Memo

To	Randel Perry, USACE, Seattle District, Regulatory	File no.:891-5-15338-B
From	Kristie Dunkin, Ph.D, PMP, AMEC Melinda Gray, M.S., AMEC	Cc:Skip Sahlin
Date	July 14, 2008	

Subject NWS-2008-00266-SO. Gateway Pacific Terminal; Wetland Boundary Jurisdictional Review. Addendum. Revisions following March 2008 Site Review.

BACKGROUND

On February 22, 2008, as part of the permitting process for the Gateway Pacific Terminal (GPT) Project, AMEC Earth & Environmental, Inc., (AMEC) submitted to you a Wetland Determination and Delineation Report (USACE Project No. NWS-2008-00266-SO).

On March 24 and 25, 2008, Kristie Dunkin (AMEC) and Melinda Gray (AMEC) accompanied you (USACE – Seattle District) and Matthew Bennett (USACE – Seattle District) on a review of the study area to review wetland jurisdiction, other potential waters of the U.S., and wetland boundary locations.

In an email to Kristie Dunkin on March 27, 2008, you requested that AMEC re-evaluate the presence of wetland conditions at specified locations and revise the wetland boundaries and report. The field notes recorded by yourself and Matt Bennett onto an AMEC base map (shown as Figure 1) identify the locations where additional investigations should be concentrated in regard to Wetlands 1, 2, 8A, and 9A. Attachment A is your March 27 email for reference and the results of our re-evaluation of the wetland conditions in response to each of the USACE comments (1 through 8).

METHODS

Comprehensive site investigations, similar to those described in the original wetland report submitted on February 22, 2008, were used to revisit areas the USACE suggested be re-evaluated. The fieldwork occurred on March 31 and April 15, 2008.

In brief, potential wetland areas were evaluated in the field using the comprehensive methods outlined in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997). According to these manuals, hydrophytic (wetland) vegetation and hydric (wetland) soils must be present along with wetland hydrologic conditions for a significant duration during the growing season for an area to be considered a wetland. Data used to evaluate these

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parameters were collected from plots representative of typical conditions in each wetland. Additional data collected in areas adjacent to wetlands were used to document upland conditions. In general, the site has facultative vegetation and hydric soil indicators present in upland areas. Specific wetland indicators in forested plant communities include species of hydrophytic vegetation such as *Carex obnupta* and *Lonicera involucrata.*

As you recommended during our site visit, wetland conditions were evaluated in mid-April in the seeded field east of Wetland 9A where vegetation was mowed by digging sample pits to a depth of 18 inches along a series of transects. The eastern boundary of Wetland 9A was defined as the area where the depth to free water in the sample pit was greater than 12 inches from the surface.

Boundaries, transect locations, and data plot locations were mapped using high-resolution GPS methods (0.5-foot accuracy).

RESULTS

Revisions made to wetland boundaries are presented on Figure 2.

Comment 1 (see Area 1 on Figure 2)

Regarding Wetland 9A and 9B, you stated that

> *"Wetland 9B appears to be contiguous to 9A as I observed saturated hydric soil conditions extending from 9B to 9A. The consultants need to take a closer look at this area and determine the exact configuration of the boundary between the two wetlands."*

Response

AMEC staff evaluated the area of interest and confirmed that Wetland 9A and 9B are connected by saturated areas with hydric soils. A revised boundary was identified and mapped (Figure 3). AMEC staff also investigated areas lying to the north, east, and west of the area originally delineated as Wetland 9B to ensure the wetland was not more expansive. The investigation confirmed that wetland conditions are not present beyond the northern boundary of Wetland 9B.

The revised wetland boundary (shown on Figure 3) that now connects Wetland 9A and 9B was identified by relying on wetland hydrology, vegetation, and soils. Wetland vegetation included the obligate wetland species slough sedge (*Carex obnupta*), as well as several facultative wetland species. Soils were saturated to the surface with water as deep as 7 inches in some places.

