traditional Navigable Waters (TNWs))

- **Complete Table 1 - Required**

☐ This AJD includes a case-specific (a)(1) TNW (Section 404 navigable-in-fact) determination on a water that has not previously been designated as such. Documentation required for this case-specific (a)(1) TNW determination is attached.

☐ (a)(2): All interstate waters, including interstate wetlands.

- **Complete Table 2 - Required**

☐ (a)(3): The territorial seas.

- **Complete Table 3 - Required**

☐ (a)(4): All impoundments of waters otherwise identified as waters of the U.S. under 33 CFR part 328.3.

- **Complete Table 4 - Required**

☐ (a)(5): All tributaries, as defined in 33 CFR part 328.3, of waters identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 5 - Required**

☐ (a)(6): All waters adjacent to a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters.

- **Complete Table 6 - Required**

☐ Bordering/Contiguous.

Neighboring:

☐ (c)(2)(i): All waters located within 100 feet of the ordinary high water mark (OHWM) of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3.

☐ (c)(2)(ii): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 and not more than 1,500 feet of the OHWM of such water.

☐ (c)(2)(iii): All waters located within 1,500 feet of the high tide line of a water identified in paragraphs (a)(1) or (a)(3) of 33 CFR part 328.3, and all waters within 1,500 feet of the OHWM of the Great Lakes.

☐ (a)(7): All waters identified in 33 CFR 328.3(a)(7)(i)-(v) where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 7 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ (a)(8): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3 not covered by (c)(2)(ii) above and all waters located within 4,000 feet of the high tide line or OHWM of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 8 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

C. NON-WATERS OF THE U.S. FINDINGS:

Check all that apply.

☐ The review area is comprised entirely of dry land.

☐ Potential-(a)(7) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☒ Potential-(a)(8) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ Excluded Waters (Non-Waters of U.S.), even where they otherwise meet the terms of paragraphs (a)(4)-(a)(8):

- **Complete Table 10 - Required**

☐ (b)(1): Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA.

☐ (b)(2): Prior converted cropland.

☐ (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.

☐ (b)(3)(ii): Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.

☐ (b)(3)(iii): Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1)-(a)(3).

☐ (b)(4)(i): Artificially irrigated areas that would revert to dry land should application of water to that area cease.

☐ (b)(4)(ii): Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds.

☐ (b)(4)(iii): Artificial reflecting pools or swimming pools created in dry land.[1]

☐ (b)(4)(iv): Small ornamental waters created in dry land.[1]

☐ (b)(4)(v): Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water.

☐ (b)(4)(vi): Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways.[1]

☐ (b)(4)(vii): Puddles.[1]

☐ (b)(5): Groundwater, including groundwater drained through subsurface drainage systems.[1]

☐ (b)(6): Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.[1]

☐ (b)(7): Wastewater recycling structures created in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.

☐ Other non-jurisdictional waters/features within review area that do not meet the definitions in 33 CFR 328.3 of (a)(1)-(a)(8) waters and are not excluded waters identified in (b)(1)-(b)(7).

- **Complete Table 11 - Required.**

D. ADDITIONAL COMMENTS TO SUPPORT AJD: .

[1] In many cases these excluded features will not be specifically identified on the AJD form, unless specifically requested. Corps Districts may, in case-by-case instances, choose to identify some or all of these features within the review area.

Jurisdictional Waters of the U.S.

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 1. (a)(1) Traditional Navigable Waters

(a)(1) Waters Name	(a)(1) Criteria	Rationale to Support (a)(1) Designation Include High Tide Line or Ordinary High Water Mark indicators, when applicable.
N/A	Choose an item.	N/A

Table 2. (a)(2) Interstate Waters

(a)(2) Waters Name	Rationale to Support (a)(2) Designation
N/A	N/A

Table 3. (a)(3) Territorial Seas

(a)(3) Waters Name	Rationale to Support (a)(3) Designation
N/A	N/A

Table 4. (a)(4) Impoundments

(a)(4) Waters Name	Rationale to Support (a)(4) Designation
N/A	N/A
N/A	N/A

Table 5. (a)(5)Tributaries

(a)(5) Waters Name	Flow Regime	(a)(1)-(a)(3) Water Name to which this (a)(5) Tributary Flows	Tributary Breaks	Rationale for (a)(5) Designation and Additional Discussion. Identify flowpath to (a)(1)-(a)(3) water or attach map identifying the flowpath; explain any breaks or flow through excluded/non-jurisdictional features, etc.
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A

Table 6. (a)(6) Adjacent Waters

(a)(6) Waters Name	(a)(1)-(a)(5) Water Name to which this Water is Adjacent	Rationale for (a)(6) Designation and Additional Discussion. Identify the type of water and how the limits of jurisdiction were established (e.g., wetland, 87 Manual/Regional Supplement); explain how the 100-year floodplain and/or the distance threshold was determined; whether this water extends beyond a threshold; explain if the water is part of a mosaic, etc.
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Table 7. (a)(7) Waters

SPOE Name	(a)(7) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; discuss whether any similarly situated waters were present and aggregated for SND; discuss data, provide analysis, and summarize how the waters have more than speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 8. (a)(8) Waters

SPOE Name	(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to subject water and aggregated for SND; discuss data, provide analysis, and then summarize how the waters have more than speculative or insubstantial effect the on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Non-Jurisdictional Waters

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 9. Non-Waters/No Significant Nexus

SPOE Name	Non-(a)(7)/(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water DOES NOT have a Significant Nexus	Basis for Determination that the Functions DO NOT Contribute Significantly to the Chemical, Physical, or Biological Integrity of the (a)(1)-(a)(3) Water. Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to the subject water; discuss data, provide analysis, and summarize how the waters did not have more than a speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water.
SPOE	Kettle Wetland (KW)	Puget Sound (PS) or Sequalitchew Creek (SC)	See MFR in the administrative record for this project for Similarly Situated Waters and Significant Nexus Determination dated April 5, 2019 for further rationale to support a finding of no significant nexus.

Table 10. Non-Waters/Excluded Waters and Features

Paragraph (b) Excluded Feature/Water Name	Rationale for Paragraph (b) Excluded Feature/Water and Additional Discussion.
N/A	N/A
N/A	N/A

Table 11. Non-Waters/Other

Other Non-Waters of U.S. Feature/Water Name	Rationale for Non-Waters of U.S. Feature/Water and Additional Discussion.
N/A	N/A

CENWS-ODR
Reference: NWS-2018-1114; Small, John (AJD (JD Only))

MEMORANDUM FOR RECORD

SUBJECT: **Similarly Situated Waters and Significant Nexus Determination**
The waters specified at paragraph (a)(8) require a determination whether they are similarly situated. Under this step, the agencies apply factors in the determination of when waters evaluated under paragraph (a)(8) should be considered either individually or in combination for purposes of a significant nexus analysis. A determination of ''similarly situated'' requires an evaluation of whether a group of waters in the region that meet the distance thresholds set out under paragraph (a)(8) can reasonably be expected to function together in their effect on the chemical, physical, or biological integrity of downstream traditional navigable waters, interstate waters, or the territorial seas. Similarly situated waters can be identified as sufficiently close together for purposes of this paragraph of the regulation when they are within a contiguous area of land with relatively homogeneous soils, vegetation, and landform (*e.g.*, plain, mountain, valley, etc.).

A water has a significant nexus when any single function or combination of functions performed by the water, alone or together with similarly situated waters in the region, contributes significantly to the chemical, physical, or biological integrity of the nearest water identified in paragraphs (a)(1) through (3).

1. Subject Wetland
    a. Soils: Per the USDA's "Web Soil Survey" mapper, the soils at the location of the Kettle Wetland (KW) are classified as "Spanaway sandy loam," which is not a hydric soil. Per the ORM JD viewer, the KW is "well drained." A site visit was not conducted by the Corps for this AJD, therefore no soil samples were taken, but a site visit was conducted for a previous AJD for this wetland (NWS-2008-911). Kettle wetlands, such as the subject wetland, exist within glacially carved, static depressions, so they do not tend to change quickly as other types of wetlands might. Therefore, it is appropriate to consider previous soil findings at the KW. In the 2007 soil study, soil was described as following: "Soils consist of 16 to 20 inches of black peat above a layer of lower permeability silty clay. The peat contained low chroma (less than 1) with slightly decomposed wood fragments indicative of extended periods of inundation. Some areas beneath the peat also contained organic lenses within the silty clay layer. The silty clay layer appears to correspond with the "dead ice" phenomenon associated with the formation of kettle wetlands. Upland soils adjacent to the wetland boundary are composed of high chroma (greater than or equal to 2), dry, brown Spanaway gravelly sandy loam. The wetland boundary corresponded with a clear change in soils from gravelly sandy loam to peat." It was also previously noted that surface saturation was often present, but soils were not always saturated to a depth of 12 inches.

b. Vegetation: PEM1F, Palustrine, Emergent, Persistent, Semipermanently Flooded. Per ORM JD Viewer, the "GAP Landcover – Vegetation Class" of the KW is mostly "Forest and Woodland" but also contains "Developed and Other Human Use." Per the 2007 data sheets, wetland vegetation included pacific dogwood, red elderberry, shining willow, rose spirea, Douglas fir, Scouler's willow, beaker hazelnut and other native species.

c. Landform: Per ORM JD viewer, the landform surrounding the KW is classified as "Irregular Plains." The KW is 1.7 acres in size and sits within a 40-foot, glacially carved depression. Relatively flat topography exists east of the KW, but to the west is a large slope leading down into a large, manmade depression that exists from mining activity on the property. West of the large mining pit, topography slopes upward again, then an approximately 200-foot forested buffer exists before reaching escarpment features that drop 200 feet to Puget Sound (PS). The topography between the KW and Sequalitchew Creek (SC) is flat to slightly concave.

d. Proximity: The KW is approximately 2,900 feet east of the PS. The KW is approximately 2,500 feet north of SC. It is also 200 feet above Puget Sound in elevation. There are other kettle wetlands within the geographic area, but there are no other waters within the SPOE or the review area.

2. Similarly Situated Characteristics

a. wetland of peat soils atop lesser permeable silty/clay soils, surrounded by well drained soils

b. within forested woodlands, containing native shrubs and other native vegetation

c. wetland surrounded by irregular plains

d. within 3,000 feet of PS

3. Similarly Situated Waters Identified

a. There are no other waters within the small SPOE, therefore, no similarly situated waters were identified.

4. Significant Nexus Determination

The subject water alone, does not significantly affect the chemical, physical, or biological integrity of Puget Sound or Sequalitchew Creek based on the discussion below:

Because of the concave topography between the KW and PS, it is unlikely that surface water sheet-flowing through the KW makes its way to PS. Therefore, it is unlikely that the KW is performing filtration or sediment trapping functions for PS.

Because of the lesser-permeable layer of silty clay under the KW, it is unlikely that there is measurable ground water connection to the PS.

Because of disconnectivity and the heavily mined/disturbed nature of the immediately surrounding area, it is unlikely that wildlife would use the KW, therefore, it is likely that the KW is performing very low wildlife habitat functions.

There are no features (drainages, flow paths, sloped topography) to suggest that surface water running through the KW would then reach SC. Additionally, an approximate 200-foot forested buffer exists around SC. It is unlikely that the KW is performing filtration or sediment trapping functions for SC, or contributing any kind of organic input to SC.

