

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>N/A</u>	-	-	-	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>75</u> (A/B)
2.				
3.				
4.				
Total Cover: <u>N/A</u> 50% of total cover: _____ 20% of total cover: _____				
VEGETATION (use scientific names of plants)				
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Picea glauca</u>	3	Y	FACU	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>79</u> X 1 = <u>79</u> FACW species: <u>4</u> X 2 = <u>8</u> FAC species: <u>13</u> X 3 = <u>39</u> FACU species: <u>3</u> X 4 = <u>12</u> UPL species: _____ X 5 = _____ Column Totals: <u>99</u> (A) <u>138</u> (B) PI = B/A = <u>1.39</u>
2. <u>Dasiphora fruticosa</u>	5	Y	FAC	
3. <u>Betula nana</u>	3	Y	FAC	
4. <u>Vaccinium oxycoccos</u>	1		OBL	
5. <u>Andromeda polifolia</u>	2		FACW	
6. <u>Vaccinium uliginosum</u>	2		FAC	
7. <u>Unknown shrub</u>	T		Assume FAC	
8.				
9.				
Total Cover: <u>16</u> 50% of total cover: <u>8</u> 20% of total cover: <u>3.2</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Drosera rotundifolia</u>	1		OBL	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <u>Comarum palustre</u>	5		OBL	
3. <u>Viola palustris</u>	1		FACW	
4. <u>Menyanthes trifidata</u>	5		OBL	
5. <u>Carex microchaeta</u>	3		FAC	
6. <u>Plantanthera dilatata</u>	1		FACW	
7. <u>Eriophorum scheuchzeri</u>	T		OBL	
8. <u>Beckmannia syzigachne</u>	45	Y	OBL	
9. <u>Carex maritima</u>	10		OBL	
10. <u>Eleocharis palustris</u>	10		OBL	
Total Cover: <u>83</u> 50% of total cover: <u>41.5</u> 20% of total cover: <u>16.6</u>				_____ % Bare Ground _____ % Cover of Wetland Bryophytes <u>15%</u> Total Cover of Bryophytes <u>60</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
<u>Eleocharis acicularis</u>	2		OBL	

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>6/29/14</u> Feature ID <u>WG1HT008</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>0-16"</u>							<u>Hemic</u>	<u>Saturated</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: _____								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>Y</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>	
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) <u>Y</u>	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>6"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0"</u>			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>			
Notes: _____				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input checked="" type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>3</u> Tall shrub (2-6m) <input checked="" type="checkbox"/> Short shrub (0.5-2m) <u>10</u> Dwarf shrub (<0.5m) <u>3</u> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <u>63</u> Moss-Lichen <u>15</u> Floating <input checked="" type="checkbox"/> Submerged <input checked="" type="checkbox"/>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven <input checked="" type="checkbox"/> Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet <input checked="" type="checkbox"/>	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.03</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W614T008 Field Target: 081 Date: 0/29/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 6/29/14
Signature / Date

X Kim DeGroot
Field Crew Chief (print)

X [Signature] 6/29/14
Signature / Date

WETLAND DETERMINATION DATA FORM

2000 A 1-14-14

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 082	Map #: 54130 Map Date: 5/21/14
Date: 6/29/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W61HT009
Investigators: K DEGUTIS J ANDERSON A Fisher			Team No.: W61
State: Alaska	Region: Alaska	Milepost: 590.13	
Latitude: 63° 09' 26.13	Longitude: 149° 24' 41.09	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 12	Picture No.: P_W61HT009_P1; Plug; W; E	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): convex
Slope (%): 2	Local relief (concave, convex, none): flat
Pre-mapped Alaska LNG/NWI classification: PUB/ABH	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PUB/ABH
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): BDI ^{JA} III D 1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 12
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>N/A</u>			
2.			
3.			
4.			
Total Cover: <u>N/A</u> 50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Dasiphora fruticosa</u>	<u>3</u>		<u>Fac</u>
2. <u>Vaccinium Vliginosum</u>	<u>2</u>		<u>Fac</u>
3. <u>Betula nana</u>	<u>10</u>	<u>Y</u>	<u>Fac</u>
4. <u>Andromeda Polifolia</u>	<u>2</u>		<u>FacW</u>
5. <u>Vaccinium Oxycoccus</u>	<u>1</u>		<u>obl</u>
6.			
7.			
8.			
9.			
Total Cover: <u>18</u> 50% of total cover: <u>9%</u> 20% of total cover: <u>3.6%</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 0 x 1 = 0
 FACW species: 0.5 x 2 = 1.0
 FAC species: 0.25 x 3 = 0.75
 FACU species: - x 4 = -
 UPL species: - x 5 = -
 Column Totals: 62 (A) 117 (B)
 PI = B/A = 1.8

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Meyanthes trifoliata</u>	<u>2</u>		<u>obl</u>
2. <u>Cyperus palustris</u>	<u>5</u>		<u>obl</u>
3. <u>Drosera rotundifolia</u>	<u>2</u>		<u>obl</u>
4. <u>Eleocharis Palustris</u>	<u>10.7</u>	<u>Y</u>	<u>obl</u>
5. <u>Beckmannia sizigachne</u>	<u>15.10</u>	<u>Y</u>	<u>obl</u>
6. <u>Carex microchaeta</u>	<u>10.</u>	<u>Y</u>	<u>Fac</u>
7. <u>Viola Palustris</u>	<u>3</u>		<u>FacW</u>
8. <u>Carex magellanica</u>	<u>5</u>		<u>Obl</u>
9. <u>Carex spp.</u>	<u>1</u>		<u>assume fac</u>
10.			
Total Cover: <u>44</u> 50% of total cover: <u>22%</u> 20% of total cover: <u>8.8%</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
0 % Cover of Wetland Bryophytes
10 Total Cover of Bryophytes
70 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 6/29/14 Feature ID WG1HT009 Soil Pit Required (Y/N) N

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: No pit dug due to presence of water assume A1 indicator
No restrictive layer found

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u>X</u>	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>6ft</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0"</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0"</u>	

Notes: _____

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation-Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed <input checked="" type="checkbox"/>		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>15</u> Dwarf shrub (<0.5m) <u>3</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>44</u> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>2</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover <input checked="" type="checkbox"/> 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs <input checked="" type="checkbox"/> Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.03</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

[Handwritten Signature]

GPS Technician QA/QC check:

[Handwritten Signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W01HT00^a Field Target: 002 Date: 6/25/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson
Signature / Date

X Kim DeGoutis
Field Crew Chief (print)

X [Signature] 6/29/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: <u>055</u>	Map #: <u>35</u> ¹¹³⁰ Map Date: <u>5/27/14</u>	
Date: <u>6/30/14</u>	Project Name & No.: Alaska LNG 26221306	Feature Id: <u>W61HT010</u>	
Investigators: <u>K DEGOUTIS J Anderson A Fisher</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>528.67</u>	
Latitude: <u>63° 49' 09.16"</u>	Longitude: <u>148° 59' 28.68"</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>14</u>	Picture No.: <u>P-W61HT010-At; Plug: S; W</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FIAL</u>
Slope (%): <u>3</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSSI/EMIB</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PSSI/EMIB</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): <u>II C1, II A2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 14
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	2%		FACU
2.			
3.			
4.			
Total Cover: <u>2%</u>			
50% of total cover: <u>—</u> 20% of total cover: <u>—</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	8		FACU
2. <i>Desiphora fruticosa</i>	8		FAC
3. <i>Betula glandulosa</i>	35	Y	FAC
4. <i>Salix alexensis</i>	25	Y	FAC
5. <i>Salix reticulata</i>	25	Y	FAC
6. <i>Vaccinium vitis-idaea</i>	5		FAC
7. <i>Dryas integrifolia</i>	5		FACU
8. <i>Alnus tenuifolia</i>	10		FAC
9. <i>Vaccinium uliginosum</i>	5		FAC
Total Cover: <u>132</u>			
50% of total cover: <u>66</u> 20% of total cover: <u>26.4</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 45 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: — X 1 = —
 FACW species: 35 X 2 = 70
 FAC species: 118 X 3 = 354
 FACU species: 15 X 4 = 60
 UPL species: _____ X 5 = _____
 Column Totals: 168 (A) 484 (B)
 PI = B/A = 2.8

Salix myrtillofolia 2% FACW
Rhododendron tomentosum 1% FACW
Salix barclayi 1% FAC

Tree stratum added to shrub stratum since there was < 5% cover.

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rubus chamaemorus</i>	12	Y	FACW
2. <i>Calamagrostis canadensis</i>	2		FAC
3. <i>Equisetum arvense</i>	1		FAC
4. <i>Stellaria longipes</i>	T		—
5. <i>Equisetum sylvaticum</i>	T		—
6. <i>Petasites frigidus</i>	T		—
7. <i>Agrostis gigantea</i>	1		FAC
8. <i>Carex membranacea</i>	20	Y	FACW
9.			
10.			
Total Cover: <u>36</u>			
50% of total cover: <u>18</u> 20% of total cover: <u>7.2</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

2 % Bare Ground
— % Cover of Wetland Bryophytes
20 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>6/30/14</u> Feature ID <u>W6LHT010</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7"							Fibric	organic / sst. Saturated
7-11"	10 YR 2/2	90	10 YR 4/4	10			hemic/silt loam	Saturated
11"	Frozen							
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) <u>X</u>			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Frozen</u> Depth (inches): <u>11"</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>7 1/2"</u>		
Saturation Present (Y/N) (includes capillary fringe) <u>Y</u>	Depth (in): <u>?</u>		
Notes:			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>X</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>2</u> Sapling (<5 dbh, <6m tall) <u>8</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>102</u> Dwarf shrub (<0.5m) <u>30</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>36</u> Moss-Lichen <u>20</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <u>X</u> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <u>X</u> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <u>X</u>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <u>X</u> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>X</u>		
HGM Class (P): Slope _____ Flat <u>X</u> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty <u>X</u> Mineral: Clayey _____	

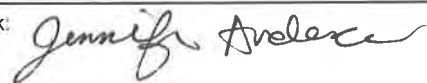
HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <u>X</u> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>X</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <u>X</u>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <u>X</u>	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown <u>X</u>	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <u>X</u> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <u>X</u> Large (>100 acres) _____	

Crew Chief QA/QC check:



GPS Technician QA/QC check:



Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT010

Field Target: 055

Date: 6/30/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 6/30/14
Signature / Date

X Kim DEGOUTIS
Field Crew Chief (print)

X [Signature] 6/30/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 054	Map #: 35/130 Map Date: 5/27/14
Date: 6/30/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W61HT011
Investigators: E DeGoutis J Anderson A Fisher			Team No.: W61
State: Alaska	Region: Alaska	Milepost: 528.65	
Latitude: 63° 49' 11.34		Longitude: 148° 59' 32.29	Datum: WGS84
Logbook No.: W61-2	Logbook Page No.: 14	Picture No.: P.W61H011-Dt; Plug: SW; SE	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 4	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PSS1/EM1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1 A / EM1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIC1, IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 14
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	3		FACU
2.			
3.			
4.			
Total Cover: <u>3</u>			
50% of total cover: <u>—</u> 20% of total cover: <u>—</u>			
Sapling/Shrub Stratum ()	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	5		FACU
2. <i>Betula glandulosa</i>	35	Y	FAC
3. <i>Salix pulchra</i>	5		FACW
4. <i>Salix alexensis</i>	15	Y	FAC
5. <i>Salix pseudomonticola</i>	2		FAC
6. <i>Vaccinium vitis-idaea</i>	8		FAC
7. <i>Dasiphora fruticosa</i>	3		FAC
8. <i>Alnus tenuifolia</i>	15	Y	FAC
9. <i>Vaccinium uliginosum</i>	5		FAC
Total Cover: <u>105</u>			
50% of total cover: <u>52.5</u> 20% of total cover: <u>21</u>			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

% Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species: _____ X 1 = _____

FACW species: 14 X 2 = 28

FAC species: 98 X 3 = 294

FACU species: 9 X 4 = 36

UPL species: _____ X 5 = _____

Column Totals: 121 (A) 358 (B)

PI = B/A = 2.9

Salix alboscutoides 2 FACW

Salix reticulata 5 FAC

Salix lasioandra 2 FACW

Tree stratum added to shrub stratum since there was < 5% cover.

VEGETATION (use scientific names of plants)			
Herb Stratum ()	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Chamaecrista angustifolia</i>	1		FACU
2. <i>Rubus chamaemorus</i>	5	Y	FACW
3. <i>Equisetum arvense</i>	1		FAC
4. <i>Stellaria longipes</i>	T		FAC
5. <i>Carex</i> sp. (No inflor.)	8	Y	Assume FAC
6. <i>Pedicularis labradorica</i>	T		FACW
7. <i>Calamagrostis canadensis</i>	1		FAC
8. <i>Peltandra frigidus</i>	T		FACW
9.			
10.			
Total Cover: <u>10</u>			
50% of total cover: <u>8</u> 20% of total cover: <u>3.2</u>			

Hydrophytic Vegetation Indicators:

Dominance Test is > 50%

Prevalence Index is ≤ 3.0

_____ Morphological Adaptations¹ (Provide supporting data in Notes)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground

_____ % Cover of Wetland Bryophytes

20 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>6/30/10</u> Feature ID <u>W61HT010</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	—		—				Fibric	Dry Organics
3-9"	—		—				Fibric	Saturated Organics
9"								Frozen
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Frozen</u> Depth (inches): <u>9"</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in):	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in):			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>3"</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>3</u> Sapling (<5 dbh, <6m tall) <u>5</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>82</u> Dwarf shrub (<0.5m) <u>23</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>16</u> Moss-Lichen <u>20</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>1</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) <input checked="" type="checkbox"/>			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown <input checked="" type="checkbox"/>	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

[Signature]

GPS Technician QA/QC check:

Jonny Anderson

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT011 Field Target: 054 Date: 6/30/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 6/30/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X [Signature] 6/30/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 056	Map #: 36 Map Date: 5/27/14
Date: 6/30/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W61HT012
Investigators: K Degutis, J Anderson, A Fisher			Team No.: W61
State: Alaska	Region: Alaska	Milepost: 529.7	
Latitude: 63° 48' 35.43"		Longitude: 148° 58' 01.38"	Datum: WGS84
Logbook No.: W61-2	Logbook Page No.: 16	Picture No.: P-W61HT012-pt, plug, SW, NW	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Flat
Slope (%): 3%	Local relief (concave, convex, none): Convex
Pre-mapped Alaska LNG/NWI classification: P551/EM1B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: P551/EM1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): II C 1, III A 2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 16
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26 ft</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				
2.				
3.				
4.				
Total Cover: <u> </u> 50% of total cover: <u> </u> 20% of total cover: <u> </u>				Prevalence Index worksheet: Total % Cover of: <u> </u> Multiply by: <u> </u> OBL species: <u> </u> X 1 = <u> </u> FACW species: <u>33</u> X 2 = <u>66</u> FAC species: <u>84</u> X 3 = <u>252</u> FACU species: <u>3</u> X 4 = <u>12</u> UPL species: <u> </u> X 5 = <u> </u> Column Totals: <u>120</u> (A) <u>330</u> (B) PI = B/A = <u>2.75</u> salix glauca 2 Fac
Sapling/Shrub Stratum (<u>26 ft</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Picea glauca</u>	<u>3</u>		<u>FacU</u>	
2. <u>Salix glauca</u>	<u>12</u>	<u>Y</u>	<u>Fac</u>	
3. <u>Betula glandulosa</u>	<u>40</u>	<u>Y</u>	<u>Fac</u>	
4. <u>Salix pulchra</u>	<u>5</u>		<u>FacW</u>	
5. <u>Dasiphora fruticosa</u>	<u>3</u>		<u>Fac</u>	
6. <u>Vaccinium uliginosum</u>	<u>10</u>		<u>Fac</u>	
7. <u>Salix reticulata</u>	<u>8</u>		<u>Fac</u>	
8. <u>Alnus tenuifolia</u>	<u>5</u>		<u>Fac</u>	
9. <u>Salix barclayi</u>	<u>1</u>		<u>Fac</u>	
Total Cover: <u>89</u> 50% of total cover: <u>44.5</u> 20% of total cover: <u>17.8</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26 ft</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <u>Equisetum arvense</u>	<u>1</u>		<u>Fac</u>	
2. <u>Juncus giganteus</u>	<u>1</u>		<u>Fac</u>	
3. <u>Petasites frigidus</u>	<u>3</u>		<u>FacW</u>	
4. <u>Carex sp. (no inflorescence)</u>	<u> </u>		<u>Assume Fac</u>	
5. <u>Calamagrostis canadensis</u>	<u>2</u>		<u>Fac</u>	
6. <u>Carex membranacea</u>	<u>25</u>	<u>Y</u>	<u>FacW</u>	
7.				
8.				
9.				
10.				
Total Cover: <u>31</u> 50% of total cover: <u>15.5</u> 20% of total cover: <u>6.2</u>				_____ % Bare Ground _____ % Cover of Wetland Bryophytes <u>5%</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>6/30/14</u> Feature ID <u>W101HT012</u>		Soil Pit Required (Y/N) <u>Y</u>			
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹		
<u>0-5"</u>						<u>hemic.</u>	<u>Saturated</u>
<u>5-7"</u>	<u>10YR 4/1</u>	<u>80</u>	<u>7.5YR 4/6</u>	<u>20</u>		<u>sandy/loam</u>	<u>saturated</u>
<u>7"</u>							<u>Frozen</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
HYDRIC SOIL INDICATORS			INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³				
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____		Alaska Color Change (TA4) ⁴ _____				
Histic Epipedon (A2) <u>X</u>	Alaska Redox (A14) _____		Alaska Alpine Swales (TA5) <u>X</u>				
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____		Alaska Redox with 2.5Y Hue _____				
Hydrogen Sulfide (A4) _____			Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____				
Thick Dark Surface (A12) _____			Other (Explain in Notes) _____				
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.							
Restrictive Layer (if present): Type: <u>Frozen</u> Depth (inches): <u>7"</u>							
Hydric Soil Present (Y/N): <u>Y</u>							
Notes:							

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>φ</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>6"</u>		
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>		
Notes:			

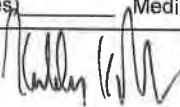
WETLAND DETERMINATION DATA FORM

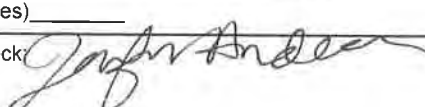
VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>3</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>81</u> Dwarf shrub (<0.5m) <u>8</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>31</u> Moss-Lichen <u>5</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty <input checked="" type="checkbox"/> Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check: 

GPS Technician QA/QC check: 

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: JG11HT012 Field Target: 056 Date: 6/30/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 6/30/14
Signature / Date

X Kim DEGUAS
Field Crew Chief (print)

X [Signature] 6/30/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>	Field Target: <u>083</u>	Map #: <u>05</u> Map Date: <u>5/27</u>	
Date: <u>7/1/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W61HT013</u>	
Investigators: <u>K Deaytis, J Anderson, A Fisher</u>			Team No.: <u>W61</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>59.5</u>	
Latitude: <u>63° 08' 32.36"</u>	Longitude: <u>149° 25' 17.00"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>18</u>	Picture No.: <u>P_W61HT013-PR; Plus; NW; NE</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>slope</u>
Slope (%): <u>4</u>	Local relief (concave, convex, none): <u>none</u>
Pre-mapped Alaska LNG/NWI classification: <u>upland</u>	Soil Map Unit Name: <u>—</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Wetland Type: <u>Upland</u>
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>IA2, IB2, IC1</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 18 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Picea glauca</i>	20	Y	FaeU	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>67</u> (A/B)
2.				
3.				
4.				
Total Cover: <u>20</u>				
50% of total cover: _____		20% of total cover: _____		Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: _____ X 1 = _____ FACW species: _____ X 2 = _____ FAC species: <u>97</u> X 3 = <u>291</u> FACU species: <u>73</u> X 4 = <u>292</u> UPL species: _____ X 5 = _____ Column Totals: <u>170</u> (A) <u>583</u> (B) PI = B/A = <u>3.4</u>
Sapling/Shrub Stratum (_____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Picea glauca</i>	5		FaeU	
2. <i>Betula glandulosa</i>	25	Y	Fae	
3. <i>Vaccinium uliginosum</i>	35	Y	Fae	
4. <i>Spiraea stevenii</i>	20		FaeU	
5. <i>Linnaea borealis</i>	15		FaeU	
6. <i>Empetrum nigrum</i>	15		Fae	
7.				
8.				
9.				
Total Cover: <u>115</u>				
50% of total cover: <u>57.5</u>		20% of total cover: <u>23</u>		

VEGETATION (use scientific names of plants)				
Herb Stratum (_____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Chamaenerion angustifolium</i>	3		FaeU	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Notes) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <i>Rubus arcticus</i>	2		Fae	
3. <i>Cornus canadensis</i>	10	Y	FaeU	
4. <i>Athyrium cyclosporum</i>	8	Y	Fae	
5. <i>Calla macrostis canadensis</i>	10	Y	Fae	
6. <i>Aconogonon alaskanum</i>	2		Fae	
7. <i>Carex sp.</i>	T		Assume Fae	
8.				
9.				
10.				
Total Cover: <u>55</u>				% Bare Ground: <u>0</u> % Cover of Wetland Bryophytes: _____ Total Cover of Bryophytes: <u>30%</u> % Cover of Water: _____
50% of total cover: <u>17.5</u>		20% of total cover: <u>7</u>		
Total Cover: _____				Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/1/14</u> Feature ID <u>W44HFA13</u>		Soil Pit Required (Y/N) <u>Y</u>			
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹		
0-4"							Fabric dry
4-9	10YR 3/1	60	7.5YR 3/3.4		C	M	Silt-loom
9-13	2.5Y 5/3	70	7.5YR 4/2	30	C	M	Fine sandy loam 30% Cobble Redox not distinct or prominent

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³	
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____	

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: No Depth (inches): _____

Hydric Soil Present (Y/N): N

Notes: _____

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>✓</u>
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>N</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): _____	
Saturation Present (Y/N): <u>N</u> (includes capillary fringe)	Depth (in): _____	

Notes: Sample plot at toe of slope

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____			
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check:

[Handwritten Signature]

GPS Technician QA/QC check:

Jennifer Anderson 7/1/14

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT013

Field Target: 083

Date: 7/1/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/1/14
Signature / Date

X Kim Deering
Field Crew Chief (print)

X [Signature] 7/1/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 024	Map #: 90/130 Map Date: 5/21/14	
Date: 7/1/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61 HTO 14	
Investigators: K. DEWITT J. Anderson A. Fowler			Team No.: W61-1
State: Alaska	Region: Alaska	Milepost: 592.6	
Latitude: 63° 07' 58.07"	Longitude: 149° 26' 56.74"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 16	Picture No.: P-W61H014-Pit; Plug; E; SW.	

SITE PARAMETERS	
Subregion: Interior / South Central	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 1	Local relief (concave, convex, none): Convex
Pre-mapped Alaska LNG/NWI classification: PFOIC	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation _____, Soil <input checked="" type="checkbox"/> , or Hydrology _____ Naturally Problematic? No <input checked="" type="checkbox"/> (If yes, explain in Notes.)	

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: UPLAND
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): IA2, IIB2, IIC1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Soils naturally problematic, glacial till material.

See logbook W61-2, page 16

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Populus balsamifera</i>	10	Y	Faell
2. <i>Picea glauca</i>	35	Y	Faell
3.			
4.			
Total Cover: <u>45</u> 50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Linnaea borealis</i>	25	Y	FACU
2. <i>Shepherdia canadensis</i>	20	Y	FACW
3. <i>Ribes glandulosum</i>	10		FACW
4. <i>Ribes hudsonianum</i>	15		FAC
5. <i>Salix pseudomonticola</i>	5		FAC
6. <i>Alnus tenuifolia</i>	8		Fae
7.			
8.			
9.			
Total Cover: <u>83</u> 50% of total cover: <u>41.5</u> 20% of total cover: <u>16.6</u>			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

% Dominant Species that are OBL, FACW, or FAC: 28.5 (A/B) 25%

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____

OBL species: — X 1 = —

FACW species: 3 X 2 = 6

FAC species: 53 X 3 = 159

FACU species: 16 X 4 = 64

UPL species: — X 5 = —

Column Totals: 172 (A) 629 (B)

PI = B/A = 3.66

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Chamaecrista alleghaniensis</i>	35	Y	FACU
2. <i>Cornus canadensis</i>	5	Y	FACU
3. <i>Calamagrostis canadensis</i>	20	Y	FAC
4. <i>Equisetum pratense</i>	3		FACW
5. <i>Rubus arcticus</i>	5	Y	FAC
6. <i>Mertensia paniculata</i>	3		FACU
7. <i>Pyrola asarifolia</i>	2		FACU
8. <i>Gymnocarpium dryopteris</i>	7		FACU
9. <i>Galium boreale</i>	1		FACU
10.			
Total Cover: <u>44</u> 50% of total cover: <u>22</u> 20% of total cover: <u>8.8</u>			

Hydrophytic Vegetation Indicators:

Dominance Test is > 50%

Prevalence Index is ≤ 3.0

Morphological Adaptations¹ (Provide supporting data in Notes)

Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground

0 % Cover of Wetland Bryophytes

40% Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL	Date <u>7/1/14</u>	Feature ID <u>W0114014</u>	Soil Pit Required (Y/N) <u>Y</u>					
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1							Fibric	Drn
1-14"	Gtan + 25/104	50	10Y 2.5/1				Sandy loam	Rock/cobble/ gravel 35%
	Gtan 3/14	50						
	N 3/							

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: No Depth (inches): _____

Hydric Soil Present (Y/N): N

Notes: Naturally problematic conditions - due to existence of glacial tills masking

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>4</u>	Wetland Hydrology Present (Y/N): <u>N</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>0</u>	
Saturation Present (Y/N): <u>N</u> (includes capillary fringe)	Depth (in): <u>1</u>	
Notes: _____		

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ 75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (<25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvial Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT014 Field Target: 084 Date: 7/1/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/1/14
Signature / Date

X Kim DeGuis
Field Crew Chief (print)

X [Signature] 7/1/14
Signature / Date

WETLAND DETERMINATION DATA FORM

300 ft corridor

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>	Field Target <u>005</u>	Map #: <u>57130</u>	Map Date: <u>5/27/14</u>
Date: <u>7/1/14</u>	Project Name & No.: Alaska LNG 26221306	Feature Id: <u>W61HT015</u>	
Investigators: <u>K DeLoris J Andersen A Fisher</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>594.1</u>	
Latitude: <u>63° 06' 57.56"</u>	Longitude: <u>149° 28' 17.67"</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>20</u>	Picture No.: <u>P-W61HT015-Pit, Plug, NE, W</u>	

SITE PARAMETERS	
Subregion: <u>Interior/Southcentral</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FAT</u>
Slope (%): <u>2</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>DEM B</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic? No <input checked="" type="checkbox"/> (If yes, explain in Notes.)	

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Wetland Type: <u>UPLAND</u>
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>III A1</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 20
for site sketch &
notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>240'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: _____ X 1 = _____ FACW species: _____ X 2 = _____ FAC species: <u>102</u> X 3 = <u>306</u> FACU species: <u>52</u> X 4 = <u>208</u> UPL species: _____ X 5 = _____ Column Totals: <u>154</u> (A) <u>514</u> (B) PI = B/A = <u>3.3</u>
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (<u>240'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>N/A</u>				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				

VEGETATION (use scientific names of plants)				
Herb Stratum (_____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Notes) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Colantheopsis canadensis</u>	<u>86</u>	<u>Y</u>	<u>FAC</u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <u>Chamaecrista angustifolia</u>	<u>20</u>		<u>FACU</u>	
3. <u>Mentzelia paniculata</u>	<u>12</u>		<u>FACU</u>	
4. <u>Aconitum delphinifolium</u>	<u>5</u>		<u>FAC</u>	
5. <u>Hieracium maximum</u>	<u>20</u>		<u>FACU</u>	
6. <u>Polemonium acutellum</u>	<u>10</u>		<u>FAC</u>	
7. <u>Athyrium cycloporum</u>	<u>2</u>		<u>FAC</u>	
8.				
9.				
10.				
Total Cover: <u>154</u> 50% of total cover: <u>77</u> 20% of total cover: <u>30.6</u>				<input type="checkbox"/> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input type="checkbox"/> Total Cover of Bryophytes <input type="checkbox"/> % Cover of Water <u>Y</u> Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/1/14</u>	Feature ID <u>WHT015</u>	Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"	10YR 3/2	100					Silt/loam	St. JA
3"-18"	2.5Y 4/3	95	10YR 5/6	5	C	M	Silt-loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>1</u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>1</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u>1</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol: Fibric _____ Histosol: Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]* 7/17/24

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT 015

Field Target: 085

Date: 085 7/1/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/1/14
Signature / Date

X Kim DEGRIS
Field Crew Chief (print)

X [Signature] 7/1/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/> <i>outside 2000 condition</i>	Field Target: 115	Map #: 82/130	Map Date: 6/27/14
Date: 7/2/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT016	
Investigators: K. DEBOVIS J. Anderson		Team No.: W61	
State: Alaska	Region: Alaska	Milepost: 645.35	
Latitude: 62° 33' 55.12	Longitude: 150° 15' 34.19	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 22	Picture No.: P-W61HT016-Pit; Plug; W; SE	

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 2	Local relief (concave, convex, none): Concave
Pre-mapped Alaska LNG/NWI classification: UPLAND	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation, Soil, or Hydrology Naturally Problematic? No <input checked="" type="checkbox"/> (If yes, explain in Notes.)	
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Wetland Type: Upland
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): TIIA1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

• Note polygon shape for sample plot altered only to include open grassed area & not adjacent shrubs/treed areas.