Comment 2 (see Area 2 on Figure 2)

Regarding Wetland 9A, you stated that

> *"Wetland 9A PEM in SE corner needs a closer inspection. The wetland boundary needs to be revised to extend south from the existing boundary where it occurs at a minor rise in topography. It appears the revised boundary may extend south to the road."*

Response

During the jurisdictional determination and boundary confirmation site visit in mid-March, standing water was observed in the area south of the existing boundary. In the follow-up fieldwork by AMEC staff (March 31), there was a small area of ponded water south of a small rise in topography, near the south end of the field. Upon digging several holes beyond the perimeter of the ponded water, additional wetland area was delineated (Wetland 9C), based primarily on the identification of hydrology and soils. Investigation of the area revealed that Wetland 9C is not hydrologically connected to the larger wetland (9A) to the north (shown in Figure 3). Wetland 9C is a Category IV wetland. The wetland rating is included with this addendum.

Comment 3 (see Area 3 on Figure 2)

Regarding Wetland 9A, you recommended that

> *"The pasture identified as upland located immediately east of 9A needs further assessment and review. It appears wetland mosaic conditions occur. I suggest the consultants establish 3 to 5 transects west to east from the identified wetland boundary to the treeline. Record if standing water occurs in the pit (and at what depth) and to what depth bgs saturation occurs. JUEF and CAOB are reliable indicator species for the wetlands I observed. Where wetland hydrology is present, and hydric soils occur, identify the area as wetland We may take a percentage based approach to the JD in this mosaic condition as wetlands appear to comprise a larger percentage of the area than upland."*

Response

Five east-west transects were laid from the tree line at the east end of the open field, to the identified eastern wetland boundary, as recommended. The primary wetland indicator used to identify the wetland boundary was hydrology. AMEC staff dug 16-inch deep sample pits approximately every 50 feet to evaluate the presence of wetland hydrology. Figure 5 shows the location of the sample pits as recorded by GPS. Table 1 provides the depth to standing water for these sample pits and the wetland determination.

Table 1 Wetland Hydrology Sample Pits (see Figure 5 for locations)

Sample Hole	Depth to Water (in.)	Determination
1	Greater than 16	Upland
2	12	Wetland
3	12	Wetland
4	11	Wetland
5	16	Upland
6	11	Wetland
7	14	Upland
8	11	Wetland
9	13	Upland
10	15	Upland
11	8	Wetland
12	9	Wetland
13	9.5	Wetland
14	10	Wetland
15	7	Wetland
16	15	Upland
17	14	Upland
18	13	Upland
19	14	Upland
20	13	Upland
21	12	Wetland
22	Greater than 16	Upland
23	14	Upland
24	14	Upland
25	14	Upland

Where the depth to free water in the pit was greater than 12 inches, and the soil was not saturated to the surface, the area was determined to be upland. The wetland boundary was revised to include an additional 3.43 acres in Wetland 9A.

Comment 4 (see Area 4 on Figure 2)

Regarding Wetland 2, you recommended that

> *"Wetland 2 tributary should be revised to a wetland swale that appears approximately 10-feet in width."*

Response

In the field, AMEC staff adjusted flags to indicate the area previously surveyed as a drainage was actually a wetland swale. Further investigation revealed the wetland area is slightly broader than the previously surveyed drainage. The identified boundary was mapped with GPS and is shown on Figure 4.

Comment 5 (see Area 5 on Figure 2)

You recommend the following for Wetland 2:

> *"The wetland boundary inspected in the southwest corner of Wetland 2 appears 20 to 40-feet low in some locations. The consultant should revisit the Wetland 2 boundary and revise boundaries accordingly."*

Response

As requested, AMEC staff adjusted the wetland boundary flagging in the southeast corner of Wetland 2 to include an additional 4.3 acres of wetland (shown on Figure 4). The wetland boundary was adjusted to include a small area that indicated wetland hydrology that is connected to the larger system. Vegetation in the area included the characteristic wetland species twinberry (*Lonicera Involucrata*) and the obligate species slough sedge (*Carex obnupta*). Soils were hydric.