The KW is not performing functions in flood attenuation. The KW contains a small 100-year flood plain in its center but it is not within a floodplain associated with another water and it is not in close-enough proximity to SC to attenuate flood water associated with overflow of the creek. The depression was created after glacial carving, and saturated wetland conditions came to exist in response to this topography, not in response to recurrent saturation from flood waters.

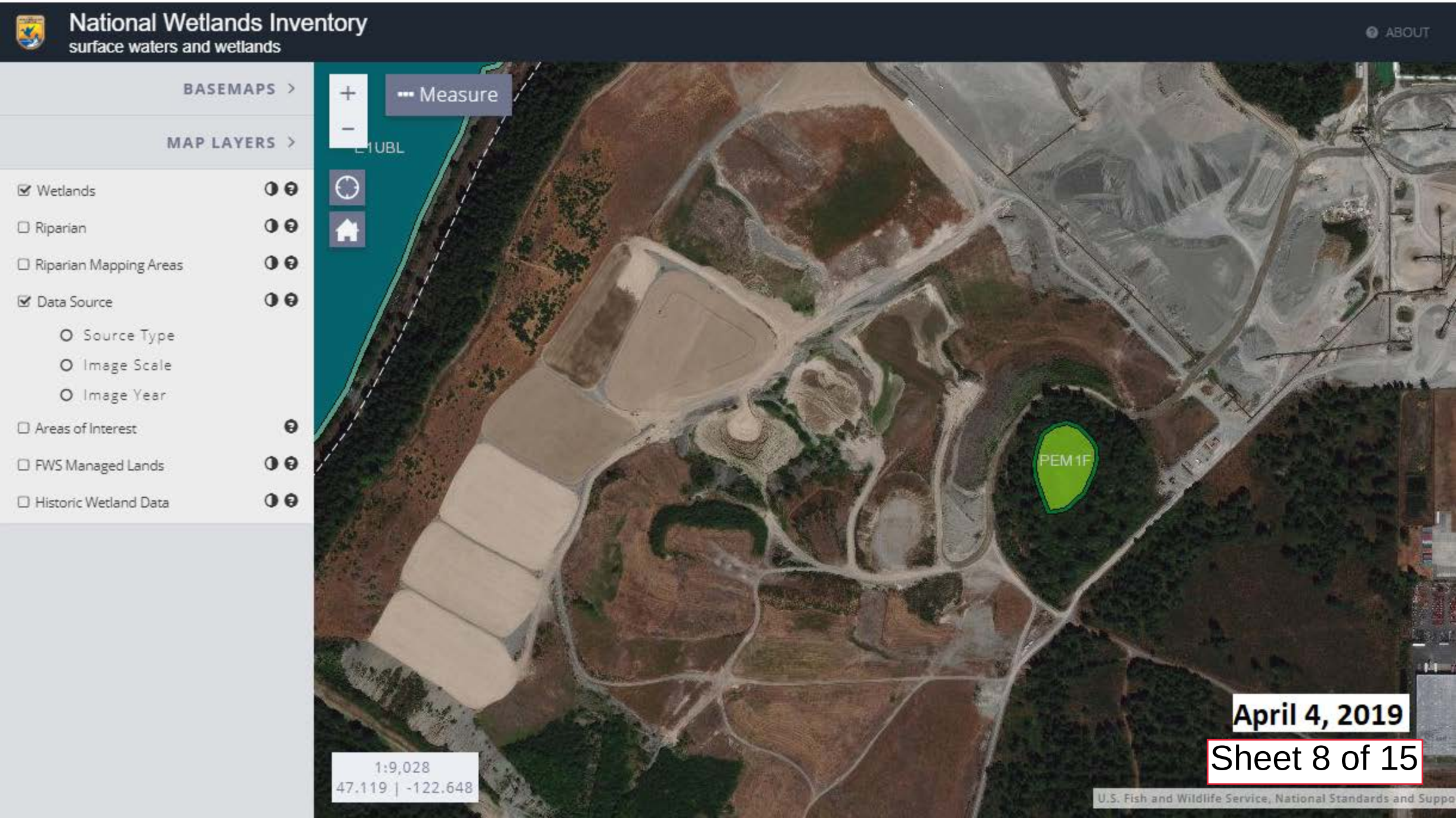
5. Conclusion: Because there is not a significant nexus, Kettle Wetland is not a water of the U.S.

Halie Endicott — 5 April 2019

Halie Endicott
Project Manager

Kristina G. Tong — 16 April 2019

Reviewed by: Kristina G. Tong, Section Chief — Date


National Wetlands Inventory
surface waters and wetlands
ABOUT
BASEMAPS
MAP LAYERS
Wetlands
Riparian
Riparian Mapping Areas
Data Source
Source Type
Image Scale
Image Year
Areas of Interest
FWS Managed Lands
Historic Wetland Data
Measure
PEM1F
April 4, 2019
1:9,028
47.119 | -122.648
U.S. Fish and Wildlife Service, National Standards and Suppo

Sheet 8 of 15

Search

Map Unit Legend

Joint Base Lewis-McChord Area, Washington, Parts of Pierce and Thurston Counties (WA777)
Pierce County Area, Washington (WA653)

Joint Base Lewis-McChord Area, Washington, Parts of Pierce and Thurston Counties (WA777)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes	65.2	5.6%
996	Dumps	136.3	11.7%
Subtotals for Soil Survey Area		**201.5**	**17.3%**

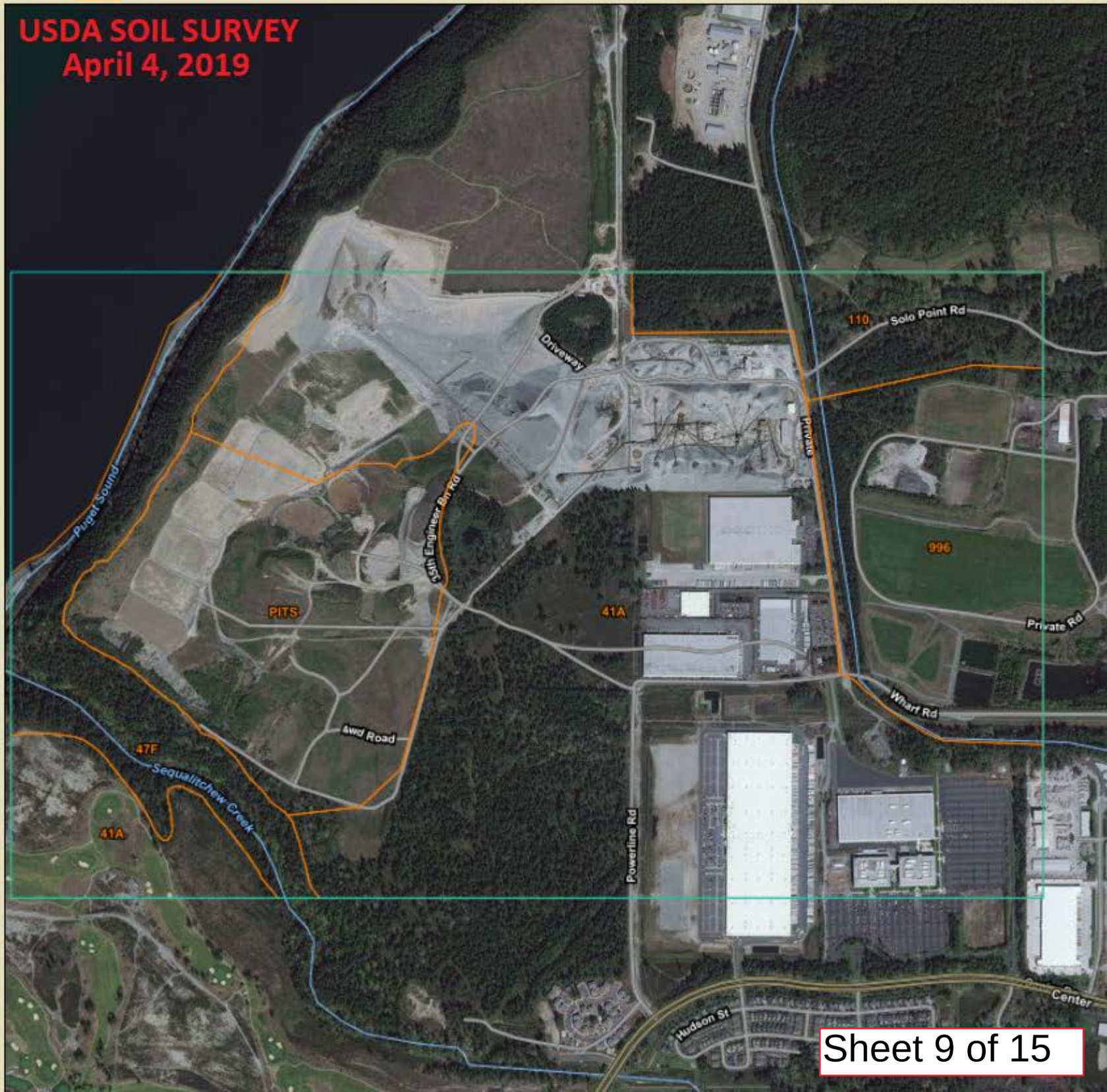
Pierce County Area, Washington (WA653)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
41A	Spanaway gravelly sandy loam	632.4	54.2%
47F	Xerochrepts, 45 to 70 percent slopes	94.6	8.1%
PITS	Pits	175.4	15.0%

Legend

Soil Map

Scale (not to scale)



ORM Landform Map
April 5, 2019

Kettle Wetland

Solo Point Road

Pioneer Avenue

Wharf Road

Legend

- Flat Hills
- Smooth Plains
- Irregular Plains
- Escarpments
- Low Hills
- Hills
- Breaks/Foothills
- Low Mountains
- High Mountains/Deep Canyons
- Drainage Channels

300 m

Clean Water Rule Web App

Esri World Geocoder

Zone A

Zone A

AREA OF MINIMAL FLOOD HAZARD

April 4, 2019

Sheet 11 of 15

-122.640 47.122 Degrees

USDA FSA, DigitalGlobe, GeoEye | USGS TNM – National Hydrography Dataset, Data refre

Legend

- Spillway
- StreamRiver
- Submerged Stream
- Wash
- Water IntakeOutflow

Waterbody - Large Scale

- Estuary
- Ice Mass
- LakePond
- Playa
- Reservoir
- SwampMarsh

National Flood Hazard Layer (Existing)

Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

National Flood Hazard Layer (Pending)