See logbook W61-2, page 22 for notes & site sketch

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: _____ X 1 = _____ FACW species: _____ X 2 = _____ FAC species: <u>110</u> X 3 = <u>330</u> FACU species: <u>8</u> X 4 = <u>32</u> UPL species: _____ X 5 = _____ Column Totals: <u>118</u> (A) <u>362</u> (B) PI = B/A = <u>3.06</u>
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				
Sapling/Shrub Stratum (<u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>N/A</u>				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Notes) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Colanagrostis canadensis</u>	<u>90</u>	<u>Y</u>	<u>FAC</u>	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
2. <u>Chamaenerion angustifolium</u>	<u>5</u>		<u>FACU</u>	
3. <u>Epizetum sylvaticum</u>	<u>10</u>		<u>FAC</u>	
4. <u>Polygonum acetiflorum</u>	<u>10</u>		<u>FAC</u>	
5. <u>Geranium linidum</u>	<u>T</u>		<u>FACU</u>	
6. <u>Gymnocarpium dryopteris</u>	<u>3</u>		<u>FACU</u>	
7.				<input type="checkbox"/> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input type="checkbox"/> Total Cover of Bryophytes <input type="checkbox"/> % Cover of Water
8.				
9.				
10.				
Total Cover: <u>118</u> 50% of total cover: <u>59</u> 20% of total cover: <u>236</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/2/14</u>	Feature ID <u>D61H2016</u>	Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"							Fibric	Dry
1-9"	2.5Y 4/1	80	10YR 5/6	20	C	M	Fine sandy loam	10am
9-19"	10YR 5/6	100					Fine Sandy loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS				INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³				
Histosol or Histel (A1) _____		Alaska Gleyed (A13) _____		Alaska Color Change (TA4) ⁴ _____				
Histic Epipedon (A2) _____		Alaska Redox (A14) _____		Alaska Alpine Swales (TA5) _____				
Black Histic (A3) _____		Alaska Gleyed Pores (A15) _____		Alaska Redox with 2.5Y Hue _____				
Hydrogen Sulfide (A4) _____				Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____				
Thick Dark Surface (A12) _____				Other (Explain in Notes) _____				
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u> </u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u> </u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fabric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____			
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61 HTO16 Field Target: 115 Date: 7/2/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/2/14
Signature / Date

X Kim DEGOTTIS
Field Crew Chief (print)

X Kelly [Signature] 7/2/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <i>p</i>	Field Target: <i>114</i>
Date: <i>7/2/14</i>	Project Name & No.: Alaska LNG 26221306	Feature Id: <i>W61HT017</i>	Map #: <i>82/130</i> Map Date: <i>6/27/14</i>
Investigators: <i>L DEBUTIS J Anderson</i>	State: Alaska		Team No.: <i>W61</i>
Region: Alaska	Milepost: <i>645.3</i>	Datum: WGS84	
Latitude: <i>62°33'57.16</i>	Longitude: <i>150°15'48.13</i>	Logbook No.: <i>W61-2</i>	
Logbook Page No.: <i>23</i>	Picture No.: <i>P-W61HT017-Pit; Plug; E; S</i>		

SITE PARAMETERS	
Subregion: <i>Southcentral</i>	Landform (hillslope, terrace, hummocks, etc.): <i>Flat</i>
Slope (%): <i>1</i>	Local relief (concave, convex, none): <i>Concave</i>
Pre-mapped Alaska LNG/NWI classification: <i>Upland</i>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: <i>UPLAND</i>
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): <i>II B1, III A1</i>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

** Pbl size altered to capture veg community c bottom of local depression*

See Pagebook W61-2, page 23 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>20'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	<u>N/A</u>			
2.				
3.				
4.				
Total Cover: _____		50% of total cover: _____ 20% of total cover: _____		
Sapling/Shrub Stratum (<u>20'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	<u>Alnus fruticosa</u>	<u>55</u>	<u>Y</u>	<u>FAC</u>
2.	<u>Oplopanax horridus</u>	<u>5</u>		<u>FACU</u>
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>60</u>		50% of total cover: <u>27.5</u> 20% of total cover: <u># 12</u>		

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 3 (B)
 % Dominant Species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: _____ X 1 = _____
 FACW species: _____ X 2 = _____
 FAC species: 78 X 3 = 234
 FACU species: 20 X 4 = 80
 UPL species: _____ X 5 = _____
 Column Totals: 98 (A) 314 (B)
 PI = B/A = 3.20

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	<u>Athyrium cyclosporum</u>	<u>3</u>		<u>FAC</u>
2.	<u>Gymnocarpium dryopteris</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
3.	<u>Calla palustris</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
4.	<u>Equisetum sylvaticum</u>	<u>3</u>		<u>FAC</u>
5.	<u>Oplopanax horridus</u>	<u>5</u>		<u>FACU</u>
6.	<u>Botrychium virginianum</u>	<u>5</u>		<u>FACU</u>
7.				
8.				
9.				
10.				
Total Cover: <u>46.4</u>		50% of total cover: <u>23.2</u> 20% of total cover: <u>9.28</u>		

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

2 % Bare Ground
 _____ % Cover of Wetland Bryophytes
0 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 7/2/14 Feature ID W61HT017 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"							Fibric	Dry
1-8"	10YR 3/2	85	7.5YR 4/6	15	C	M	silt loam	
8-18"	10YR 3/6	100						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches):

Hydric Soil Present (Y/N): N

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: <u>W/in locally concave depression</u>	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>N</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): <u> </u>	
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u> </u>	

Notes:

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W611T017 Field Target: 114 Date: 7/2/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X
Jennifer Anderson
Wetland Scientist (print)

X
Jennifer Anderson 7/2/14
Signature / Date

X
Kim DEGUSTIS
Field Crew Chief (print)

X
Kathy Park 7/2/14
Signature / Date

WETLAND DETERMINATION DATA FORM

Zoned Consider

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>	Field Target: <u>113</u>	Map #: <u>82/130</u>	Map Date: <u>6/27/130</u>
Date: <u>7/2/14</u>	Project Name & No.: Alaska LNG 26221306	Feature Id: <u>W61HT018</u>	
Investigators: <u>K DeGuisis J Anderson</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>645.4</u>	
Latitude: <u>62° 33' 53.18"</u>	Longitude: <u>150° 15' 53.92"</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>24</u>	Picture No.: <u>P_W61HT018_Pit; Plug; NE; SE</u>	

SITE PARAMETERS	
Subregion: <u>South Central</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Depression</u>
Slope (%): <u>1</u>	Local relief (concave, convex, none): <u>Concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>Upland</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PEM1XB</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u># A3</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

** Sample plot shape modified to only include grassed vegetation type.*

See logbook W61-2, page 24 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>3</u> X 1 = <u>3</u> FACW species: <u>2</u> X 2 = <u>4</u> FAC species: <u>50</u> X 3 = <u>150</u> FACU species: <u>-</u> X 4 = <u>-</u> UPL species: <u>-</u> X 5 = <u>-</u> Column Totals: <u>50</u> (A) <u>157</u> (B) PI = B/A = <u>2.85</u>
Sapling/Shrub Stratum (<u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>N/A</u>				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>15'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. <div style="text-align: right;"> <input checked="" type="checkbox"/> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input checked="" type="checkbox"/> Total Cover of Bryophytes <input checked="" type="checkbox"/> % Cover of Water </div> Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below): <u>Calamagrostis growing in large hummock habitat</u>
1. <u>Calamagrostis canadensis</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Carex Aquatilis</u>	<u>3</u>		<u>OBL</u>	
3. <u>Carex macrochaeta</u>	<u>2</u>		<u>FACW</u>	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>55</u> 50% of total cover: <u>27.5</u> 20% of total cover: <u>11</u>				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/2/14</u> Feature ID <u>Wx117018</u>					Soil Pit Required (Y/N) <u>Y</u>	
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1"							Thatch/roots	
1-6"	2.5Y 3/2	100					silt	saturated
6-16"	2.5Y 4/3	90	10YR 3/4	10	C	PL	silt	Saturated
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue <u>X</u>		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Bedrock</u> Depth (inches): <u>16"</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>Hard bedrock encountered @ 16" in sample plot; locally adjacent to sample plot bedrock w/in 14" of surface; Excavated multiple pits to confirm not permafrost or frozen soils</u>								
HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)					SECONDARY INDICATORS (2 or more required)			
Surface Water (A1) _____		Surface Soil Cracks (B6) _____			Water-stained Leaves (B9) _____		Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>		Inundation Visible on Aerial Imagery (B7) _____			Drainage Patterns (B10) _____		Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>		Sparsely Vegetated Concave Surface (B8) _____			Oxidized Rhizospheres along Living Roots (C3) _____		Shallow Aquitard (D3) _____	
Water Marks (B1) _____		Marl Deposits (B15) _____			Presence of Reduced Iron (C4) _____		Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____		Hydrogen Sulfide Odor (C1) _____			Salt Deposits (C5) _____		FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____		Dry-Season Water Table (C2) _____			Notes: _____			
Algal Mat or Crust (B4) _____		Other (Explain in Notes): _____						
Iron Deposits (B5) _____								
Surface Water Present (Y/N): <u>N</u>		Depth (in): _____			Wetland Hydrology Present (Y/N): <u>Y</u>			
Water Table Present (Y/N): <u>Y</u>		Depth (in): <u>3"</u>						
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>		Depth (in): <u>?</u>						
Notes: _____								

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <input type="checkbox"/>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) <input checked="" type="checkbox"/> Medium (5-25 species) _____ High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty <input checked="" type="checkbox"/> Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated <input checked="" type="checkbox"/> Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG14T018

Field Target: 113

Date: 7/2/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/2/14
Signature / Date

X Kim DeGuis
Field Crew Chief (print)

X Kelly Wolf 7/2/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 117	Map #: 831130	Map Date: 6/27/14
Date: 7/3/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT019	
Investigators: K DEBOUTS J Anderson		Team No.: W61	
State: Alaska	Region: Alaska	Milepost: 645.94	
Latitude: 62° 33' 25.70"	Longitude: 150° 15' 46.16"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 26	Picture No.: P-W61HT019	Pt. Plug: NE; NW

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): Slope
Slope (%): 3	Local relief (concave, convex, none): Convex
Pre-mapped Alaska LNG/NWI classification: UPLAND	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil <input checked="" type="checkbox"/> , or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: UPLAND
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): I C 3, II B 2, III A

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Soils show Ash-influenced horizon
See logbook W61-2, page 26 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>50</u> (A/B)
1. <i>Betula neolacina</i>	<u>35</u>	<u>Y</u>	<u>FACU</u>	
2. <i>Picea glauca</i>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
3.				
4.				
Total Cover: <u>45</u> 50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: _____ X 1 = _____ FACW species: _____ X 2 = _____ FAC species: <u>105</u> X 3 = <u>315</u> FACU species: <u>67</u> X 4 = <u>268</u> UPL species: _____ X 5 = _____ Column Totals: <u>172</u> (A) <u>583</u> (B) PI = B/A = <u>3.38</u>
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Alnus fruticosa</i>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2. <i>Ribes glandulosum</i>	<u>2</u>		<u>FACU</u>	
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>32</u> 50% of total cover: <u>16</u> 20% of total cover: <u>6.2</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is > 50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Notes) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Calamagrostis canadensis</i>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2. <i>Gymnocarpium dryopteris</i>	<u>20</u>	<u>Y</u>	<u>FACU</u>	
3. <i>Athyrium filix-femina</i>	<u>35</u>	<u>Y</u>	<u>FAC</u>	
4. <i>Equisetum sylvaticum</i>	<u>10</u>		<u>FAC</u>	
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>95</u> 50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				<input type="checkbox"/> <u>20</u> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input type="checkbox"/> <u>∅</u> Total Cover of Bryophytes <input type="checkbox"/> <u>∅</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>N</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL	Date <u>7/3/14</u>	Feature ID <u>U61HT019</u>	Soil Pit Required (Y/N) <u>Y</u>					
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"							Fabric	dry
6-10"	2.5Y 5/1	100					silt/loam	may be influenced by ash.
10-18"	10YR 3/6	50						
10-18"	10YR 5/2	50						
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>N</u>								
Notes: <u>6-10" horizon includes Ash-influenced soils; does not satisfy Alaska 2.5Y Hue indicator (no PL)</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>—</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u>—</u>			
Notes: _____				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvial Soils Sediment Created _____			
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W6142019 Field Target: 117 Date: 7/3/19

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/3/14
Signature / Date

X Kim DEGUITS
Field Crew Chief (print)

X Kelly Grieb 7/3/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 116
Date: 7/3/14	Project Name & No.: Alaska LNG 26221306	Map #: 83/130	Map Date: 6/27/14
Investigators: K DEGWIS	J ANDERSON	Feature Id: W61HT020	Team No.: W61
State: Alaska	Region: Alaska	Milepost: 645.8	
Latitude: 62° 33' 27.54"	Longitude: 150° 15' 55.56"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 27	Picture No.: P-W61HT020-Plu; Plug; E; W.	

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 0	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (If no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): III A3, II C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

No evidence of burn

See logbook W61-2, page 27
for notes & site sketch

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>43</u> (A) Total Number of Dominant Species Across All Strata: <u>43</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>76</u> X 1 = <u>76</u> FACW species: <u>24</u> X 2 = <u>48</u> FAC species: <u>35</u> X 3 = <u>105</u> FACU species: <u>-</u> X 4 = <u>-</u> UPL species: <u>-</u> X 5 = <u>-</u> Column Totals: <u>135</u> (A) <u>229</u> (B) PI = B/A = <u>1.69</u>
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Betula nana</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Rhododendron groenlandicum</u>	<u>5</u>		<u>FAC</u>	
3. <u>Chamaedaphne ciliolata</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	
4. <u>Anchomena palifolia</u>	<u>1</u>		<u>FACW</u>	
5. <u>Picea mariana</u>	<u>1</u>		<u>FACW</u>	
6. <u>Vaccinium oxycoccus</u>	<u>1</u>		<u>OBL</u>	
7.				
8.				
9.				
Total Cover: <u>53</u> 50% of total cover: <u>26.5</u> 20% of total cover: <u>10.6</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. _____ % Bare Ground _____ % Cover of Wetland Bryophytes <u>40</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
1. <u>Rubus chamaemorus</u>	<u>7</u>		<u>FACW</u>	
2. <u>Pedicularis labradorica</u>	<u>1</u>		<u>FACW</u>	
3. <u>Carex sitchensis</u>	<u>60</u>	<u>Y</u>	<u>OBL</u>	
4. <u>Carex vaginata</u>	<u>15</u>	<u>Y</u>	<u>OBL</u>	
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>75</u> <u>82</u> 50% of total cover: <u>37.5</u> 20% of total cover: <u>15</u> <u>41</u> <u>16.4</u>				

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 7/3/14 Feature ID LW61HT020 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"							Fibric	Saturated

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>Y</u>	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches): -

Hydric Soil Present (Y/N): Y

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>Y</u>
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>Y</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>-</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>7.5"</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0"</u>	

Notes:

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input checked="" type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> Tall shrub (2-6m) <input checked="" type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> <u>50</u> Dwarf shrub (<0.5m) <input checked="" type="checkbox"/> <u>2</u> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> <u>75</u> Moss-Lichen <input checked="" type="checkbox"/> <u>40</u> Floating <input checked="" type="checkbox"/> Submerged <input checked="" type="checkbox"/>		
Number of Wetland Types (M): <input checked="" type="checkbox"/> <u>2</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1 HT020 Field Target: 116 Date: 7/3/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X
Jennifer Anderson
Wetland Scientist (print)

X
Jennifer Anderson 7/2/14
Signature / Date

X
Kim DEGUTIS
Field Crew Chief (print)

X
Kim DEGUTIS
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 074	Map #: 501130	Map Date: 6/24/14
Date: 7/5/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT021	
Investigators: K. REGOUTIS J. Anderson	Team No.: W61		
State: Alaska	Region: Alaska	Milepost: 576.34	
Latitude: 63° 19' 48.35"	Longitude: 149° 10' 56.10"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 28	Picture No.: P-W61HT021; P.t.; Plug; W; E	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 0	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PEM1F	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1 & F
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): III A3, II C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 28
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	1		FACU
2.			
3.			
4.			
Total Cover: <u>1</u> 50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	3		FACU
2. <i>Dasiphora fruticosa</i>	5		FAC
3. <i>Arctostaphylos</i>	10	Y	FAC
4. <i>Salix reticulata</i>	3		FAC
5. <i>Betula nana</i>	10	Y	FAC
6. <i>Vaccinium oxycoccus</i>	1		OBL
7. <i>Empetrum nigrum</i>	1		FAC
8. <i>Vaccinium uliginosum</i>	3		FAC
9. <i>Salix arctica</i>	10	Y	FACU
Total Cover: <u>46.47</u> 50% of total cover: <u>23.5</u> 20% of total cover: <u>9.4</u>			

Dominance Test worksheet:	
No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A)	
Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
% Dominant Species that are OBL, FACW, or FAC: <u>75%</u> (A/B)	

Prevalence Index worksheet:	
Total % Cover of:	Multiply by:
OBL species: <u>66</u> X 1 = <u>66</u>	
FACW species: <u>7</u> X 2 = <u>14</u>	
FAC species: <u>42</u> X 3 = <u>126</u>	
FACU species: <u>16</u> X 4 = <u>64</u>	
UPL species: <u>—</u> X 5 = <u>—</u>	
Column Totals: <u>131</u> (A) <u>270</u> (B)	
PI = B/A = <u>2.06</u>	

Tree stratum added to shrub stratum since there was < 5% cover

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Pedicularis laboratorica</i>	1		FACW
2. <i>Sanguisorba canadensis</i>	5		FACW
3. <i>Geranium exanthum</i>	2		FACU
4. <i>Equisetum arvense</i>	8		FAC
5. <i>Thalictrum pusilla</i>	2		FAC
6. <i>Rubus chamaemorus</i>	1		FACW
7. unknown herb (^{WLD} orchid)	1		FAC
8. <i>Carex aquatilis</i>	55	Y	OBL
9. <i>Eleocharis acicularis</i>	10		OBL
10.			
Total Cover: <u>84</u> 50% of total cover: <u>42</u> 20% of total cover: <u>16.8</u>			

Hydrophytic Vegetation Indicators:	
<u>0</u> Dominance Test is > 50%	
<u>0</u> Prevalence Index is ≤ 3.0	
____ Morphological Adaptations ¹ (Provide supporting data in Notes)	
____ Problematic Hydrophytic Vegetation ¹ (Explain)	
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	

<u>0</u> % Bare Ground
<u>10</u> % Cover of Wetland Bryophytes
<u>55</u> Total Cover of Bryophytes
<u>5</u> % Cover of Water
Hydrophytic Vegetation Present (Y/N): <u>Y</u>
Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/5/14</u> Feature ID <u>1261H8021</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>0-18"</u>							<u>Fibric</u>	<u>Saturated</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) <u>X</u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: _____								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>X</u>	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1/2"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>1"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>	
Notes: _____		

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent <u>10</u> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>1</u> Sapling (<5 dbh, <6m tall) <u>3</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>18</u> Dwarf shrub (<0.5m) <u>25</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>84</u> Moss-Lichen <u>55</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <u>2</u> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <u>2</u> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <u>0</u> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>0</u> High (>25) _____		
Presence of Islands (M): Absent (none) <u>0</u> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>0</u>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>0</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>0</u>		
HGM Class (P): Slope _____ Flat <u>0</u> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <u>0</u> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>0</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <u>0</u>	
Evidence of Sedimentation (P): No Evidence Observed <u>0</u> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <u>0</u> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>0</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>0</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <u>0</u> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>7.06</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <u>0</u> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>0</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>0</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <u>0</u> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>0</u>	
Watershed Land Use: 0-5% Rural <u>0</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <u>0</u> Large (>100 acres) _____	

Crew Chief QA/QC check:

[Signature]

GPS Technician QA/QC check:

Jennifer Anderson

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1HT021 Field Target: 074 Date: 7/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/5/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X Kelly 14/14 7/5/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 073	Map #: 501130	Map Date: 6/24/14
Date: 7/5/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT022	
Investigators: K JEGOUSIS J Anderson	Team No.: W61		
State: Alaska	Region: Alaska	Milepost: 576.2	
Latitude: 63° 18' 54.04"	Longitude: 149° 10' 53.30"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 28	Picture No.: P-W61HT022 - Pit; Plug; N; E	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 5	Local relief (concave, convex, none): CONVEX
Pre-mapped Alaska LNG/NWI classification: PSS1/4B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: UPLAND
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): PSS1/4B

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Right at top edge of topo break (2-3' drop)

See logbook W61-2, page 28 for notes & site sketch

VIERECK:
II B2, II C1

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				Dominance Test worksheet:	
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A)	Total Number of Dominant Species Across All Strata: <u>5</u> (B)
1. <i>Picea glauca</i>	8	Y	FACU	% Dominant Species that are OBL, FACW, or FAC: <u>60%</u> (A/B)	
2.					
3.					
4.					
Total Cover: <u>8</u>				Total % Cover of: _____ Multiply by: _____	
50% of total cover: <u>4</u> 20% of total cover: <u>2</u>				OBL species: <u>—</u> X 1 = <u>—</u>	
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	FACW species: <u>5</u> X 2 = <u>10</u>	
1. <i>Betula glandulosa</i>	65	Y	FAC	FAC species: <u>156</u> + <u>71</u> X 3 = <u>513</u> + <u>4108</u>	
2. <i>Vaccinium uliginosum</i>	45	Y	FAC	FACU species: <u>26</u> X 4 = <u>104</u>	
3. <i>Empetrum nigrum</i>	2		FAC	UPL species: <u>15</u> X 5 = <u>—</u> + <u>75</u>	
4. <i>Salix pulchra</i>	5		FACW	Column Totals: <u>202</u> (A) <u>627</u> (B)	
5. <i>Ahus fruticosa</i>	15		FAC	PI = B/A = <u>3.10</u> <u>3.25</u>	
6. <i>Vaccinium vitis-idaea</i>	2		FAC		
7. <i>Spiraea steyerii</i>	8		FACU		
8. <i>Salix pseudomyrsinites</i>	7 15		FAC UPL	UPL - not listed in AK 2014 Wetland Plant List - so considered an UPL species.	
9.					
Total Cover: <u>157</u>					
50% of total cover: <u>78.5</u> 20% of total cover: <u>31.4</u>					

VEGETATION (use scientific names of plants)				Hydrophytic Vegetation Indicators:	
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	<u>0</u> Dominance Test is > 50%	Prevalence Index is ≤ 3.0
1. <i>Calamagrostis canadensis</i>	25	Y	FAC	Morphological Adaptations ¹ (Provide supporting data in Notes)	
2. <i>Cornus canadensis</i>	10	Y	FACU	Problematic Hydrophytic Vegetation ¹ (Explain)	
3. <i>Dasychloa cespitosa</i>	2		FAC	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
4.					
5.					
6.					
7.				<u>5</u> % Bare Ground	
8.				<u>∅</u> % Cover of Wetland Bryophytes	
9.				<u>10</u> Total Cover of Bryophytes	
10.				<u>∅</u> % Cover of Water	
Total Cover: <u>37</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>	
50% of total cover: <u>18.5</u> 20% of total cover: <u>7.4</u>				Notes: (If observed, list morphological adaptations below):	

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/5/14</u> Feature ID <u>W61H7022</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5"							Fibric	dry
5-18"	10YR 4/4	100					Sandy/loam	30% gravel
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u> </u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u> </u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Vegetation _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____			
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposits Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Junction Position: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Wetland Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1HT022

Field Target: 073

Date: 7/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/5/14
Signature / Date

X Kim DEGUTIS
Field Crew Chief (print)

X Kelly KST 7/5/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: <u>067</u>	Map #: <u>44/130</u>	Map Date: <u>5/21/14</u>
Date: <u>7/5/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W61HT023</u>	
Investigators: <u>K DEGUTIS</u> <u>J Anderson</u>		Team No.: <u>W61</u>	
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>562.6</u>	
Latitude: <u>64° 24' 57.34"</u>	Longitude: <u>148° 50' 44.73"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>31</u>	Picture No.: <u>P.W61HT023_P1; Plug; NW; E</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FLAT</u>
Slope (%): <u>4</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS1/EM1B</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PSS1/EM1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): <u>II C1, III A2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 31
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>45</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B) 80%
1. <u>N/A</u>				
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: _____ X 1 = _____ FACW species: <u>38</u> X 2 = <u>76</u> FAC species: <u>91</u> X 3 = <u>273</u> FACU species: <u>19</u> X 4 = <u>76</u> UPL species: _____ X 5 = _____ Column Totals: <u>148</u> (A) <u>425</u> (B) PI = B/A = <u>2.87</u>
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Betula nana</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Vaccinium uliginosum</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Rhododendron groenlandicum</u>	<u>10</u>		<u>FAC</u>	
4. <u>Empetrum nigrum</u>	<u>2</u>		<u>FAC</u>	
5. <u>Vaccinium vitis-idaea</u>	<u>5</u>		<u>FAC</u>	
6. <u>Cassiope tetragona</u>	<u>4</u>		<u>FACU</u>	
7. <u>Salix reticulata</u>	<u>3</u>		<u>FAC</u>	
8. <u>Salix arctica</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>	
9. <u>Salix pulchra</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	
Total Cover: <u>104</u> 50% of total cover: <u>52</u> 20% of total cover: <u>20.8</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. <input checked="" type="checkbox"/> % Bare Ground <input checked="" type="checkbox"/> % Cover of Wetland Bryophytes <u>10</u> % Total Cover of Bryophytes <input checked="" type="checkbox"/> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
1. <u>Bistorta vivipara</u>	<u>1</u>		<u>FAC</u>	
2. <u>Petasites frigidus</u>	<u>8</u>		<u>FACW</u>	
3. <u>Carex bigelowii</u>	<u>35</u>	<u>Y</u>	<u>FAC</u>	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>44</u> 50% of total cover: <u>22</u> 20% of total cover: <u>8.8</u>				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/5/14</u>	Feature ID <u>W61HT023</u>	Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4"							Fibric	organics
4-8"	10YR 3/6	50						Mixed Matrix
8-13"	2.5Y 4/2	50					Mineral/silty	Mixed Matrix
8-13"	2.5Y 4/1	90	10YR 4/6	10	C	PL	Mineral/silty	distinct & prominent
13"	Bedrock							
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue <u>X</u>		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Bedrock</u> Depth (inches): <u>13"</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)		
Surface Water (A1) _____	Surface Soil Cracks (B6) _____		Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____		Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____		Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____		Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____		Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____		Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____				
Iron Deposits (B5) _____					
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____		Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): _____				
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>2"</u>				
Notes: <u>Logbook notes saturation at 11" and water table at 12.5" (w/ 2 page 31) etc</u>					

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>75</u> Dwarf shrub (<0.5m) <u>29</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>44</u> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>			
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty <input checked="" type="checkbox"/> Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <input checked="" type="checkbox"/> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]* GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61A1023

Field Target: 067

Date: 7/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/5/14
Signature / Date

X Kim J. DEGUTIS
Field Crew Chief (print)

X Kimberly W. 7/5/14
Signature / Date

WETLAND DETERMINATION DATA FORM

200 - 14
2000 - 14
consider

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>	Field Target: 066	Map #: 43130	Map Date: 5/27/14
Date: 7/5/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT024	
Investigators: K DEGUIS J ANDERSON		Team No.: W61	
State: Alaska	Region: Alaska	Milepost: 560.95	
Latitude: 63° 26' 15.69	Longitude: 148° 49' 37.14	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 32	Picture No.: P-W61HT024-P.t; Plug; N; W	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): FIAT
Slope (%): 5	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PEM1 SS1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation, Soil, or Hydrology Naturally Problematic? No <input checked="" type="checkbox"/> (If yes, explain in Notes.)	

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): II C 1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 32
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				Dominance Test worksheet:	
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	No. of Dominant Species that are OBL, FACW, or FAC: <u>3¹</u> (A)	Total Number of Dominant Species Across All Strata: <u>34</u> (B)
1. <i>Picea glauca</i>	1		FACU	% Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)	
2.					
3.					
4.					
Total Cover: <u>1</u>				Prevalence Index worksheet:	
50% of total cover: <u>.5</u> 20% of total cover: <u>0.2</u>				Total % Cover of: _____ Multiply by: _____	
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	OBL species: <u>—</u> X 1 = _____	FACW species: <u>8</u> X 2 = <u>16</u>
1. <i>Betula nana</i>	50.	Y	FAC	FAC species: <u>16.5</u> X 3 = <u>49.5</u>	FACU species: <u>11</u> X 4 = <u>44</u>
2. <i>Vaccinium uliginosum</i>	40.	Y	FAC	UPL species: <u>—</u> X 5 = _____	Column Totals: <u>184</u> (A) <u>555</u> (B)
3. <i>Vaccinium vitis-idaea</i>	15.		FAC	PI = B/A = <u>3.0</u>	
4. <i>Rhododendron canadense</i>	25.		FAC		
5. <i>Empetrum nigrum</i>	5.		FAC		
6. <i>Picea glauca</i>	10.		FACU		
7. <i>Vaccinium oxycoccos</i>	1		OBL		
8. <i>Salix scouleriana</i>	10		FAC		
9.					
Total Cover: <u>156</u> / <u>78</u>					
50% of total cover: <u>77.5</u> 20% of total cover: <u>31.2</u>					

Tree stratum added to shrub stratum since there was 45% cover

VEGETATION (use scientific names of plants)				Hydrophytic Vegetation Indicators:	
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	<input checked="" type="checkbox"/> Dominance Test is > 50%	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
1. <i>Rubus chamaemorus</i>	8	Y	FACW	____ Morphological Adaptations ¹ (Provide supporting data in Notes)	
2. <i>Carex bigelowii</i>	20	Y	FAC	____ Problematic Hydrophytic Vegetation ¹ (Explain)	
3.				¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.	
4.					
5.					
6.					
7.					
8.					
9.					
10.					
Total Cover: <u>28</u>				% Bare Ground: <u>0</u>	
50% of total cover: <u>14</u> 20% of total cover: <u>5.6</u>				% Cover of Wetland Bryophytes: <u>0</u>	
				Total Cover of Bryophytes: <u>20</u>	
				% Cover of Water: <u>0</u>	
				Hydrophytic Vegetation Present (Y/N): <u>X</u>	
				Notes: (If observed, list morphological adaptations below):	

WETLAND DETERMINATION DATA FORM

SOIL Date 7/5/14 Feature ID WGIHT024 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"							Fibric	dry
3-13"							Fibric	saturated
13"	Frozen							

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: 13" frozen Depth (inches): 13"

Hydric Soil Present (Y/N): X

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>10"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>5"</u>	

Notes:

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>1</u> Sapling (<5 dbh, <6m tall) <u>10</u> Tall shrub (2-6m) <u>125</u> Short shrub (0.5-2m) <u>105</u> Dwarf shrub (<0.5m) <u>20</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>28</u> Moss-Lichen <u>20</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>1</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

[Handwritten Signature]

GPS Technician QA/QC check:

[Handwritten Signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT024

Field Target: 066

Date: 7/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/5/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X Kimberly K. Sak 7/5/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 064	Map #: 44130 Map Date: 5/27/14
Date: 7/6/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W61HT025
Investigators: K DEGUIS J Anderson			Team No.: W61
State: Alaska	Region: Alaska	Milepost: 560.05	
Latitude: 63° 26' 29.67"		Longitude: 148° 48' 09.35"	Datum: WGS84
Logbook No.: W61-2	Logbook Page No.: 34	Picture No.: P-W61HT025-PT; Plug: N;W	

SITE PARAMETERS	
Subregion: Intaion	Landform (hillslope, terrace, hummocks, etc.): Slope
Slope (%): 20	Local relief (concave, convex, none): None
Pre-mapped Alaska LNG/NWI classification: PSS1 EM1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): II C1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Sample plot located on +20% hillslope
(Declinometer indicates this area is 50% slope)

See logbook W61-2, page 34 for notes & site sketch

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>N/A</u>				
2.				
3.				
4.				
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u> </u> X 1 = <u> </u> FACW species: <u>13</u> X 2 = <u>26</u> FAC species: <u>143</u> X 3 = <u>429</u> FACU species: <u>10</u> X 4 = <u>40</u> UPL species: <u> </u> X 5 = <u> </u> Column Totals: <u>166</u> (A) <u>495</u> (B) PI = B/A = <u>2.98</u>
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <u>Betula nana</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Vaccinium vitis-idaea</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Rhododendron groenlandicum</u>	<u>15</u>		<u>FAC</u>	
4. <u>Salix pulchra</u>	<u>10</u>		<u>FACW</u>	
5. <u>Empetrum nigrum</u>	<u>5</u>		<u>FAC</u>	
6. <u>Picea canadica</u>	<u>10</u>		<u>FACU</u>	
7. <u>Alnus tenuifolia</u>	<u>3</u>		<u>FAC</u>	
8. <u>Vaccinium uliginosum</u>	<u>35</u>	<u>Y</u>	<u>FAC</u>	
9. <u>Salix scouleriana</u>	<u>10</u>		<u>FAC</u>	
Total Cover: <u>138</u> 50% of total cover: <u>69</u> 20% of total cover: <u>27.6</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <u>Rubus chamaemorus</u>	<u>3</u>		<u>FACW</u>	
2. <u>Carex bigelowii</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Bistorta vivipara</u>	<u>5</u>		<u>FAC</u>	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>28</u> 50% of total cover: <u>14</u> 20% of total cover: <u>5.6</u>				<input type="checkbox"/> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input checked="" type="checkbox"/> <u>30</u> Total Cover of Bryophytes <input type="checkbox"/> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 7/6/14 Feature ID W61HT025 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10"							Fibric	Saturated

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____	Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: FROZEN Depth (inches): 10"

Hydric Soil Present (Y/N): Y

Notes: Note - saturation @ 8" bgs

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>8"</u>	

Notes: Sample produces water when lightly squeezed

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>10</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>10</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>103</u> Dwarf shrub (<0.5m) <u>25</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>28</u> Moss-Lichen <u>30</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <u>X</u>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <u>X</u> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <u>X</u>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <u>X</u> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>X</u>		
HGM Class (P): Slope <u>X</u> Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <u>X</u> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <u>X</u> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>X</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <u>X</u>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <u>X</u>	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above <u>X</u> Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized <u>X</u> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <u>X</u> Large (>100 acres) _____	

Crew Chief QA/QC check:

Kelly [Signature]

GPS Technician QA/QC check:

Janice Anderson

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W01HT025 Field Target: 064 Date: 7/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

<p>X Jennifer Anderson Wetland Scientist (print)</p>	<p>X Jennifer Anderson Signature / Date</p>
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<p>X Kim DEGUIS Field Crew Chief (print)</p>	<p>X Kim Deguis Signature / Date 7/6/14</p>
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WETLAND DETERMINATION DATA FORM

300-ft Consider

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: <u>DB</u>
Date: <u>7/6/14</u>	Project Name & No.: Alaska LNG 26221306	Map #: <u>421130</u>	Map Date: <u>5/27/14</u>
Investigators: <u>K DeGutis J Anderson</u>	State: Alaska	Region: Alaska	Feature Id: <u>W61HT026</u>
State: Alaska	Region: Alaska	Milepost: <u>560.1</u>	Team No.: <u>W61</u>
Latitude: <u>63° 26' 29.79"</u>	Longitude: <u>148° 48' 14.34"</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>35</u>	Picture No.: <u>D-W61HT026-Pt; Plug; SE, NE</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FLAT</u>
Slope (%): <u>2%</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>Upland</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: <u>Upland</u>
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>IA2, IIC2, IIIA1</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 35 for notes & site sketch