Comment 6 (see Area 6 on Figure 2)

Regarding Wetland 8A, you stated:

> *"Wetland 8A southeast corner at unnamed tributary needs to be re-evaluated. The boundary appears to extend from the PFO possibly as far south as the unnamed tributary. Saturation and hydric soils with some presence of Lonicera involucrata are reliable conditions for wetland determination."*

Response

During the site visit on March 25, 2008, ponded water was observed in a thicket of Himalayan blackberry. Other wetland indicators suggesting the boundary may need to be re-evaluated in the southeast corner included the presence of obligate vegetation (*slough sedge*).

AMEC re-evaluated the area on March 31, 2008, and wetland boundaries were expanded so that the plant community dominated by obligate vegetation and areas with wetland hydrologic conditions and hydric soils were included within the wetland (shown in Figure 3).

The small area of ponded water previously observed within a thicket of Himalayan blackberry was no longer present and soils at this location were not hydric. The identified wetland boundary does not include the area of Himalayan blackberry and ponded water that had been observed during the March 25, 2008 site visit.

Comment 7 (see USACE Area 7 on Figure 2)

You addressed an area near Wetland 2, stating:

> *"…in the east side half-circle of upland. Wetland conditions occur in a mosaic pattern in this vicinity and may be more abundant in the northern half of the wetland. All wetlands should be identified paying particular attention to meandering saturated hydric soil connections to the primary wetland system."*

Response

During the March 25 site visit, you and AMEC staff observed obligate species and wetland hydrology in the northeastern portion of an area previously delineated as upland. As recommended, the eastern boundary of Wetland 2 that delineates the half circle of upland adjacent to Gulf Road was re-evaluated.

During the follow-up investigation conducted by AMEC staff on March 31, 2008, it was determined that much of what was previously determined to be upland is more characteristic of an upland/wetland mosaic, with wetland covering a slightly higher percentage of the area. AMEC staff re-evaluated conditions at the site on April 15, 2008. Based on the conditions observed during follow-up visits, the area was redelineated as shown in Figure 4. Ultimately, AMEC determined the conditions in the southeast corner of Wetland 2 that were previously delineated as wetland have predominantly upland conditions, while in the northeastern portion of Wetland 2, areas delineated as upland were determined to be an upland/wetland mosaic with greater than 50 percent wetland area.

Criteria for adjusting the wetland boundaries included indicators of wetland hydrology and wetland vegetation. The strongest wetland indicator species in the forested areas was twinberry (*Lonicera involucrata*). Other vegetation characteristic of the delineated wetland included red alder (*Alnus rubra)*, slough sedge (*Carex obnupta*), and prickly currant (*Ribes lacustre*). Vegetation characteristic of the upland area included red elderberry (*Sambucus racemosa)*, Indian plum (*Oemlaria cerasiformis)*, and oceanspray (*Holodiscus discolor*). Indicators of wetland hydrology, such as water-stained leaves and areas of ponding, were also useful in determining the wetland boundaries for this mosaic area.

Comment 8

You recommended that in regard to Wetland 1:

> *"…flagging conditions sequence was difficult to follow on site. Mosaic conditions may occur landward of delineated boundary. Reevaluate northwest corner of Wetland 1. Saturation and hydric soils with some presence of LOIN are reliable conditions for wetland determination."*

Response

AMEC staff re-evaluated this area on March 31, 2008 and April 15, 2008 by walking six north-south transects, comprehensively investigating the area in the northwest corner of Wetland 1. The dominant vegetation in this area included sword fern, Indian plum, and snowberry. The area in question is characterized by what appears to be scars from historical logging trails.