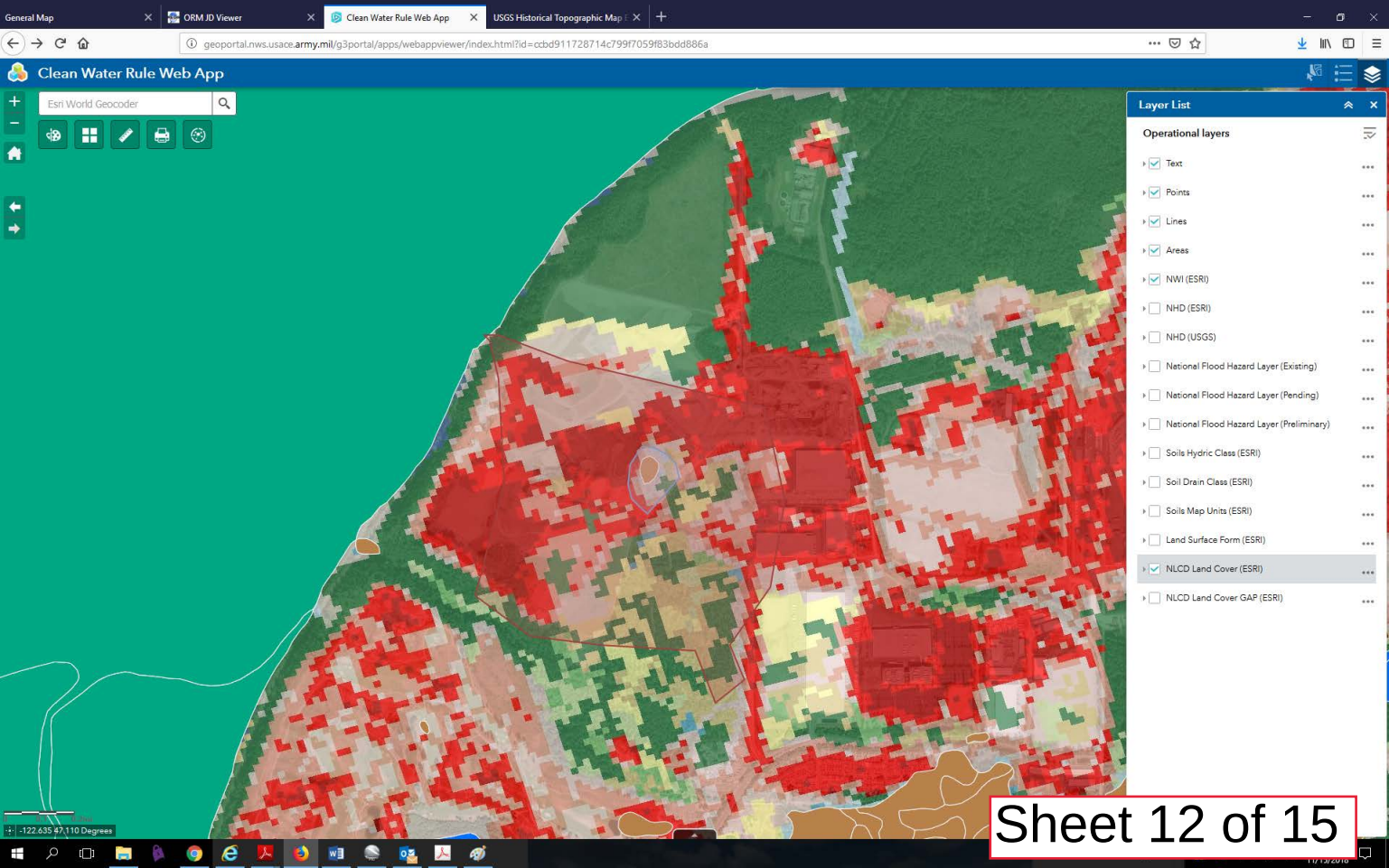
Pending Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

National Flood Hazard Layer (Preliminary)

Preliminary Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee


General Map
ORM JD Viewer
Clean Water Rule Web App
USGS Historical Topographic Map
geoportal.nws.usace.army.mil/g3portal/apps/webappviewer/index.html?id=ccbd911728714c799f7059f83bdd886a
Clean Water Rule Web App
Esri World Geocoder
Layer List
Operational layers
Text
Points
Lines
Areas
NWI (ESRI)
NHD (ESRI)
NHD (USGS)
National Flood Hazard Layer (Existing)
National Flood Hazard Layer (Pending)
National Flood Hazard Layer (Preliminary)
Soils Hydric Class (ESRI)
Soil Drain Class (ESRI)
Soils Map Units (ESRI)
Land Surface Form (ESRI)
NLCD Land Cover (ESRI)
NLCD Land Cover GAP (ESRI)
-122.635 47.110 Degrees
Sheet 12 of 15

Wetland Perimeter Photo 1

Wetland Perimeter Photo 2

Appendix B
Wetland Mitigation Plan Checklist

Mitigation Plan Checklist

Adapted from Ecology (2006)

Section (Page)	Omitted	Content Description
		Introduction and Summary of Document
1		Cover / Title Page
1		Project Name
1		Reference numbers's (e.g., Corps application number)
1		Date of publication
1		Who it was prepared for and by / contact information
i		Table of Contents
ii		List of Tables
ii		List of Figures
(1)		Responsible Parties
(2)		Executive Summary
		Proposed Development Project
4		Project description
Figures 2-1, 2-2, 2-3		Project location, maps
2		Type of development (existing and proposed land uses)
2		Size of the development project
2.1		Construction schedule
2		Description of the development site (baseline conditions)
	X	Historic and current land uses and zoning designations
2.3		Existing wetlands on, or adjacent to, the development site
2.4		Other aquatic resources on, or adjacent to, the development site
	X	Known historic or cultural resources on the development site
Figures 1, 2		Maps showing the baseline conditions of the development site and adjacent properties
		Assessment of the Impacts at the Development Site
3		Area (acreage) of wetland impacts
Appendix C		Description of the water regime
Appendix C		Description of the soils
Appendix C		Description of the vegetation
Appendix C		Description of fauna using the site
Appendix C		Position and function of the wetland(s) in the landscape
Appendix C		Description of functions provided by the wetlands
3		Wetland rating

Section (Page)	Omitted	Content Description
3		Buffers
Appendix C		Water quality
		Mitigation Approach
4.1		Mitigation sequencing
4.2		Project-specific goals
4.3		Mitigation strategy
		Proposed Mitigation Site(s)
5.1		Location, including map
5.1		Site ownership
5		Site selection rationale
5		Site constraints
		Existing (Baseline) Conditions of the Mitigation Site
5.1		Historic and current land uses and zoning designations
5.1		Known historic or cultural resources on the mitigation site
2.9		Existing wetlands on, or adjacent to, the development site
2.4		Other aquatic resources on, or adjacent to, the development site
	X[1]	Maps showing current contours as surveyed. This is needed particularly when mitigation activities will alter ground elevations.
	X[1]	Description of the water regime
	X[1]	Description of the soils
	X[1]	Description of the vegetation
	X[1]	Description of fauna using the site
	X[2]	Position and function of the wetland(s) in the landscape
	X[2]	Description of functions provided by the wetlands
	X[2]	Wetland rating
	X[2]	Buffers
	X[2]	Water quality
	Figures 1, 2	Maps related to the existing conditions of the mitigation site, existing wetlands, and adjacent properties.
		Mitigation Site Plans / Design
5		Description of Site Plan/Design
5.2.1		Description of the water regime and how adequate amounts of water will be provided to support a wetland
4.1.3		Type of development (existing and proposed land uses) Discussion of how the mitigation plan will compensate for lost and degraded functions
Figures 4-9		Schematic drawings
Figures 7-9		Section drawings showing relationship of topography to water regime and vegetation

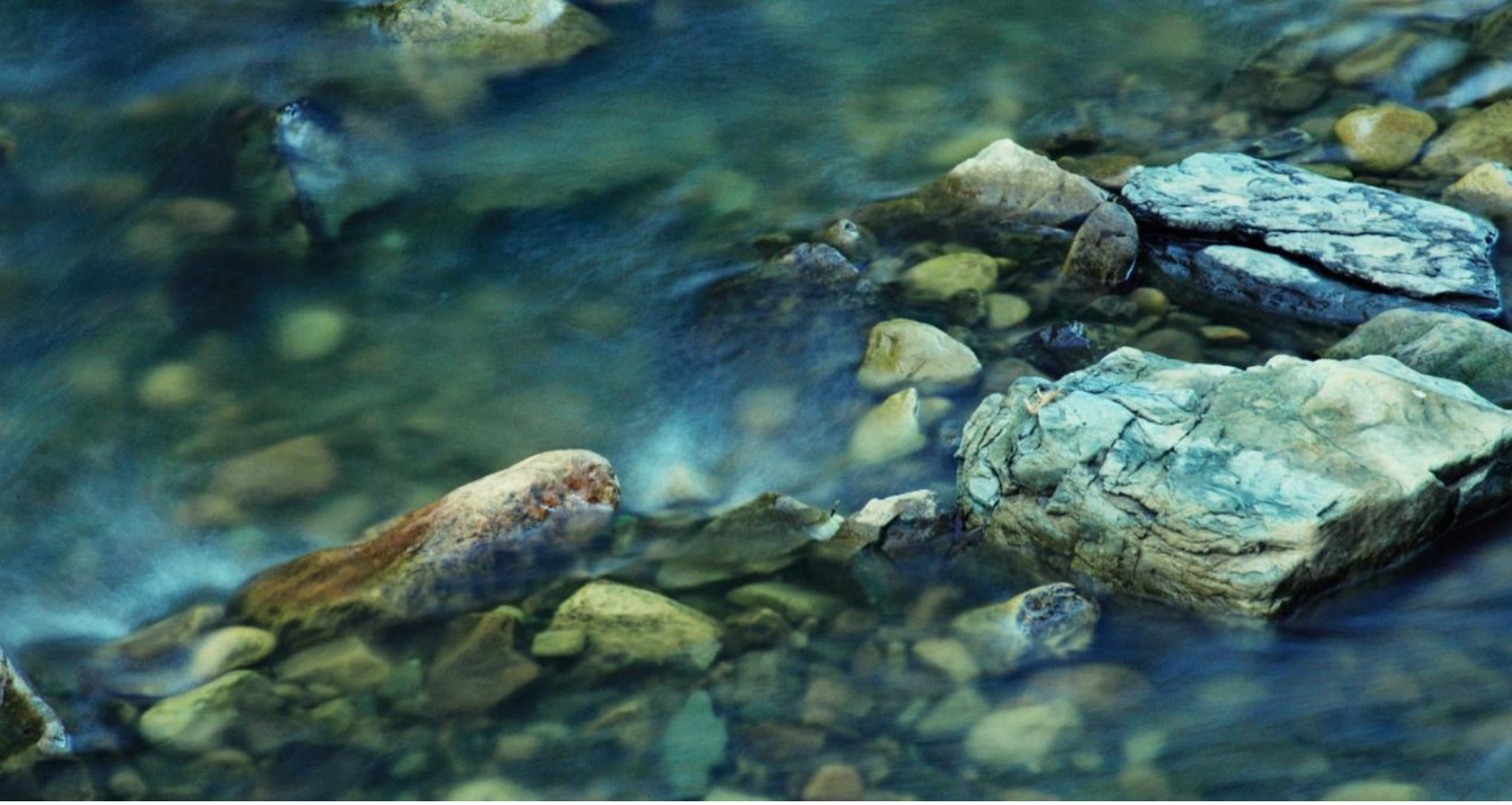
Section (Page)	Omitted	Content Description
Figure 5		Grading Plan / Site Maps
Figures 1-9		Orientation and scale
Figures 4, 5		Existing and proposed elevation contours
Figure 5		Spot elevations for low points, high points, and structures
Figure 2		Property boundaries
Figure 3		On-site wetland boundaries
	X	On-site floodplain and ordinary high water mark boundaries
	X	Survey of benchmarks
	X	Location and elevation of soil borings or test pits
	X	Location and elevation of water level sampling devices
	X	Location of soils to be stockpiled, if any
Figure3		Description of methods of erosion control and bank stabilization
Figure 6		Buffer areas for the mitigation site and their boundaries
5.2.1		Water Regime
5.2.1		Description of the proposed frequency and duration of flooding, inundation, or soil saturation
5.2.1		Description of the proposed groundwater and surface water sources and characteristics
	X[3]	Description of the elevation of the water table and dates measured
Figure. 5-X[4]		Engineering drawings of any proposed water control structures
5.2.2		Soils
Appendix A		Soils logs from on-site evaluation
5.2.2		Description of how the soil characteristics will be affected by the mitigation activities
	X[3]	Description of the elevation of the water table and dates measured
Figure. 5-X[4]		Engineering drawings of any proposed water control structures
Figure 5-1		Planting / Landscape Plans
Figures 5-1, 5-2		Topographic map showing typical planting scheme (distribution and spacing of vegetation)
Figure 11		List of plant materials
Figure 11		Other planting details
	X	Expected natural revegetation from existing seed bank and natural recruitment from nearby sites.
	X	Description of methods to control invasive species
	X	A plan for irrigating the plants
	X	Description of soil amendments
Figures 5-6, 5-7		Section drawings showing water levels in relation to plant distributions
Figure. 5-X[4]	X	Description of protective features (fences, signs)