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	45	Y	FACU
2.			
3.			
4.			
Total Cover: <u>45</u> 50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Ribes glandulosum</i>	10	Y	FACU
2. <i>Alnus fruticosa</i>	15	Y	FAC
3. <i>Linnaea borealis</i>	10	Y	FACU
4. <i>Rosa acicularis</i>	8		FACU
5. <i>Picea glauca</i>	2		FACU
6.			
7.			
8.			
9.			
Total Cover: <u>45</u> 50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: - X 1 = -
 FACW species: - X 2 = -
 FAC species: 75 X 3 = 225
 FACU species: 98 X 4 = 392
 UPL species: - X 5 = -
 Column Totals: 173 (A) 617 (B)
 PI = B/A = 3.56

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum pratense</i>	45	Y	FAC
2. <i>Chamaecium angustifolium</i>	5		FACU
3. <i>Colonyopsis canadensis</i>	5		FAC
4. <i>Mertensia paniculata</i>	10		FACU
5. <i>Cornus canadensis</i>	7		FACU
6. <i>Pyrola asarifolia</i>	1		FACU
7. <i>Aconitum delphinifolium</i>	10		FAC
8.			
9.			
10.			
Total Cover: <u>83</u> 50% of total cover: <u>41.5</u> 20% of total cover: <u>16.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

25 % Bare Ground
0 % Cover of Wetland Bryophytes
5 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/6/14</u> Feature ID <u>W01HT026</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3"							Fibric	dry
3-12"	10YR 2/2	45	100%				loam	50% gravel 5% pebble
12"	Refusal due to high pebble content							
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>No</u> Depth (inches): <u>—</u>								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____		Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____		Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____		Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____		Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____		Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____		Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>—</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u>—</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (M): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]* 7/6/14

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WX61 H7026 Field Target: 065 Date: 7/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

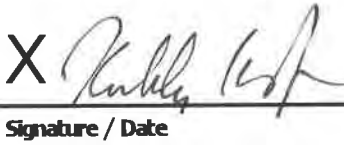
8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X  7/6/14
Signature / Date

X Kim DEGUTIS
Field Crew Chief (print)

X  7/6/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: <u>068</u>
Date: <u>7/6/14</u>	Project Name & No.: Alaska LNG 26221306	Feature Id: <u>W61HT027</u>	Map #: <u>45/130</u> Map Date: <u>5/27/14</u>
Investigators: <u>K DEGENIS / J ANDERSON</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>563.6</u>	
Latitude: <u>63° 24' 08.92</u>	Longitude: <u>148° 51' 28.89</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>36</u>	Picture No.: <u>P_W61HT027-D1; Plug;</u>	<u>NW/S</u>

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Slope</u>
Slope (%): <u>2</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>P551/EM13</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation, Soil, or Hydrology Naturally Problematic? No <input type="checkbox"/> (If yes, explain in Notes.)	
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PEM1/SS1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>III A², II C²</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Soils problematic - extremely high gravel & pebble content, profile is hypersaturated where sample material is a soup consistency

See logbook W61-2, page 36 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)					
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)	
1. <u>N/A</u>					
2.					
3.					
4.					
Total Cover: <u>—</u> 50% of total cover: <u>—</u> 20% of total cover: <u>—</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>12</u> X 1 = <u>12</u> FACW species: <u>63</u> X 2 = <u>126</u> FAC species: <u>60</u> X 3 = <u>180</u> FACU species: _____ X 4 = _____ UPL species: _____ X 5 = _____ Column Totals: <u>135</u> (A) <u>318</u> (B) PI = B/A = <u>2.35</u>	
VEGETATION (use scientific names of plants)					
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status		
1. <u>Salix glauca</u>	<u>12</u>	<u>Y</u>	<u>FAC</u>		
2. <u>Salix reticulata</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>		
3. <u>Salix myrtillifolia</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>		
4. <u>Vaccinium uliginosum</u>	<u>5</u>		<u>FAC</u>		
5. <u>Andromeda polifolium</u>	<u>1</u>		<u>FACW</u>		
6. <u>Rhododendron sp. tentidicum</u>	<u>2</u>		<u>FAC</u>		
7. <u>Cassiope tetragyna</u>	<u>T</u>		<u>FACU</u>		
8. <u>Salix polaris</u>	<u>7</u>	<u>X</u>	<u>FACW</u>		
9. <u>Betula glandulosa</u>	<u>5</u>		<u>FAC</u>		
Total Cover: <u>57</u> 50% of total cover: <u>28.5</u> 20% of total cover: <u>11.4</u>					

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <u>Eleocharis palustris</u>	<u>7</u>		<u>OBL</u>	
2. <u>Eleocharis acicularis</u>	<u>5</u>		<u>OBL</u>	
3. <u>Chamaenerion latifolium</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
4. <u>Saxifraga rivularis</u>	<u>T</u>		<u>OBL</u>	
5. <u>Stellaria longipedunculata</u>	<u>1</u>		<u>FAC</u>	
6. <u>Carex membranacea</u>	<u>45</u>	<u>Y</u>	<u>FACW</u>	
7. <u>Carex</u>				
8.				
9.				
10.				
Total Cover: <u>78</u> 50% of total cover: <u>39</u> 20% of total cover: <u>15.6</u>				_____ % Bare Ground _____ % Cover of Wetland Bryophytes _____ Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/2/14</u> Feature ID <u>WG1HT027</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"							Fibric	Saturated organics
2-18"	10YR 7/2	100						50% gravel 5% pebbles
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) <u>X</u>		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>High gravel content, hyper saturated soils w/in sample plot</u> <u>* Soil has low organic matter content and a high pH (7.39)</u>								
HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)				SECONDARY INDICATORS (2 or more required)				
Surface Water (A1) _____		Surface Soil Cracks (B6) _____		Water-stained Leaves (B9) _____		Stunted or Stressed Plants (D1) _____		
High Water Table (A2) <u>X</u>		Inundation Visible on Aerial Imagery (B7) _____		Drainage Patterns (B10) _____		Geomorphic Position (D2) <u>X</u>		
Saturation (A3) <u>X</u>		Sparsely Vegetated Concave Surface (B8) _____		Oxidized Rhizospheres along Living Roots (C3) _____		Shallow Aquitard (D3) _____		
Water Marks (B1) _____		Marl Deposits (B15) _____		Presence of Reduced Iron (C4) _____		Microtopographic Relief (D4) _____		
Sediment Deposits (B2) _____		Hydrogen Sulfide Odor (C1) _____		Salt Deposits (C5) _____		FAC-Neutral Test (D5) <u>X</u>		
Drift Deposits (B3) _____		Dry-Season Water Table (C2) _____		Notes:				
Algal Mat or Crust (B4) _____		Other (Explain in Notes):						
Iron Deposits (B5) _____								
Surface Water Present (Y/N): <u>Y</u>		Depth (in): <u>1/2"</u>		Wetland Hydrology Present (Y/N): <u>Y</u>				
Water Table Present (Y/N): <u>Y</u>		Depth (in): <u>0"</u>						
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)		Depth (in): <u>0"</u>						
Notes:								

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input checked="" type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> Tall shrub (2-6m) <input checked="" type="checkbox"/> Short shrub (0.5-2m) <u>56</u> Dwarf shrub (<0.5m) <u>1</u> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <u>78</u> Moss-Lichen <input checked="" type="checkbox"/> Floating <input checked="" type="checkbox"/> Submerged <input checked="" type="checkbox"/>		
Number of Wetland Types (M): <u>2</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope <input checked="" type="checkbox"/> Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly <input checked="" type="checkbox"/> Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet <input checked="" type="checkbox"/> Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet <input checked="" type="checkbox"/>	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <input checked="" type="checkbox"/> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>7.39</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed <input checked="" type="checkbox"/> Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

Handwritten signature

GPS Technician QA/QC check:

Handwritten signature: Jennifer Anderson

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT027 Field Target: 068 Date: 7/4/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/6/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X [Signature]
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input type="checkbox"/>		Field Target: <u>69</u>	Map #: <u>101130</u> Map Date: <u>5/2/14</u>
Date: <u>7/6/14</u>	Project Name & No.: Alaska LNG 26221306		Feature Id: <u>WG1HT028</u>
Investigators: <u>K DEGUTIS</u> <u>J ANDERSON</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>566.35</u>	
Latitude: <u>63° 22' 47.46"</u>		Longitude: <u>148° 54' 36.50"</u>	Datum: WGS84
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>37</u>	Picture No.: <u>P-WG1HT028-Pt; Plug; SW; NW</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FLAT</u>
Slope (%): <u>2</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS1/EM1B</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input checked="" type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS1/EM1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>II C1, III A2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 37
for site sketch & notes

Problematic soils - high gravel & hypersaturation
of soil profile

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)																			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status																
1. <u>N/A</u>				Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4³</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>80%</u> (A/B) 60%															
2.																			
3.																			
4.																			
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____																			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status																
1. <u>Rhododendron groenlandicum</u>	<u>5</u>		<u>FAC</u>	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>1</u> X 1 = <u>1</u> FACW species: <u>39</u> X 2 = <u>78</u> FAC species: <u>80</u> <u>95</u> X 3 = <u>285</u> <u>240</u> FACU species: <u>10</u> X 4 = <u>40</u> UPL species: <u>30</u> X 5 = <u>150</u> Column Totals: <u>160</u> <u>145</u> (A) <u>404</u> <u>509</u> (B) PI = B/A = <u>2.70</u> <u>3.18</u> <table style="font-size: small;"> <tr><td><u>Salix scouleriana</u></td><td><u>T</u></td><td><u>FAC</u></td></tr> <tr><td><u>Salix stolonifera</u></td><td><u>15 Y</u></td><td><u>Agave UPL</u></td></tr> <tr><td><u>Picea glauca</u></td><td><u>10</u></td><td><u>FACU</u></td></tr> <tr><td><u>Salix pulchra</u></td><td><u>10</u></td><td><u>FACW</u></td></tr> <tr><td><u>Dryas ajacensis</u></td><td><u>15 Y</u></td><td><u>NI - OPL</u></td></tr> </table> <p style="color: red; font-size: x-small;">* no indicator status listed in 2014 AR Wetland Plant List considered UPL species</p>	<u>Salix scouleriana</u>	<u>T</u>	<u>FAC</u>	<u>Salix stolonifera</u>	<u>15 Y</u>	<u>Agave UPL</u>	<u>Picea glauca</u>	<u>10</u>	<u>FACU</u>	<u>Salix pulchra</u>	<u>10</u>	<u>FACW</u>	<u>Dryas ajacensis</u>	<u>15 Y</u>	<u>NI - OPL</u>
<u>Salix scouleriana</u>	<u>T</u>	<u>FAC</u>																	
<u>Salix stolonifera</u>	<u>15 Y</u>	<u>Agave UPL</u>																	
<u>Picea glauca</u>	<u>10</u>	<u>FACU</u>																	
<u>Salix pulchra</u>	<u>10</u>	<u>FACW</u>																	
<u>Dryas ajacensis</u>	<u>15 Y</u>	<u>NI - OPL</u>																	
2. <u>Betula nana</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>																
3. <u>Arctostaphylos rubra</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>																
4. <u>Vaccinium uliginosum</u>	<u>10</u>		<u>FAC</u>																
5. <u>Empetrum nigrum</u>	<u>10</u>		<u>FAC</u>																
6. <u>Andromeda polifolia</u>	<u>T</u>		<u>FACW</u>																
7. <u>Salix reticulata</u>	<u>8</u>		<u>FAC</u>																
8. <u>Vaccinium vitis-idaea</u>	<u>5</u>		<u>FAC</u>																
9. <u>Vaccinium oxycoccos</u>	<u>1</u>		<u>OBL</u>																
Total Cover: <u>129</u> 50% of total cover: <u>64.5</u> 20% of total cover: <u>25.8</u>																			

VEGETATION (use scientific names of plants)												
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status									
1. <u>Toxicaria pusilla</u>	<u>1</u>		<u>FAC</u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. <table style="font-size: small;"> <tr><td><u>0</u></td><td>% Bare Ground</td></tr> <tr><td><u>10</u></td><td>% Cover of Wetland Bryophytes</td></tr> <tr><td><u>50</u></td><td>Total Cover of Bryophytes</td></tr> <tr><td><u>0</u></td><td>% Cover of Water</td></tr> </table> Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):	<u>0</u>	% Bare Ground	<u>10</u>	% Cover of Wetland Bryophytes	<u>50</u>	Total Cover of Bryophytes	<u>0</u>	% Cover of Water
<u>0</u>	% Bare Ground											
<u>10</u>	% Cover of Wetland Bryophytes											
<u>50</u>	Total Cover of Bryophytes											
<u>0</u>	% Cover of Water											
2. <u>Petasites frigidus</u>	<u>3</u>		<u>FACW</u>									
3. <u>Bistorta vivipara</u>	<u>1</u>		<u>FAC</u>									
4. <u>Carex membranacea</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>									
5. <u>Dodecatheon frigidum</u>	<u>1</u>		<u>FACW</u>									
6. <u>Stellaria longipes</u>	<u>T</u>		<u>FAC</u>									
7.												
8.												
9.												
10.												
Total Cover: <u>31</u> 50% of total cover: <u>15.5</u> 20% of total cover: <u>6.2</u>												

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/6/14</u> Feature ID <u>W61HT028</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>0-4"</u>							<u>Fibric</u>	<u>Saturated</u>
<u>4-18"</u>	<u>2.5Y 2/1</u>	<u>100</u>						<u>45% gravel, 5% pebble mix, saturated</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes) <u>X</u>		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u>—</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>Problem soils - high content of gravel, pebbles does not allow for observation of redox features. Profile hyper saturated throughout</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>	
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>4"</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>2"</u>			
Notes:				

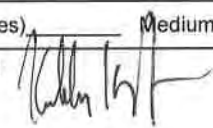
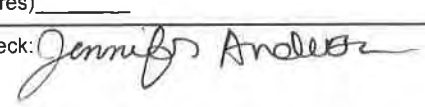
WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input checked="" type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> Tall shrub (2-6m) <input checked="" type="checkbox"/> Short shrub (0.5-2m) <u>73</u> Dwarf shrub (<0.5m) <u>56</u> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <u>31</u> Moss-Lichen <u>50</u> Floating <input checked="" type="checkbox"/> Submerged <input checked="" type="checkbox"/>		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly <input checked="" type="checkbox"/> Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above <input checked="" type="checkbox"/> Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:  GPS Technician QA/QC check: 

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61ATO28

Field Target: 069

Date: 7/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/6/14
Signature / Date

X Kim DEGUTIS
Field Crew Chief (print)

X [Signature] 7/6/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain)	Field Target: 071
Date: 7/6/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W61HT029	Map #: 471150 Map Date: 5/20/14
Investigators: K DeGutis	J Anderson	Team No.: W61	
State: Alaska	Region: Alaska	Milepost: 567.6	
Latitude: 63° 22' 26.400	Longitude: 148° 56' 54.53	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 38	Picture No.: P_W61HT029_P1; Plug; NE; SE	

SITE PARAMETERS	
Subregion: Interior / Southcentral	Landform (hillslope, terrace, hummocks, etc.): Stream terrace
Slope (%): 4	Local relief (concave, convex, none): Convex
Pre-mapped Alaska LNG/NWI classification: PSS1 / EM1C	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation, Soil, or Hydrology Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1 / EM1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): IIC1, IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 38
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>N/A</u>			
2.			
3.			
4.			
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Salix reticulata</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
2. <u>Vaccinium uliginosum</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>
3. <u>Desiphora fruticosa</u>	<u>10</u>		<u>FAC</u>
4. <u>Salix bebbiana</u>	<u>7</u>		<u>FAC</u>
5. <u>Salix pulchra</u>	<u>10</u>		<u>FACW</u>
6. <u>Betula glandulosa</u>	<u>5</u>		<u>FAC</u>
7. <u>Salix barclayi</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
8. <u>Salix arctica</u>	<u>10</u>		<u>FACW</u>
9. <u>Picea glauca</u>	<u>2</u>		<u>FACW</u>
Total Cover: <u>104</u> 50% of total cover: <u>52</u> 20% of total cover: <u>20.8</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 5 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: — X 1 = —
 FACW species: 35 X 2 = 70
 FAC species: 86 X 3 = 258
 FACU species: 12 X 4 = 48
 UPL species: — X 5 = —
 Column Totals: 133 (A) 376 (B)
 PI = B/A = 2.82

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>CAREX membranacea</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>
2. <u>Rumex</u>			
3. <u>CAREX saxatilis</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
4. <u>Columagostis canadensis</u>	<u>3</u>		<u>FAC</u>
5. <u>Aconogonon alaskanum</u>	<u>1</u>		<u>FAC</u>
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>29</u> 50% of total cover: <u>14.5</u> 20% of total cover: <u>5.8</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
5 % Cover of Wetland Bryophytes
35 Total Cover of Bryophytes
20 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/6/14</u> Feature ID <u>W61HT029</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"							Fibric	dry
2-15"	7.5 YR 2.5/1	95	10 YR 3/4	5	C	M	Sandy loam	Redox dark surface (Fb)
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes) <u>X</u>		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Frozen</u> Depth (inches): <u>15"</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>2-15" = Redox dark surface (Fb). Initial soil pit taken on convex surface - was dry so dug check soil pit on locally concave surface and saturation at 6"</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>✓</u>	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>—</u>			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>6"</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>2</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>74</u> Dwarf shrub (<0.5m) <u>25</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>29</u> Moss-Lichen <u>35</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy <input checked="" type="checkbox"/> Mineral: Silty <input checked="" type="checkbox"/> Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet <input checked="" type="checkbox"/> Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvial Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs <input checked="" type="checkbox"/> Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.82</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *Jennifer Anderson*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT029 Field Target: 71 Date: 7/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/6/14
Signature / Date

X Kim DEBUTIS
Field Crew Chief (print)

X Andy K. Debutis 7/6/14
Signature / Date



1
5

WETLAND DETERMINATION DATA FORM

300 ft corridor

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 70
Date: 7/6/14	Project Name & No.: Alaska LNG 26221306	Map #: 41/130	Map Date: 5/27/14
Investigators: K DEGWIS	J ANDERSON	Feature Id: W61HT030	Team No.: W61
State: Alaska	Region: Alaska	Milepost: 567.55	
Latitude: 63° 22' 27.20"	Longitude: 148° 56' 49.88"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 39	Picture No.: P-W61HT030 - Pit; Plug; E; South	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): River terrace
Slope (%): 2	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PSS1/EM1C	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation, Soil, or Hydrology Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1C
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): II B1, II C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 39 for site sketch & notes.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>N/A</u>	—	—	—
2.			
3.			
4.			
Total Cover: <u>—</u> 50% of total cover: <u>—</u> 20% of total cover: <u>—</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Alnus fruticosa</u>	10		FAC
2. <u>Salix bairdii</u>	30	Y	FAC
3. <u>Rubus arcticus</u>	20		FAC
4. <u>Salix pulchra</u>	15		FACW
5. <u>Salix glauca</u>	35	Y	FAC
6.			
7.			
8.			
9.			
Total Cover: <u>110</u> 50% of total cover: <u>55</u> 20% of total cover: <u>22</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 15 X 1 = 15
 FACW species: 15 X 2 = 30
 FAC species: 105 X 3 = 315
 FACU species: — X 4 = —
 UPL species: — X 5 = —
 Column Totals: 135 (A) 360 (B)
 PI = B/A = 2.67

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Comarum palustre</u>	10	Y	OBL
2. <u>Calamagrostis canadensis</u>	10	Y	FAC
3. <u>Carex aquatilis</u>	5		OBL
4. <u>Viola palustris</u>	T		FACW
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>25</u> 50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 3.0
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

30 % Bare Ground
0 % Cover of Wetland Bryophytes
5 Total Cover of Bryophytes
10 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):
multiple trunking observed on most Salix. specimen

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 7/6/14 Feature ID W611T030 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"							Fibric	Saturated
2-10"	7.5 YR						Fibric	includes sandy loam
2-6"	7.5 YR 3/1	100					Fibric/sandy loam	
6-18"	7.5 YR 2.5/1	85	10 YR 3/4	15	C	M	Fine sandy loam	Redox distinct, prominent includes 15% gravel, 5% pebbles

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) <u>X</u>

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches): -

Hydric Soil Present (Y/N): Y

Notes: Satisfies (FG) indicator = Redox dark surface

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) <u>X</u>	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) <u>a</u>	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>a</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1/2"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>6"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>	

Notes:

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <u>75</u> Short shrub (0.5-2m) <u>15</u> Dwarf shrub (<0.5m) <u>20</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>25</u> Moss-Lichen <u>5</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>			
Number of Wetland Types (M): <u>1</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly <input checked="" type="checkbox"/> Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet <input checked="" type="checkbox"/>	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate <input checked="" type="checkbox"/> Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <input checked="" type="checkbox"/> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs <input checked="" type="checkbox"/> Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.84</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

[Handwritten Signature]

GPS Technician QA/QC check:

[Handwritten Signature] 7/6/14

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1HT030

Field Target: 70

Date: 7/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X [Signature] 7/6/14
Signature / Date

X Kim DEGUTIS
Field Crew Chief (print)

X [Signature] 7/6/14
Signature / Date

WETLAND DETERMINATION DATA FORM

*2000-ft
Corridor*

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 075
Date: 7/7/14	Project Name & No.: Alaska LNG 26221306		Map #: 51130 Map Date: 5/27/14
Investigators: K DEBOVIS J Anderson	Feature Id: W61HT031		Team No.: W61
State: Alaska	Region: Alaska	Milepost: 581.15	
Latitude: 63°15'20.05	Longitude: 149°15'44.85	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 40	Picture No.: P-W61HT031-Pit; Plug; NE, S	

SITE PARAMETERS	
Subregion: <i>Interior/Southcentral</i>	Landform (hillslope, terrace, hummocks, etc.): <i>hummocks</i>
Slope (%): <i>1</i>	Local relief (concave, convex, none): <i>CONVEX</i>
Pre-mapped Alaska LNG/NWI classification: <i>PEM1F</i>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <i>PEM1/SS1X/F</i>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): <i>IIA3, IICD</i>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Sample plot w/in area of patterned ground area

See logbook W61-2, page 40 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: _____ 20% of total cover: _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>49</u> X 1 = <u>49</u> FACW species: <u>23</u> X 2 = <u>46</u> FAC species: <u>57</u> X 3 = <u>171</u> FACU species: <u>5</u> X 4 = <u>20</u> UPL species: _____ X 5 = _____ Column Totals: <u>134</u> (A) <u>286</u> (B) PI = B/A = <u>2.13</u>
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Betula nana</i> -	20	Y	FAC	
2. <i>Vaccinium uliginosum</i> -	15 12	Y	FAC	
3. <i>Rhododendron sprentlandicum</i> -	10		FAC	
4. <i>Andromeda polifolia</i> *	1		FACW	
5. <i>Picea glauca</i>	2		FACU	
6. <i>Empetrum nigrum</i> *	7		FAC	
7. <i>Spirea stenonii</i> -	3		FACU	
8. <i>Vaccinium oxycoccos</i> *	1		OBL	
9.				
Total Cover: <u>56</u> 50% of total cover: <u>28</u> 20% of total cover: <u>11.2</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Comarum palustre</i>	3		OBL	
2. <i>Viola palustris</i>	1		FACW	
3. <i>Eleocharis acicularis</i>	30	Y	obl	
4. <i>Calamagrostis canadensis</i>	15.8		FAC	
5. <i>Pedicularis labradorica</i>	1		FACW	
6. <i>Carex vaginata</i>	15		obl	
7. <i>Carex capillaris</i>	20	Y	FACW	
8. <i>Rubus chamaemorus</i>	7		FACW	
9.				
10.				
Total Cover: 85 78 50% of total cover: 42.5 39 20% of total cover: 17 15.6				<u>0</u> % Bare Ground <u>5</u> % Cover of Wetland Bryophytes <u>45</u> Total Cover of Bryophytes <u>55</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/7/14</u> Feature ID <u>NW1HT031</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"							Histel/Fibric	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) <u> </u>			Alaska Gleyed (A13) <u> </u>			Alaska Color Change (TA4) ⁴ <u> </u>		
Histic Epipedon (A2) <u> </u>			Alaska Redox (A14) <u> </u>			Alaska Alpine Swales (TA5) <u> </u>		
Black Histic (A3) <u> </u>			Alaska Gleyed Pores (A15) <u> </u>			Alaska Redox with 2.5Y Hue <u> </u>		
Hydrogen Sulfide (A4) <u> </u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer <u> </u>		
Thick Dark Surface (A12) <u> </u>						Other (Explain in Notes) <u> </u>		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.								
⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u> </u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u> </u>								
Notes: <u> </u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u> </u>	Surface Soil Cracks (B6) <u> </u>	Water-stained Leaves (B9) <u> </u>	Stunted or Stressed Plants (D1) <u> </u>	
High Water Table (A2) <u> </u>	Inundation Visible on Aerial Imagery (B7) <u> </u>	Drainage Patterns (B10) <u> </u>	Geomorphic Position (D2) <u> </u>	
Saturation (A3) <u> </u>	Sparsely Vegetated Concave Surface (B8) <u> </u>	Oxidized Rhizospheres along Living Roots (C3) <u> </u>	Shallow Aquitard (D3) <u> </u>	
Water Marks (B1) <u> </u>	Marl Deposits (B15) <u> </u>	Presence of Reduced Iron (C4) <u> </u>	Microtopographic Relief (D4) <u> </u>	
Sediment Deposits (B2) <u> </u>	Hydrogen Sulfide Odor (C1) <u> </u>	Salt Deposits (C5) <u> </u>	FAC-Neutral Test (D5) <u> </u>	
Drift Deposits (B3) <u> </u>	Dry-Season Water Table (C2) <u> </u>	Notes: <u> </u>		
Algal Mat or Crust (B4) <u> </u>	Other (Explain in Notes): <u> </u>			
Iron Deposits (B5) <u> </u>				
Surface Water Present (Y/N): <u> </u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u> </u>		
Water Table Present (Y/N): <u> </u>	Depth (in): <u> </u>			
Saturation Present (Y/N): (includes capillary fringe) <u> </u>	Depth (in): <u> </u>			
Notes: <u> </u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> ^{Note} Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> 45 Dwarf shrub (<0.5m) <input checked="" type="checkbox"/> 9 Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> 78 Moss-Lichen <input checked="" type="checkbox"/> 45 Floating <input type="checkbox"/> Submerged <input type="checkbox"/>			
Number of Wetland Types (M): <input checked="" type="checkbox"/> 2		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven <input checked="" type="checkbox"/> Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.35</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check: *Kelly W*

GPS Technician QA/QC check: *Jennifer Anderson*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1HTO31

Field Target: 075

Date: 7/7/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/7/14
Signature / Date

X Kim DEGUTIS
Field Crew Chief (print)

X Kelly L. Alt 7/7/14
Signature / Date

WETLAND DETERMINATION DATA FORM

2000' corridor

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 76
Date: 7/7/14	Project Name & No.: Alaska LNG 26221306		Map #: 51130 Map Date: 5/27/14
Investigators: K DeGuis J Anderson			Feature Id: W61HT032
State: Alaska	Region: Alaska	Milepost: 581.2	Team No.: W61
Latitude: 63° 15' 14.41"	Longitude: 149° 15' 51.15"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 41	Picture No.: P-W61HT032-Pit; Plug; S; NE	

SITE PARAMETERS	
Subregion: South central	Landform (hillslope, terrace, hummocks, etc.): Flat
Slope (%): 1	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: PEMIF	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1/EMIB
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): IIC1, IIIA3

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 41 for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>N/A</u>	-	-	-
2.			
3.			
4.			
Total Cover: <u>—</u> 50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Petula nana</u>	45	Y	FAC
2. <u>Vaccinium uliginosum</u>	35	Y	FAC
3. <u>Rhododendron greenlandicum</u>	15		FAC
4. <u>Vaccinium oxycoccos</u>	1		OBL
5. <u>Empetrum nigrum</u>	15		FAC
6. <u>Andromeda polifolia</u>	2		FACW
7.			
8.			
9.			
Total Cover: <u>113</u> 50% of total cover: <u>56.5</u> 20% of total cover: <u>22.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 5 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 8 X 1 = 8
 FACW species: 21 X 2 = 42
 FAC species: 122 X 3 = 366
 FACU species: — X 4 = —
 UPL species: — X 5 = —
 Column Totals: 151 (A) 416 (B)
 PI = B/A = 2.75

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <u>Rubus chamaemorus</u>	8	Y	FACW
2. <u>Carex vaginata</u>	7	Y	OBL
3. <u>Calamagrostis canadensis</u>	5		FAC
4. <u>Pedicularis laboradorica</u>	3		FACW
5. <u>Carex bigelowii</u>	7	Y	FAC
6. <u>Sanguisorba canadensis</u>	3		FACW
7. <u>Euphorum angustifolium</u>	T		OBL
8. <u>Carex membranacea</u>	5		FACW
9.			
10.			
Total Cover: <u>38</u> 50% of total cover: <u>19</u> 20% of total cover: <u>7.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
— % Cover of Wetland Bryophytes
60 Total Cover of Bryophytes
3 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/7/14</u> Feature ID <u>W61HT03 2</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18"							Fibric	Saturated
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>Y</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>No</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>Y</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>8"</u>		
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>		
Notes:			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>95</u> Dwarf shrub (<0.5m) <u>18</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>39</u> Moss-Lichen <u>60</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>2</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.23</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

[Signature]

GPS Technician QA/QC check:

[Signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W6LHT032

Field Target: FT:076

Date: 7/7/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X
Jennifer Anderson
Wetland Scientist (print)

X
Jennifer Anderson 7/7/14
Signature / Date

X
Kim DEGOTTIS
Field Crew Chief (print)

X
Kimberly K. ... 7/7/14
Signature / Date

WETLAND DETERMINATION DATA FORM

2000-ft Corridor

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 77
Date: 7/7/14	Project Name & No.: Alaska LNG 26221306		Map #: 51130 Map Date: 5/27/14
Investigators: K DEGUTIS J ANDERSON		Feature Id: W61HT033	
State: Alaska	Region: Alaska	Milepost: 581.25	Team No.: W61
Latitude: 63° 16' 12.00" N	Longitude: 149° 15' 52.92" W	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 42	Picture No.: P_W61HT033-P1; Plug; SW; NE	

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 1	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: PSS1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation, Soil, or Hydrology Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): II B1, III A2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 42
for notes & site sketch

Salix. dom. wetland

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				Indicator Status	Dominant Species? (Y/N)	Absolute % Cover	Tree Stratum (Plot sizes: <u>20'</u>)
1.	N/A	-	-				
2.							
3.							
4.							
Total Cover: <u>-</u>				50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>20'</u>)				Indicator Status	Dominant Species? (Y/N)	Absolute % Cover	
1.	<i>Spirea stevenii</i>	10					
2.	<i>Salix pseudomyrsinites</i>	65	Y	Assumed FAC UPL			
3.	<i>Rubus cuneifolius</i>	8		FAC			
4.							
5.							
6.							
7.							
8.							
9.							
Total Cover: <u>83</u>				50% of total cover: <u>41.5</u> 20% of total cover: <u>16.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)
50

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: - X 1 = -
 FACW species: 4 X 2 = 8
 FAC species: 113.48 X 3 = 339.174
 FACU species: 12 X 4 = 48
 UPL species: 65 X 5 = 325
 Column Totals: 129 (A) 395.525 (B)
 PI = B/A = 3.06 4.07

* Not listed in 2014 AT Wetland Plant List - so considered UPL species

VEGETATION (use scientific names of plants)				Indicator Status	Dominant Species? (Y/N)	Absolute % Cover	Herb Stratum (<u>20'</u>)
1.	<i>Calamagrostis canadensis</i>	35	Y				
2.	<i>Sanguinaria canadensis</i>	3		FACW			
3.	<i>Equisetum arvense</i>	5		FAC			
4.	<i>Chamaenerion angustifolium</i>	2		FACU			
5.	<i>Viola palustris</i>	1		FACW			
6.							
7.							
8.							
9.							
10.							
Total Cover: <u>46</u>				50% of total cover: <u>23</u> 20% of total cover: <u>9.2</u>			

Hydrophytic Vegetation Indicators:
 _____ Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

5 % Bare Ground
0 % Cover of Wetland Bryophytes
0 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):
Salix exhibits surficial rooting & multiple trunking throughout plot & w/in adjacent areas

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/7/14</u> Feature ID <u>W61H033</u>				Soil Pit Required (Y/N) <u>Y</u>	
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹		
0-2"						Fibric	Saturated
2-5"						Hemic	Saturated
5-7"	10YR 2/2	100				Silt loam	Saturated
7-12"	2.5Y 4/3	70	7.5YR 4/6	30	C	PL	Silt loam
12-18"	2.5Y 5/3	85	7.5YR 5/6	15	C	PL	Silt loam 5% gravel throughout, Saturated
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
HYDRIC SOIL INDICATORS				INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³			
Histosol or Histel (A1) _____		Alaska Gleyed (A13) _____		Alaska Color Change (TA4) ⁴ _____			
Histic Epipedon (A2) _____		Alaska Redox (A14) _____		Alaska Alpine Swales (TA5) _____			
Black Histic (A3) _____		Alaska Gleyed Pores (A15) _____		Alaska Redox with 2.5Y Hue <u>X</u>			
Hydrogen Sulfide (A4) _____				Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____			
Thick Dark Surface (A12) _____				Other (Explain in Notes) _____			
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.							
⁴ Give details of color change in Notes.							
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u>—</u>							
Hydric Soil Present (Y/N): <u>Y</u>							
Notes:							

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>Y</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>Y</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>5"</u>		
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0"</u>		
Notes:			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>10</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>0</u> Tall shrub (2-6m) <u>65</u> Short shrub (0.5-2m) <u>10</u> Dwarf shrub (<0.5m) <u>0</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>46</u> Moss-Lichen <u>0</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>1</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <u>α</u>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <u>α</u> Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>α</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>α</u> High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <u>α</u>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>α</u>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>α</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>α</u>			
HGM Class (P): Slope _____ Flat <u>α</u> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty <u>α</u> Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>α</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>α</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>α</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <u>α</u> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>α</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>α</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>α</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <u>α</u> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>α</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>α</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <u>α</u> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>α</u>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <u>α</u> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <u>α</u> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: 

GPS Technician QA/QC check: 

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: 061HT033 Field Target: 077 Date: 7/7/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson X Jennifer Anderson
Wetland Scientist (print) Signature / Date

X Kim DeGuis X [Signature] 7/2/14
Field Crew Chief (print) Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <i>✓ corridor</i>	Field Target: <u>79</u>
Map #: <u>531</u>		Map Date: <u>6/26/14</u>	
Date: <u>7/8/14</u>	Project Name & No.: Alaska LNG 26221306		Feature Id: <u>W61HT034</u>
Investigators: <u>K DEGOUTS</u> <u>J ANDUSOR</u>			Team No.: <u>W61</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>No MP ON MAP OF OPS</u>	
Latitude: <u>63° 14' 11.8560"</u>		Longitude: <u>149° 16' 29.39"</u>	Datum: <u>WGS84</u>
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>43</u>	Picture No.: <u>P-W61HT034 - Pit; Plug; S; N</u>	

SITE PARAMETERS	
Subregion: <u>Southcentral</u>	Landform (hillslope, terrace, hummocks, etc.): <u>TERRACE</u>
Slope (%): <u>1</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>PF01/4/SS1B</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <u>✓</u> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <u>✓</u> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <u>✓</u> (If yes, explain in Notes)
Are Vegetation _____, Soil <u>✓</u> , or Hydrology _____ Naturally Problematic?	No _____ (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <u>✓</u> No _____	Is the Sampled Area within a Wetland? Yes <u>✓</u> No _____
Hydric Soil Present? Yes <u>—</u> No <u>—</u>	Wetland Type: <u>PF01A/SS1B</u> PS1B <i>ok</i> <i>27</i>
Wetland Hydrology Present? Yes <u>✓</u> No _____	Alaska Vegetation Classification (Viereck): <u>IC3, IIB1, IIIA2</u> <i>ok</i>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

- Sample plot located on river terrace, soils problematic throughout.
- Very P/E 3.45, however multiple trunking & buttressing of trees observed w/in plot (MORPHOLOGICAL ADAPTATION)

Water table @ 6" (this is deepest WT out of several pits dug to confirm hydrology throughout).