The less than 2-foot-wide linear features are the only portions of the area where wetland vegetation appears dominant. These areas are relatively small in relation to the landscape and are not hydrologically connected to the larger wetland system. They were delineated as an upland/wetland mosaic with upland as the dominant component throughout.

Additional Comments (see Figure 6)

You suggested on-site tributaries be identified as follows:

> *"Based on our site visit, we believe all of the features labeled "stream" and "drainage" (Whatcom Co. designations) as shown on the drawing labeled Figure B and dated February 2008 are tributaries to waters of the United States - the Strait of Georgia, a Traditional Navigable Water. Examples would be "persistent flow for 9 months out of the year from October through June", "Perennial" (year round flow), etc."*

Response

Streams and drainages were re-evaluated by AMEC staff to verify which streams and drainages would be characterized by persistent flow for 9 months out of the year, perennial, or year round flow. Figure 6, and the associated Table 2, summarizes the tributaries to waters of the United States at the GPT site and indicates the duration of flow. Table 3 provides a summary of wetland connectivity.

Table 2 Characteristics of On-site Wetlands and Distance to Nearest Traditional Navigable Water (TNW) and Relatively Permanent Water (RPW).

Distances between wetlands and tributaries were measured as the number of feet (ft.) or miles (mi.) the wetland was located upstream from the confluence with the nearest RPW tributary or TNW, based on observed and inferred drainage patterns.

Name of Drainage	General Location	Drainage Path to Strait of Georgia	Length (mi.)	Width (ft.)	Depth (ft.)	Class[1]	Adjacent Wetlands	Distance from RPW (mi.)	Distance from TNW (mi.)
Stream 1	Western portion of site	Strait of Georgia	1.25	various	various	RPW tributary	2, 3, 8A, 11A	N/A	0
Stream 2	Eastern portion of site	Strait of Georgia	0.96	various	various	RPW tributary	12, 13A, 13E	N/A	0
Stream 3	South side of Alder Grove Rd. and east of Gulf Rd.; north side of Alder Grove and west of Gulf Rd.	East of Gulf Rd: Stream 6 – Stream 4 – Stream 1 – Gulf of Georgia West of Gulf Rd: Wetland 1	1.3	3 to 5	2 to 3	RPW tributary	1,3	N/A	1.7
Stream 4	North side of Lonseth Rd.	Stream 1 – Straight of Georgia	1.7	3 to 5	2 to 3	RPW tributary	2, 3	N/A	0.9
Stream 5	North side of Henry Rd., west of the railroad tracks	Stream 1 – Strait of Georgia	1.8	3 to 5	2 to 3	RPW tributary	5A, 5C, 7A	N/A	0.4
Stream 6	East side of Gulf Rd.	North of Henry Rd: Stream 4 or 5 – Stream 1 – Gulf of Georgia. South of Henry Rd: Stream 2 – Strait of Georgia	1.4	3 to 5	2 to 3	RPW tributary	3, 6	N/A	0.1

Name of Drainage	General Location	Drainage Path to Strait of Georgia	Length (mi.)	Width (ft.)	Depth (ft.)	Class[1]	Adjacent Wetlands	Distance from RPW (mi.)	Distance from TNW (mi.)
Stream 7	West side of railroad berm	Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Strait of Georgia	0.2	No data	No data	RPW tributary	5A	N/A	2.3
Drainage 1	South side Lonseth Rd.	East of Gulf Rd: Stream 6 – Stream 5 – Stream 1 – Strait of Georgia West of Gulf Rd: Stream 1 – Strait of Georgia.	1.7	2 to 4	1 to 3	RPW tributary	5A, 6, 7A	N/A	0.9
Drainage 2	North side of Henry Rd, east of railroad tracks	Wetland 5A – Stream 5 – Stream 6 – Stream 1 – Strait of Georgia	0.2	2 to 4	1 to 3	Non-RPW tributary	4D, 4E	0.5	2.5
Drainage 3	South side of Henry Rd.	East of Gulf Rd: Stream 6- Stream 2 – Straight of Georgia West of Gulf Rd: Stream 1 – Straight of Georgia	1.2	2 to 5	1 to 3	RPW tributary	14	N/A	0.4
Drainage 4	South side of Henry Rd., west of Stream 1	Stream 1 – Straight of Georgia	0.8	2 to 5	1 to 3	RPW tributary	10A	N/A	0.4
Drainage 5	West side of Gulf Rd.	North of Henry Rd: Stream 4 or 5 – Stream 1 – Straight of Georgia	1.4	2 to 4	1 to 3	Non-RPW tributary	2, 7A,	0	0.1
Drainage 6	West side of Kickerville Rd.	Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia	0.5	1 to 3	1 to 2	Non-RPW tributary	4A, 4B, 4C	0	2.5