Section (Page)	Omitted	Content Description
Figure. 5-X[4]	X	Map of location and type of habitat structures
	X	Examples of Similar Mitigation Projects
	X	Description of the experience the designer has had with the type of mitigation proposed
	X	Examples of other sites that have used the same approach
	X	Other information that demonstrates that the high-risk plan will be successful
		Site-Specific Goals, Objectives, and Performance Standards
6.1		Goals
6.1		Objectives for each goal
6.2		Performance standards for each objective
		Monitoring Plan
7		Variables to be measured
7		Sampling methods for each variable
7		Schedule for sampling each variable
	X	A map of sampling locations or describe how the locations will be determined for each monitoring event
	X	Laboratory methods to be used, if applicable
7.5		Timetable for reporting monitoring results to the agencies (final plan only)
		Site Protection
7.6		Describe measures that will be taken to protect the site over the long term
	X	Copies of legal documents (e.g., conservation easement, deed restriction) (final plan only)
		Maintenance and Contingency Plans (final plan only)
8		Maintenance plan
8		Description of and reason for each maintenance activity planned
8		Maintenance schedule for each activity (where applicable)
8.1		Contingency plan
Figure 8-1		Initiating procedures
	X	Description of contingency funds
		Implementation Schedule (final plan only)
4.3		Construction sequence for grading, water diversions, plantings, etc.
	X	Time schedule and completions dates
	X	Permit conditions specifying time limits
	X	**Financial Assurances (final plan only)**

Notes:

1. The mitigation site is inside the active mine; grading will continue to be changed as part of normal operations until the mitigation site is constructed.
2. The mitigation site is currently entirely upland.
3. The mitigation site is not intended to interact directly with existing water table.
4. Not included in this draft.

Appendix C
Kettle Wetland Delineation Report



March 2021
Pioneer Aggregates Mine Expansion (South Parcel)

ANCHOR QEA

Kettle Wetland Delineation Report

Prepared for CalPortland

March 2021
Pioneer Aggregates Mine Expansion (South Parcel)

Kettle Wetland Delineation Report

Prepared for
CalPortland
P.O. Box 1730
Seattle, WA 98111

Prepared by
Anchor QEA, LLC
1201 3rd Avenue
Suite 2600
Seattle, Washington 98101

Project Number: 190217-01.01

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ABBREVIATIONS

DMC	City of DuPont Municipal Code
Ecology	Washington State Department of Ecology
FAC	facultative
FACW	facultative wetland
HGM	Hydrogeomorphic
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	obligate wetland
PEM	palustrine emergent
PHS	Priority Habitats and Species
PSS	palustrine scrub-shrub
Report	*Kettle Wetland Delineation Report*
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1 Introduction

This *Kettle Wetland Delineation Report* (Report) provides the wetland delineation results for the Kettle Wetland located in DuPont, Washington (Township 19 North, Range 1 East, Section 23). This Report has been prepared to compile the information from previous Kettle Wetland delineation reports into one cohesive document. Information in this Report is based on the Kettle Wetland delineation results presented in the *North Sequalitchew Creek Project Impact Area Wetland Delineation Report* (Anchor Environmental 2007) and the *Addendum to the 2007 North Sequalitchew Creek Project Impact Area Wetland Delineation Report* (Anchor QEA 2018).

The initial Kettle Wetland delineation was performed by Anchor Environmental wetland scientists on July 31 and August 9, 2007 (Anchor Environmental 2007). On December 6, 2017, Anchor QEA wetland scientists performed a wetland boundary verification site visit (Anchor QEA 2018). On October 22 and December 5, 2019, Anchor QEA wetland scientists performed site visits verifying that the Kettle Wetland boundary and wetland features were consistent with the 2007 and 2017 reports (Anchor QEA 2019). A vicinity map showing the Kettle Wetland in relationship to the existing DuPont Aggregates mine and South Parcel Expansion Area is presented as Figure 1. An aerial photograph of the Kettle Wetland showing the mapped soils, wetland data plot locations, and wetland boundary flag locations is shown as Figure 2.

Section 2 of this Report describes the wetland delineation and verification methods, and Section 3 describes the findings of the wetland delineation and verification. Wetland field data forms are included in Appendix A. The Washington State Department of Ecology (Ecology) wetland rating forms are included in Appendix B.

1.1 Review of Existing Information

As part of the Kettle Wetland delineation analysis, Anchor Environmental and Anchor QEA wetland scientists reviewed the following sources of information to support the 2007 and 2017 field observations and preparation of this Report:

- Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2007, 2017, 2020)
- U.S. Fish and Wildlife Service (USFWS) Wetlands Mapper for National Wetlands Inventory (NWI) map information (USFWS 2017, 2020)
- DuPont City Code (City of DuPont 2007, 2017, 2020)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) maps (WDFW 2017, 2020)
- Aerial photographs, Google Earth, December 2020

2 Methods

This section describes the methodology used to perform the 2007 wetland delineation and the 2017 and 2019 wetland verification site visits and field investigation procedures. These methods are consistent with current federal and state agency requirements, as well as local (City of DuPont) jurisdiction requirements, for performing wetland delineations and identifying protective wetland buffer widths.

2.1 Data Collection

As specified by the City of DuPont Municipal Code (DMC; City of DuPont 2007, 2017, 2020), in 2007, 2017, and 2019 the Kettle Wetland boundary was identified, delineated, and verified according to the methods defined in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and Ecology's *Washington State Wetland Identification and Delineation Manual* (Ecology 1997). Soil colors were classified by their numerical description, as identified on a Munsell Soil Color Chart (Munsell 1994). In 2017 and 2019 the wetland boundary was also identified and verified according to the methods defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (USACE 2010).

The U.S. Army Corps of Engineers (USACE; Environmental Laboratory 1987) defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The method for delineating wetlands is based on the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. Hydrophytic vegetation is "the macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present." Hydric soils are "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Wetland hydrology "encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season" (Ecology 1997). Data collection methods for each of these parameters are described in the following subsections.

In 2007, a total of six data plots were sampled and recorded (Anchor Environmental 2007). Vegetation, soils, and hydrology information was collected at each of the plots and recorded on field datasheets (Appendix A). The Kettle Wetland boundary was determined based on plot data and visual observations of the wetland. The Kettle Wetland boundary and data plot locations were flagged and surveyed.

In 2017, vegetation, soil, and hydrology information was collected at sample plots in locations similar to the previous 2007 delineation plots (Anchor QEA 2018). In addition, the boundary of the Kettle Wetland was walked with a handheld Trimble GPS that contained the mapped 2007 wetland delineation boundary for comparison with the 2017 site conditions. The wetland boundary observed during the 2017 investigation was nearly identical to the 2007 delineation boundary; therefore, no additional flagging or survey of the wetland boundary was performed in 2017.

In 2019, the boundary of the Kettle Wetland was walked for comparison with the 2007 and 2017 site conditions (Anchor QEA 2019). Again, no discernable change in the wetland boundary was observed; therefore, no additional flagging or survey of the wetland boundary was performed in 2019.

2.1.1 Vegetation

Plant species occurring in each plot were recorded on field data forms, with one data form per plot (Appendix A). Percent cover for each plant species was estimated in the plot, and dominant plant species were identified. At each plot, trees within a 30-foot radius, shrubs within a 15-foot radius, and emergents within a 3-foot radius from the center of the plot were identified and recorded. A plant indicator status, designated by USFWS (Reed 1988, 1993), was assigned to each species, and a determination was made as to whether the vegetation in the plot was hydrophytic. To meet the hydrophytic parameter, more than 50% of the dominant species, with 20% or greater cover, must have an indicator of obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC). Table 1 provides the wetland indicator status categories.

Table 1
Wetland Plant Indicator Definitions

Indicator Status	Description
Obligate Wetland (OBL)	Plant species occur almost always in wetlands (estimated probability greater than 99%) under natural conditions.
Facultative Wetland (FACW)	Plant species usually occur in wetlands (estimated probability 67% to 99%) but are occasionally found in non-wetlands.
Facultative (FAC)	Plant species are equally likely to occur in wetlands or non-wetlands (estimated probability 34% to 66%).
Facultative Upland (FACU)	Plant species usually occur in non-wetlands (estimated probability 67% to 99%) but are occasionally found in wetlands.
Obligate Upland (UPL)	Plant species occur almost always in non-wetlands (estimated probability greater than 99%) under natural conditions.

2.1.2 Soils

Soils were sampled in each plot and evaluated for hydric soil indicators. Soil pits were dug to a depth of 18 inches, unless prevented by impenetrable substrate. Hydric soil indicators include low soil

matrix chroma, gleying, and redoximorphic (or "redox") features. Redox features are spots of contrasting color that occur within the soil matrix (the predominant soil color). Gleyed soils are predominantly bluish, greenish, or grayish in color. Soils having a chroma of 2 or less are positive indicators of hydric soils (Environmental Laboratory 1987; USACE 2010).

2.1.3 Hydrology

Wetland hydrology was evaluated at each plot to determine whether it "encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season" (Ecology 1997). Field observations of saturation, inundation, and other indicators of wetland hydrology, such as water-stained leaves and drainage patterns in wetlands, were recorded.

2.2 Wetland Classifications

Wetland community types are discussed according to the USFWS classification developed by Cowardin et al. (1979) for use in the NWI. This system, published in 1979 by a team of USFWS scientists led by L.M. Cowardin, bases the classification of wetlands on their physical characteristics, such as the general type of vegetation in the wetland (e.g., trees, shrubs, grass) and how much, and where, water is present in the wetland. The Cowardin system provides a classification for every known wetland type that occurs throughout the United States and, under this system, a wetland can be classified as having one or more wetland classification types. The Kettle Wetland contained the following Cowardin community types:

- **Palustrine scrub-shrub (PSS):** These wetlands have at least 30% cover of woody vegetation that is less than 20 feet high.
- **Palustrine emergent (PEM):** These wetlands have erect, rooted, herbaceous vegetation present for most of the growing season in most years.

2.3 State Hydrogeomorphic Classification System

Scientists have come to understand that wetlands can perform functions in different ways. The way a wetland functions depends to a large degree on hydrologic and geomorphic conditions. To recognize these differences among wetlands, a way to group or classify them has been developed. This classification system, called the Hydrogeomorphic (HGM) Classification, groups wetlands into categories based on the geomorphic and hydrologic characteristics that control many functions.