See logbook W61-2, page 43

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>40</u> (A/B)
1. <i>Populus balsamifera</i>	15	Y	FACU	
2. <i>Salix glauca</i>	3		FACU	
3. <i>Petula neotaskana</i>	2		FACU	
4.				
Total Cover: <u>20</u> 50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>—</u> X 1 = <u>—</u> FACW species: <u>3</u> X 2 = <u>6</u> FAC species: <u>71</u> X 3 = <u>213</u> FACU species: <u>68</u> X 4 = <u>272</u> UPL species: <u>—</u> X 5 = <u>—</u> Column Totals: <u>142</u> (A) <u>491</u> (B) PI = B/A = <u>3.45</u>
1. <i>Shepherdia canadensis</i>	10		FACU	
2. <i>Salix pseudomyrsinites</i>	55	Y	NI	
3. <i>Rosa acicularis</i>	5		FACU	
4. <i>Salix pseudo-monticola</i>	5		FAC	
5. <i>Vaccinium uliginosum</i>	25	Y	FAC	
6. <i>Ribes hudsoni glandulosum</i>	2		FACU	
7. <i>Populus balsamifera</i>	5		FACU	
8.				
9.				
Total Cover: <u>107</u> 50% of total cover: <u>53.5</u> 20% of total cover: <u>21.4</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is > 50% <input type="checkbox"/> Prevalence Index is ≤ 3.0 <input checked="" type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Notes) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Calamagrostis canadensis</i>	12	Y	FAC	
2. <i>Equisetum arvense</i>	20	Y	FAC	
3. <i>Cornus canadensis</i>	15	Y	FACU	
4. <i>Chamaecrista angustifolium</i>	10		FACU	
5. <i>Aconitum delphinifolium</i>	2		FAC	
6. <i>Salix boreale</i>	1		FACU	
7. <i>Rubus arcticus</i>	7		FAC	
8. <i>Sanguisorba canadensis</i>	3		FACU	
9. <i>Lupinus arcticus</i>	T		FACU	
10.				
Total Cover: <u>70</u> 50% of total cover: <u>35</u> 20% of total cover: <u>14</u>				
				% Bare Ground: <u>45</u> % Cover of Wetland Bryophytes: <u>0</u> Total Cover of Bryophytes: <u>0</u> % Cover of Water: <u>20-15</u> Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below): Some multiple trunking observed in <i>Salix</i> sp. <i>Populus balsam</i> (tree) buttressing of trees observed some surficial rooting

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 7/8/14 Feature ID W6147034 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2"							Fibric	Saturated
2-7"	7.5YR 3/1	80	10YR 3/10	20	C	M	Fine Sandy loam	Saturated
7-18"	10YR 2/1	100					Fine Sandy loam	15% cobble, 50% gravel

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) <u>X</u>

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: No Depth (inches): -

Hydric Soil Present (Y/N): Y

Notes: problem soils on flood plain; Hydrology criteria satisfied. pH is high (7.3), and soil has low organic-matter content

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u>X</u>	Drainage Patterns (B10) <u>10</u>	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>4"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>8"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>2"</u>	

Notes:

WETLAND DETERMINATION DATA FORM

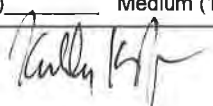
VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved <input checked="" type="checkbox"/>		
Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/>		
Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>20</u> Sapling (<5 dbh, <6m tall) <u>5</u> Tall shrub (2-6m) <u>60</u> Short shrub (0.5-2m) <u>17</u>		
Dwarf shrub (<0.5m) <u>6</u> Tall herb (≥1m) <u>6</u> Short herb (<1m) <u>70</u> Moss-Lichen <u>0</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>3</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) <u>NE</u>		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____	
Mineral: Gravelly _____ Mineral: Sandy <input checked="" type="checkbox"/> Mineral: Silty _____ Mineral: Clayey _____	

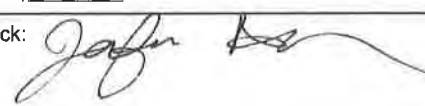
HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate <input checked="" type="checkbox"/> Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent <input checked="" type="checkbox"/> Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs <input checked="" type="checkbox"/> Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>7.31</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:



GPS Technician QA/QC check:



Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W614T034 Field Target: 79 Date: 7/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Janice Arce 7/8/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X [Signature] 7/8/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 7B
Date: 7/8/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W6117035	
Investigators: K DeGuns	J Anderson	Team No.: W613	
State: Alaska	Region: Alaska	Milepost: No MP on MAP & GPS	
Latitude: 63° 14' 38.74"	Longitude: 149° 16' 20.73"	Datum: WGS84	
Logbook No.: W61-2	Logbook Page No.: 44	Picture No.: P_W6117035_Pt; Plug; NE; SE	

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 2	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: Upland	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: UPLAND
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): II C2, III A2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 44
for site sketch & notes

- Hydrology by 2° indicator only
- Soils very dry, no redox features observed

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. N/A	-	-	-
2.			
3.			
4.			
Total Cover: <u>-</u> 50% of total cover: _____ 20% of total cover: _____			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula glandulosa</i>	30	Y	FAC
2. <i>Vaccinium uliginosum</i>	8		FAC
3. <i>Salix bebbiana</i>	10		FAC
4. <i>Salix polaris</i>	7		FACW
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>55</u> 50% of total cover: <u>27.5</u> 20% of total cover: <u>11</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: - X 1 = -
 FACW species: 15 X 2 = 30
 FAC species: 108 X 3 = 324
 FACU species: - X 4 = -
 UPL species: - X 5 = -
 Column Totals: 123 (A) 354 (B)
 PI = B/A = 2.87

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Calamagrostis canadensis</i>	45	Y	FAC
2. <i>Deschampsia caespitosa</i>	5		FAC
3. <i>Rubus chamaemorus</i>	5		FACW
4. <i>Polemonium acutiflorum</i>	3		FAC
5. <i>Carex peduncarpa</i>	5		FAC
6. <i>Carex loliacea</i>	2		FAC
7. <i>Carex saxatilis</i>	3		FACW
8.			
9.			
10.			
Total Cover: <u>69</u> 50% of total cover: <u>34</u> 20% of total cover: <u>13.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

15 % Bare Ground
0 % Cover of Wetland Bryophytes
35 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date _____	Feature ID _____		Soil Pit Required (Y/N) _____			
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0. - 0.5"							Fibric	dry
0.5 - 18"	2.5Y 4/3	45	10YR 3/3	5	C	PL	silt loam	5% gravel; 2% cobble
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u> — </u>								
Hydric Soil Present (Y/N): <u>N</u>								
Notes: <u>Does not satisfy Alaska 2.5Y Hue indicator (color, % of redox throughout)</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> — </u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u> — </u>			
Saturation Present (Y/N): <u>N</u> (includes capillary fringe)	Depth (in): <u> — </u>			
Notes: _____				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvioaquatic Soils Sediment Created _____			
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W614T035 Field Target: 78 Date: 7/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson X Jennifer Anderson 7/8/14
Wetland Scientist (print) Signature / Date

X Kim DEGUIS X [Signature] 7/8/14
Field Crew Chief (print) Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: <u>63</u>	Map #: <u>41130</u> Map Date: <u>5/27/14</u>	
Date: <u>7/8/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W61HT036</u>	
Investigators: <u>K DEGUTIS J Anderson</u>			Team No.: <u>W61</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>557.95</u>	
Latitude: <u>63° 27' 55.57"</u>	Longitude: <u>148° 48' 22.33"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>45</u>	Picture No.: <u>P-W61HT036 - Pt; Plug; S; E.</u>	

SITE PARAMETERS	
Subregion: <u>Southcentral</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FLAT</u>
Slope (%): <u>3</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>UPLAND</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (If no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PSS1 EM1 B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): <u>IIA2, IIC1, IIIA2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2,
page 45 &
notes & site sketch

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	7	Y	FACU
2.			
3.			
4.			
Total Cover: <u>7</u> 50% of total cover: <u>3.5</u> 20% of total cover: <u>-</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Vaccinium uliginosum</i>	40	Y	FAC
2. <i>Vaccinium vitis-idaea</i>	10		FAC
3. <i>Betula nana</i>	15	Y	FAC
4. <i>Salix lasiantha</i>	10		FACW
5. <i>Salix pulchra</i>	10		FACW
6. <i>Rhododendron groenlandicum</i>	5		FAC
7. <i>Picea glauca</i>	15	Y	FACU
8. <i>Spirea stevensii</i>	15	Y	FACU
9. <i>Eupatorium nigrum</i>	5		FAC
Total Cover: <u>140</u> 50% of total cover: <u>70</u> 20% of total cover: <u>28</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 7 (B)
 % Dominant Species that are OBL, FACW, or FAC: 57% (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: - X 1 = -
 FACW species: 25 X 2 = 50
 FAC species: 30 X 3 = 90
 FACU species: 36 X 4 = 108
 UPL species: - X 5 = -
 Column Totals: 193 (A) 554 (B)
 PI = B/A = 2.87

Salix glauca 10 FAC
Salix arbusculoidea 5 FACW

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum sylvaticum</i>	30	Y	FAC
2. <i>Calamagrostis canadensis</i>	15	Y	FAC
3. <i>Equisetum arvense</i>	10		FAC
4. <i>Rubus chamaemorus</i>	5		FACW
5. <i>Pyrola grandiflora</i>	2		FAC
6. <i>Rumex crispus</i>	7		FAC
7.			
8.			
9.			
10.			
Total Cover: <u>62</u> 50% of total cover: <u>31</u> 20% of total cover: <u>12.4</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

5 % Bare Ground
0 % Cover of Wetland Bryophytes
20 Total Cover of Bryophytes
15 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/9/14</u>	Feature ID <u>E.V.61HT036</u>	Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"							Fibric	Saturated
6-18"	10YR 3/2	100					sandy loam	100% cobble
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS				INDICATORS FOR PROBLEMATIC HYDRIC SOILS³				
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) <u>0</u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u>—</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>0</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>0</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>0</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>0</u>	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1/2"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>1"</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0"</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>7</u> Sapling (<5 dbh, <6m tall) <u>15</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>120</u> Dwarf shrub (<0.5m) <u>5</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>62</u> Moss-Lichen <u>20</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven <input checked="" type="checkbox"/> Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy <input checked="" type="checkbox"/> Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet <input checked="" type="checkbox"/> Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) <input checked="" type="checkbox"/> Acid (<5.5) _____ pH Reading <u>8.25</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized <input checked="" type="checkbox"/> 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

[Signature]

GPS Technician QA/QC check:

[Signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61HT036

Field Target: 63

Date: 7/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson
Wetland Scientist (print)

X Jennifer Anderson 7/8/14
Signature / Date

X Kim DEGUIS
Field Crew Chief (print)

X [Signature] 7/8/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: <u>62</u>	Map #: <u>40/130</u> Map Date: <u>5/27/14</u>	
Date: <u>7/8/14</u>	Project Name & No.: Alaska LNG 26221306	Feature Id: <u>W6117037</u>	
Investigators: <u>K DeGruis J Anderson</u>			Team No.: <u>W61</u>
State: Alaska	Region: Alaska	Milepost: <u>553.85</u>	
Latitude: <u>63° 31' 14.16"</u>	Longitude: <u>148° 48' 02.06"</u>	Datum: WGS84	
Logbook No.: <u>W61-2</u>	Logbook Page No.: <u>46</u>	Picture No.: <u>P_W61HT037_P.t; Plug; S; W</u>	

SITE PARAMETERS	
Subregion: <u>Southcentral</u>	Landform (hillslope, terrace, hummocks, etc.): <u>FLAT</u>
Slope (%): <u>1</u>	Local relief (concave, convex, none): <u>NONE</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS4/1B</u>	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: <u>UPLAND</u>
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>I A2, II C1, III A2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook W61-2, page 46
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	7	Y	FACU
2.			
3.			
4.			
Total Cover: <u>7</u> 50% of total cover: <u>3.5</u> 20% of total cover: <u>-</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula glandulosa</i>	55	Y	FAC
2. <i>Rhododendron appenlandicum</i>	30	Y	FAC
3. <i>Vaccinium vitis idaea</i>	35	7	FAC
4. <i>Rosa acicularis</i>	3		FACU
5. <i>Vaccinium uliginosum</i>	35	Y	FAC
6. <i>Picea glauca</i>	7		FACU
7.			
8.			
9.			
Total Cover: 130 <u>137</u> 50% of total cover: 65 <u>68.5</u> 20% of total cover: 26 <u>27.4</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 6 (B)
 % Dominant Species that are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: - X 1 = -
 FACW species: 8 X 2 = 16
 FAC species: 139 X 3 = 417
 FACU species: 28 X 4 = 112
 UPL species: - X 5 = -
 Column Totals: 175 (A) 545 (B)
 PI = B/A = 3.11

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Petasites frigidus</i>	5		FACW
2. <i>Calamagrostis CANADENSIS</i>	10	Y	FAC
3. <i>Cornus canadensis</i>	7	10	FACU
4. <i>Rubus Chamaemorus</i>	3		FACW
5. <i>Equisetum arvense</i>	2		FAC
6. <i>Chamaecrista nictitans</i>	1		FACU
7.			
8.			
9.			
10.			
Total Cover: <u>31</u> 50% of total cover: <u>15.5</u> 20% of total cover: <u>6.2</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

∅ % Bare Ground
∅ % Cover of Wetland Bryophytes
2∅ Total Cover of Bryophytes
∅ % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/8/14</u>	Feature ID <u>WGLW057</u>	Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8"							Fibric	Dry
8-10"	2.5Y 3/2	87	10YR 3/6	15	PL	M	silt loam	
10-18"	2.5Y 4/1	89	7.5YR 3/4		PL	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: No Depth (inches): _____

Hydric Soil Present (Y/N): No

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>-</u>	Wetland Hydrology Present (Y/N): <u>N</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>-</u>	
Saturation Present (Y/N): <u>N</u> (includes capillary fringe)	Depth (in): <u>-</u>	
Notes:		

WETLAND DETERMINATION DATA FORM


VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: 

GPS Technician QA/QC check: 

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG1HT037

Field Target: 62

Date: 7/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson X [Signature] 7/8/14
Wetland Scientist (print) Signature / Date

X Kim DEGUSIS X [Signature] 7/8/14
Field Crew Chief (print) Signature / Date

WETLAND DETERMINATION DATA FORM

2000-ft corridor

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 61
Date: 7/8/14	Project Name & No.: Alaska LNG 26221306		Map #: 40130 Map Date: 5/27/14
Investigators: K DEGUTIS J Anderson		Feature Id: WG1HT038	
State: Alaska	Region: Alaska	Milepost: 553.65	Team No.: WG1
Latitude: 63° 31' 24.36"	Longitude: 148° 48' 06.96"	Datum: WGS84	
Logbook No.: WG1-2	Logbook Page No.: 47	Picture No.: P-WG1HT038-P.t; P.W; E	

SITE PARAMETERS	
Subregion: Southcentral	Landform (hillslope, terrace, hummocks, etc.): FLAT
Slope (%): 1	Local relief (concave, convex, none): NONE
Pre-mapped Alaska LNG/NWI classification: UPLAND	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: UPLAND
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): IA2, IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See logbook WG1-2, page 47
for site sketch & notes

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea glauca</i>	40	Y	FACU
2.			
3.			
4.			
Total Cover: <u>40</u> 50% of total cover: <u>20</u> 20% of total cover: <u>8</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rosa acicularis</i>	10	Y	FACU
2. <i>Vaccinium vitis-idaea</i>	7		FAC
3. <i>Empetrum nigrum</i>	5		FAC
4. <i>Linnaea borealis</i>	2		FACU
5. <i>Vaccinium uliginosum</i>	25	Y	FAC
6. <i>Salix lucida</i>	7		FAC
7.			
8.			
9.			
Total Cover: <u>56</u> 50% of total cover: <u>28</u> 20% of total cover: <u>11.2</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 6 (B)
 % Dominant Species that are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: - X 1 = -
 FACW species: 2 X 2 = 4
 FAC species: 51 X 3 = 153
 FACU species: 59 X 4 = 236
 UPL species: - X 5 = -
 Column Totals: 112 (A) 393 (B)
 PI = B/A = 3.51

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum arvense</i>	5	Y	FAC
2. <i>Petasites frigidus</i>	2		FACW
3. <i>Calamagrostis canadensis</i>	2		FAC
4. <i>Mertensia paniculata</i>	3	Y	FACU
5. <i>Helysacum alpinum</i>	3	Y	FACU
6. <i>Chamaenerion angustifolium</i>	1		FACU
7. <i>Rumex crispus</i>	1		FAC
8.			
9.			
10.			
Total Cover: <u>16</u> 50% of total cover: <u>8</u> 20% of total cover: <u>3.2</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

10 % Bare Ground
0 % Cover of Wetland Bryophytes
10 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>7/8/14</u> Feature ID <u>W61H038</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7"							Fibric	organic
7-12"	2.5Y 3/1	95	10YR 3/6	5	C	M	sand/loam	
12"	frozen							
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>frozen</u> Depth (inches): <u>12"</u>								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>—</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u>—</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES	
P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____	
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____	
Number of Wetland Types (M): _____	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____	
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____	
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____	
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____	
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____	
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____	
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____	
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____	

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: *[Signature]*

GPS Technician QA/QC check: *[Signature]*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W61 HT039 Field Target: 61 Date: 7/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Jennifer Anderson X John Am 7/8/14
Wetland Scientist (print) Signature / Date

X Kim DEGUIS X [Signature] 7/8/14
Field Crew Chief (print) Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 193	Map #: 126 Map Date: 5/27/14
Date: 06-01-2014	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1001
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 701.9	
Latitude: 61°48'28.66"		Longitude: -150°18'40.96"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 1	Picture No.: P-W60T1001-E-W-pit-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummock
Slope (%): 0-3	Local relief (concave, convex, none): Flat
Pre-mapped Alaska LNG/NWI classification: PSS1/EMIB	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): 2C7 2C1 II C1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

spruce/birch forest surrounding wetland

Survey pt.

veg photo 001

veg photo 002

pit/plug

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nealaskana</i>	5	-	FACU
2. <i>Betula nana</i>	25	Y	FAC
3. <i>Picea mariana</i>	1	-	FACW
4. <i>Salix fuscescens</i>	5	-	FACW
5. <i>Vaccinium Uliginosum</i>	60	Y	FAC
6.			
7.			
8.			
9.			
Total Cover: <u>96</u> 50% of total cover: <u>48</u> 20% of total cover: <u>19.2</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 3 x 1 = 3
 FACW species: 26 x 2 = 52
 FAC species: 110 x 3 = 330
 FACU species: 5 x 4 = 20
 UPL species: 0 x 5 = 0
 Column Totals: 144 (A) 405 (B)
 PI = B/A = 2.8

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Andromeda polifolia</i>	20	Y	FACW
2. <i>Cyperus palustris</i>	3	-	OBL
3. <i>Calamagrostis Canadensis</i>	25	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>48</u> 50% of total cover: <u>24</u> 20% of total cover: <u>9.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
40 % Cover of Wetland Bryophytes
10 Total Cover of Bryophytes
5 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 06-01-14 Feature ID W60T1001 Soil Pit Required (Y/N) _____

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6								Organic; fibric only
6-22	7.5 YR 4/4	60	7.5 YR 2.5/3	15	C	M	Sandy loam	
	10 YR 2/1	25						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) <u>X</u>	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: 7.5 YR 2.5/3
10 YR 2/1
7.5 YR 4/4

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>X</u>	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>✓</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: Saturated to surface	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>9 3"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0</u>	

Notes: parts of plot have standing surface water

conductivity 25µs

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES P= Plot, M= Matrix

Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____
 Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved X
 Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____

Percent Cover (P): Tree (>5 dbh, >6m tall) 0 Sapling (<5 dbh, <6m tall) 0 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 25
 Dwarf shrub (<0.5m) 65 Tall herb (≥1m) 0 Short herb (<1m) 48 Moss-Lichen 60 Floating 0 Submerged 0

Number of Wetland Types (M): 1 **Evenness of Wetland Type Distribution (M):** Even X Highly Uneven _____ Moderately even _____

Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) X Very High Density (80-100%) _____

Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover X N/A _____

Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) X High (>25) _____

Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A X

Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover X

Dead Woody Material (P): Low Abundance (0-25% of surface) X Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____

Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) X

HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional X Riverine _____ Estuarine Fringe _____

SOIL VARIABLES

Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____
 Mineral: Gravelly _____ Mineral: Sandy X Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES

Inlet/Outlet Class (P): No Inlet/Outlet X No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____

Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated X
 Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____

Evidence of Sedimentation (P): No Evidence Observed X Sediment Observed on Wetland Substrate _____ Fluvial Soils Sediment Created _____

Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) X Pronounced (>18in.) _____

Frequency of Overbank Flooding (P): No Overbank Flooding X Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____

Degree of Outlet Restriction (P): No Outflow X Restricted Outflow _____ Unrestricted Outflow _____

Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) X **pH Reading** 4.04

Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits X
 Glacial Till/Not Permeable _____

Basin Topographic Gradient (M): Low Gradient (<2%) X High Gradient (≥2%) _____

Evidence of Seeps and Springs (P): No Seeps or Springs X Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)

Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below X
 Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____

Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) X

Watershed Land Use: 0-5% Rural X 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____

Size: Small (<10 acres) X Medium (10-100 acres) _____ Large (>100 acres) _____

Crew Chief QA/QC check:

VW

GPS Technician QA/QC check:

JM

*QA/QC check
DEC*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOTI 001

Field Target: 193

Date: 06-01-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?

Two photos were taken for each Observation Point (vegetation/site overview)?

NA

X Zoe Meade

Wetland Scientist (print)

X *Zoemeade* 06-01-14

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

Signature / Date

DEE

Vegetation Classification Data Form

Site Description		
Date: 6/1/14	Project Name & #: Alaska LNG 26221306	Field Target: 192
Investigators: VW, ZM		Feature ID: W60T1002
Latitude: 61° 48' 30.09"	Longitude: -150° 18' 38.19"	Datum: WGS84
Logbook #: 1	Logbook Page #: 1	Picture #: P-W60T1002-veg(W)(N)
Location Description:		
NEq FT 193		
Common Species Observed (Scientific Name)		
Picea mariana		
Betula nealaskana		
Vaccinium vitis-idaea		
Rhododendrum greenlandicum		
Percent Cover of Dominant Structure Level:		
Habitat Description:		
spruce / birch forest upland		
Alaska Vegetation Classification: Level I, Level II, Level III		
I A ³ II C2		
Notes:		

Field Crew Chief: Van Lathus

Field Scientist/Technician: Zamora

QAQC 2/22

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B. Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C. Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B. Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C. Low scrub	(1) Closed low scrub (2) Open low scrub
	D. Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III Herbaceous	A. Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B. Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C. Bryoid herbaceous	(1) Mosses (2) Lichens
	D. Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
I. Forest			
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	I A Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	I A.1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	I A.2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	I A.3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	I B Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		8
5a	Tree canopy of 60-100 percent cover	I B.1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	I B.2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	I B.3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	I C.1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	I C.2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	I C.3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub

8a	Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II A.3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11 a	Shrub canopy cover greater than 75 percent	II B.1 Closed tall scrub	
11 b	Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b	Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II C.1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C.2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II D.1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II D.2 Willow dwarf scrub	
III. Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b	Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Eriophorum</i> spp., tussocks often present	III A.2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra, bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III C.2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21b	Vegetation submerged or floating in brackish water	III D.2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W00T1002 Field Target: 192 Date: 00-01-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe Meade

Field Technician (print)

X Zoe Meade

Signature

X Valerie Winters

Field Crew Chief (print)

X Valerie Winters

Signature

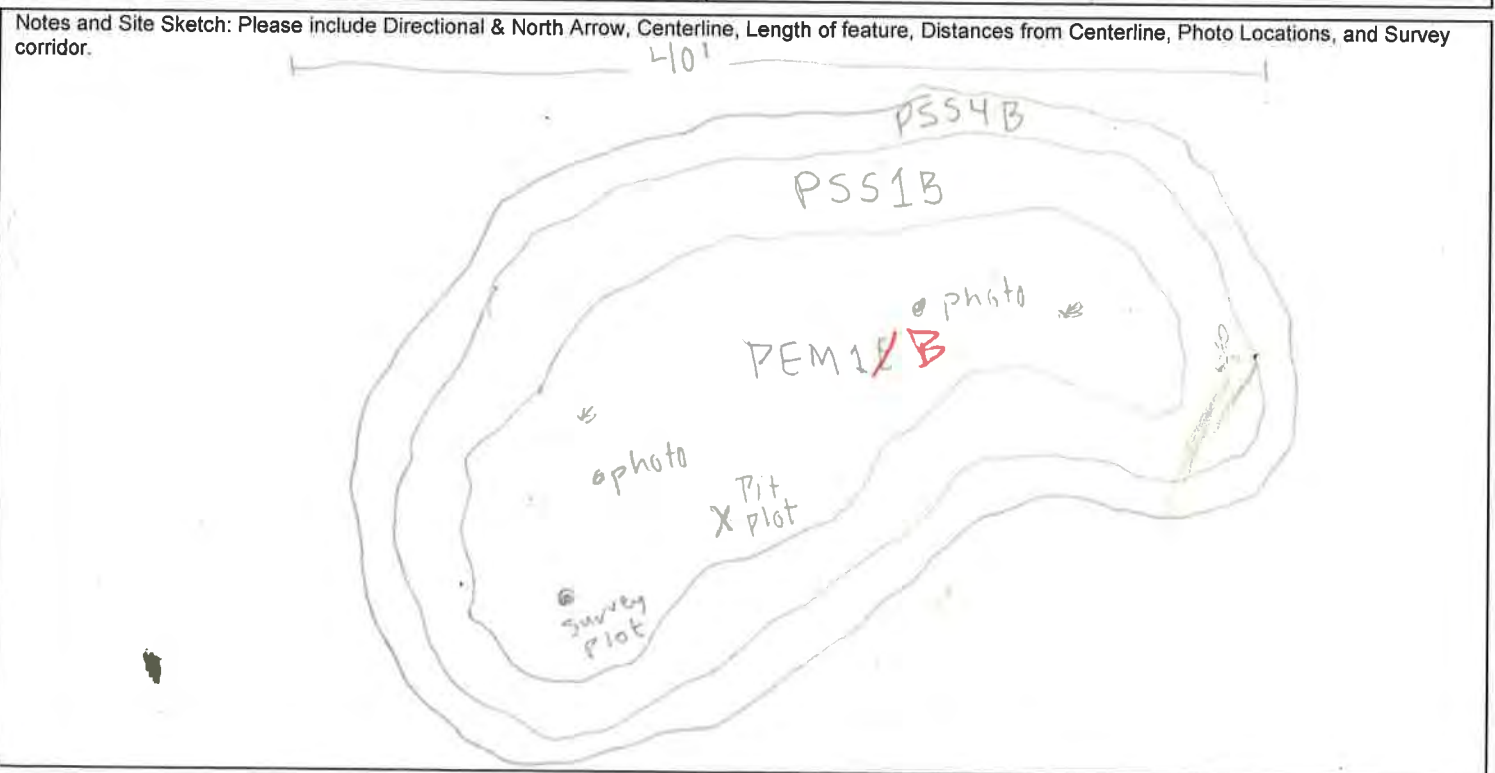
QA/QC Done

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 191	Map #: 125	Map Date: 5/27/14
Date: 06-01-2014	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1003	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 700	
Latitude: 61°49'52.50"	Longitude: -150.16'54.30"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 2	Picture No.: P-W60T1003-N-S-pit-plot	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): sm, hummocks
Slope (%): 0-3	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PSS1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/B TEE
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): 3A3 III A3



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	3	Y	FAC
2. <i>Vaccinium oxycoccus</i>	10	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>13</u> 50% of total cover: <u>6.5</u> 20% of total cover: <u>2.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4.5 (A)
 Total Number of Dominant Species Across All Strata: 4.5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 25 x 1 = 25
 FACW species: 23 x 2 = 46
 FAC species: 8 x 3 = 24
 FACU species: 0 x 4 = 0
 UPL species: 0 x 5 = 0
 Column Totals: 56 (A) 95 (B)
 PI = B/A = 1.7

VEGETATION (use scientific names of plants)

Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Comarum palustre</i>	10	Y	OBL
2. <i>Vaccinium oxycoccus</i>			OBL
3. <i>Andromeda polifolia</i>	3	Y	FACW
4. <i>Calamagrostis Canadensis</i>	5 5	N	FAC
5. <i>Carex aquatilis</i>	5	N	OBL
6. <i>Carex saxatilis</i>	20	Y	FACW
7.			
8.			
9.			
10.			
Total Cover: <u>43</u> 50% of total cover: <u>21.5</u> 20% of total cover: <u>8.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
80 % Cover of Wetland Bryophytes
80 Total Cover of Bryophytes
15 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-04-14</u> Feature ID <u>W6011003</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	—	—	—	—	—	—	Fibric	Organics
11-16	—	—	—	—	—	—	Sapric/hemic	Organics
16-18	10YR 3/6	—	—	—	—	—	hemic	SL texture organics
18-21	2.5YR 4/4	50	10YR 3/6	5	C	PL	SL	SL-silt loam
	10YR 3/2	45					SL	
21-23	10YR 2/2	100					SL	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) <u>X</u>			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u>N/A</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>10YR 2/2 saturated organic layers</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>✓</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>1</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>pockets of standing water present</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES P= Plot, M= Matrix

Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____
 Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____
 Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-
 Persistent Aquatic Bed _____

Percent Cover (P): Tree (>5 dbh, >6m tall) 0 Sapling (<5 dbh, <6m tall) 0 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 0
 Dwarf shrub (<0.5m) 13 Tall herb (≥1m) 0 Short herb (<1m) 43 Moss-Lichen 80 Floating 0 Submerged 0

Number of Wetland Types (M): 3 **Evenness of Wetland Type Distribution (M):** Even Highly Uneven _____ Moderately even _____

Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) High Density (60-80%) _____
 Very High Density (80-100%) _____

Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or
 Peripheral Cover _____ >75% Scattered or Peripheral Cover N/A _____

Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) High (>25) _____

Presence of Islands (M): Absent (none) One or Few _____ Several to Many _____ N/A _____

Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site
 Open _____ Small Scattered Patches _____ Continuous Cover

Dead Woody Material (P): Low Abundance (0-25% of surface) Moderately Abundant (25-50% of surface) _____
 Abundant (>50% of surface) _____

Vegetative Interspersion (P): Low (large patches, concentric rings) Moderate (broken irregular rings) _____
 High (small groupings, diverse and interspersed) _____

HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional Riverine _____ Estaurine Fringe _____

SOIL VARIABLES

Soil Factors (P): Soil Lacking _____ Histosol:Fibric Histosol:Hemic _____ Histosol: Sapric _____
 Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES

Inlet/Outlet Class (P): No Inlet/Outlet No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No
 Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial
 Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____

Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated
 Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____

Evidence of Sedimentation (P): No Evidence Observed Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment
 Created _____

Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) Well Developed (6-18in.) _____ Pronounced (>18in.) _____

Frequency of Overbank Flooding (P): No Overbank Flooding Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____
 Return Interval >5 yrs _____

Degree of Outlet Restriction (P): No Outflow Restricted Outflow _____ Unrestricted Outflow _____

Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) **pH Reading** 4.1

Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits
 Glacial Till/Not Permeable _____

Basin Topographic Gradient (M): Low Gradient (<2%) High Gradient (≥2%) _____

Evidence of Seeps and Springs (P): No Seeps or Springs Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)

Wetland Juxtaposition: Wetland Isolated Wetlands within 400m, Not Connected _____ Only Connected Below _____
 Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____

Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space)

Watershed Land Use: 0-5% Rural 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____

Size: Small (<10 acres) Medium (10-100 acres) _____ Large (>100 acres) _____

Crew Chief QA/QC check:

VW

GPS Technician QA/QC check:

ZM

DEG

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1003

Field Target: 191

Date: 06-01-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Mada

Wetland Scientist (print)

X [Signature]

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X [Signature]

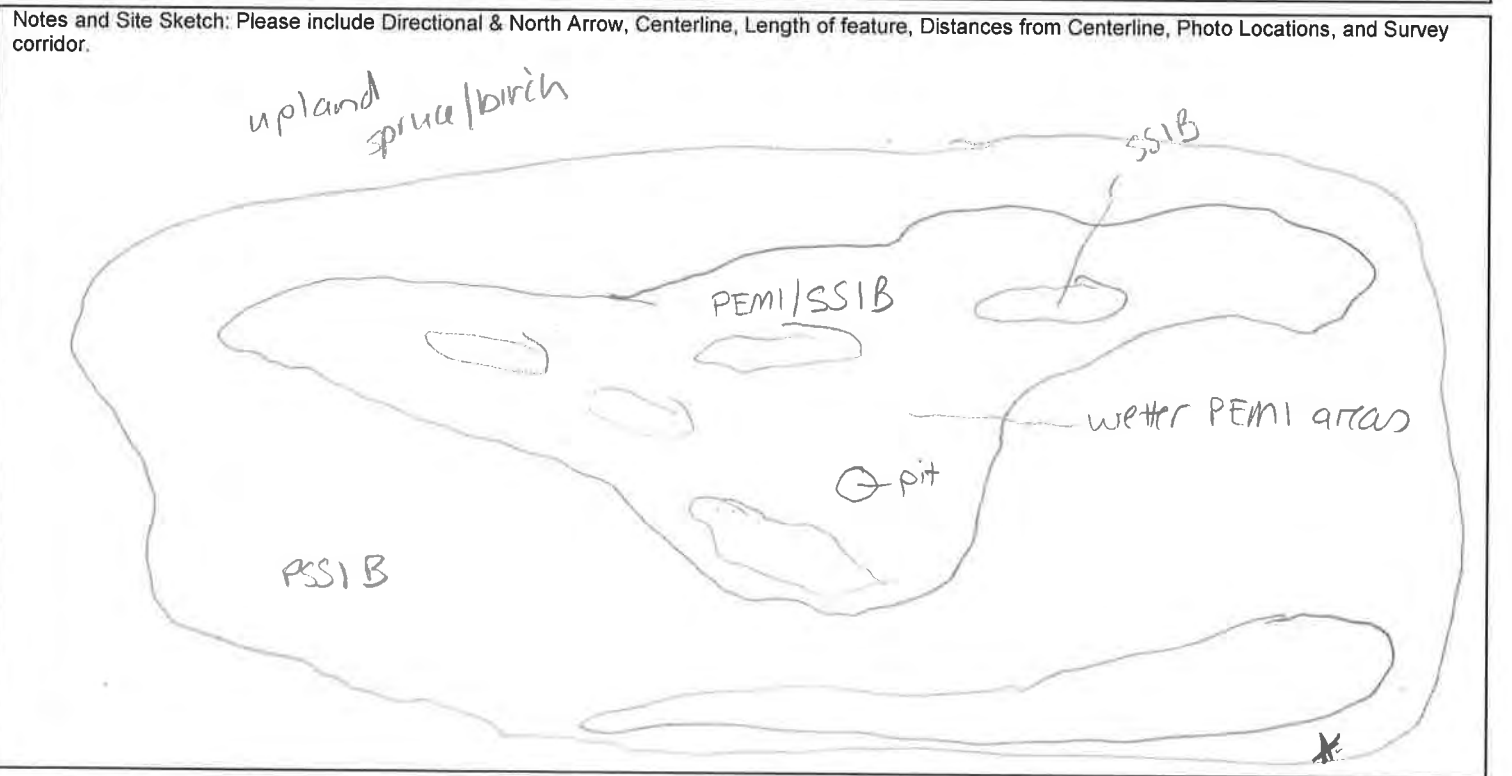
Signature / Date

QAQC AEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: <u>Centerline</u> <input checked="" type="checkbox"/> <u>Access Road</u> (explain) _____ <u>Other</u> (explain) <u>corridor</u>	Field Target: <u>190</u>	Map #: <u>124</u>	Map Date: <u>05 27 14</u>
Date: <u>06-02-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W60T1004</u>	
Investigators: <u>Valerie Watkins, Zoe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>699.8</u>	
Latitude: <u>61° 50' 02.87"</u>	Longitude: <u>-150° 16' 49.43"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>4</u>	Picture No.: <u>P_W60T1004-N-5-pit-D149</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>small hummocks</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>slightly concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PEMIB</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PEMI/SSIB</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): <u>IIIA2, IIC2</u>



check in survey pt.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)					
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:	
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A)	
2.				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3.				% Dominant Species that are OBL, FACW, or FAC: <u>75</u> (A/B)	
4.					
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>19</u> X 1 = <u>19</u> FACW species: <u>0</u> X 2 = <u>0</u> FAC species: <u>55</u> X 3 = <u>165</u> FACU species: <u>25</u> X 4 = <u>100</u> UPL species: <u>0</u> X 5 = <u>0</u> Column Totals: <u>99</u> (A) <u>284</u> (B) PI = B/A = <u>2.87</u>	
Prevalence Index worksheet:					
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>					
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status		
1. <i>Betula neoalaskana</i>	5	N	FACU		
2. <i>Rhododendron groenlandicum</i>	5	N	FAC		
3. <i>Vaccinium oxycoccus</i>	4	N	OBL		
4. <i>Vaccinium uliginosum</i>	15	Y	FAC		
5. <i>Spiraea stevenii</i>	20	Y	FACU		
6.					
7.					
8.					
9.					
Total Cover: <u>49</u> 50% of total cover: <u>24.5</u> 20% of total cover: <u>9.8</u>					

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Calamagrostis canadensis</i>	35	Y	FAC	<input checked="" type="checkbox"/> Dominance Test is > 50%
2. <i>Carex pluri flora</i>	25	Y	OBL	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
3.				_____ Morphological Adaptations ¹ (Provide supporting data in Notes)
4.				_____ Problematic Hydrophytic Vegetation ¹ (Explain)
5.				¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
6.				
7.				<u>0</u> % Bare Ground
8.				<u>15</u> % Cover of Wetland Bryophytes
9.				<u>15</u> Total Cover of Bryophytes
10.				<u>3</u> % Cover of Water
Total Cover: <u>60</u> 50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>
				Notes: (If observed, list morphological adaptations below):

unknown shrub sample taken for ID
Identified as *Spiraea stevenii*

2.5 YR 2.5/1

WETLAND DETERMINATION DATA FORM

SOIL Date 06/02 Feature ID W00T1004 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	—	—	—	—	—	—	Fibric	organics
10-13	—	—	—	—	—	—	Sapric/Hemic	organics
13-22	2.5Y 5/3	65	7.5YR 3/4	15	C	M	Silt loam	
13-22	2.5YR 2.5/1	15	2.5YR 3/6	5	C	PL	Silty loam	
22-25	10 YR 2/2	100	—	—	—	—	sandy loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) <u>X</u>	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) <u>X</u>		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches): N/A

Hydric Soil Present (Y/N): Y

Notes: Faint hydrogen sulfide odor at 10"

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>X</u>	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: conductivity = 58	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>6 inches</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0 inches</u>	

Notes: small pockets of standing water. Saturated to surface.

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>5</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>20</u> Dwarf shrub (<0.5m) <u>24</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>60</u> Moss-Lichen <u>15</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>2</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>4.7</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated <input checked="" type="checkbox"/> Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check: WV 3m

GPS Technician QA/QC check:

QA/QC WV Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60TI004

Field Target: 190

Date: 06-02-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X soe meade

Wetland Scientist (print)

X

Signature / Date

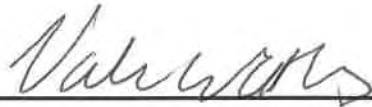


X Valeri Watkins

Field Crew Chief (print)

X

Signature / Date



ASC

Vegetation Classification Data Form

Site Description		
Date: 6/2/14	Project Name & #: Alaska LNG 26221306	Field Target: 190
Investigators: VW, ZM		Feature ID: W60T1 005
Latitude: 61° 50' 02.66"	Longitude: -150° 16' 51.25"	Datum: WGS84
Logbook #: 1	Logbook Page #: 4	Picture #: P-W60T1005-
Location Description:		
West of W60T1004		
Common Species Observed (Scientific Name)		
Picea mariana		
Betula neodalisikana		
Salix sp.		
Vaccinium vitis-idaea		
Percent Cover of Dominant Structure Level: 80		
Habitat Description:		
spruce/birch forest		
Alaska Vegetation Classification: Level I, Level II, Level III		
I C F I		
Notes:		

Field Crew Chief: VW

Field Scientist/Technician: ZM

ICI

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I. Forest	A Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II. Scrub	A Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C Low scrub	(1) Closed low scrub (2) Open low scrub
	D Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III. Herbaceous	A Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C Bryoid herbaceous	(1) Mosses (2) Lichens
	D Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
I Forest			
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	I A Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	I A 1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	I A 2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	I A 3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	I B Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a	Tree canopy of 60-100 percent cover	I B 1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	I B 2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	I B 3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	I C 1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	I C 2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	I C 3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub			
8a	Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II A 3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11 a	Shrub canopy cover greater than 75 percent	II B 1 Closed tall scrub	
11 b	Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b	Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II C 1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C.2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II D.1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II D 2 Willow dwarf scrub	
III. Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b	Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A 1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Callamagrostis</i> spp., <i>Carex</i> spp. or <i>Enophorum</i> spp. tussocks often present	III A 2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra, bogs, marshes, and fens	III A 3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III B 3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III C 2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III D 1 Freshwater aquatic herbaceous	
21 b	Vegetation submerged or floating in brackish water	III D 2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III D 3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W60TI005 Field Target: V1900

Date: 06-02-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe Meade

Field Technician (print)

X Zoe Meade

Signature

X Valerie Watten

Field Crew Chief (print)

X Valerie Watten

Signature

DEC

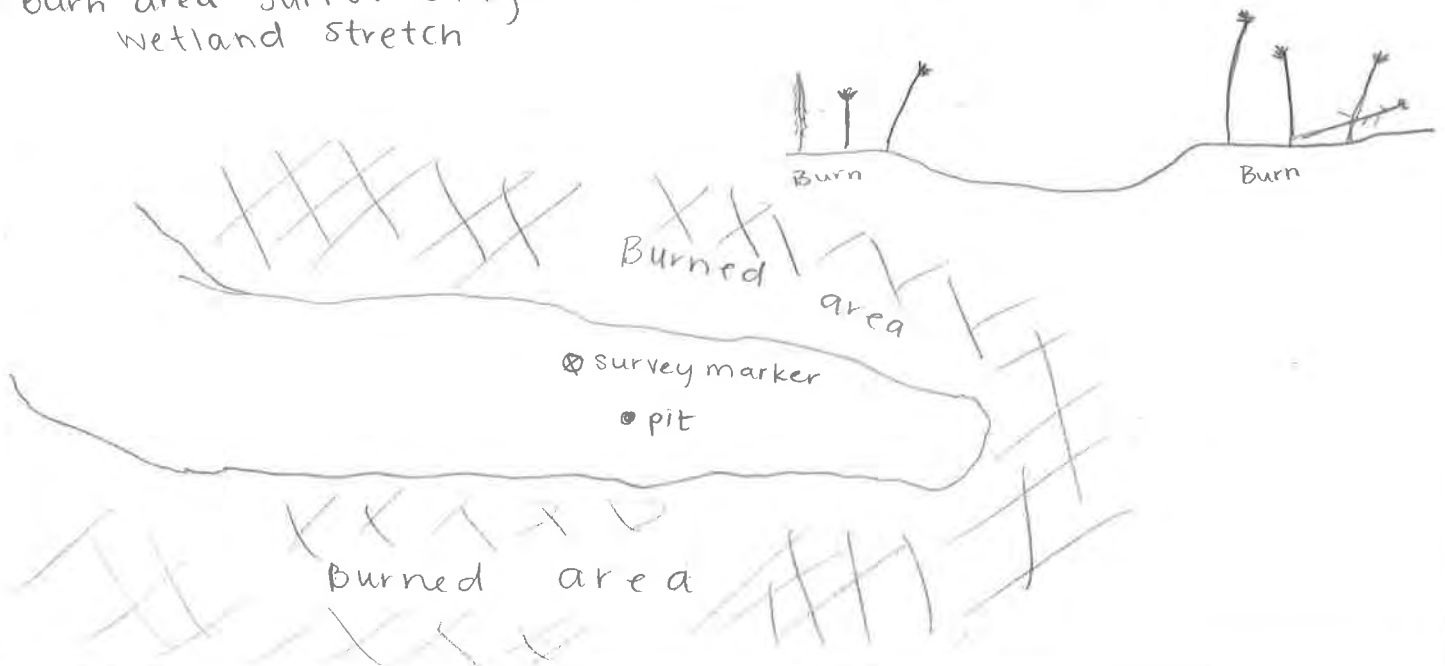
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 188	Map #: 123 Map Date: 5/27/14
Date: 06-02-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60TI006
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 692.8	
Latitude: 61° 55' 31.6"		Longitude: -150.12' 06.39"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 4	Picture No.: P-W60TI006-E-W-pit-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): sm. hummocks
Slope (%): 3-5	Local relief (concave, convex, none): concave; slight
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): III A2, IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Burn area surrounding wetland stretch



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	5	Y	FAC
2. <i>Spiraea stevenii</i>	5	Y	FACU
3. <i>Betula neolaskana</i>	5	Y	FACU
4. <i>Salix pulchra</i>	10	Y	FACW
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>25</u> 50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 6 (B)
 % Dominant Species that are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 20 X 1 = 20
 FACW species: 10 X 2 = 20
 FAC species: 55 X 3 = 165
 FACU species: 10 X 4 = 40
 UPL species: 0 X 5 = 0
 Column Totals: 85 (A) 245 (B)
 PI = B/A = 2.89

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>16'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Calamagrostis Canadensis</i>	50	Y	FAC
2. <i>Trientalis arctica</i>	T	N	FACU
3. <i>Carex aquatilis</i>	20	Y	OBL
4. <i>Equisetum sylvaticum</i>	T	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>70</u> 50% of total cover: <u>35</u> 20% of total cover: <u>14</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

15 % Bare Ground
0 % Cover of Wetland Bryophytes
0 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL Date 060214 Feature ID W00TI006 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	—	—	—	—	—	—	Fibric	Organics
2-8	7.5YR 3/4	100	—	—	—	—	Silty loam	w/ fine roots
8-22	2.5Y 3/2	85	7.5YR 2.5/2	15	C	M	Sandy loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) <u>X</u>	Alaska Redox with 2.5Y Hue _____
Thick Dark Surface (A12) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: N/A Depth (inches): N/A

Hydric Soil Present (Y/N): Y

Notes: water table is present at 11"
faint hydrogen sulfide odor at 11"

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>X</u>	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>11"</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>9"</u>	

Notes: saturation present at 9"

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>5</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>20</u> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estuarine Fringe _____		

SOIL VARIABLES
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy <input checked="" type="checkbox"/> Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____
Microrrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)
Wetland Juxtaposition: Wetland Isolated <input checked="" type="checkbox"/> Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____

Crew Chief QA/QC check: *vw*

GPS Technician QA/QC check: *zjm*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOT1006 Field Target: 188 Date: 06-02-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valent Watkinson

Field Crew Chief (print)

X *Valent Watkinson*

Signature / Date

DEC

Vegetation Classification Data Form

Site Description		
Date: 06-02-14	Project Name & #: Alaska LNG 26221306	Field Target: 189
Investigators: V W, Z M		Feature ID: W60T1007
Latitude: 61° 55' 25.39"	Longitude: 150° 12' 16.25"	Datum: WGS84
Logbook #: 1	Logbook Page #: 5-6	Picture #: P_W60T1007_E.W ⁰⁰¹⁻⁰⁰²
Location Description:		
SW of W60T1006		
Common Species Observed (Scientific Name)		
Salex pulchra	Fern Chamerion angustifolium	
Betula neoalaskana		
Rosa ascicularis		
Calamagrostis Canadensis		
Percent Cover of Dominant Structure Level: 30		
Habitat Description:		
Burned area		
Alaska Vegetation Classification: Level I, Level II, Level III		
II B 2	II C 2	III A 2
Notes:		

Field Crew Chief: VW

Field Scientist/Technician: Z M

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Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I Forest	A Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II Scrub	A Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C Low scrub	(1) Closed low scrub (2) Open low scrub
	D Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III Herbaceous	A Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C Bryoid herbaceous	(1) Mosses (2) Lichens
	D Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table.

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	I A Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	I A 1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	I A 2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	I A 3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	I B Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a	Tree canopy of 60-100 percent cover	I B 1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	I B 2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	I B 3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	I C 1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	I C 2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	I C 3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II Scrub			
8a	Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II A 3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11 a	Shrub canopy cover greater than 75 percent	II B 1 Closed tall scrub	
11 b	Shrub canopy cover of 25-74 percent	II B 2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b	Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II C 1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C 2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II D 1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II D 2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II D 2 Willow dwarf scrub	
III Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b	Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Empetrum</i> spp.; tussocks often present	III A 2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III C 2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21 b	Vegetation submerged or floating in brackish water	III D 2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III D 3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W60T1007 Field Target: 189

Date: 06-02-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe meade

Field Technician (print)

X Zo meade

Signature

X Valerie Wootkins

Field Crew Chief (print)

X Valerie Wootkins

Signature

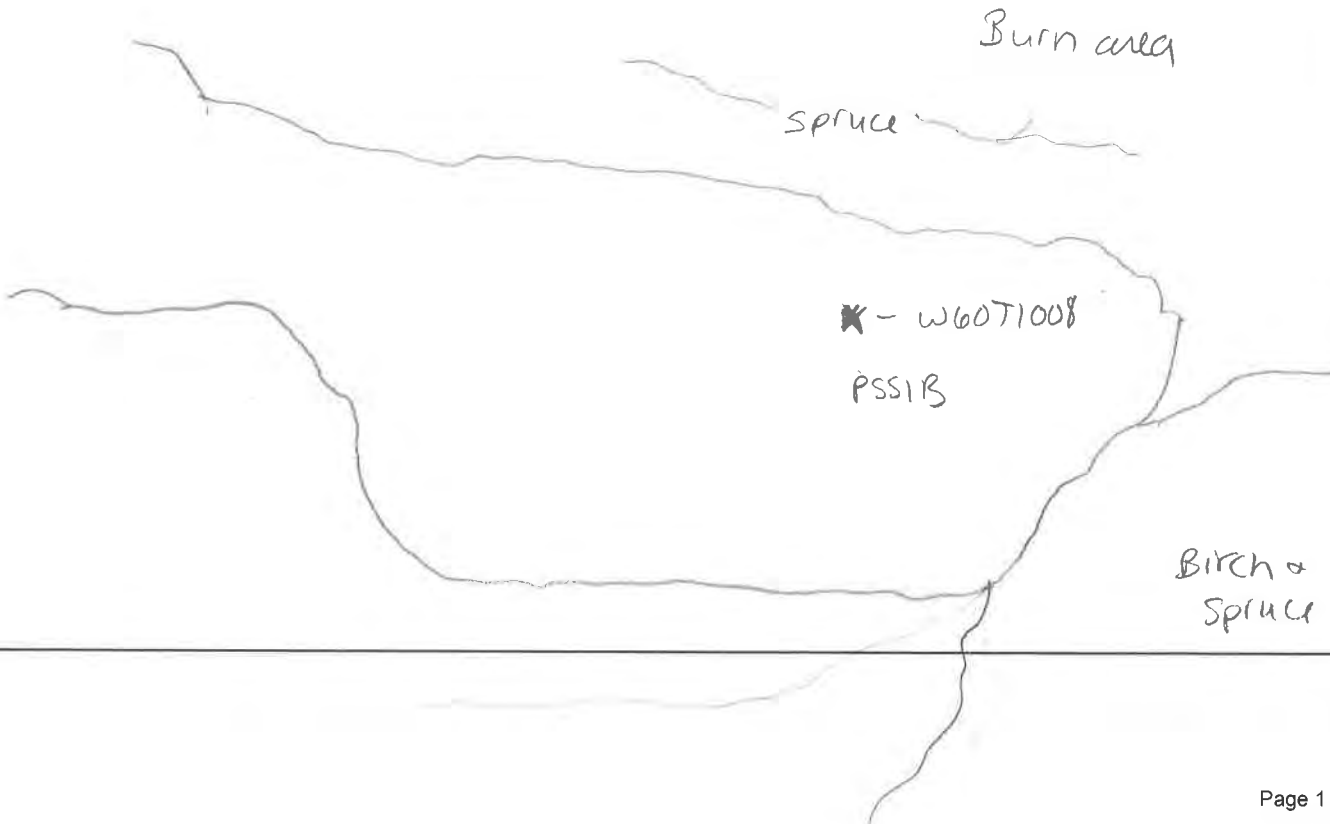
QA/QC ZEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 187	Map #: 100 Map Date: 5/27/14
Date: 06-03-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1008
Investigators: VW, ZM			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 6913	
Latitude: 61° 56' 45.33"		Longitude: -150° 11' 44.57"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 7	Picture No.: P-W60T1008-N-S-pH-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-3	Local relief (concave, convex, none): Flat
Pre-mapped Alaska LNG/NWI classification: PSS4/1B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): II C 1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A)
2.				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3.				% Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
4.				
Total Cover: <u>0</u>				Prevalence Index worksheet:
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Total % Cover of: _____ Multiply by:
1. <i>Betula nana</i>	75	Y	FAC	OBL species: <u>33</u> X 1 = <u>33</u>
2. <i>Chamaedaphne calyculata</i>	8		FACW	FACW species: <u>32</u> X 2 = <u>64</u>
3. <i>Rhododendrum tomentosum</i>	8		FACW	FAC species: <u>88</u> X 3 = <u>264</u>
4. <i>Salix pulchra</i>	8		FACW	FACU species: <u>2</u> X 4 = <u>16</u>
5. <i>Salix fuscescens</i>	8		FACW	UPL species: <u>0</u> X 5 = <u>0</u>
6. <i>Vaccinium uliginosum</i>	5		FAC	Column Totals: <u>155</u> (A) <u>377</u> (B)
7.				PI = B/A = <u>2.43</u>
8.				
9.				
Total Cover: <u>112</u>				
50% of total cover: <u>56</u> 20% of total cover: <u>22.4</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Equisetum fluviatile</i>	20	Y	OBL	<input checked="" type="checkbox"/> Dominance Test is > 50%
2. <i>Comarum palustre</i>	8	Y	OBL	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
3. <i>Rubus arcticus</i>	8	Y	FAC	_____ Morphological Adaptations ¹ (Provide supporting data in Notes)
4. <i>Carex aquatilis</i>	5		OBL	_____ Problematic Hydrophytic Vegetation ¹ (Explain)
5. <i>Chamerion angustifolium</i>	2		FACU	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
6.				
7.				
8.				<u>0</u> % Bare Ground
9.				<u>80</u> % Cover of Wetland Bryophytes
10.				<u>80</u> Total Cover of Bryophytes
Total Cover: <u>43</u>				<u>0</u> % Cover of Water
50% of total cover: <u>21.5</u> 20% of total cover: <u>8.6</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>
Notes: (If observed, list morphological adaptations below):				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-03</u> Feature ID <u>W60TI008</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20	—	—	—	—	—	—	Fibric	organics
20-22	—	—	—	—	—	—	hemic	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: _____				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>X</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>0</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>90</u> Dwarf shrub (<0.5m) <u>20</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>43</u> Moss-Lichen <u>20</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <u>X</u> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) <u>X</u>		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____		
Presence of Islands (M): Absent (none) <u>X</u> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>X</u>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>X</u>		
HGM Class (P): Slope _____ Flat <u>X</u> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estuarine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <u>X</u> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <u>X</u> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>X</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <u>X</u> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>X</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above <u>X</u> Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <u>X</u> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

zmm

*QAQC
25.6*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: 187 Field Target: W60TI008 Date: 06-03-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X <i>Zoe Meade</i>	X <i>Zoe Meade</i>
Wetland Scientist (print)	Signature / Date

X <i>Valerie Wath</i>	X <i>Valerie Wath</i>
Field Crew Chief (print)	Signature / Date

QAQC
JEE

Vegetation Classification Data Form

Site Description		
Date: 6/3/14	Project Name & #: Alaska LNG 26221306	Field Target: 187
Investigators: VW, ZM		Feature ID: W6071009
Latitude: 61° 56' 48.06"	Longitude: -150° 11' 42.66"	Datum: WGS84
Logbook #: 1	Logbook Page #: 8	Picture #: P-W6071009-N-S
Location Description:		
north of W6071008 on centurion		
Common Species Observed (Scientific Name)		
Betula neoalaskana	Equisetum sylvaticum	
Rosa acicularis		
Salix pulchra		
Chamaenerion angustifolium		
Percent Cover of Dominant Structure Level: 30		
Habitat Description:		
burned upland area		
Alaska Vegetation Classification: Level I, Level II, Level III		
II B2	II C2	
Notes:		

Field Crew Chief: W

Field Scientist/Technician: ZM

AGC
WCE

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I. Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B. Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C. Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II. Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B. Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C. Low scrub	(1) Closed low scrub (2) Open low scrub
	D. Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III. Herbaceous	A. Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B. Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C. Bryoid herbaceous	(1) Mosses (2) Lichens
	D. Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table.

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters (10 ft) tall may be present and abundant)		7
I Forest			
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	IA Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	IA.1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	IA.2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	IA.3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	IB Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a	Tree canopy of 60-100 percent cover	IB.1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	IB.2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	IB.3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	IC.1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	IC.2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	IC.3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters (10 ft) tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub			
8a	Vegetation with at least 10 percent cover of dwarf trees	II.A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II.A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II.A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II.A.3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II.B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11a	Shrub canopy cover greater than 75 percent	II.B.1 Closed tall scrub	
11b	Shrub canopy cover of 25-74 percent	II.B.2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II.C Low scrub	13
12b	Shrubs under 20 centimeters in height	II.D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II.C.1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II.C.2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II.D.1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II.D.2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II.D.2 Willow dwarf scrub	
III. Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		15
15b	Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III.D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III.A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III.A.1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Eriophorum</i> spp.; tussocks often present	III.A.2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra, bogs, marshes, and fens	III.A.3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III.B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III.C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained; mostly tundra sites	III.B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III.B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III.B.3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III.C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III.C.2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III.D.1 Freshwater aquatic herbaceous	
21b	Vegetation submerged or floating in brackish water	III.D.2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III.D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W60T1009 Field Target: 187 Date: 4/3/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Loe Meade

Field Technician (print)

X [Signature]

Signature

X Valerie Watkins

Field Crew Chief (print)

X [Signature]

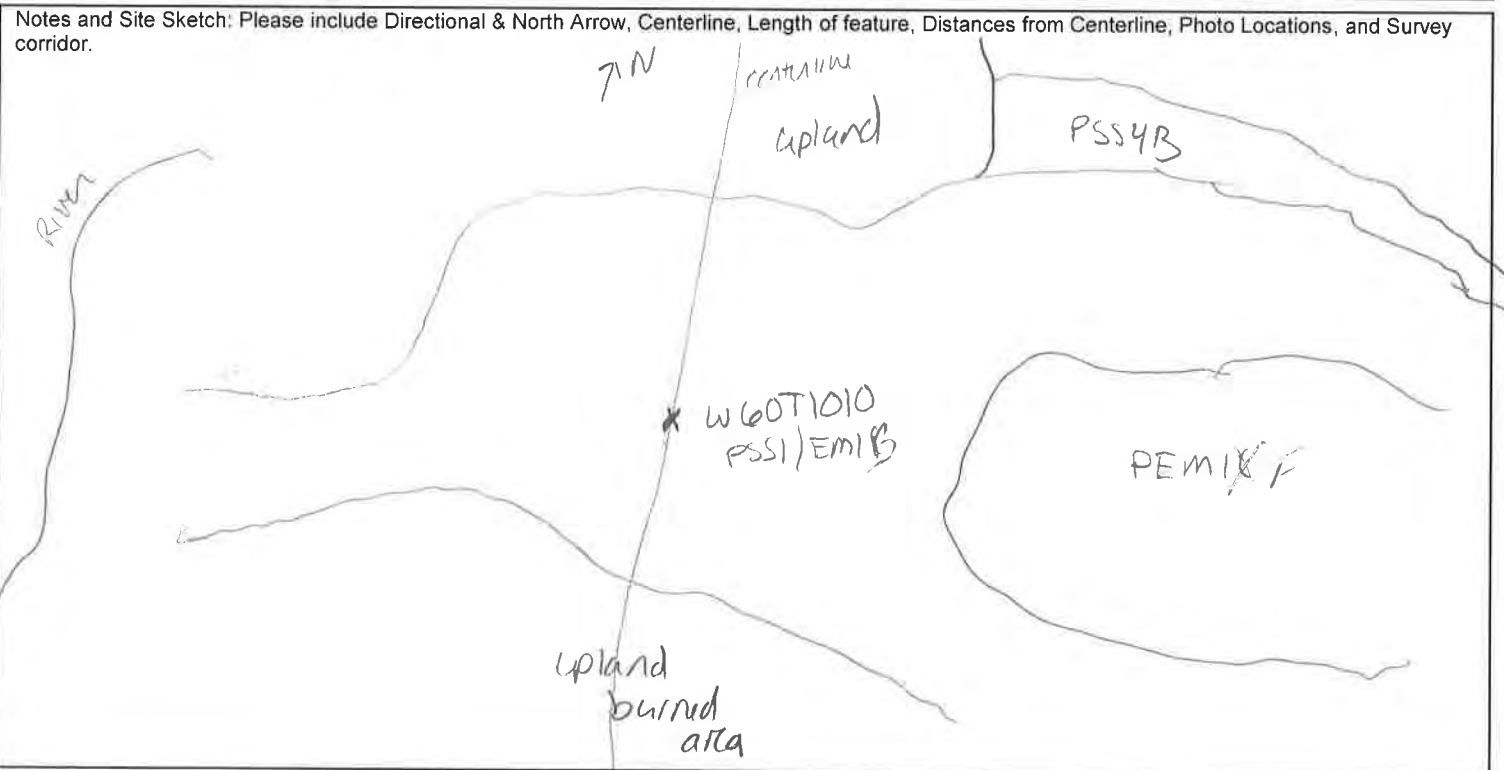
Signature

QA/QC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 186	Map #: 121 Map Date: 5/27	
Date: 06-03-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60TI010	
Investigators: VW, ZM	Team No.: W60		
State: Alaska	Region: Alaska	Milepost: 691.1	
Latitude: 61° 56' 56.21"	Longitude: -150° 11' 37.74"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 8	Picture No.: P-W60TI010-N-S-pt-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): slight hummocks
Slope (%): 0-3	Local relief (concave, convex, none): slightly concave
Pre-mapped Alaska LNG/NWI classification: PEM1Bc	Soil Map Unit Name: -
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (If no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed? No <input checked="" type="checkbox"/> (If yes, explain in Notes)	
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic? No <input checked="" type="checkbox"/> (If yes, explain in Notes.)	
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1/EM1B <i>SM</i>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIC2, IIIA2



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	65	Y	FAC
2. <i>Chamaedaphne calyculata</i>	20	Y	FACW
3. <i>Andromeda polifolia</i>	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>95</u> 50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 68 X 1 = 68
 FACW species: 30 X 2 = 60
 FAC species: 65 X 3 = 195
 FACU species: 0 X 4 = 0
 UPL species: 0 X 5 = 0
 Column Totals: 163 (A) 323 (B)
 PI = B/A = 1.98

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Andromeda polifolia</i>			—
2. <i>Equisetum fluviale</i>	20	Y	OBL
3. <i>Comarum palustre</i>	3		OBL
4. <i>Menyanthes trifoliata</i>	5		OBL
5. <i>Carex aquatilis</i>	40	Y	OBL
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>68</u> 50% of total cover: <u>34</u> 20% of total cover: <u>13.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
80 % Cover of Wetland Bryophytes
80 Total Cover of Bryophytes
8 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

conductivity 25 μm

SOIL _____ Date 6/3/14 Feature ID W60T1010 Soil Pit Required (Y/N) _____

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11							Fibric	organics
11-22							Fibric hemic	organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³	
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____	

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: Saturated to surface could not dig deeper due to roots and water in pit.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0</u>	

Notes: water table 0" Pockets of standing water up to ~5 inches deep.