Name of Drainage	General Location	Drainage Path to Strait of Georgia	Length (mi.)	Width (ft.)	Depth (ft.)	Class[1]	Adjacent Wetlands	Distance from RPW (mi.)	Distance from TNW (mi.)
Drainage 7	North side of Henry Rd, west side of Stream 1	Stream 1 – Straight of Georgia	.54	3 to 5	2 to 3	RPW	9A	N/A	0.4
Drainage 8	South side of Lonseth, west side of Stream 1	Stream 1 – Straight of Georgia	.11	2 to 4	1 to 3	RPW	8B	N/A	0.9
Drainage 9	North side of Lonseth, west side of Stream 1	Stream 1 – Straight of Georgia	.11	2 to 4	1 to 3	RPW	2	N/A	0.9

[1] According to Rapanos Guidance

Table 3 Drainage Relationships of Wetlands

Distance to nearest Traditional Navigable Water (TNW) and Relatively Permanent Water (RPW) tributaries were measured as the number of feet (ft.) or miles (mi.) the wetland was located upstream from the confluence with the nearest RPW tributary or TNW based on observed and likely drainage patterns.

Wetland Name	Location	Size (acres)	Drainage Association/ Adjacency	Hydro-geomorphic Class	Distance from RPW	Distance from TNW	Wetland Drains to
1	Northwest corner of site	44.21	Abuts Stream 3	Depressional	0	0.9 mi.[1]	Infiltrates to groundwater south of Aldergrove Rd.
2	Northwest corner of site	53.28	Abuts Streams 1 and 4, Drainage 9 and 5	Slope	0	0.9 mi.	Drainage 5, Drainage 9, Stream 1 and Stream 4 – Stream 1 – Straight of Georgia
3	Northern portion of site	144.37	Abuts Streams 1, 3, 4, and 6	Slope	0	1.2 mi.	Streams 4 and 6 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia; Stream 3 and Stream 1 – Straight of Georgia
4A	Eastern portion of site	26.62	Abuts Drainage 6	Slope	0	2.3 mi.	Drainage 6 – Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia
4B	Eastern portion of site	4.36	Abuts Drainage 6	Depressional	800 ft.	2.5 mi.	Drainage 6 – Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia
4C	Eastern portion of site	0.15	Abuts Drainage 6	Depressional	0.4 mi.	2.7 mi.	Drainage 6 – Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia

Wetland Name	Location	Size (acres)	Drainage Association/ Adjacency	Hydro-geomorphic Class	Distance from RPW	Distance from TNW	Wetland Drains to
4D	Eastern portion of site	1.31	Adjacent to but not abutting Drainage 2	Slope	0.7 mi.	2.7 mi.	Infiltrates to groundwater
4E	Eastern portion of site	0.17	Adjacent to but not abutting Drainage 2	Depressional	0.6 mi.	2.6 mi.	Infiltrates to groundwater.
4F	Eastern portion of site	1.07	Isolated	Slope	0.3 mi.	2.6 mi.	Infiltrates to groundwater.
5A	Eastern portion of site	95.24 (on-site)	Abuts Drainage 1 and Stream 5 and 7	Slope	0	1.7 mi.	Stream 7 and Drainage 1 – Stream 6 – Stream 5 – Stream 1 – Straight of Georgia; Stream 5 – Stream 1 – Straight of Georgia
5B	Eastern portion of site	0.13	Isolated	Depressional	0.3 mi	2.0 mi.	Infiltrates to groundwater
5C	Eastern portion of site	0.22	Adjacent to but not abutting Stream 5	Slope	30 ft	1.9 mi.	Infiltrates to groundwater
6	Central portion of site	36.93	Abuts Stream 6 and Drainage 1	Slope	0	0.9 mi.	Drainage 1 and Stream 6 – Stream 5 – Stream 1 – Straight of Georgia
7A	Western portion of site	40.06	Abuts Stream 5, Drainage 1, and Drainage 5	Slope	0	0.5 mi.	Drainage 5 and Stream 5 – Stream 1 – Straight of Georgia
7B	Western portion of site	0.59	Isolated	Depressional	500 ft.	0.8 mi.	Infiltrates to groundwater
8A	Western portion of site	24.79	Abuts Stream 1	Slope	0	0.6 mi.	Stream 1 to Strait of Georgia
8B	Western portion of site	0.15	Abuts Drainage 8	Depressional	0	1.0 mi.	Drainage 8 – Stream 1 – Straight of Georgia

Wetland Name	Location	Size (acres)	Drainage Association/ Adjacency	Hydro-geomorphic Class	Distance from RPW	Distance from TNW	Wetland Drains to
9A	Western portion of site	28.24	Abuts Drainage 7	Slope	0	0.7 mi.	Drainage 7 – Stream 1 –Straight of Georgia
9C	Western portion of site	0.11	Adjacent to but not abutting Drainage 7	Depressional	50 ft	0.7 mi.	Infiltrates to groundwater
10A	Southwest corner of site	3.73	Abuts Drainage 4	Slope	0	0.6 mi.	Infiltrates to groundwater
10B	Southwest corner of site	0.04	Adjacent to but not abutting Drainage 7	Depressional	N.A.	450 ft.	Infiltrates to groundwater
11A	Southern portion of site	3.54	Abuts Stream 1	Riverine	0	450 ft.	Stream 1, to Straight of Georgia
11B	Southern portion of site	0.003	Adjacent to but not abutting the Strait of Georgia	Depressional	250 ft.	550 ft.	Infiltrates to groundwater
12	Southern portion of site	11.17	Abuts Stream 2 and Strait of Georgia	Depressional	N.A.	0	Stream 2 – Strait of Georgia and Straight of Georgia
13A	Southern portion of site	5.50	Abuts Stream 2	Riverine	0	0.4	Stream 2 – Strait of Georgia
13C	Southern portion of site	0.02	Adjacent to Stream 2	Depressional	125 ft.	0.4 mi.	Infiltrates to groundwater
13D	Southern portion of site	0.37	Isolated	Slope	200 ft.	0.4 mi.	Infiltrates to groundwater
13E	Southern portion of site	0.06	Abuts Stream 2	Riverine	0	0.4 mi.	Stream 2 – Straight of Georgia
13F	Southern portion of site	0.62	Abuts Straight of Georgia	Depressional	N.A.	0	Straight of Georgia

Wetland Name	Location	Size (acres)	Drainage Association/ Adjacency	Hydro-geomorphic Class	Distance from RPW	Distance from TNW	Wetland Drains to
13G	Southern portion of site	0.37	Abuts Straight of Georgia	Depressional	N.A.	140 ft.	Straight of Georgia
14	Southwest portion of site	0.67	Abuts Drainage 3	Depressional	0	0.5 mi.	Drainage 3 – Stream 1– Straight of Georgia