The *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) incorporates the HGM Classification system as part of the questionnaire for characterizing a wetland's functions. The rating system uses only the highest grouping in the classification, i.e., wetland class. Wetland classes are based on geomorphic settings, such as Riverine, Slope, Lake-fringe, or Depressional. A classification key is provided within the rating form to help identify

which of the following HGM Classifications apply to the wetland: Riverine; Depressional; Slope; Lake-fringe; Tidal Fringe; or Flats.

2.4 Other Data Sources

Existing information was referenced to identify potential wetlands or site characteristics indicative of wetlands. The sources of reference information that supported field observations are identified in Section 1.1, Review of Existing Information.

2.5 Wetland Ratings

In 2007, wetland ratings were determined using the most current version of Ecology guidance in *Washington State Wetland Rating System for Western Washington: Revised* (Ecology 2004) and *Wetland Rating Form – Western Washington, Version 2* (Ecology 2006) and according to the City of DuPont wetland rating criteria, as defined in the DMC (City of DuPont 2007).

For the 2017 verification, wetland ratings were determined using the most current version of Ecology guidance in the *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) and according to the DMC (City of DuPont 2017). The DMC has been updated since the 2017 wetland verification was performed. The Kettle Wetland rating under the current DMC (City of DuPont 2020) has been identified in this Report.

The rating system developed by Ecology is used to differentiate wetlands based on their sensitivity to disturbance, their significance in the watershed, their rarity, ability to be replaced, and the beneficial functions they provide to society. The Ecology rating system requires the user to collect specific information about the wetland in a step-by-step process. Three major functions are analyzed (water quality improvement, hydrologic functions, and habitat). Ratings are based on a point system, where points are given if a wetland meets specific criteria related to the wetland's potential and the opportunity to provide certain benefits.

Per Ecology's rating system, wetlands are categorized according to the following criteria and to points given:

- **Category I wetlands (23 or more points)** represent a unique or rare wetland type, are more sensitive to disturbance, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.
- **Category II wetlands (20 to 22 points)** are difficult, though not impossible, to replace, and provide high levels of some functions.
- **Category III wetlands (16 to 19 points)** have moderate levels of functions. They have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

- **Category IV wetlands (less than 16 points)** have the lowest levels of functions and are often heavily disturbed.

The current DMC classifies wetlands into four categories (Categories I, II, III, and IV) based on the updated 2014 Ecology Wetland Rating System for Western Washington (City of DuPont 2020).

2.6 Wetland Functional Assessment

During the 2017 wetland verification, the functional values of wetlands were rated according to *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014). Using Ecology's system, wetlands were rated based on a point system where points were awarded to three functional value categories (water quality improvement, hydrologic functions, and habitat). Detailed scoring, based on Ecology wetland rating forms, is provided in Appendix B.

3 Wetland Delineation Results

This section describes the wetland delineation results of the 2007 wetland delineation (Anchor Environmental 2007) and 2017 (Anchor QEA 2018) and 2019 (Anchor QEA 2019) wetland verification site visits. Overall, no discernable changes in the Kettle Wetland vegetation, soils, or hydrologic characteristics or the wetland boundary or were observed across the various investigations.

3.1 Kettle Wetland

The Kettle Wetland is a 1.78-acre enclosed, depressional HGM class wetland dominated by a PEM vegetation class with a PSS vegetation class along the wetland boundary. Forty-eight flags were used to identify the Kettle Wetland boundary in 2007. The Kettle Wetland boundary was confirmed to be unchanged during the 2017 and 2019 investigations. The Kettle Wetland is identified on the USFWS Wetlands Mapper for NWI Map Information (USFWS 2007, 2017, 2020) and WDFW PHS maps (WDFW 2017, 2020). The boundary of the Kettle Wetland is shown in Figure 1 in relationship to other wetlands in the vicinity and in detail on Figure 2. The following subsections provide a description of the Kettle Wetland vegetation, soils, and hydrology.

3.1.1 Vegetation

Similar vegetation species were observed in the Kettle Wetland during the 2007, 2017, and 2019 investigations. The PEM communities consist of common mare's tail (*Hippuris vulgaris*), creeping spike rush (*Eleocharis palustris*), giant bur-reed (*Sparganium eurycarpum*), water parsnip (*Sium suave*), reed canarygrass (*Phalaris arundinacea*), water ladysthumb (*Polygonum amphibium*), mild waterpepper (*Polygonum hydropiperoides*), skunk cabbage (*Lysichiton americanus*), inflated sedge (*Carex vesicaria*), and northern bugleweed (*Lycopus uniflorus*). Aquatic species observed include pondweed (*Potamogeton* sp.) and lesser duckweed (*Lemna minor*).

Along the wetland boundary, the PSS community consists of Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), sitka willow (*Salix sitchensis*), red-osier dogwood (*Cornus sericea*), and hardhack (*Spiraea douglasii*). Other vegetation along the wetland boundary consists of stinging nettle (*Urtica dioica*), blue elderberry (*Sambucus caerulea*), beaked hazelnut (*Corylus cornuta*), and Henderson sedge (*Carex hendersonii*).

Kettle Wetland upland buffer vegetation includes tree, shrub, grass, and herbaceous species. Dominant tree species include big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western red cedar (*Thuja plicata*), bitter cherry (*Prunus emarginata*), Douglas hawthorne (*Crataegus douglasii*), blue elderberry, and Pacific madrone (*Arbutus menziesii*). Dominant shrub species include trailing blackberry (*Rubus ursinus*), salal (*Gaultheria shallon*), snowberry (*Symphoricarpos albus*), Scot's broom (*Cytisus scoparius*), Oregon grape (*Mahonia*

nervosa), bald-hip rose (*Rosa gymnocarpa*), oceanspray (*Holodiscus discolor*), sword fern (*Polystichum munitum*), saskatoon (*Amelanchier alnifolia*), red huckleberry (*Vaccinium parvifolium*), and bracken fern (*Pteridium aquilinum*). Herbaceous species include velvet grass (*Holcus lanatus*), western wild-rye (*Elymus glaucus*), colonial bent-grass (*Agrostis capillaries*). Vine species include manroot (*Marah oreganus*). Data plot vegetation is presented in the field data forms in Appendix A.

3.1.2 Soils

Kettle wetlands were formed during glacial retreat, when the stagnant melting ice sheet left large blocks of stranded glacial ice called "dead ice." Glacial meltwater would often flow around these stagnant ice blocks, depositing sediment. When the ice blocks later melted, kettles were formed where sediment had been deposited adjacent to the ice blocks. The ice-contact sediment is typically an unstratified silt, sand, and gravel, much lower in permeability than the adjacent outwash. An ablation till can also be formed in kettles when stagnant ice evaporates, leaving the glacial fines once contained in the ice as a low-permeability deposit. Kettles generally are present in the area as closed topographic depressions, some of which are lakes, bogs, and marshes. Over time, peat, silt, and clay collect in these quiet waters, producing the peat and wetland deposits encountered near the ground surface in these low areas.

The NRCS has mapped one soil series in the location of the Kettle Wetland (USDA 2007, 2017, 2020), Spanaway gravelly sandy loam (0% to 6% slopes). These soils are glacial outwash. These soils are very steep and moderately well drained to somewhat excessively drained. Spanaway soils are not classified as hydric soils by the NRCS. Mapped soils are shown in Figure 2.

Kettle Wetland soil characteristics were the same during the 2007 and 2017 investigations. Soils consist of 16 to 20 inches of black peat above a layer of lower permeability silty clay. The peat contained low chroma (less than 1) with slightly decomposed wood fragments indicative of extended periods of inundation. Some areas beneath the peat also contained thin organic lenses within the silty clay layer. The silty clay layer appears to correspond to the "dead ice" phenomenon associated with the formation of kettle wetlands. Upland soils adjacent to the wetland boundary are composed of high chroma (greater than or equal to 2), dry, brown Spanaway gravelly sandy loam. The wetland boundary corresponded with a clear change in soils from gravelly sandy loam to peat. Data plot soils are presented in the field data forms in Appendix A.

3.1.3 Hydrology

The Kettle Wetland is located within the Chambers/Clover Basin Water Resource Inventory Area 12 (Ecology 2020) and the Sequalitchew Creek drainage basin, and it is hydrologically connected with the Vashon aquifer (CH2M Hill 2003a). There are no streams that drain into or out of the Kettle Wetland. The Kettle Wetland is more than 1/2 mile from a Water of the United States and has no surface water connection to any other waterbody. As an enclosed depression, precipitation falling

within the existing vegetated wetland buffer drains toward the Kettle Wetland. The PEM area is inundated for all or most of the year. Water levels in the Kettle Wetland fluctuate seasonally, from 1 to 2 feet during the summer, to 4 to 6 feet during the winter. The width of the open water component also varies seasonally from 50 feet during the summer to several hundred feet during the winter. Water levels in the wetland were monitored intermittently at a staff gauge installed in the wetland in 1999 (CH2M Hill 2003b). Water levels over the monitoring period ranged from a high of 6.22 feet in December 1999, to the soil surface (0.63 foot) in October 1999.

Similar Kettle Wetland hydrology characteristics were observed during the 2007, 2017, and 2019 investigations. Inundation of up to 3 feet was present throughout the central portion of the Kettle Wetland. Within the wetland near the edges, soil saturation ranged from near the surface to greater than 20 inches. However, several secondary indicators of wetland hydrology were observed in areas with peat soils where saturation was well below the surface, including sediment deposits, water marks, and the FAC neutral test. No saturation, standing water, or indications of wetland hydrology were observed in adjacent upland areas. Data plot hydrology is presented in the field data forms in Appendix A.

Data was collected at six data plots, K-1 through K-6 (Appendix A). Plots K-1, K-4, and K-5 contained indicators of hydrophytic vegetation, wetland hydrology, and hydric soils. Plots K-2, K-3, and K-6 contained no hydric soil or wetland hydrology, although K-3 contained hydrophytic vegetation.

3.2 Regulatory Framework

Guidance from USFWS, Ecology, and the City of DuPont was used to determine the wetland classifications. Information and excerpts from the specific guidance language are provided in the following subsections.

3.2.1 USFWS Classification

The Kettle Wetland has been classified using the system developed by Cowardin et al. (1979) for use in the NWI. Table 2 lists the USFWS classifications for the Kettle Wetland and the connection to surface water.

Table 2
U.S. Fish and Wildlife Service Wetland Classifications

Wetland	USFWS Classification	Surface Water Connection
Kettle	PSS and PEM	None

3.2.2 Ecology Rating, Classification, and Functions and Values Scores

Per the current DMC (City of DuPont 2020), wetland ratings are determined using Ecology's *Washington State Wetlands Rating System – Western Washington: 2014 Update* (Hruby 2014). Under the 2014 Ecology wetland rating system, the Kettle Wetland is rated as Category III wetland. Table 3 lists the 2014 Ecology and local (City of DuPont) wetland rating and classification.

Table 3
Summary of Wetland Classes and Ratings Using Ecology 2014 Wetland Rating Systems

Wetland	Area (acres)	Hydrogeomorphic Classification	2014[1] State Rating (Ecology)	Local Rating (City of DuPont)[2]
Kettle	1.78	Depressional	III	III

Notes:

1. Hruby, T., 2014. *Washington State Wetlands Rating System for Western Washington: 2014 Update*. Publication No. 14-06-029. Olympia, WA: Washington State Department of Ecology.
2. City of DuPont, 2020. City of DuPont Municipal Code. Accessed December 8, 2020. Available at http://www.codepublishing.com/WA/DuPont/.