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>65</u> Dwarf shrub (<0.5m) <u>30</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>10</u> Moss-Lichen <u>80</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>3</u>		Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> ^W <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> ^W Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> ^W No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>4.40</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

W

GPS Technician QA/QC check:

zm

QA/QC

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOTI010

Field Target: 180

Date: 06-03-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X <i>roc Meade</i>	X <i>roc Meade</i>
Wetland Scientist (print)	Signature / Date

X <i>Valerie Watkins</i>	X <i>Valerie Watkins</i>
Field Crew Chief (print)	Signature / Date

PAQC
DEC

Vegetation Classification Data Form

Site Description		
Date: 4/3/14	Project Name & #: Alaska LNG 26221306	Field Target: 186
Investigators: VW, ZM		Feature ID: W60T1011
Latitude: 61°56'53.37"	Longitude: -150°11'39.56"	Datum: WGS84
Logbook #: 1	Logbook Page #: 9	Picture #: P-W60T1011-
Location Description:		
South of W60T1010		
Common Species Observed (Scientific Name)		
Betula neocalascensis	Equisetum sylvaticum	
Rhododendrum tomentosum		
Betula nana		
Vaccinium vitis-idaea		
Percent Cover of Dominant Structure Level: 40		
Habitat Description:		
Burned upland area - previous spruce / birch forest		
Alaska Vegetation Classification: Level I, Level II, Level III		
II B2	II C2	
Notes:		

Field Crew Chief: VW

Field Scientist/Technician: ZM

QAQC
see

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B. Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C. Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B. Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C. Low scrub	(1) Closed low scrub (2) Open low scrub
	D. Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III Herbaceous	A. Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B. Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C. Bryoid herbaceous	(1) Mosses (2) Lichens
	D. Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
I Forest			
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	I A Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	I A.1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	I A.2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	I A.3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	I B Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a	Tree canopy of 60-100 percent cover	I B.1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	I B.2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	I B.3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	I C.1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	I C.2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	I C.3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub

8a	Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II A.3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11 a	Shrub canopy cover greater than 75 percent	II B.1 Closed tall scrub	
11 b	Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b	Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II C.1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C.2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II D.1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II D.2 Willow dwarf scrub	
III. Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b	Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Eriophorum</i> spp., tussocks often present	III A.2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained, mostly tundra sites	III B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III C.2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21 b	Vegetation submerged or floating in brackish water	III D.2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: ~~W6071010~~ ^{W6071011} _{uv} Field Target: 186 Date: 06-03-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Joe Meade

Field Technician (print)

X [Signature]

Signature

X Valent Watkins

Field Crew Chief (print)

X [Signature]

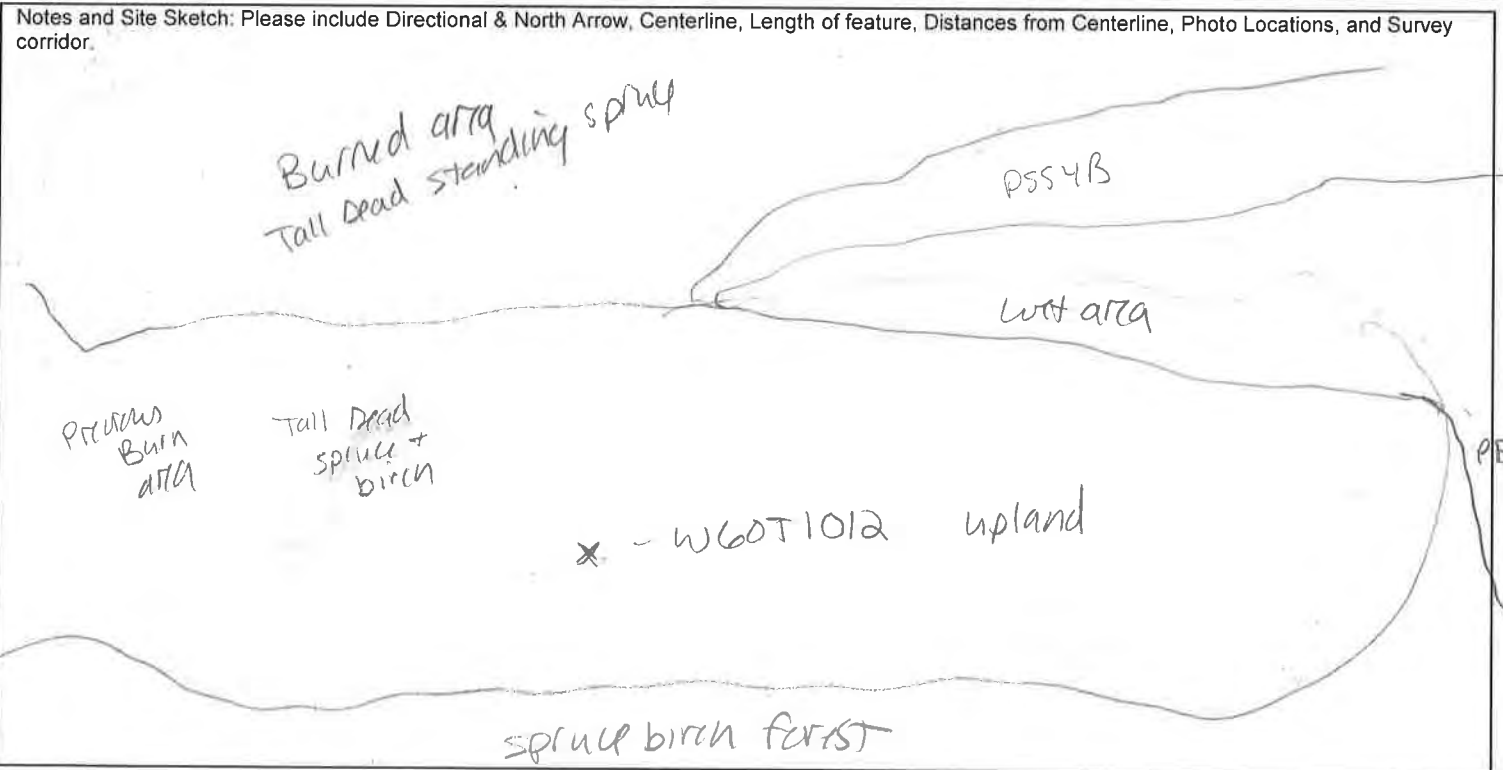
Signature

QAQC
WEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> ^{WV} Access Road (explain) _____ Other (explain) <u>corridor</u>	Field Target: <u>185</u>	Map #: <u>120</u> Map Date: <u>5/27/14</u>	
Date: <u>06-03-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W60TI 012</u>	
Investigators: <u>Valerie Watkins, Zoe Meade</u>			Team No.: <u>W60 1011</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>CA0.7</u>	
Latitude: <u>61° 57' 19.13"</u>	Longitude: <u>-150° 11' 28.21"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>9</u>	Picture No.: <u>P-W60TI012-F-W-Pit-plug</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>hummocks</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>none</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS1B</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: <u>upland</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): <u>IIc2</u>



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>34</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100/75</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>2</u> x 1 = <u>2</u> FACW species: <u>30</u> x 2 = <u>60</u> FAC species: <u>40</u> x 3 = <u>120</u> FACU species: <u>10</u> x 4 = <u>40</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>72</u> (A) <u>222</u> (B) PI = B/A = <u>3.1</u>
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Salex pulchra</i>	30	Y	FACW	
2. <i>Betula nana</i>	5	Y	FAC	
3. <i>Betula neolaskana</i>	10	Y	FACU	
4. <i>Vaccinium uliginosum</i>	2		FAC	
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>47</u> 50% of total cover: <u>23.5</u> 20% of total cover: <u>9.4</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. <input type="checkbox"/> % Bare Ground <input type="checkbox"/> % Cover of Wetland Bryophytes <input type="checkbox"/> Total Cover of Bryophytes <input type="checkbox"/> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
1. <i>Calamagrostis Canadensis</i>	30	Y	FAC	
2. <i>Comarum palustre</i>	2		OBL	
3. <i>Equisetum arvense</i>	2		FAC	
4. <i>Iris setosa</i>	1		FAC	
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06/03/14</u> Feature ID <u>W60TJ 012</u>					Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		Redox Features				Texture	Notes	
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-5							Fibric	Organics	
5-12							hemiclapric	organics	
12-18	2.5Y 3/3	50	5YR 3/4	50	C	M	Silt loam		
18-21	10YR 3/4	60	5YR 3/4	40	C	M	Silt loam		
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.									
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³			
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____			
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____			
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____			
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer			
Thick Dark Surface (A12) _____						Other (Explain in Notes)			
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.									
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): <u>N/A</u>									
Hydric Soil Present (Y/N): <u>N</u>									
Notes:									

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>N/A</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>15</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>05</u>			
Notes: <u>Saturation at 5"</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ 75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine-Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

zm

QARC
WEE Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: 185 Field Target: NGOTI012 Date: 06-03-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade X Meade, Zoe

Wetland Scientist (print) Signature / Date

X Valerie Watkins X

Field Crew Chief (print) Signature / Date

QAQC
REC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 184	Map #: 119 Map Date: 5/27	
Date: 06-03-2014	Project Name & No.: Alaska LNG 26221306	Feature Id: W60TI013	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 688.45	
Latitude: 61° 59' 13.66"	Longitude: -150° 11' 50.83"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 11	Picture No.: P-W60TI013-E-W-pit-plot	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 3-5%	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: Upland	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): II B2, III A2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Burned area
Dead spruce / birch

Scattered dead standing spruce + birch

x - W60TI013

Burned area
Dead spruce / birch

upland
ICI

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nealaskana</i>	15	Y	FACU
2. <i>Alnus ssp.</i>	3		FAC
3. <i>Salex bebbiana</i>	5	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>23</u> 50% of total cover: <u>11.5</u> 20% of total cover: <u>4.6</u>			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

% Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species: 0 X 1 = 0

FACW species: 0 X 2 = 0

FAC species: 94 X 3 = 282

FACU species: 0 X 4 = 0

UPL species: 0 X 5 = 0

Column Totals: 94 (A) 282 (B)

PI = B/A = 3.0

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Calamagrostis Canadensis</i>	65	Y	FAC
2. <i>Equisetum arvens</i>	5		FAC
3. <i>Equisetum sylvaticum</i>	1		FAC
4. <i>Streptopus amplexifolius</i>	T		FACU
5. <i>Rubus idaeus</i>	T		
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>71</u> 50% of total cover: <u>35.5</u> 20% of total cover: <u>14.2</u>			

Hydrophytic Vegetation Indicators:

Dominance Test is > 50%

Prevalence Index is ≤ 3.0

_____ Morphological Adaptations¹ (Provide supporting data in Notes)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground

0 % Cover of Wetland Bryophytes

0 Total Cover of Bryophytes

5 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

conductivity = 18

SOIL Date 06-03 Feature ID W60TI013 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	—	—	—	—	—	—	Fibric/hemic	Organics
11-17	10YR 3/2	70	5YR 3/4	30	C	M	Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS **INDICATORS FOR PROBLEMATIC HYDRIC SOILS³**

Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) <u>X</u>	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) <u>X</u> 12"		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: Frozen Depth (inches): 17 inches

Hydric Soil Present (Y/N): Y

Notes: Faint hydrogen sulfide odor at 12"

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient) **SECONDARY INDICATORS (2 or more required)**

Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) <u>X</u>
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) <u>X</u> 12"	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0-10</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>6"</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	

Notes: water seeping into pit at 3"
pockets of standing water throughout site

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>15</u> Tall shrub (2-6m) <u>3</u> Short shrub (0.5-2m) <u>5</u> Dwarf shrub (<0.5m) <u>0</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>31</u> Moss-Lichen <u>0</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) <input checked="" type="checkbox"/> Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>5.95</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable <input checked="" type="checkbox"/>	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) <input checked="" type="checkbox"/>	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated <input checked="" type="checkbox"/> Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

M

GPS Technician QA/QC check:

M

QA/QC DEC

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60TI013

Field Target: 184

Date: 06-03-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook


- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade	X 
Wetland Scientist (print)	Signature / Date

X Valerie Warrini	X 
Field Crew Chief (print)	Signature / Date

QAQC
239

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 183	Map #: 119	Map Date: 5/27/14
Date: 6/4/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1014	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 688.4	
Latitude: 61° 59' 16.79"	Longitude: -150° 11' 50.14"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 12	Picture No.: P_W60T1014_S-N_pit_plug	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): slight slope
Slope (%): 3 - 5	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: PSSIB	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: Upland
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): IIB2, IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

↑ N

Burned

upland
not burned
IIC2

* W60T1014 FT 183
upland

* FT 184
PEMI/SSIB

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>33%</u> (A/B)
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet:
Total % Cover of: _____ Multiply by: _____				OBL species: <u>0</u> x 1 = <u>0</u> FACW species: <u>6</u> x 2 = <u>12</u> FAC species: <u>21</u> x 3 = <u>63</u> FACU species: <u>45</u> x 4 = <u>180</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>72</u> (A) <u>255</u> (B) PI = B/A = <u>3.54</u>
1. <i>Betula neolaskana</i>	30	Y	FACU	
2. <i>Vaccinium vitis-idaea</i>	1		FAC	
3. <i>Picea mariana</i>	5		FACW	
4. <i>Rhododendron tomentosum</i>	1		FACW	
5. <i>Ribes laxiflorum</i>	7		FAC	
6.				
7.				
8.				
9.				
Total Cover: <u>37</u> 50% of total cover: <u>18.5</u> 20% of total cover: <u>7.4</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
<u>N</u> Dominance Test is > 50% <u>N</u> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain)				
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.				
1. <i>Equisetum sylvaticum</i>	20	Y	FAC	_____ % Bare Ground _____ % Cover of Wetland Bryophytes <u>40</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>N</u> Notes: (If observed, list morphological adaptations below):
2. <i>Chamerion angustifolium</i>	10	Y	FACU	
3. <i>Cornus canadensis</i>	5		FACU	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-04</u> Feature ID <u>W60TI014</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	—	—	—	—	—	—	Fibric	Organics
4-6	2.5YR 2.5/3	100	—	—	—	—	Loamy Sand	
6-11	10YR 5/8	100	—	—	—	—	Loamy Sand	
11-16	10YR 5/6	100	—	—	—	—	Loamy Sand	
16-21	2.5Y 4/4	100	—	—	—	—	Silt Loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>N/A</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>N</u>								
Notes: <u>dry sandy soils</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>N</u>	
Water Table Present (Y/N): <u>N</u>	Depth (in): _____		
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): _____		
Notes: <u>NO saturation. very dry</u>			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

zm

QAQC
28-4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60TIO14

Field Target: 0183

Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoemeade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *ValWat*

Signature / Date

QAQC
DRE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 181	Map #: 118 Map Date: 5/27/14	
Date: 6/4/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1015	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 685.3	
Latitude: 62° 01' 55.09"	Longitude: -150° 11' 48.59"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 13	Picture No.: P_W60T1015_E.W_PIT-plaq	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): slight hummocks
Slope (%): 0-3	Local relief (concave, convex, none): slightly concave
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIC2, IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	10	Y	FAC
2. <i>picea mariana</i>	8		FACW
3. <i>Rhododendrom tomentosum</i>	15	Y	FACW
4. <i>Vaccinium oxycoccus</i>	2		OBL
5. <i>Andromeda polifolia</i>	6		FACW
6. <i>Empetrum nigrum</i>	1		FAC
7. <i>Chamaedaphne calyculata</i>	8		FACW
8.			
9.			
Total Cover: <u>50</u> 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)
 Total Number of Dominant Species Across All Strata: 3 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 62 X 1 = 62
 FACW species: 47 X 2 = 94
 FAC species: 11 X 3 = 33
 FACU species: 0 X 4 = 0
 UPL species: 0 X 5 = 0
 Column Totals: 120 (A) 189 (B)
 PI = B/A = 1.58

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Andromeda polifolium</i>			
2. <i>Carex rotundata</i>	60	Y	OBL
3. <i>Rubus Chamaemorus</i>	10		FACW
4. <i>Chamaedaphne calyculata</i>			FACW
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>70</u> 50% of total cover: <u>35</u> 20% of total cover: <u>14</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
80 % Cover of Wetland Bryophytes
80 Total Cover of Bryophytes
0 % Cover of Water
Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-04-14</u> Feature ID <u>WG0T1 0015</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>0-11</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>Fibric</u>	<u>organics</u>
<u>11-22</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>Fibric/hemic</u>	<u>organics</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) <u> </u>			Alaska Color Change (TA4) ⁴ <u> </u>		
Histic Epipedon (A2) <u> </u>			Alaska Redox (A14) <u> </u>			Alaska Alpine Swales (TA5) <u> </u>		
Black Histic (A3) <u> </u>			Alaska Gleyed Pores (A15) <u> </u>			Alaska Redox with 2.5Y Hue <u> </u>		
Hydrogen Sulfide (A4) <u> </u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) <u> </u>						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u> </u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u> </u>	Surface Soil Cracks (B6) <u> </u>	Water-stained Leaves (B9) <u> </u>	Stunted or Stressed Plants (D1) <u>X</u>	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u> </u>	Drainage Patterns (B10) <u> </u>	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) <u> </u>	Oxidized Rhizospheres along Living Roots (C3) <u> </u>	Shallow Aquitard (D3) <u> </u>	
Water Marks (B1) <u> </u>	Marl Deposits (B15) <u> </u>	Presence of Reduced Iron (C4) <u> </u>	Microtopographic Relief (D4) <u> </u>	
Sediment Deposits (B2) <u> </u>	Hydrogen Sulfide Odor (C1) <u> </u>	Salt Deposits (C5) <u> </u>	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) <u> </u>	Dry-Season Water Table (C2) <u> </u>	Notes: <u> </u>		
Algal Mat or Crust (B4) <u> </u>	Other (Explain in Notes): <u> </u>			
Iron Deposits (B5) <u> </u>				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>4</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>X</u>	Depth (in): <u>0</u>			
Notes: <u>Site is saturated to surface, water table at 4 inches</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> Dwarf shrub (<0.5m) <input checked="" type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> Moss-Lichen <input checked="" type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>4</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

zm

*QA/QC
NCE*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W00T1015 Field Target: 181 Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of on-site vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X

Zoe Meade

Signature / Date

X VALANT WATKINS

Field Crew Chief (print)

X

Valant Watkins

Signature / Date

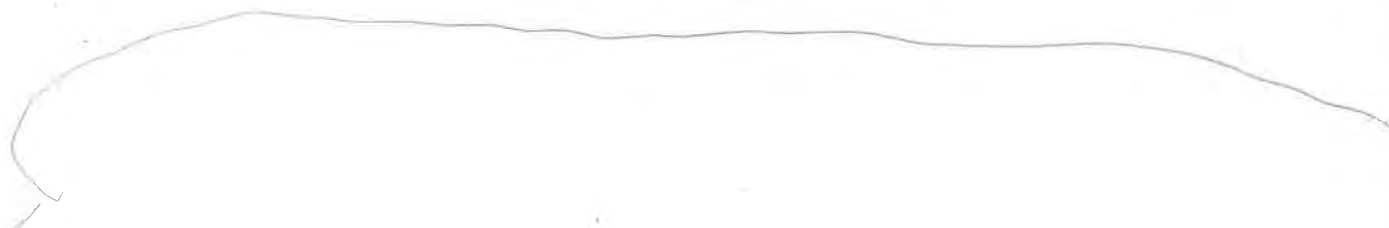
QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 182	Map #: 118 Map Date: 5/27/14
Date: 6/4/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1016
Investigators: Valerie Watkins, Zoe Mead			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 685.3	
Latitude: 62° 01' 54.04"		Longitude: 150° 11' 49.75"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 13	Picture No.: P_W60T1016_E-W_PIT-Plug	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): slight hummocks
Slope (%): 0-3	Local relief (concave, convex, none): slightly concave
Pre-mapped Alaska LNG/NWI classification: PEMIF	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEMIB
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): III A 2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.



see sight sketch for
W60T1015

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1.				Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>10</u> (A) Total Number of Dominant Species Across All Strata: <u>10</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Betula nana</i>	10	Y	FAC	
2. <i>Andromeda polifolia</i>	5		FACW	
3. <i>Chamaedaphne calyculata</i>	2		FACW	
4. <i>Rhododendron tomentosum</i>	8	Y	FACW	
5. <i>Vaccinium oxycoccus</i>	2		OBL	
6. <i>Picea mariana</i>	1		FACW	
7.				
8.				
9.				
Total Cover: <u>28</u> 50% of total cover: <u>14</u> 20% of total cover: <u>5.6</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Carex rotundata</i>	40	Y	OBL	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. _____ % Bare Ground _____ % Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
2. <i>Menyanthes trifoliata</i>	7		OBL	
3. <i>Carex limosa</i>	30	Y	OBL	
4. <i>Tricophorum caespitosum</i>	8		OBL	
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>78</u> 50% of total cover: <u>39</u> 20% of total cover: <u>15.6</u>				

WETLAND DETERMINATION DATA FORM

SOIL _____ **Date** 06-04 **Feature ID** W60TJ016 **Soil Pit Required (Y/N)** Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-13							Fibric	organics
13-22							Fibric/hemic	organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____	Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: 22 inches of saturated organics

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): Y Depth (in): N/A

Water Table Present (Y/N): Y Depth (in): 1

Saturation Present (Y/N): X (includes capillary fringe) Depth (in): 0

Wetland Hydrology Present (Y/N): Y

Notes: no surface water - but water table at about 1 inch, wetter than W60TJ015.

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>1</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>15</u> Dwarf shrub (<0.5m) <u>2</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>78</u> Moss-Lichen <u>80</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <u>N/A</u>		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils' Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

zm

QAQC
2009 Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60TI 016

Field Target: 182

Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoemeade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *ValWatkins*

Signature / Date

QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 179	Map #: 117	Map Date: 5/27/14
Date: 6/4/14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1017	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 685	
Latitude: 62° 02' 06.77"	Longitude: -150° 11' 35.01"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 14	Picture No.: P-W60T1017-E-W-pit-plug	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Hummocks
Slope (%): 0-3	Local relief (concave, convex, none): -concave
Pre-mapped Alaska LNG/NWI classification: PEM1B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS4/1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIA3, IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

The sketch depicts a landscape with several features. At the top, a line is labeled 'upland'. Below it, a larger area is labeled 'PSS4B'. A central feature is a cluster of ovals representing vegetation, with a note 'taller Picea mariana scattered'. Two survey points are marked with 'X' and labeled 'FT 179 X W60T1017 PSS4/1B' and 'FT 180 X W60T1018'. To the right, an area is labeled 'wetter' and contains more ovals. At the bottom right, there is a note 'grass/shrubs'. At the bottom center, there is a label 'PEM1/SS1F' with an arrow pointing towards the survey points.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1.				Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Picea mariana</i>	40	Y	FACW	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>67</u> X 1 = <u>67</u> FACW species: <u>52</u> X 2 = <u>104</u> FAC species: <u>14</u> X 3 = <u>48</u> FACU species: <u>2</u> X 4 = <u>8</u> UPL species: <u>0</u> X 5 = <u>0</u> Column Totals: <u>137</u> (A) <u>227</u> (B) PI = B/A = <u>1.65</u>
2. <i>betula nana</i>	10		FAC	
3. <i>Rhodadron tomentosum</i>	6		FACW	
4. <i>Empetrum nigrum</i>	2		FAC	
5. <i>Rosa acicularis</i>	T		FACU	
6. <i>Andromeda polifolia</i>	3		FACW	
7. <i>Ribes triste</i>	4		FAC	
8. <i>Dasiphora fruticosa</i>	15		FAC	
9.				
Total Cover: 80 <u>80</u> 50% of total cover: <u>40.0</u> 20% of total cover: <u>16.0</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Carex limosa</i>	5		OBL	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. _____ % Bare Ground <u>60</u> % Cover of Wetland Bryophytes <u>60</u> Total Cover of Bryophytes <u>5</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
2. <i>Rubus chamaemorus</i> ^{sp}	3		FACW	
3. <i>Trientalis europaea</i>	2		FACU	
4. <i>Dasiphora fruticosa</i> m			FAC	
5. unknown herb	T		-	
6. <i>Equisetum fluviatile</i>	1		OBL	
7. <i>Trichophorum caespitosa</i>	50	Y	OBL	
8. <i>Carex aquatilis</i>	10		OBL	
9. <i>Carex gynocrates</i>	1		OBL	
10. <i>Viola</i> spp.	T		-	
Total Cover: 72 <u>72</u> 50% of total cover: <u>36</u> 20% of total cover: <u>14.4</u>				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-04</u> Feature ID <u>W60T1017</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14							Fibric	organics
14-19							Hemic	organics
19-22							Sapric	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>NJK</u> Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>6 inches</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>2"</u>			
Saturation Present (Y/N): <u>X</u> (includes capillary fringe)	Depth (in): <u>0</u>			
Notes: <u>surface water is ~6 inches and only in scattered pockets around site.</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>40</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <u>40</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>74</u> Moss-Lichen <u>60</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvial Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.08</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

rw

GPS Technician QA/QC check:

zm

QA/QC REC

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOT1017

Field Target: 179

Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valeri Watkins

Field Crew Chief (print)

X *Valeri Watkins*

Signature / Date

QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 180	Map #: 117 Map Date: 5/27/14
Date: 06-04-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1018
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 685	
Latitude: 62° 02' 06.77"		Longitude: -150° 11' 35.01"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 15	Picture No.: P-W60T1018	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-3	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PEM1F	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PEM1/SS1</u> B <i>X Two more strands for "E"</i>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): III A3, II C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

see site sketch for W60T1017

Wettest area should be mapped as PEM1F

PEM1/SS1F uv and AEE

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Dasiphora fruticosa</i>	25	Y	FAC	
2. <i>Betula nana</i>	5		FAC	
3. <i>Andromeda polifolia</i>	2		FACW	
4. <i>Vaccinium oxycoccus</i>	1		OBL	
5. <i>Myrica gale</i>	3		OBL	
6. <i>Spiraea stevenii</i>	5		FACU	
7.				
8.				
9.				
Total Cover: <u>41</u> 50% of total cover: <u>20.5</u> 20% of total cover: <u>8.2</u>				

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)
 Total Number of Dominant Species Across All Strata: 3 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 136 X 1 = 136
 FACW species: 2 X 2 = 4
 FAC species: 30 X 3 = 90
 FACU species: 6 X 4 = 24
 UPL species: 0 X 5 = 0
 Column Totals: 174 (A) 254 (B)
 PI = B/A = 1.46

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Trichophorum caespitosum</i>	70	Y	OBL	
2. <i>Menyanthes trifoliata</i>	10		OBL	
3. <i>Trientalis europaea</i>	1		FACU	
4. <i>Equisetum fluviatile</i>	2		OBL	
5. <i>Drosera rotundifolia</i>	5		OBL	
6. <i>Carex rotundata</i>	5		OBL	
7. <i>Utricularia macrorhiza</i>	40	Y	OBL	
8.				
9.				
10.				
Total Cover: <u>133</u> 50% of total cover: <u>66.5</u> 20% of total cover: <u>26.6</u>				

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
40 % Cover of Wetland Bryophytes
40 Total Cover of Bryophytes
50 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):
*other carex may be present at site but no seed heads found for identification

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>6/4/14</u> Feature ID <u>W160T1018</u>				Soil Pit Required (Y/N) <u>N</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>no soil pit required. standing water throughout site.</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u>X</u>	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>10 inches</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0</u>			
Notes: <u>Surface water throughout site</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <u>41</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>93</u> Moss-Lichen <u>40</u> Floating <u>0</u> Submerged <u>40</u>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> ^{vw} <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.07</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

zm

QAQC
NSP

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG0T1018

Field Target: 180

Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X *Valerie West*

Field Crew Chief (print)

X *Valerie West*

Signature / Date

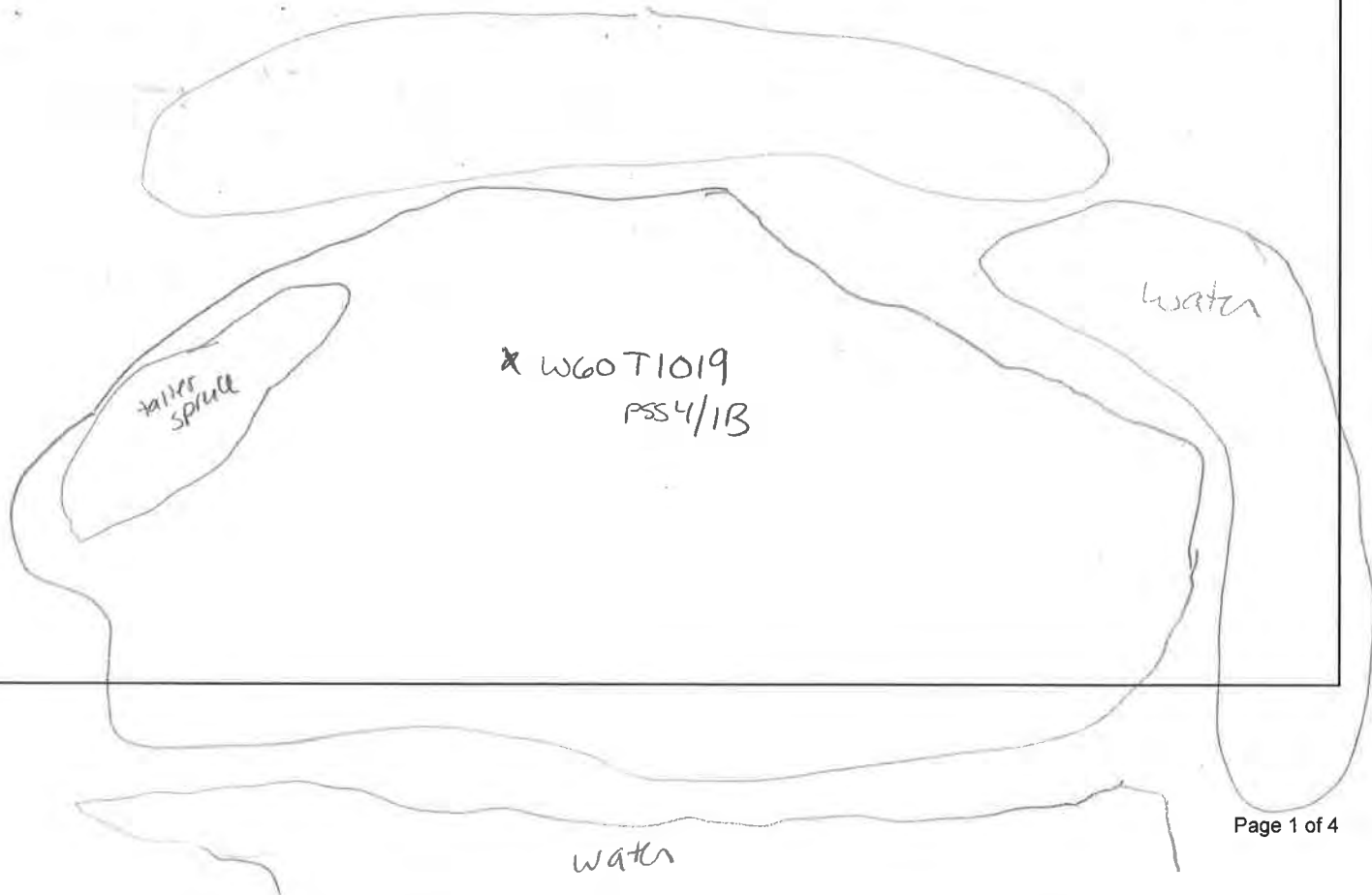
QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 177	Map #: 116	Map Date: 5/27/14
Date: 06-05-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1019	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 684	
Latitude: 62° 02' 52.69"	Longitude: -150° 10' 42.71"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 17	Picture No.: P-W60T1019-E-W-pt-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-2	Local relief (concave, convex, none): slightly concave
Pre-mapped Alaska LNG/NWI classification: PSS4/1B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS4/1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIA3, IC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	5	Y	FACW
2.			
3.			
4.			
Total Cover: <u>5</u> 50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	50	Y	FACW
2. <i>Empetrum nigrum</i>	30	Y	FAC
3. <i>Rhododendron tomentosum</i>	20		FACW
4. <i>Betula nana</i>	5		FAC
5. <i>Andromeda polifolia</i>	8		FACW
6. <i>Chamaedaphne calyculata</i>	5		FACW
7. <i>Vaccinium oxycoccus</i>	3		
8.			
9.			
Total Cover: <u>121</u> 50% of total cover: <u>60.5</u> 20% of total cover: <u>24.2</u>			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 34 (A)