For the 2014 Ecology wetland rating system (Hruby 2014), a low, moderate, or high rating is based on three functions: 1) Water Quality Improvement; 2) Hydrologic; and 3) Habitat. Within each of these three functions are three sub-function categories: 1) Site Potential; 2) Landscape Potential; and 3) Value. Each of these sub-function categories is rated as low, moderate, or high. Wetland functional values and scores for the Kettle Wetland under the 2014 Ecology rating system are shown in Table 4. The 2014 Ecology wetland rating forms are provided in Appendix B.

Table 4
Summary of Functions and Values: 2014 Wetland Rating Scores

Wetland and Function	Water Quality Improvement	Hydrologic	Habitat	Total Functions Score[1]
Kettle Wetland				
Site Potential	High	High	High	
Landscape Potential	Moderate	Moderate	Low	
Value	Low	Low	High	
Score Based on Rating[1]	6	6	7	19

Notes:

1. Potential total score per function is 9, for a potential total score of 27.

3.3 Wetland Functional Assessment

The following subsections provide a description of the functions of the Kettle Wetland based on the 2014 Ecology wetland rating system.

3.3.1 Water Quality Improvement Functions

The Kettle Wetland has a high function score for the potential to improve water quality for removal of sediments, nutrients, and toxics, because it is a closed depression with no surface water outlet. The Kettle Wetland also has dense vegetation to trap sediments and pollutants, and the soil characteristics include organic material.

The Kettle Wetland has a moderate function score for the landscape potential to support water quality functions because of the potential of the surrounding land uses to generate pollutants and discharge stormwater to the wetland.

The Kettle Wetland has a low function score to provide water quality improvement valuable to society because it is not located in the vicinity of aquatic resources that are on the Ecology 303(d) list, and there is no surface flow from the wetland to other waterbodies.

3.3.2 Hydrologic Functions

The Kettle Wetland provides a high function score for potential to reduce flooding and erosion based on the absence of surface water outflows from the wetland, the depth of storage provided by the wetland during wet periods, and the contribution of the wetland to storage in the watershed.

The Kettle Wetland provides a moderate functions score for potential to support hydrologic functions based on the potential for surrounding land uses to generate pollutants and discharge stormwater to the wetland.

The Kettle Wetland has a low function score to provide hydrologic functions valuable to society because it is located in a landscape where it does not potentially flow downgradient into areas where flooding has damaged human or natural resources.

3.3.3 Habitat Functions

The Kettle Wetland has a high function score for the potential to provide habitat due to the vegetative structure (number of Cowardin [1979] vegetation classes), the number of water regimes or hydroperiods, the plant richness, the habitat diversity, and special habitat features present.

The Kettle Wetland has a low score for the landscape potential to support habitat functions because of the characteristics of disturbed and undisturbed habitats surrounding the wetland and the land use intensity of the surrounding area.

The Kettle Wetland has a high function score to provide habitat functions valuable to society because the wetland is identified by WDFW as providing habitat for WDFW priority species, native bats (WDFW 2020). The 2014 Ecology wetland rating forms are included in Attachment A.

3.4 City of DuPont Wetland Buffer Guidance

Required wetland buffers have been identified according to the current DMC Chapter 25.105.050 (City of DuPont 2020). The DMC identifies minimum protective buffer widths based on the wetland category, per the 2014 Ecology rating system. The Kettle Wetland is a Category III wetland.

Wetland boundaries are shown in Figure 2. Table 5 summarizes DMC ratings and buffer widths based on the 2014 Ecology rating system.

Table 5
Wetland Rating and Standard Buffer Widths

Wetland	2014 State Rating (Ecology)	Local Rating (City of DuPont)	Buffer Width (feet)[1]
Kettle	III	III	75

Note:
1. City of DuPont, 2020. City of DuPont Municipal Code. Accessed December 8, 2020. Available at http://www.codepublishing.com/WA/DuPont/.

3.5 Wetland Delineation and Typing Limitations

Wetland identification is an inexact science, and differences of professional opinion occasionally occur between trained individuals. Final determinations for wetland boundaries and typing concurrence or adjustments to these are the responsibility of the regulating resource agency. Wetlands are, by definition, transitional areas; their boundaries can be altered by changes in hydrology or land use. In addition, the definition of jurisdictional wetlands may change. If a physical change occurs in the basin, or if 3 years pass before the proposed project is undertaken, another wetland survey should be conducted. The results and conclusions expressed herein represent Anchor QEA's professional judgment based on the information available.

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Figures

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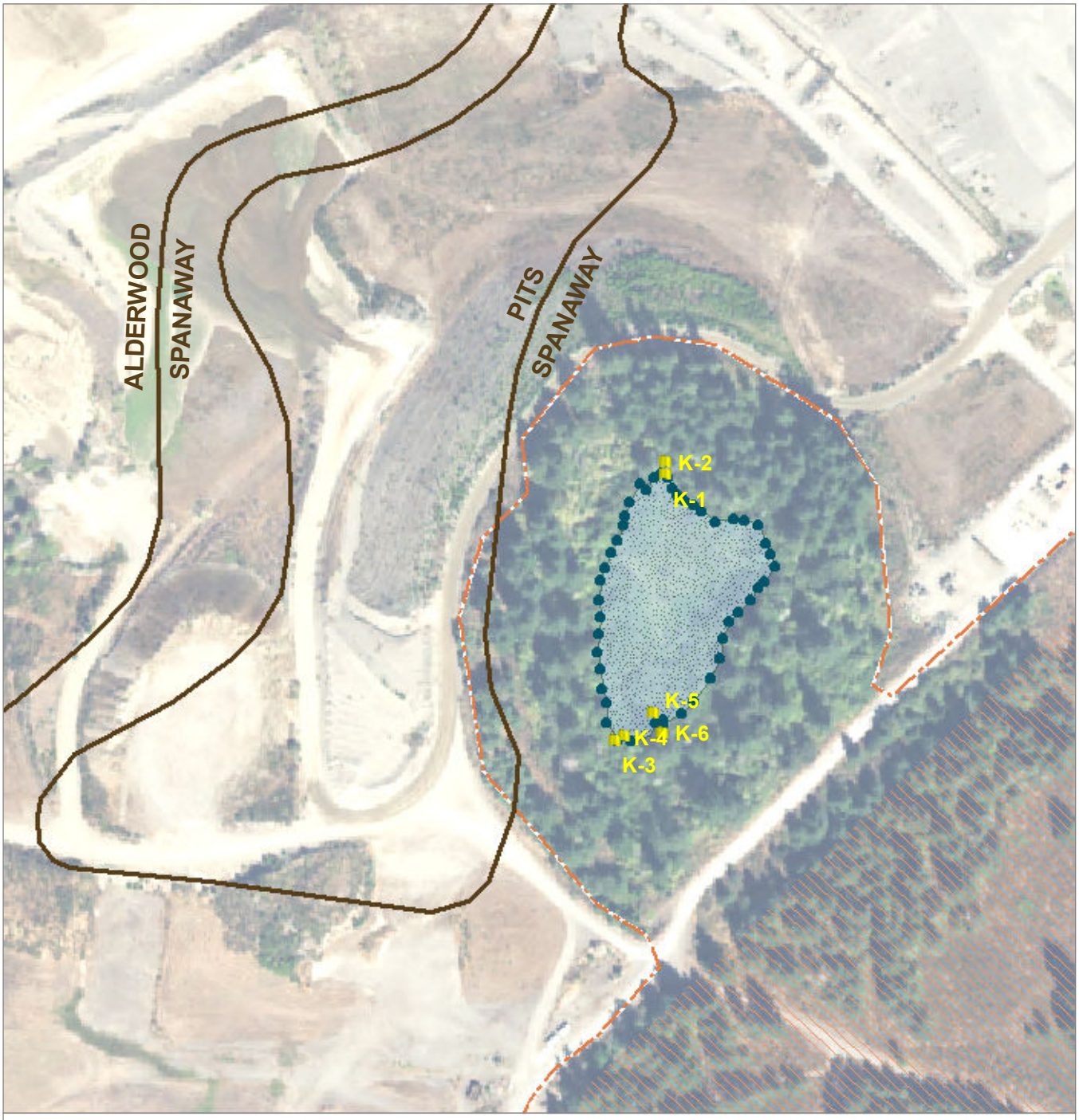
ANCHOR QEA

Figure 1
Vicinity Map
Kettle Wetland Delineation Report
Pioneer Aggregates South Parcel Project



LEGEND:

- South Parcel Expansion Area (188 ac)
- South Parcel Mineral Resource Area Expansion
- Mining Limits (existing and proposed, 620 ac)
- Pioneer Aggregates Property (791 ac)
- Data Plot
- Wetland Boundary Flag
- Kettle Wetland
- Sequalitchew Creek

NOTES:
Imagery: 2017 USDA NAIP

0 200
Feet

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ANCHOR QEA

Figure 2
Kettle Wetland Map
Kettle Wetland Delineation Report
Pioneer Aggregates South Parcel Project

Appendix A
Field Data Forms

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K1
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasiandra	T 60%	FACW+	Urtica dioica	H 15%	FAC+
Pseudotsuga menziesii	T 20%	FACU	Sium suave	H 5%	OBL
Sambucus racemosa	T 5%	FACU			
Spiraea douglasii	S 15%	FACW			
Salix lasiandra	S 10%	FAC+			
Symphoricarpus albus	S 15%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/2 = 50%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: >20 inches			

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☐ Aerial photographs	
☐ Other	

Wetland hydrology present? ☒ **Yes** ☐ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	O1	10YR 2,1	None	None	Peat (black, decomposed wood/twigs and peat)	
14-20	O2	10YR 2,1	None	None	Gravelly peat	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☒ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☒ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

Wetland Determination

Hydrophytic vegetation present?	☒ **Yes**	☐ **No**
Hydric soils present?	☒ **Yes**	☐ **No**
Wetland hydrology present?	☒ **Yes**	☐ **No**
Is the sampling point within a wetland?	☒ **Yes**	☐ **No**

Rationale/Remarks:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K2
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Polystichum munitum	H 20%	FACU	Pseudotsuga menziesii	T 20%	FACU
Rubus ursinus	H 40%	FACU	Holodiscus discolor	T 10%	NI
Mahonia nervosa	S 20%	FACU	Sambucus racemosa	T 15%	FACU
Symphoricarpos albus	S 20%	FACU	Corylus cornuta	T 10%	FACU
Marah oreganus	V 20%	NI	Carex hendersonii	H 15%	FAC
Salix lasiandra	T 40%	FAC+	Urtica dioica	H 5%	FAC+

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/7 = 14%

Check all indicators that apply and explain below:

- ☐ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☐ No	Sediment Deposits: ☐ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☐ No	Local Soil Survey: ☐ Yes ☐ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: None inches			

Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):

Wetland hydrology present? ☐ **Yes** ☒ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	A	10YR 2,2	None	None	Gravelly sandy loam (brown). Gravel prevented further shovel penetration.	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☐ **Yes** ☒ **No**

Rationale for decision/Remarks:

Wetland Determination

Hydrophytic vegetation present?	☐ **Yes**	☒ **No**
Hydric soils present?	☐ **Yes**	☒ **No**
Wetland hydrology present?	☐ **Yes**	☒ **No**
Is the sampling point within a wetland?	☐ **Yes**	☒ **No**

Rationale/Remarks:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K3
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Sambucus racemosa	S 40%	FACU			
Cornus nutallii	S 50%	NI			
Urtica dioica	H 15%	FAC+			
Galium aparine	H 5%	FACU			
Rubus ursinus	H 5%	FACU			
Tolmiea menziesii	H 5%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 0/2 = 0%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☒ No	Sediment Deposits: ☐ Yes ☒ No
Based on: Observation	Drift Lines: ☐ Yes ☒ No	Drainage Patterns: ☐ Yes ☒ No
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☒ No	Water-stained Leaves: ☐ Yes ☒ No
Depth to saturated soil: None inches		

Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):

Wetland hydrology present? ☐ **Yes** ☒ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-6	A	7.5YR 2.5,1	None	None	Loamy gravel; Gravel prevented further penetration.	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks: Soil chroma is low because color is black, but no other indications of hydric soil are present. No indications of wetland hydrology are present.

Wetland Determination

Hydrophytic vegetation present?	☐ **Yes**	☒ **No**
Hydric soils present?	☒ **Yes**	☐ **No**
Wetland hydrology present?	☐ **Yes**	☒ **No**
Is the sampling point within a wetland?	☐ **Yes**	☒ **No**

Rationale/Remarks:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K4
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasandra	S 40%	FAC+			
Cornus nutallii	S 50%	NI			
Moss	H 10%	None			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/2 = 50%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No
Based on: Observation	Drift Lines: ☒ Yes ☐ No	Drainage Patterns: ☐ Yes ☒ No
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No
Depth to free water in pit: 20 inches	FAC Neutral: ☐ Yes ☒ No	Water-stained Leaves: ☒ Yes ☐ No
Depth to saturated soil: 1 inches		

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☒ Aerial photographs	
☐ Other	

Wetland hydrology present? ☒ **Yes** ☐ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-8	A1	7.5YR 2.5,1	None	None	Siilty peat (decomposed organic debris)	
8-15	A2	7.5YR 2.5,1	7.5YR 3,2	40% 2 inches	Silty peat with gleyed colors	
15-17	B1	7.5YR 3,2	2.5Y 5,6	10% 1/2 inch	clayey silt with organic lenses	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☒ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

Wetland Determination

Hydrophytic vegetation present?	☒ **Yes**	☐ **No**
Hydric soils present?	☒ **Yes**	☐ **No**
Wetland hydrology present?	☒ **Yes**	☐ **No**
Is the sampling point within a wetland?	☒ **Yes**	☐ **No**

Rationale/Remarks:

NOTES: Matrix chroma <=2 with mottles

DATA FORM 1
Routine Wetland Determination
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Project/Site:	Sequalitchew Kettle Wetland	Date:	8/9/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K5
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Salix lasiandra	T 30%	FAC+			
Salix scouleriana	T 30%	FAC			
Cornus nutallii	S 30%	NI			
Spirea douglasii	S 40%	FACW			
Oenanthe sarmentosa	H 20%	OBL			
Solanum dulcamara	H 5%	FAC+			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 4/5 = 80%

Check all indicators that apply and explain below:

- ☒ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☒ Yes ☐ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☒ Yes ☐ No	Sediment Deposits: ☒ Yes ☐ No	
Based on: Observation	Drift Lines: ☒ Yes ☐ No	Drainage Patterns: ☐ Yes ☒ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☒ No	Local Soil Survey: ☐ Yes ☒ No	
Depth to free water in pit: 20 inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☒ Yes ☐ No	
Depth to saturated soil: 1 inches			

Check all that apply & explain below:	Other (explain):
☐ Stream, lake or gage data	
☒ Aerial photographs	
☐ Other	

Wetland hydrology present? ☒ **Yes** ☐ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Dupont muck

Drainage Class Very poorly drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-14	A1	7.5YR 2.5,1	None	None	Siilty peat (decomposed organic debris)	
14-16	A2	7.5YR 2.5,1	10YR 6,2	20% 1 inch	clayey silt (chalky) and silty peat	
16-20	B	10YR 6,2	None	None	clayey silt (chalky)	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☒ Reducing Conditions
- ☒ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☒ **Yes** ☐ **No**

Rationale for decision/Remarks:

Wetland Determination

Hydrophytic vegetation present?	☒ **Yes**	☐ **No**
Hydric soils present?	☒ **Yes**	☐ **No**
Wetland hydrology present?	☒ **Yes**	☐ **No**
Is the sampling point within a wetland?	☒ **Yes**	☐ **No**

Rationale/Remarks:

NOTES:

DATA FORM 1
Routine Wetland Determination
(WA State Wetland Delineation Manual or 1987 Corps Wetland Delineation Manual)

Project/Site:	Sequalitchew Kettle Wetland	Date:	7/31/2007
Applicant/owner:	Glacier DuPont	County:	Pierce
Investigator(s):	Dan Berlin	State:	WA
		S/T/R:	S23 T19N R1E

Do normal circumstances exist on the site?	☒ Yes	☐ No	Community ID:
Is the site significantly disturbed (atypical situation)?	☐ Yes	☒ No	Transect ID:
Is the area a potential problem area?	☐ Yes	☒ No	Plot ID: K6
Explanation of atypical or problem area:			

VEGETATION (For *strata, indicate T = tree; S = shrub; H = herb; V = vine)

Dominant Plant Species	*Stratum	Indicator	Dominant Plant Species	*Stratum	Indicator
Polystichium munitum	S 20%	FACU	Galium aparine	H 10%	FACU
Corylus cornuta	T 80%	FACU	Tolmiea menziesii	H 10%	FACU
Salix scouleriana	T 20%	FAC			
Urtica dioica	S 10%	FAC+			
Symphoricarpus albus	S 10%	FACU			
Rubus ursinus	H 10%	FACU			

HYDROPHYTIC VEGETATION INDICATORS:

% of dominants OBL, FACW, & FAC: 1/3 = 33%

Check all indicators that apply and explain below:

- ☐ Regional knowledge of plant communities
- ☐ Physiological or reproductive adaptations
- ☐ Technical Literature
- ☐ Wetland plant list (nat'l or regional)
- ☐ Morphological adaptations
- ☐ Wetland plant database
- ☐ Other (explain)

Hydrophytic vegetation present? ☐ Yes ☒ No

Rationale for decision/Remarks:

HYDROLOGY

Is it the growing season? ☒ Yes ☐ No	Water Marks: ☐ Yes ☐ No	Sediment Deposits: ☐ Yes ☐ No	
Based on: Observation	Drift Lines: ☐ Yes ☐ No	Drainage Patterns: ☐ Yes ☐ No	
Depth of inundation: None inches	Oxidized Root (live roots) Channels <12 in.: ☐ Yes ☐ No	Local Soil Survey: ☐ Yes ☐ No	
Depth to free water in pit: None inches	FAC Neutral: ☐ Yes ☐ No	Water-stained Leaves: ☐ Yes ☐ No	
Depth to saturated soil: None inches			
Check all that apply & explain below: ☐ Stream, lake or gage data ☐ Aerial photographs ☐ Other	Other (explain):		

Wetland hydrology present? ☐ **Yes** ☒ **No**

Rationale for decision/remarks:

SOILS

Map Unit Name (Series and Phase) : Spanaway gravelly sandy loam

Drainage Class Somewhat excessively drained

Field observations confirm mapped type? ☒ Yes ☐ No

Taxonomy (subgroup)

Profile Description

Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance size and contrast	Texture, concretions, structure, etc.	Drawing of soil profile (match description)
0-8	A	10YR 2,2	None	None	Sandy gravel. Gravel prevented further shovel penetration.	

Hydric Soil Indicators: (check all that apply)

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma (=1) matrix
- ☐ Concretions
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Other (explain in remarks)

Hydric soils present? ☐ **Yes** ☒ **No**

Rationale for decision/Remarks:

Wetland Determination

Hydrophytic vegetation present?	☐ **Yes**	☒ **No**
Hydric soils present?	☐ **Yes**	☒ **No**
Wetland hydrology present?	☐ **Yes**	☒ **No**
Is the sampling point within a wetland?	☐ **Yes**	☒ **No**

Rationale/Remarks:

NOTES:

Appendix B
Ecology Wetland Rating Forms

Wetland name or number Kettle

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Kettle Wetland Date of site visit: November 2017

Rated by C. Douglas Trained by Ecology? ☒ Yes ☐ No Date of training 2007

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☒ Y ☐ N

NOTE: **Form is not complete without the figures requested** *(figures can be combined)*.

Source of base aerial photo/map _____

OVERALL WETLAND CATEGORY III (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

X **Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
	Circle the appropriate ratings									
Site Potential	**H**	M	L	**H**	M	L	**H**	M	L	
Landscape Potential	H	**M**	L	H	**M**	L	H	M	**L**	
Value	H	M	**L**	H	M	**L**	**H**	M	L	**TOTAL**
Score Based on Ratings	6			6			7			**19**

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	X

Wetland name or number Kettle_____

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number Kettle

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

◉ NO – go to 2 ○ **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

○ **NO – Saltwater Tidal Fringe (Estuarine)** ○ **YES – Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

◉ NO – go to 3 ○ **YES** – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

☐ At least 30% of the open water area is deeper than 6.6 ft (2 m).

◉ NO – go to 4 ○ **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

☐ The water leaves the wetland **without being impounded**.

◉ NO – go to 5 ○ **YES –** The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

☐ The overbank flooding occurs at least once every 2 years.

Wetland name or number Kettle_____

◉ NO – go to 6 ○ **YES** – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

○ NO – go to 7 ◉ **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

◉ NO – go to 8 ○ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

   NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number Kettle

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	4
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	**16**

Rating of Site Potential If score is: ☒ **12-16 = H** ☐ **6-11 = M** ☐ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☒ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2-4 = H** ☐ **1 = M** ☒ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle _____

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradation

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	4
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	7
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	5
Total for D 4 Add the points in the boxes above	**16**

Rating of Site Potential If score is: ☒ **12-16 = H** ☐ **6-11 = M** ☐ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	**2**

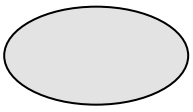
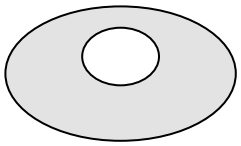
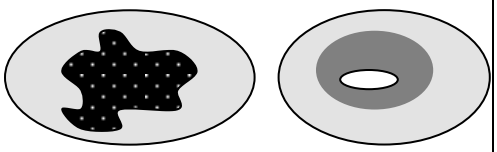
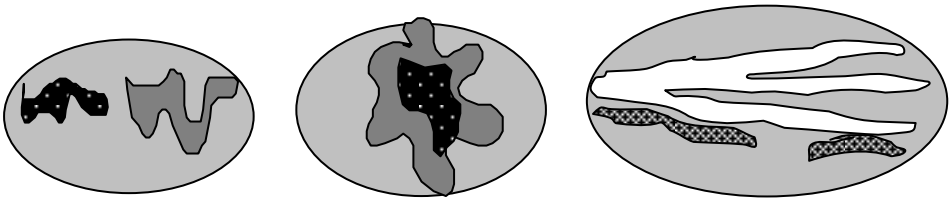
Rating of Landscape Potential If score is: ☐ **3 = H** ☒ **1 or 2 = M** ☐ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0 There are no problems with flooding downstream of the wetland. points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2-4 = H** ☐ **1 = M** ☒ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle _____