Total Number of Dominant Species Across All Strata: 34 (B)

% Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species: 41 X 1 = 41

FACW species: 98 X 2 = 196

FAC species: 35 X 3 = 105

FACU species: 0 X 4 = 0

UPL species: 0 X 5 = 0

Column Totals: 174 (A) 342 (B)

PI = B/A = 1.97

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Carex microglochin</i>	35	Y	OBL
2. <i>Rubus Chamaemorus</i>	10		FACW
3. <i>Drosera rotundifolia</i>	1		OBL
4. <i>Tricophorum caespitosum</i>	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>51</u> 50% of total cover: <u>25.5</u> 20% of total cover: <u>10.2</u>			

Hydrophytic Vegetation Indicators:

Dominance Test is > 50%

Prevalence Index is ≤ 3.0

_____ Morphological Adaptations¹ (Provide supporting data in Notes)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
5 % Cover of Wetland Bryophytes
60 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date: <u>06-05-14</u> Feature ID: <u>WG0T1019</u>				Soil Pit Required (Y/N): <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-13	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	Fibric	organics
13-22	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	Fibric/sapric	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u> X </u>			Alaska Gleyed (A13) <u> </u>			Alaska Color Change (TA4) ⁴ <u> </u>		
Histic Epipedon (A2) <u> + </u> <u> vw </u>			Alaska Redox (A14) <u> </u>			Alaska Alpine Swales (TA5) <u> </u>		
Black Histic (A3) <u> </u>			Alaska Gleyed Pores (A15) <u> </u>			Alaska Redox with 2.5Y Hue <u> </u>		
Hydrogen Sulfide (A4) <u> </u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) <u> </u>						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u> </u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u> Y </u>								
Notes: <u> 20 inches of saturated organics </u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u> </u>	Surface Soil Cracks (B6) <u> </u>	Water-stained Leaves (B9) <u> </u>	Stunted or Stressed Plants (D1) <u> </u>
High Water Table (A2) <u> </u>	Inundation Visible on Aerial Imagery (B7) <u> </u>	Drainage Patterns (B10) <u> </u>	Geomorphic Position (D2) <u> </u>
Saturation (A3) <u> X </u>	Sparsely Vegetated Concave Surface (B8) <u> </u>	Oxidized Rhizospheres along Living Roots (C3) <u> </u>	Shallow Aquitard (D3) <u> </u>
Water Marks (B1) <u> </u>	Marl Deposits (B15) <u> </u>	Presence of Reduced Iron (C4) <u> </u>	Microtopographic Relief (D4) <u> </u>
Sediment Deposits (B2) <u> </u>	Hydrogen Sulfide Odor (C1) <u> </u>	Salt Deposits (C5) <u> </u>	FAC-Neutral Test (D5) <u> X </u>
Drift Deposits (B3) <u> </u>	Dry-Season Water Table (C2) <u> </u>	Notes: <u> </u>	
Algal Mat or Crust (B4) <u> </u>	Other (Explain in Notes): <u> </u>		
Iron Deposits (B5) <u> </u>			
Surface Water Present (Y/N): <u> N </u>	Depth (in): <u> - </u>	Wetland Hydrology Present (Y/N): <u> Y </u>	
Water Table Present (Y/N): <u> Y </u>	Depth (in): <u> 15 inches </u>		
Saturation Present (Y/N): (includes capillary fringe) <u> Y </u>	Depth (in): <u> 1 </u>		
Notes: <u> water seeping into pit at 8" </u>			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <u>X</u> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>5</u> Sapling (<5 dbh, <6m tall) <u>50</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>7</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>51</u> Moss-Lichen <u>60</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>5</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <u>X</u>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <u>X</u> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <u>X</u>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>X</u>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <u>X</u>			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <u>X</u> Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <u>X</u> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <u>X</u> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>X</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>-</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <u>X</u> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>X</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <u>X</u> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <u>vw</u> Medium (10-100 acres) <u>X</u> Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

ym

QA/QC DEE

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1019

Field Target: 177

Date: 6/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

Signature / Date

QAQC
DSM

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: <u>Centerline</u> <input checked="" type="checkbox"/> <u>X</u> Access Road (explain) _____ Other (explain) _____		Field Target: <u>176</u>	Map #: <u>116</u> Map Date: <u>5/27/14</u>
Date: <u>6/5/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1020</u>
Investigators: <u>Valerie Watkins, Zoe Mead</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>684</u>	
Latitude: <u>62° 02' 52.98"</u>		Longitude: <u>-150° 10' 41.79"</u>	Datum: <u>WGS84</u>
Logbook No.: <u>1</u>	Logbook Page No.: <u>17</u>	Picture No.: <u>P-W60T1020-N-E</u>	<i>only 2 photos</i>

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Flat</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PuB/ABH</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PuB/ABH</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): <u>III D1</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

PSS 4/18

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A)
2.				Total Number of Dominant Species Across All Strata: <u>63</u> (B)
3.				% Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
4.				
Total Cover: <u>0</u>				Prevalence Index worksheet:
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Total % Cover of: _____ Multiply by: _____
1. <i>Betula nana</i>	2		FAC	OBL species: <u>91</u> X 1 = <u>91</u>
2. <i>Andromeda polifolia</i>	10	Y	FACW	FACW species: <u>12</u> X 2 = <u>24</u>
3. <i>Rhododendron tomentosum</i>	2		FACW	FAC species: <u>4</u> X 3 = <u>12</u>
4. <i>Vaccinium oxycoccus</i>	1		OBL	FACU species: <u>0</u> X 4 = <u>0</u>
5. <i>Myrica gale</i>	4	Y	OBL	UPL species: <u>0</u> X 5 = <u>0</u>
6. <i>Empetrum nigrum</i>	1		FAC	Column Totals: <u>107</u> (A) <u>127</u> (B)
7.				PI = B/A = <u>1.18</u>
8.				
9.				
Total Cover: <u>20</u>				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Trichophorum caespitosum</i>	15	Y	OBL	<input checked="" type="checkbox"/> Dominance Test is > 50%
2. <i>Carex rotundata</i>	15	Y	OBL	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
3. <i>Menyanthes trifoliata</i>	15	Y	OBL	____ Morphological Adaptations ¹ (Provide supporting data in Notes)
4. <i>Drosera rotundifolia</i>	10		OBL	____ Problematic Hydrophytic Vegetation ¹ (Explain)
5. <i>Comarum palustre</i>	1		OBL	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
6. <i>Carex limosa</i>	20	Y	OBL	
7. <i>Rubus arcticus</i>	1		FAC	<u>0</u> % Bare Ground
8. <i>Utricularia macrohiza</i>	10		OBL	<u>30</u> % Cover of Wetland Bryophytes
9.				<u>30</u> Total Cover of Bryophytes
10.				<u>70</u> % Cover of Water
Total Cover: <u>87</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>
50% of total cover: <u>48.5</u> 20% of total cover: <u>17.4</u>				Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-05-14</u> Feature ID <u>W60T1020</u>				Soil Pit Required (Y/N) <u>N</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>No pit required due to standing water on site</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u>X</u>	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0</u>			
Notes: <u>standing water throughout site over 4 inches</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES	
P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____	
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>	
Number of Wetland Types (M): <u>5</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____	
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____	
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____	
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____	
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____	
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____	
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____	
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____	

SOIL VARIABLES
Soil Factors (P): Soil Lacking <input checked="" type="checkbox"/> Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvial/Quaternary Soils Sediment Created _____
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>5.5</u>
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____

Crew Chief QA/QC check:

yw

GPS Technician QA/QC check:

zm

QAQC
DEC Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W6DT1020

Field Target: 176

Date: 06-05-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

} no test pit dug.

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

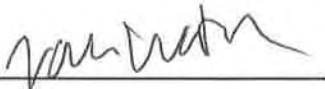
X Zoe Meade	X <i>Zoe Meade</i>
Wetland Scientist (print)	Signature / Date

X Valent Weathling	X <i>Valent Weathling</i>
Field Crew Chief (print)	Signature / Date

QAQC
WSS

Vegetation Classification Data Form

Site Description		
Date: 06-05-14	Project Name & #: Alaska LNG 26221306	Field Target: #60311 176
Investigators: Valerie Watkins, Zoe Meade		Feature ID: W60T1021
Latitude: 62° 09' 52.98"	Longitude: -150° 10' 41.79"	Datum: WGS84
Logbook #: 1	Logbook Page #:	Picture #: P-W60T1021-veg-veg
Location Description:		
North of field target 176		
Common Species Observed (Scientific Name)		
Betula neoalaskana		
Picea mariana		
Percent Cover of Dominant Structure Level: 80%		
Habitat Description:		
Upland		
Alaska Vegetation Classification: Level I, Level II, Level III		
IC2	II C2	
Notes:		

Field Crew Chief: 

Field Scientist/Technician Zoe Meade

QAQC
Dec

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I. Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest (2) Open needleleaf (conifer) forest (3) Needleleaf (conifer) woodland
	B. Broadleaf forest	(1) Closed broadleaf forest (2) Open broadleaf forest (3) Broadleaf woodland
	C. Mixed forest	(1) Closed mixed forest (2) Open mixed forest (3) Mixed woodland
II. Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub (2) Open dwarf tree scrub (3) Dwarf tree scrub woodland
	B. Tall scrub	(1) Closed tall scrub (2) Open tall scrub
	C. Low scrub	(1) Closed low scrub (2) Open low scrub
	D. Dwarf scrub	(1) Dryas dwarf scrub (2) Ericaceous dwarf scrub (3) Willow dwarf scrub
III. Herbaceous	A. Graminoid herbaceous	(1) Dry graminoid herbaceous (2) Mesic graminoid herbaceous (3) Wet graminoid herbaceous (emergent)
	B. Forb herbaceous	(1) Dry forb herbaceous (2) Mesic forb herbaceous (3) Wet forb herbaceous (emergent)
	C. Bryoid herbaceous	(1) Mosses (2) Lichens
	D. Aquatic (nonemergent) herbaceous	(1) Freshwater aquatic herbaceous (2) Brackish water aquatic herbaceous (3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table

1a. Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b. Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
I. Forest		
2a. Over 75 percent of tree cover contributed by needleleaf (conifer) species	I.A Needleleaf forest	3
2b. Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a. Tree canopy of 60-100 percent cover	I.A.1 Closed needleleaf forest	
3b. Tree canopy of 25-59 percent cover	I.A.2 Open needleleaf forest	
3c. Tree canopy of 10-24 percent cover	I.A.3 Needleleaf woodland	
4a. Over 75 percent of tree cover contributed by broadleaf species	I.B Broadleaf forest	5
4b. Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a. Tree canopy of 60-100 percent cover	I.B.1 Closed broadleaf forest	
5b. Tree canopy of 25-59 percent cover	I.B.2 Open broadleaf forest	
5c. Tree canopy of 10-24 percent cover	I.B.3 Broadleaf woodland	
6a. Tree canopy of 60-100 percent cover	I.C.1 Closed mixed forest	
6b. Tree canopy of 25-59 percent cover	I.C.2 Open mixed forest	
6c. Tree canopy of 10-24 percent cover	I.C.3 Mixed woodland	
7a. Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b. Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub		
8a. Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b. Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a. Dwarf tree canopy of 60-100 percent cover	II.A.1 Closed dwarf tree scrub	
9b. Dwarf tree canopy of 25-59 percent cover	II.A.2 Open dwarf tree scrub	
9c. Dwarf tree canopy of 10-24 percent cover	II.A.3 Dwarf tree scrub woodland	
10a. Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b. Shrubs less than 1.5 meters (5 ft) tall		12
11 a. Shrub canopy cover greater than 75 percent	II.B.1 Closed tall scrub	
11 b. Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a. Shrubs 20 centimeters to 1.5 meters tall	II.C Low scrub	13
12b. Shrubs under 20 centimeters in height	II.D Dwarf scrub	14
13a. Shrub canopy cover greater than 75 percent	II C.1 Closed low scrub	
13b. Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C.2 Open low scrub	
14a. Dryas species dominant in the dwarf shrub layer	II D.1 Dryas dwarf scrub	
14b. Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c. Willow species dominant in the dwarf shrub layer	II D.2 Willow dwarf scrub	
III. Herbaceous		
15a. Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b. Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a. Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b. Forbs or bryophytes dominant		18
17a. Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b. On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Enophorum</i> spp.; tussocks often present	III A.2 Mesic graminoid herbaceous	
17c. On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a. Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b. Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a. On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b. On moist sites but without standing water, mostly within forested areas	III.B.2 Mesic forb herbaceous	
19c. On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a. Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b. Vegetation cover dominated by lichens	III C.2 Bryoid lichen	
21a. Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21 b. Vegetation submerged or floating in brackish water	III D.2 Brackish water aquatic herbaceous	
21c. Vegetation submerged or floating in salt water	III D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W60T1021 Field Target: 176 Date: 00-05-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe Meade

Field Technician (print)

X Zoemeade

Signature

X Valerie Watkins

Field Crew Chief (print)

X Valerie Watkins

Signature

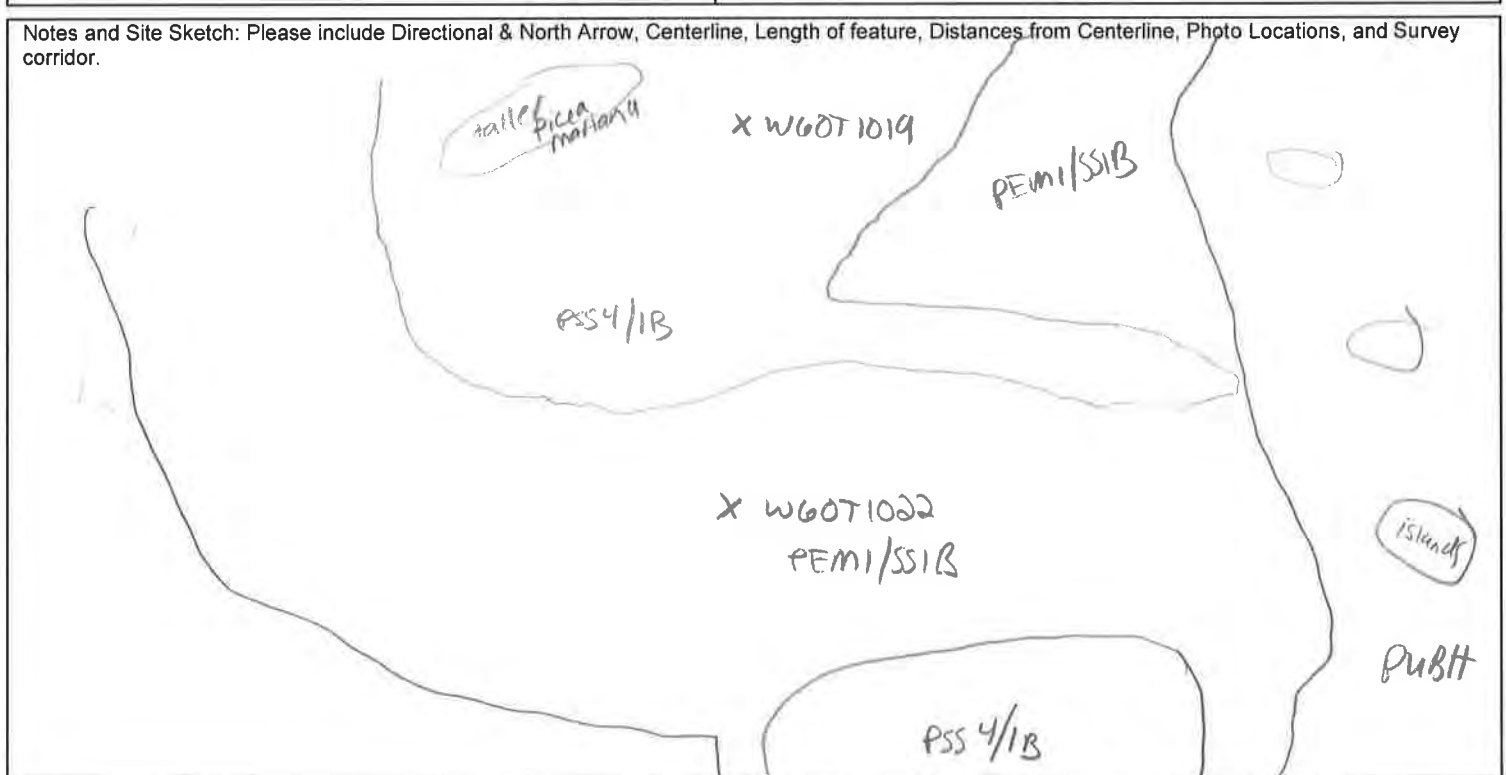
QAQC
AZC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 178	Map #: 116	Map Date: 5/27/14
Date: 06-04-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1022	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 684	
Latitude: 60° 02' 51.63"	Longitude: -150° 10' 44.18"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 18	Picture No.: P-W60T1022-W-SE, pit, dug	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-3	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1/SS1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): IIIA2, IIC2



PUBH

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>114</u> x 1 = <u>114</u> FACW species: <u>15</u> x 2 = <u>30</u> FAC species: <u>15</u> x 3 = <u>45</u> FACU species: <u>0</u> x 4 = <u>0</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>144</u> (A) <u>189</u> (B) PI = B/A = <u>1.31</u>
1. <i>Betula nana</i>	15	Y	FAC	
2. <i>Andromeda polifolia</i>	8	Y	FACW	
3. <i>Rhododendron tomentosum</i>	2		FACW	
4. <i>Chamaedaphne calyculata</i>	5		FACW	
5. <i>Vaccinium oxycoccus</i>	1		OBL	
6.				
7.				
8.				
9.				
Total Cover: <u>31</u> 50% of total cover: <u>15.5</u> 20% of total cover: <u>6.2</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Carex rotundata</i>	20		OBL	
2. <i>Tricophorum caespitosum</i>	60	Y	OBL	
3. <i>Drosera rotundifolia</i>	8		OBL	
4. <i>Carex limosa</i>	25	Y	OBL	
5.				
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>113</u> 50% of total cover: <u>56.5</u> 20% of total cover: <u>22.6</u>				
_____ % Bare Ground _____ % Cover of Wetland Bryophytes _____ % Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):				

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-05</u> Feature ID <u>W60T1022</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-22							Fibric	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): 0 <u>1-2"</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>saturation + water table to surface. scattered pockets of standing water 1-2" deep.</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>0</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>3</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>115</u> Moss-Lichen <u>60</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>5</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>4.4</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

zm

*240C
209*

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1 022

Field Target: 178

Date: 06-04-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X 

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X 

Signature / Date

QAQC
DES

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 173	Map #: 115	Map Date: 5/23/14
Date: 06-05-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1023	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 683.2	
Latitude: 62° 03' 28.95"	Longitude: 150° 10' 01.65"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 19	Picture No.: P_W60T1023-E-W-pit-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): terrace
Slope (%): PEMIC 0-3	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PEMIC	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1/EM1C
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIC2, IIIA3

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

The sketch depicts a cross-section of a landscape. At the top, an arrow points North. Below it, a wavy line represents a stream crossing, with a small oval labeled 'pool' on the left side. A wavy line below the stream is marked with an 'X' and labeled 'W60T1023 PSS1/EM1C'. Further down, another wavy line is labeled 'PSS4/1B'. The areas above and below the stream are labeled 'upland'.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A)
2.				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3.				% Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
4.				
Total Cover: <u>0</u>				Prevalence Index worksheet:
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Total % Cover of: _____ Multiply by:
1. <i>Picea mariana</i>	2		FACW	OBL species: <u>88</u> X 1 = <u>88</u>
2. <i>Betula nana</i>	60	Y	FAC	FACW species: <u>3</u> X 2 = <u>6</u>
3. <i>Myrica gale</i>	50	Y	OBL	FAC species: <u>110</u> X 3 = <u>330</u>
4. <i>Vaccinium uliginosum</i>	10		FAC	FACU species: <u>11</u> X 4 = <u>44</u>
5. <i>Spiraea stevenii</i>	5		FACU	UPL species: <u>0</u> X 5 = <u>0</u>
6. <i>Betula nana</i>	6		FACU	Column Totals: <u>212</u> (A) <u>468</u> (B)
7. <i>Saxex fuscens</i>	1		FACW	PI = B/A = <u>2.20</u>
8. <i>fuscescens</i>				
9.				
Total Cover: <u>134</u>				
50% of total cover: <u>67</u> 20% of total cover: <u>26.8</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Comarum palustre</i>	3		OBL	<input checked="" type="checkbox"/> Dominance Test is > 50%
2. <i>Carex aquatilis</i>	35	Y	OBL	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
3. <i>Calamagrostis canadensis</i>	40	Y	FAC	____ Morphological Adaptations ¹ (Provide supporting data in Notes)
4.				____ Problematic Hydrophytic Vegetation ¹ (Explain)
5.				¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
6.				
7.				<u>0</u> % Bare Ground
8.				<u>0</u> % Cover of Wetland Bryophytes
9.				<u>0</u> Total Cover of Bryophytes
10.				<u>0</u> % Cover of Water
Total Cover: <u>78</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>
50% of total cover: <u>39</u> 20% of total cover: <u>15.6</u>				Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-05</u> Feature ID <u>W60T1023</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9							fibric	Organics
9-22							hemic-sapric	Organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) <u>X</u>	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>-</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>4 inches</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>water seeping into pit at approximately 4 inches surface water in stream + pool only - not on site.</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input checked="" type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> Dwarf shrub (<0.5m) <input checked="" type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <input checked="" type="checkbox"/> 2	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet <input checked="" type="checkbox"/>	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs <input checked="" type="checkbox"/> Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.4</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

3m

QA/QC
 DEL Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WX00T1003 Field Target: 173 Date: 6/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X

Signature / Date



X Valerie Watkinson

Field Crew Chief (print)

X

Signature / Date



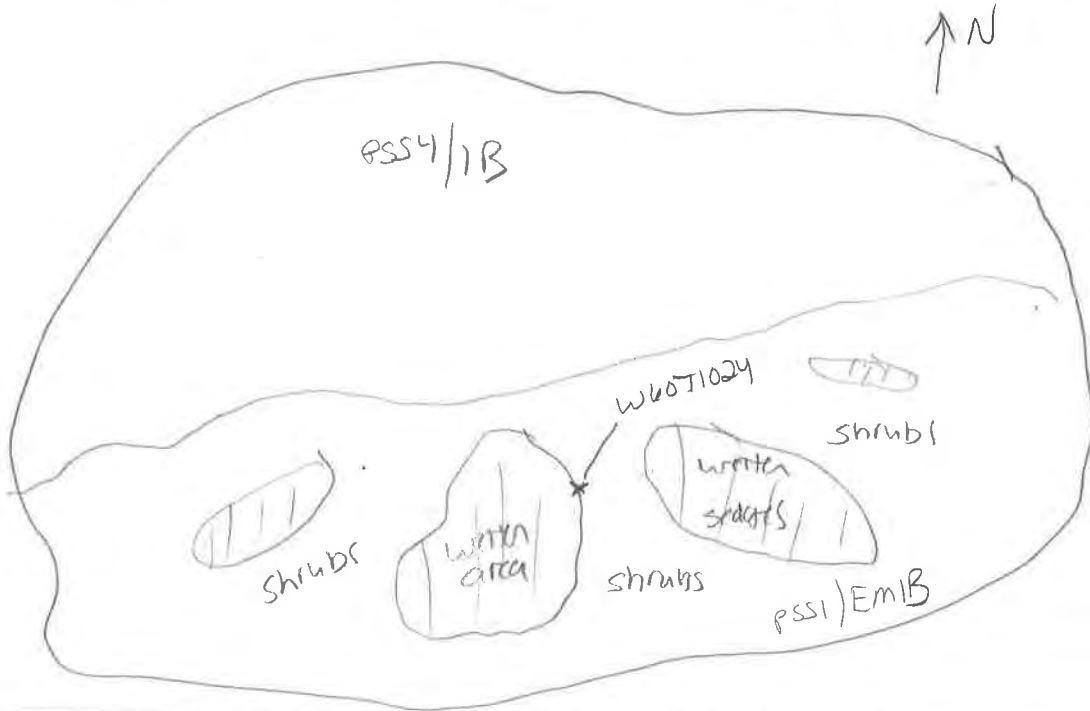
Q4QC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline	Access Road (explain)	Other (explain) <u>corridor</u>	Field Target: <u>174</u>
Date: <u>06-05-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Map #: <u>115</u> Map Date: <u>5/27/14</u>	
Investigators: <u>Valerie Watkins, Zoe Meade</u>		Feature Id: <u>W60T1024</u>	
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>683.3</u>	Team No.: <u>W60</u>
Latitude: <u>62° 03' 25.53"</u>	Longitude: <u>-150° 10' 06.90"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>20</u>	Picture No.: <u>P-W60T1024-E-W-pit-plug</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>hummocks</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PEM1/SS4B</u>	Soil Map Unit Name: <u>-</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation, Soil, or Hydrology Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation, Soil, or Hydrology Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS1 / EM1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>IIC2 / IIIA2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: _____ 50% of total cover: _____ 20% of total cover: _____			
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	45	Y	FAC
2. <i>Comarum palustre</i> <i>2m</i>			FACW
3. <i>Chamaedaphne calyculata</i>	20	Y	FACW
4. <i>Rhododendron tomentosum</i>	10		FACW
5. <i>Picea mariana</i>	15		FACW
6. <i>Andromeda polifolia</i>	2		FACW
7. <i>Vaccinium oxycoccus</i>	1		OBL
8. <i>Empetrum nigrum</i>	4		FAC
9. <i>Vaccinium uliginosum</i>	1		FAC
Total Cover: <u>99</u> 50% of total cover: <u>49.5</u> 20% of total cover: <u>19.8</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)
 Total Number of Dominant Species Across All Strata: 3 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 51 x 1 = 51
 FACW species: 47 x 2 = 94
 FAC species: 53 x 3 = 159
 FACU species: 0 x 4 = 0
 UPL species: 0 x 5 = 0
 Column Totals: 151 (A) 304 (B)
 PI = B/A = 2.01

Vaccinium vitis-idaea 1 FAC

VEGETATION (use scientific names of plants)			
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum sylvaticum</i>	2		FAC
2. <i>Carex rotundata</i>	10		OBL
3. <i>Carex microglochin</i>	40	Y	OBL
4. <i>Carex limosa</i>	10		OBL
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>62</u> 50% of total cover: <u>31</u> 20% of total cover: <u>12.4</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

% Bare Ground
 50 % Cover of Wetland Bryophytes
 50 Total Cover of Bryophytes
 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL Date 06-05-14 Feature ID W60T1024 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8							Fibric	organics
8-13							Sapric Hemic	organics
13-22	2.5Y 5/4	100					Silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) <u>X</u>	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: 13 inches of saturated organics over mineral soil
underlying mineral soil is too light

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>N/A</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>1</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	

Notes: _____

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>15</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>75</u> Dwarf shrub (<0.5m) <input checked="" type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>100</u> Moss-Lichen <u>30</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>3</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above <input checked="" type="checkbox"/> Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

mm

QAQC
2022

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W6071024 Field Target: 174 Date: 6/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

Signature / Date

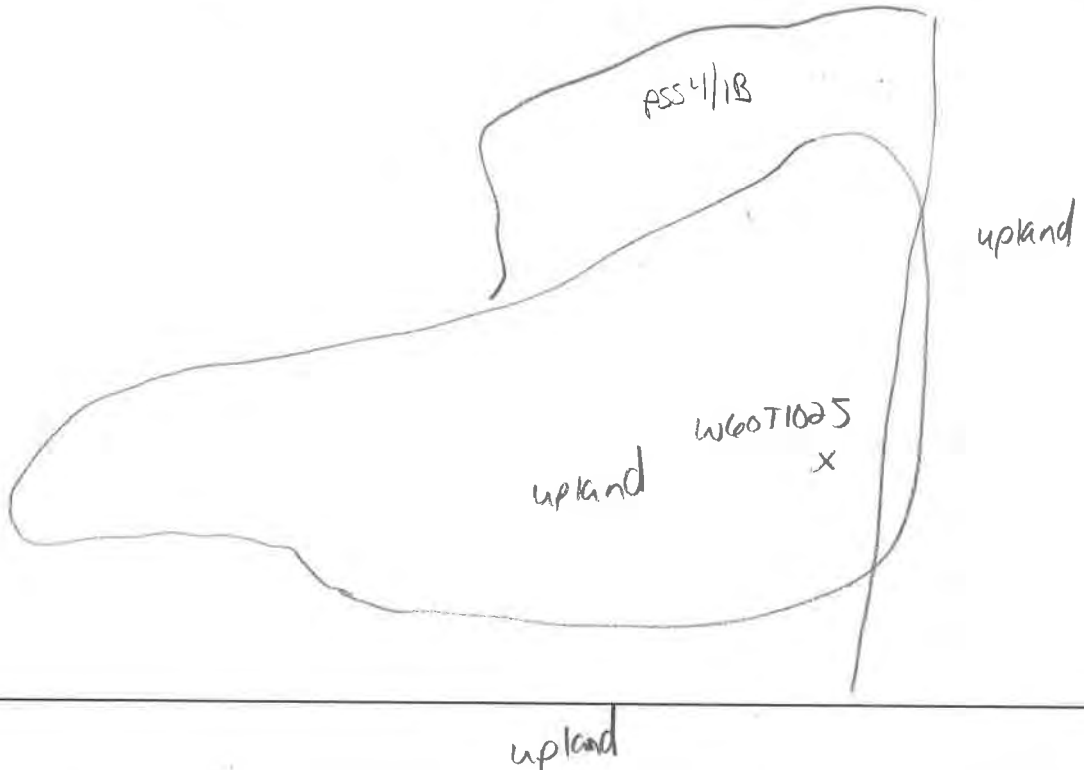
QAQC
DEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 175	Map #: 115	Map Date: 5/27/14
Date: 06-05-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1025	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 683.3	
Latitude: 62° 03' 24.64"	Longitude: 150° 10' 06.96"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 21	Picture No.: P-W60T1025-S-W-AT-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 3-5	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: PF04/BS4B	Soil Map Unit Name: —
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: upland
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): IA2, IB2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	35	Y	FACW
2.			
3.			
4.			
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Vaccinium vitis-idaea</i>	3		FAC
2. <i>Empetrum nigrum</i>	2		FAC
3. <i>Menziesia ferruginea</i>	40	Y	FACU
4. <i>Picea mariana</i>	10		FACW
5. <i>Betula neolaskana</i>	8		FACU
6.			
7.			
8.			
9.			
Total Cover: <u>63</u> 50% of total cover: <u>31.5</u> 20% of total cover: <u>12.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 0 x 1 = 0
 FACW species: 45 x 2 = 90
 FAC species: 21 x 3 = 63
 FACU species: 56 x 4 = 224
 UPL species: 0 x 5 = 0
 Column Totals: 122 (A) 377 (B)
 PI = B/A = 3.1

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum sylvaticum</i>	8	Y	FAC
2. <i>Cornus canadensis</i>	2	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>10</u> 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Hydrophytic Vegetation Indicators:
~~*~~^{vw} Dominance Test is > 50%
 _____ Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
0 % Cover of Wetland Bryophytes
70 Total Cover of Bryophytes
0 % Cover of Water
Hydrophytic Vegetation Present (Y/N): N

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 06-05 Feature ID W60TI 025 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	_____	—	_____	—	—	—	Fibric	organics
6-7	10YR 4/1						Silt loam	
7-10	5YR 2.5/2						Sandy loam	
10-15	10YR 3/6	92	2.5YR 2.5/4	8	C	PL	Sandy loam	few gravels
15-22	10YR 3/4						Sandy loam	few gravels

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): N

Notes: 10YR 3/6 ←
10YR 4/1 → 5YR 2.5/2

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>N</u>
Water Table Present (Y/N): <u>N</u>	Depth (in): _____	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>15</u>	

Notes: NO hydrology indicators present.