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	
H 1.0. Does the site have the potential to provide habitat?	
H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.* __X__Aquatic bed — 4 structures or more: points = 4 __X__Emergent — 3 structures: points = 2 __X__Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 __X__Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon	4
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*). __X__Permanently flooded or inundated — 4 or more types present: points = 3 __X__Seasonally flooded or inundated — 3 types present: points = 2 ____Occasionally flooded or inundated — 2 types present: points = 1 __X__Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	2
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle*** If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0	2
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3points 	3

Wetland name or number Kettle

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* __X__Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). __X__Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* __X__At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __X__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	**11**

Rating of Site Potential If score is: ☐ **15-18 = H** ☒ **7-14 = M** ☐ **0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 5 **+** [(% moderate and low intensity land uses)/2] 2.5 **=** 7.5 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 20 **+** [(% moderate and low intensity land uses)/2] 5 **=** 25 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	**-1**

Rating of Landscape Potential If score is: ☐ **4-6 = H** ☐ **1-3 = M** ☒ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) __X__ It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	**2**

Rating of Value If score is: ☒ **2 = H** ☐ **1 = M** ☐ **0 = L** *Record the rating on the first page*

Wetland name or number Kettle

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number Kettle

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt ◯Yes –Go to **SC 1.1** ◯No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ◯Yes = **Category I** ◯No - Go to **SC 1.2**	◯**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. ◯Yes = **Category I** ◯No = **Category II**	◯**Cat. I** ◯**Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ◯Yes – Go to **SC 2.2** ◯No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ◯Yes = **Category I** ◯No = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ◯Yes – **Contact WNHP/WDNR and go to SC 2.4** ◯No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ◯Yes = **Category I** ◯No = **Not a WHCV**	◯**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? ◯Yes – Go to **SC 3.3** ◯No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? ◯Yes – Go to **SC 3.3** ◯No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? ◯Yes = **Is a Category I bog** ◯No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? ◯Yes = **Is a Category I bog** ◯No = **Is not a bog**	◯**Cat. I**

Wetland name or number Kettle

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). ◯Yes = **Category I** ◯No = **Not a forested wetland for this section**	◯**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ◯Yes – Go to **SC 5.1** ◯No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) ◯Yes = **Category I** ◯No = **Category II**	◯**Cat. I** ◯**Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 ◯Yes – Go to **SC 6.1** ◯No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? ◯Yes = **Category I** ◯No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? ◯Yes = **Category II** ◯No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? ◯Yes = **Category III** ◯No = **Category IV**	◯**Cat I** ◯**Cat. II** ◯**Cat. III** ◯**Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	NA

Appendix D
Wetland Mitigation Credit/Debit Calculations

Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Washington

Debit Worksheet (corrected 2/20/18) **Project** kettle only

Mitigation Project is: Advanced [ ] Concurrent: 1.5 Delayed: [ ]

Only fill in boxes that are highlighted. Use Temporal Loss Factors from the table below (Appendix E).

Input Ratings for Functions from Scoring Sheet

	Wetland Unit Altered (#1)			**Wetland Unit Altered (#2)**			**Wetland Unit Altered (#3)**		
	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat
Site Potential (H,M,L)	H	H	M						
Landscape Potential (H,M,L)	M	M	L						
Value (H,M,L)	L	L	H						
Score for Wetland Unit	6	6	6	3	3	3	3	3	3
Acres of **non-forested** areas impacted	1.78								
Basic mitigation requirement (BMR)	10.68	10.68	10.68	0	0	0	0	0	0
Temporal loss factor (see below)	1.5								
DEBITS	16.02	16.02	16.02	0	0	0	0	0	0
Acres of Deciduous **forest** impacted									
Basic mitigation requirement (BMR)	0	0	0	0	0	0	0	0	0
Temporal loss factor									
DEBITS	0	0	0	0	0	0	0	0	0
Acres of **Evergreen Forest** impacted									
Basic mitigation requirement (BMR)	0	0	0	0	0	0	0	0	0
Temporal loss factor (see below)									
DEBITS	0	0	0	0	0	0	0	0	0
Acres of **Cat. 1 Deciduous forest**									
Basic mitigation requirement (BMR)	0	0	0	0	0	0	0	0	0
Temporal loss factor (see below)									
DEBITS	0	0	0	0	0	0	0	0	0
Acres of **Cat. 1 Evergreen forest**									
Basic mitigation requirement (BMR)	0	0	0	0	0	0	0	0	0
Temporal loss factor (see below)									
DEBITS	0	0	0	0	0	0	0	0	0

TOTALS

Function	**Wetland Unit Altered (#1)** Improving Water Quality	Hydrologic	Habitat	**Wetland Unit Altered (#2)** Improving Water Quality	Hydrologic	Habitat	**Wetland Unit Altered (#3)** Improving Water Quality	Hydrologic	Habitat
Acre-points	**16.02**	**16.02**	**16.02**	**0**	**0**	**0**	**0**	**0**	**0**

Total Debits by Function	Improving Water Quality	Hydrologic	Habitat
Acre-points	**16.02**	**16.02**	**16.02**

Timing of Mitigation	**Temporal Loss Factor**
Advance – At least two years has passed since plantings were completed ~~or one year since "as-built" plans were submitted to regulatory agencies~~	1.25
Concurrent – Physical alterations at mitigation site are completed within a year of the impacts, but planting may be delayed by up to 2 years if needed to optimize conditions for success.	
For impacts to an emergent or shrub community	1.5
For impacts to a deciduous forested wetland community	2.0
For impacts to an evergreen forested wetland community	2.5
For impacts to a deciduous Category I forested wetland community	3
For impacts to an evergreen Category I forested wetland community	3.5
Delayed - Construction is not completed within one year of impact, but is completed (including plantings if required) within 5 growing seasons of impact.	
For impacts to an emergent or shrub community	3
For impacts to a deciduous forested wetland community	4
For impacts to an evergreen forested wetland community	5
For impacts to a deciduous Category I forested wetland community	6
For impacts to an evergreen Category I forested wetland community	7

Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Washington

Credit Worksheet (corrected 2/20/18) **Project** CalPortland DuPont S. Parcel Expansion

Only fill in boxes that are highlighted. Use risk factors in table below.

Mitigation Project is: Advanced | Concurrent 1

This spreadsheed can calculate credits for three separate mitigation sites.

Input Ratings for Functions from Scoring Sheet.

	Site 1	W/O development		Site 2			Site 3	W/ development	
Insert a "1" in cell if creation or re-establishment	1						1		
Rating of Unit BEFORE mitigation	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat
Site Potential (H,M,L)									
Landscape Potential (H,M,L)									
Value (H,M,L)									
Score for Wetland Unit	0	0	0	3	3	3	0	0	0

	Site 1			Site 2			Site 3		
Rating of Unit AFTER mitigation	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat
Site Potential (H,M,L)	M	M	M				M	M	H
Landscape Potential (H,M,L)	M	M	M				H	H	H
Value (H,M,L)	H	L	H				H	L	L
Score for Wetland Unit	7	5	7	3	3	3	8	6	7
Lift in Functions	7	5	7	0	0	0	8	6	7

CREATION and RE-ESTABLISHMENT									
Acres created or re-established **(aquatic bed, shrub, forest)**	2.9						2.9		
Basic mitigation Credit	20.3	14.5	20.3	0	0	0	23.2	17.4	20.3
Risk Factor (see below)	0.9						0.9		
CREDITS	18.27	13.05	18.27	0	0	0	20.88	15.66	18.27
Acres created or re-established **(emergent)**	0.4						0.4		
Basic mitigation Credit	2.8	2	2.8	0	0	0	3.2	2.4	2.8
Risk Factor (see below)	0.9						0.9		
CREDITS	2.52	1.8	2.52	0	0	0	2.88	2.16	2.52
REHABILITATION AND ENHANCEMENT									
Acres rehabilitated or enhanced **(aquatic bed, shrub, forest)**	0								
Basic mitigation Credit	0	0	0	0	0	0	0	0	0
Risk Factor (see below)	1								
CREDITS	0	0	0	0	0	0	0	0	0
Acres rehabilitated or enhanced (**emergent**)	0								
Basic mitigation Credit	0	0	0	0	0	0	0	0	0
Risk Factor (see below)	1								
CREDITS	0	0	0	0	0	0	0	0	0
PRESERVATION									
Acres of **wetlands preserved**	0								
Score for wetland functions from Scoring Sheet									
Sum of scaling factors (Appendix E)									
CREDITS	0	0	0	0	0	0	0	0	0
Acres of **upland preserved**	0								
Habitat score for upland									
Sum of scaling factors (Appendix E)									
CREDITS			0			0			0

TOTALS		**Site 1**			**Site 2**			**Site 3**	
Function	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat	Improving Water Quality	Hydrologic	Habitat
Acre-points	**20.79**	**14.85**	**20.79**	**0**	**0**	**0**	**23.76**	**17.82**	**20.79**

Total Credits by Function for Project	Improving Water Quality	Hydrologic	Habitat
Acre-points	**44.55**	**32.67**	**41.58**

Risk Factors:

Type of Mitigation	Risk Factor
Advance Mitigation The site meets **criteria in Charts 1 and 3** of the site selection guidance [i.e., identified in a local plan and is sustainable] **AND** meets the **criteria in Charts 4-11** for the appropriate functions. (All worksheets for Chart 3 and in Appendix B of Ecology publication #09-06-032 for western Washington or #10-06-007 for eastern Washington are submitted) ***Advance*** *means that at least two years has passed since plantings were completed ~~or one year since "as-built" plans were submitted to regulatory agencies.~~*	1.0
Advance mitigation without meeting criteria in Ecology publication #09-06-032 or #10-06-007	0.83
Concurrent Mitigation Mitigation site meets **criteria in Charts 1 and 3** of the site selection guidance [i.e., identified in a local plan and is sustainable] **AND** meets the **criteria in Charts 4-11** for the appropriate functions. (All worksheets for Chart 3 and in Appendix B of Ecology publication #09-06-032 or #10-06-007 are submitted) *Risk factor applies to all types of mitigation.*	0.9
Mitigation site chosen meets the **criteria in Charts 2 and 3** of the site selection guidance [i.e., identified as a site with potential and that is sustainable]; **AND** meets **criteria in Charts 4-11** for the appropriate functions. (All worksheets for Chart 3 and in Appendix B of Ecology publication #09-06-032 or #10-06-007 are submitted) *Risk factor applies to all types of mitigation.*	0.80
Site does not meet criteria in site selection guide, or guide was not used. **Re-establishment, rehabilitation, or enhancement** that results in an aquatic bed, shrub, or forest community	0.67
Re-establishment, rehabilitation, or enhancement that results in an emergent community	0.5
Creation of an aquatic bed, shrub, or forest community with data showing there is adequate water to maintain wetland conditions 5 years out of every 10.	0.67
Creation of an emergent community with data showing there is adequate water to maintain wetland conditions 5 years out of every 10.	0.5
Creation of an aquatic bed, shrub, or forest community without adequate hydrologic data.	0.5
Creation of an emergent community without adequate hydrologic data.	0.4

The functions and values of the mitigation site are expected to increase with the development of the surrounding area. Once mining is complete the entire site will be redeveloped changing the Landscape Potential of the wetland. The following changes are anticipated.

D 2.1 and D 5.1 will change from 0 points to 1 point if stormwater from new roadways and development is introduced.

D 2.2 and D 5.2 will change from 0 points to 1 point if areas within 150 feet of the wetland (outside the buffer) are developed and generate pollutants.

H 1.2 will change from 2 points to 3 points if stormwater creates additional hyrdoperiods.

H 2.3 will change from -2 points to 0 points as land use intensity on the mine floor decreases from