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____	
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

W

GPS Technician QA/QC check:

ym

QA/QC
2/22

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W160 T1025 Field Target: 175 Date: 6/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X *Zoe Meade*

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X *Valerie Watkins*

Field Crew Chief (print)

X *6/5/14*

Signature / Date

QAQC
DEE

Vegetation Classification Data Form

Site Description		
Date: 06-05-14	Project Name & #: Alaska LNG 26221306	Field Target: 173
Investigators: Valerie Watkins, Zoe Meade		Feature ID: W60T1026
Latitude: 62° 03' 27.36"	Longitude: -150 10' 04.50"	Datum: WGS84
Logbook #: 1	Logbook Page #: 22	Picture #: P-W60T1026_E-W
Location Description:		
South of FT173		
Common Species Observed (Scientific Name)		
Menziesia ferruginea		
Betula neolaskana		
Picea mariana		
Percent Cover of Dominant Structure Level: 60		
Habitat Description:		
Spruce birch forest		
Alaska Vegetation Classification: Level I, Level II, Level III		
I C 2	II C 2	
Notes:		

Field Crew Chief: *rw*

Field Scientist/Technician: *zm*

QAQC
ME

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III	
I Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest	
		(2) Open needleleaf (conifer) forest	
		(3) Needleleaf (conifer) woodland	
	B Broadleaf forest	(1) Closed broadleaf forest	
		(2) Open broadleaf forest	
		(3) Broadleaf woodland	
C Mixed forest	(1) Closed mixed forest		
	(2) Open mixed forest		
	(3) Mixed woodland		
II Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub	
		(2) Open dwarf tree scrub	
		(3) Dwarf tree scrub woodland	
	B Tall scrub	(1) Closed tall scrub	
		(2) Open tall scrub	
	C Low scrub	(1) Closed low scrub	
		(2) Open low scrub	
	D Dwarf scrub	(1) Dryas dwarf scrub	
		(2) Ericaceous dwarf scrub	
		(3) Willow dwarf scrub	
	III Herbaceous	A Graminoid herbaceous	(1) Dry graminoid herbaceous
			(2) Mesic graminoid herbaceous
(3) Wet graminoid herbaceous (emergent)			
B Forb herbaceous		(1) Dry forb herbaceous	
		(2) Mesic forb herbaceous	
		(3) Wet forb herbaceous (emergent)	
C Bryoid herbaceous		(1) Mosses	
		(2) Lichens	
D Aquatic (nonemergent) herbaceous		(1) Freshwater aquatic herbaceous	
		(2) Brackish water aquatic herbaceous	
		(3) Marine aquatic herbaceous	

Descriptions of levels I, II, III, and IV follow the classification table.

1a	Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b	Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
II. Forest			
2a	Over 75 percent of tree cover contributed by needleleaf (conifer) species	IA Needleleaf forest	3
2b	Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a	Tree canopy of 60-100 percent cover	IA.1 Closed needleleaf forest	
3b	Tree canopy of 25-59 percent cover	IA.2 Open needleleaf forest	
3c	Tree canopy of 10-24 percent cover	IA.3 Needleleaf woodland	
4a	Over 75 percent of tree cover contributed by broadleaf species	IB Broadleaf forest	5
4b	Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a	Tree canopy of 60-100 percent cover	IB.1 Closed broadleaf forest	
5b	Tree canopy of 25-59 percent cover	IB.2 Open broadleaf forest	
5c	Tree canopy of 10-24 percent cover	IB.3 Broadleaf woodland	
6a	Tree canopy of 60-100 percent cover	IC.1 Closed mixed forest	
6b	Tree canopy of 25-59 percent cover	IC.2 Open mixed forest	
6c	Tree canopy of 10-24 percent cover	IC.3 Mixed woodland	
7a	Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b	Vegetation herbaceous (may have up to 25 percent shrub cover)		15

III. Scrub			
8a	Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b	Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a	Dwarf tree canopy of 60-100 percent cover	II.A.1 Closed dwarf tree scrub	
9b	Dwarf tree canopy of 25-59 percent cover	II.A.2 Open dwarf tree scrub	
9c	Dwarf tree canopy of 10-24 percent cover	II.A.3 Dwarf tree scrub woodland	
10a	Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b	Shrubs less than 1.5 meters (5 ft) tall		12
11 a	Shrub canopy cover greater than 75 percent	II.B.1 Closed tall scrub	
11 b	Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a	Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b	Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a	Shrub canopy cover greater than 75 percent	II C.1 Closed low scrub	
13b	Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II C.2 Open low scrub	
14a	Dryas species dominant in the dwarf shrub layer	II D.1 Dryas dwarf scrub	
14b	Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c	Willow species dominant in the dwarf shrub layer	II D.2 Willow dwarf scrub	
III. Herbaceous			
15a	Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b	Dominant vegetation growing submerged in water or floating on the water surface but not emerging above the water	III D Aquatic herbaceous	21

16a	Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b	Forbs or bryophytes dominant		18
17a	Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b	On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Eriophorum</i> spp., tussocks often present	III A.2 Mesic graminoid herbaceous	
17c	On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra, bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a	Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b	Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a	On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b	On moist sites but without standing water, mostly within forested areas	III B.2 Mesic forb herbaceous	
19c	On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a	Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b	Vegetation cover dominated by lichens	III C.2 Bryoid lichen	
21a	Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21 b	Vegetation submerged or floating in brackish water	III D.2 Brackish water aquatic herbaceous	
21c	Vegetation submerged or floating in salt water	III D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: W20T102e Field Target: 173 Date: 6/5/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe Meade

Field Technician (print)

X Zoe Meade

Signature

X Valerie West

Field Crew Chief (print)

X Valerie West

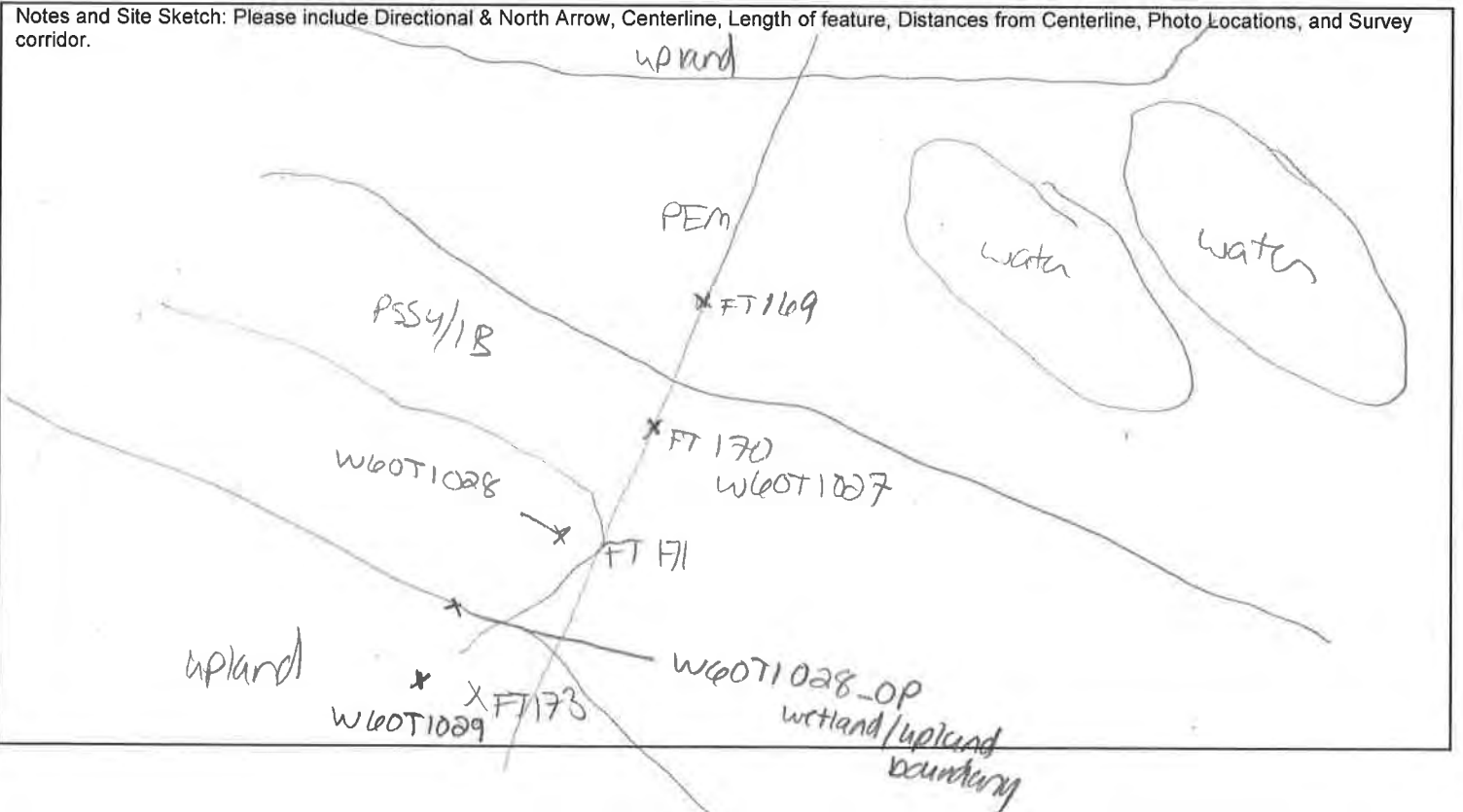
Signature

QAQC
YES

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____	Field Target: 170	Map #: 114	Map Date: 5/27/14
Date: 06-06-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1027	
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60T1027
State: Alaska	Region: Alaska	Milepost: 682.7	
Latitude: 62° 03' 52.06"	Longitude: -150° 09' 34.34"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 23	Picture No.: P-W60T1027_E-W_ph-149	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): hummocks, slight
Slope (%): 0-3	Local relief (concave, convex, none): slightly concave
Pre-mapped Alaska LNG/NWI classification: PSS4/1B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS4/1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IIA2, IIC2



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <i>Picea mariana</i>	5	Y	FACW	
2.				
3.				
4.				
Total Cover: <u>5</u> 50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>36</u> x 1 = <u>36</u> FACW species: <u>73</u> x 2 = <u>146</u> FAC species: <u>26</u> x 3 = <u>78</u> FACU species: <u>1</u> x 4 = <u>4</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>136</u> (A) <u>264</u> (B) PI = B/A = <u>1.94</u>
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)				
	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Picea mariana</i>	40	Y	FACW	
2. <i>Betula nana</i>	10		FAC	
3. <i>Rhododendron tomentosum</i>	8		FACW	
4. <i>Empetrum nigrum</i>	15		FAC	
5. <i>Andromeda polifolia</i>	4		FACW	
6. <i>Chamaedaphne calyculata</i>	6		FACW	
7. <i>Vaccinium oxycoccus</i>	1		OBL	
8.				
9.				
Total Cover: <u>84</u> 50% of total cover: <u>42</u> 20% of total cover: <u>16.8</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) <small>¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.</small>
1. <i>Rubus Chamaemorus</i>	10		FACW	
2. <i>Equisetum sylvaticum</i>	1		FAC	
3. <i>Drosera rotundifolia</i>	T		OBL	
4. <i>Carex microglochin</i>	35	Y	OBL	
5. <i>Geocaulon lividum</i>	1		FACU	
6. <i>Trichophorum caespitosum</i>	5		OBL	
7.				
8.				
9.				
10.				
Total Cover: <u>52</u> 50% of total cover: <u>26</u> 20% of total cover: <u>10.4</u>				_____ % Bare Ground <u>80</u> % Cover of Wetland Bryophytes <u>80</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-06-14</u> Feature ID <u>W60T1027</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	—	—	—	—	—	—	Fibric	organics
10-22	—	—	—	—	—	—	Fibric-hemic	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>9</u>		
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>		
Notes: <u>saturated to surface. no standing water on site.</u>			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>5</u> Sapling (<5 dbh, <6m tall) <u>40</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>34</u> Dwarf shrub (<0.5m) <u>20</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>52</u> Moss-Lichen <u>80</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>4</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

rw

GPS Technician QA/QC check:

3m

QAQC
WCC Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1027 Field Target: 170 Date: 06-06-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

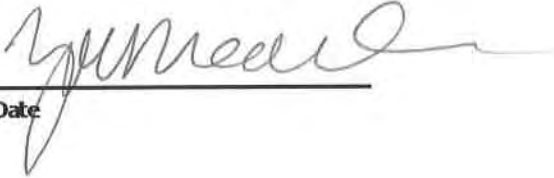
7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

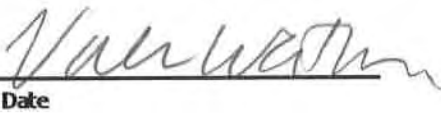
8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade
Wetland Scientist (print)

X 
Signature / Date

X Valerie Watkins
Field Crew Chief (print)

X 
Signature / Date

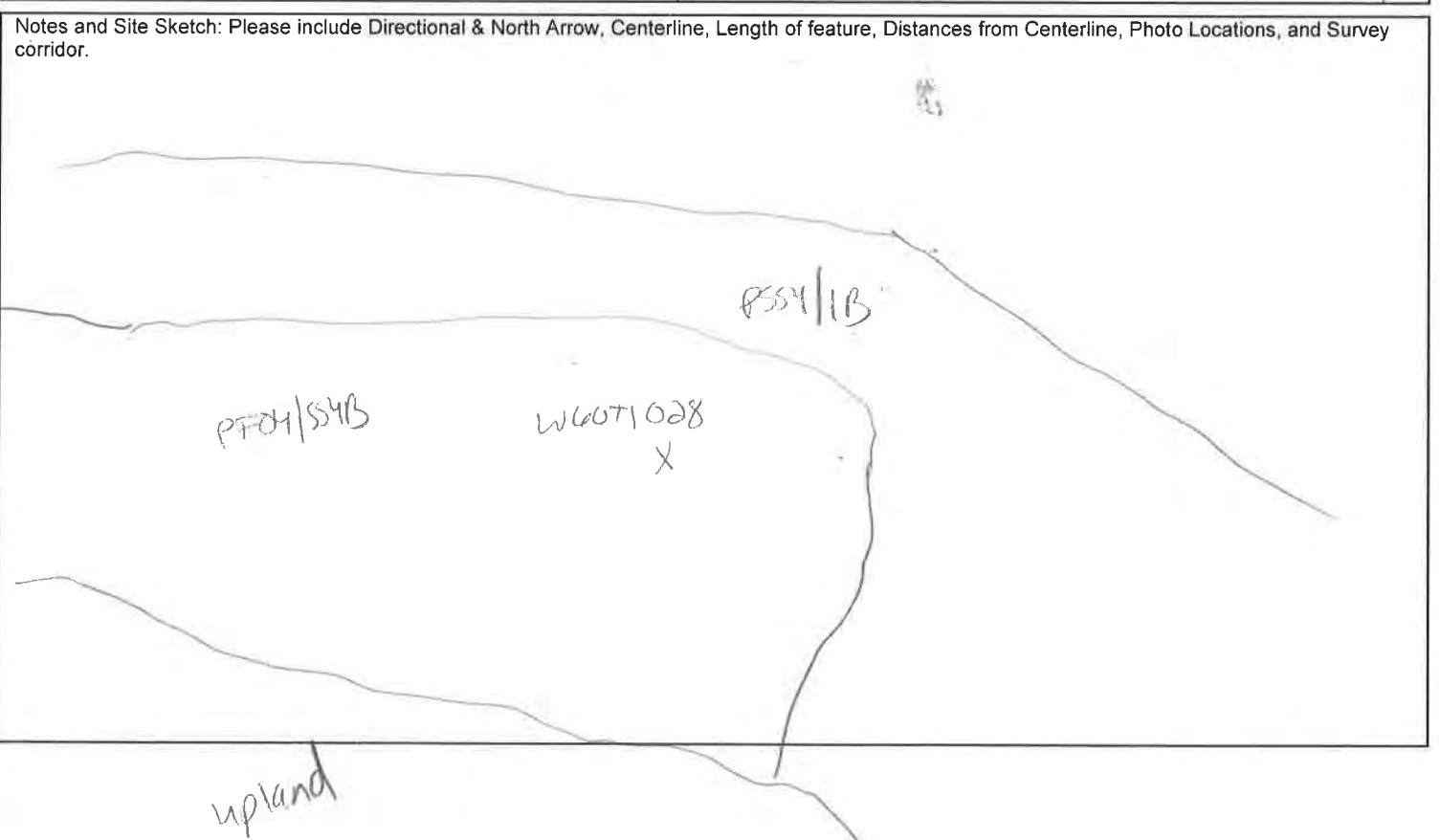
QAQC
JEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 171	Map #: 114 Map Date: 05/27/14
Date: 06-06-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1028
Investigators: Valerie Watkins, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 682.7	
Latitude: 62°03'51.94"		Longitude: -150°09'34.14"	Datum: WGS84
Logbook No.: 1	Logbook Page No.: 23	Picture No.: P_W60T1028_E_W-pit-plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-5	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: PFO4 SS4B	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PFO4 SS4B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): IA2, IIA2



WETLAND DETERMINATION DATA FORM

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VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	35	Y	FACW
2.			
3.			
4.			
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>			
Sapling/Shrub Stratum (<u>26</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	10		FAC
2. <i>Rhododendron tomentosum</i>	T		FACW
3. <i>Vaccinium vitis-idaea</i>	5		FAC
4. <i>Alnus ssp.</i>	15	Y	FAC
5. <i>Empetrum nigrum</i>	1		FAC
6. <i>Picea mariana</i>	20	Y	FACW
7. <i>Chamaedaphne calyculata</i>	T		FACW
8. <i>Vaccinium uliginosum</i>	5		FAC
9.			
Total Cover: <u>56</u> 50% of total cover: <u>28</u> 20% of total cover: <u>11.2</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 1 X 1 = 1
 FACW species: 65 X 2 = 130
 FAC species: 78 X 3 = 234
 FACU species: 6 X 4 = 0
 UPL species: 0 X 5 = 0
 Column Totals: 144 (A) 365 (B)
 PI = B/A = 2.53

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rubus chamaemorus</i>	5		FACW
2. <i>Equisetum arvens</i>	30	Y	FAC
3. <i>unidentified herb</i>	T		
4. (<i>Maianthemum</i> ssp.)	4		FAC
5. <i>Calamagrostis Canadensis</i>	8		FAC
6. <i>Equisetum fluviatile</i>	1		OBL
7. <i>Carex ssp.</i>	1		
8.			
9.			
10.			
Total Cover: <u>49</u> 50% of total cover: <u>24.5</u> 20% of total cover: <u>9.8</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

5 % Bare Ground
15 % Cover of Wetland Bryophytes
15 Total Cover of Bryophytes
3 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):
Alnus not identified to species. All species are FAC.

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-06</u> Feature ID <u>W60T1028</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9							Fibric	organics, lots of roots
9-22							Fibric/hemic	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____		Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____		Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____		Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____		Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____		Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____		Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1-2 depth</u>		Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>1</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>Surface water in scattered pockets throughout plot.</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved <input checked="" type="checkbox"/> Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>35</u> Sapling (<5 dbh, <6m tall) <u>20</u> Tall shrub (2-6m) <u>15</u> Short shrub (0.5-2m) <u>15</u> Dwarf shrub (<0.5m) <u>6</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>49</u> Moss-Lichen <u>15</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>3</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.3</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

WV

GPS Technician QA/QC check:

lym

QAQC
222

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1028

Field Target: 171

Date: 06-06-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade
Wetland Scientist (print)

X *Zoe Meade*
Signature / Date

X Valera Watkins
Field Crew Chief (print)

X *Valera Watkins*
Signature / Date

QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: <u>Centerline</u> Access Road (explain) _____ Other (explain) <u>corridor</u>		Field Target: <u>172</u>	Map #: <u>114</u> Map Date: <u>5/27</u> 14
Date: <u>06-05-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1029</u>
Investigators: <u>Valerie Watkins, Joe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>682.7</u>	
Latitude: <u>62°03'50.66"</u>		Longitude: <u>150°09'31.12"</u>	Datum: <u>WGS84</u>
Logbook No.: <u>1</u>	Logbook Page No.: <u>24</u>	Picture No.: <u>P-W60T1029-E-W</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>slight hummocks</u>
Slope (%): <u>0-5</u>	Local relief (concave, convex, none): <u>none</u>
Pre-mapped Alaska LNG/NWI classification: <u>Upland</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> ^{vw} No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Wetland Type: <u>Upland</u>
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>IC2, IB2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

see site sketch for site W60T1027

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nealaskana</i>	30	Y	FACU
2. <i>Picea mariana</i>	15	Y	FACW
3.			
4.			
Total Cover: <u>45</u> 50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Alnus ssp.</i>	40	Y	FAC
2. <i>Menziesia ferruginea</i>	15	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>40.55</u> 50% of total cover: <u>20.275</u> 20% of total cover: <u>8.11</u>			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 56 (B)

% Dominant Species that are OBL, FACW, or FAC: 0.6 (A/B)

50%

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species: 0 X 1 = 0

FACW species: 15 X 2 = 30

FAC species: 80 X 3 = 240

FACU species: 96 X 4 = 384

UPL species: 0 X 5 = 0

Column Totals: 191 (A) 654 (B)

PI = B/A = 3.4

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum sylvaticum</i>	30	Y	FAC
2. <i>Equisetum arvense</i>	10		FAC
3. <i>Dryopteris expansa</i>	50	Y	FACU
4. <i>Trientalis europaea</i>	1		FACU
5. <i>Menziesia ferruginea</i>	15		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>106.91</u> 50% of total cover: <u>53.455</u> 20% of total cover: <u>21.2</u>			

Hydrophytic Vegetation Indicators:

~~NO~~ ^{rw} Dominance Test is > 50%

Prevalence Index is ≤ 3.0

Morphological Adaptations¹ (Provide supporting data in Notes)

Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

10 % Bare Ground

0 % Cover of Wetland Bryophytes

0 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): ~~Y~~ N

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-06</u> Feature ID <u>W601</u>					Soil Pit Required (Y/N) <u>Y</u>	
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	—	—	—	—	—	—	Fibric	organics
3-13	10YR 3/3	98	7.5YR 3/4	18	C	PL/M	silt loam	N large cobbles 50%
13-22	10YR 4/3	85	7.5YR 3/4	5	C	M	silt loam	
	10YR 2/2	10						

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³	
Histosol or Histel (A1) _____	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____	

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): N

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>—</u>	Wetland Hydrology Present (Y/N): <u>N</u>	
Water Table Present (Y/N): <u>Y</u> <small>2mm</small>	Depth (in): <u>19</u>		
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>14</u>		
Notes: <u>saturation present - but not within 12 inches</u>			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____			
Number of Wetland Types (M): _____		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			
SOIL VARIABLES			
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____			
HYDROLOGIC VARIABLES			
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____			
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____			
Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____			
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____			
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____			
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____			
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____			
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____			
Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____			
Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____			
LANDSCAPE VARIABLES (M)			
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____			
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____			
Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____			
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____			

Crew Chief QA/QC check: *WJ*

GPS Technician QA/QC check: *ZJM*

QA/QC
TR Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WG071029 Field Target: 172 Date: 10/16/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- N/A - Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

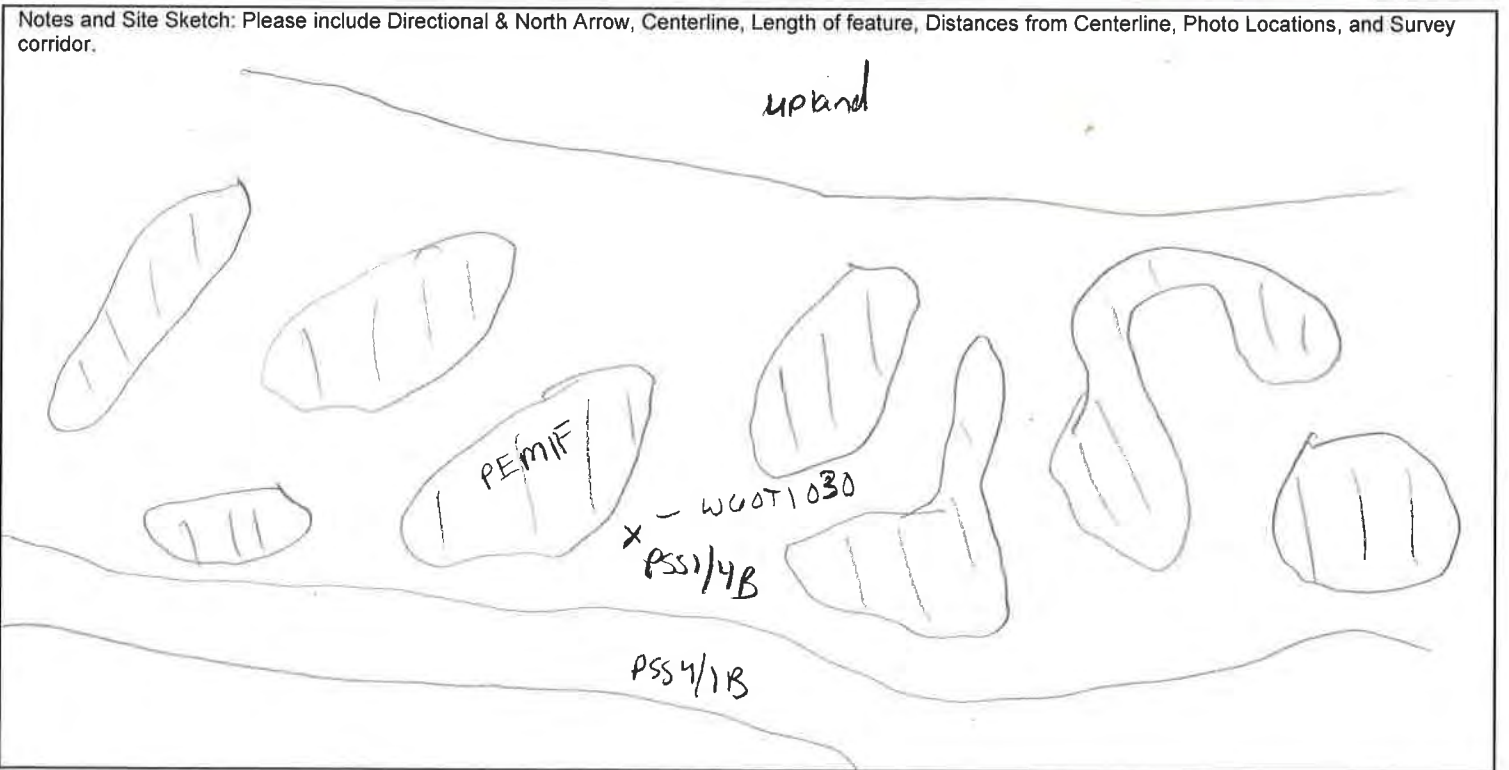
Signature / Date

QAQC
WEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: <u>169</u>	Map #: <u>114</u> Map Date: <u>5/27/14</u>
Date: <u>6/5/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1030</u>
Investigators: <u>Valerie Watkins, Zoe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>062.7</u>	
Latitude: <u>62° 03' 52.72"</u>	Longitude: <u>-150° 09' 35.02"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>25</u>	Picture No.: <u>P_W60T1030_E_W_PA_Plucy</u>	

SITE PARAMETERS	
Subregion: <u>Intertor</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Hummock1</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PEM1B F</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PSS 1/4 B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): <u>II C2, II A3</u>



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>26</u> x 1 = <u>26</u> FACW species: <u>30</u> x 2 = <u>60</u> FAC species: <u>65</u> x 3 = <u>195</u> FACU species: <u>5</u> x 4 = <u>20</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>126</u> (A) <u>301</u> (B) PI = B/A = <u>2.39</u>
1. <i>Betula nana</i>	25	Y	FAC	
2. <i>Rhododendron tomentosum</i>	6		FACW	
3. <i>Dasiphara fruticosa</i>	6		FAC	
4. <i>Empetrum nigrum</i>	2		FAC	
5. <i>Picea mariana</i>	20	Y	FACW	
6. <i>Spirea stevenii</i>	3		FACU	
7. <i>Andromeda polifolia</i>	2		FACW	
8. <i>Myrica gale</i>	4		OBL	
9.				
Total Cover: <u>68</u> 50% of total cover: <u>34</u> 20% of total cover: <u>13.6</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Comarum palustre</i>	5		OBL	
2. <i>Rubus arcticus</i>	2		FAC	
3. <i>Equisetum pratense</i>	2		FACW	
4. <i>Trientalis europaea</i>	1		FACU	
5. <i>Cornus canadensis</i>	2		FACU	
6. <i>Menyanthes trifoliata</i>	1		OBL	
7. <i>Trichophorum caespitosum</i>	10		OBL	
8. <i>Carex limosa</i>	6		OBL	
9. <i>Calamagrostis canadensis</i>	30	Y	FAC	
10.				
Total Cover: <u>59</u> 50% of total cover: <u>29.5</u> 20% of total cover: <u>11.8</u>				
				_____ % Bare Ground <u>75</u> % Cover of Wetland Bryophytes <u>75</u> Total Cover of Bryophytes <u>8</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-05-14</u> Feature ID <u>W60T1030</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10							Fibric	organics
10-22							Fibric-hemic	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>2-4 inches</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>4</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>Water seepage at 4 inches 7 pockets of standing water</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>20</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <u>48</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>59</u> Moss-Lichen <u>75</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.1</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

vw

GPS Technician QA/QC check:

gn

QAQC
acc
Page 4 of 4

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOT1030 Field Target: 169 Date: 6/6/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

Signature / Date

QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <u>corridor</u>	Field Target: <u>167</u>	Map #: <u>113</u>	Map Date: <u>5/27/14</u>
Date: <u>6/8/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W60T1031</u>	
Investigators: <u>Valerie Watkins, Dan LaPlant, Zoe Mendel</u>	Team No.: <u>W60</u>		
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>683.3</u>	
Latitude: <u>62° 07' 20.24"</u>	Longitude: <u>150° 09' 50.58"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>26</u>	Picture No.: <u>P-W60T1031-SW-NE-pit-plug</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Flat</u>
Slope (%): <u>0-3%</u>	Local relief (concave, convex, none): <u>Slight concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS4/1B</u>	Soil Map Unit Name: <u>—</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS4/1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>IIA2, IIC2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

The sketch depicts a large, irregularly shaped wetland area. At the top, there are handwritten labels: 'PSS4/1B', 'W60T1031', 'W60T103a', 'PF04B', and 'IIA2'. Inside the wetland area, there are labels 'WETTER PERMISSIF' and 'WET'. A curved line at the bottom of the sketch is labeled 'upland'.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
<u>Tree Stratum</u> (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	2*		FACW
2.			
3.			
4.			
Total Cover: <u> </u> 50% of total cover: <u> </u> 20% of total cover: <u> </u>			
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	40	Y	FACW
2. <i>Rhododendron tomentosum</i>	10		FACW
3. <i>Betula nana</i>	8		FAC
4. <i>Chamaedaphne calyculata</i>	5		FACW
5. <i>Vaccinium oxycoccus</i>	2		OBL
6. <i>Empetrum nigrum</i>	6		FAC
7. <i>Vaccinium vitis-idaea</i>	2		FAC
8. <i>Spiraea steyerii</i> m			FACW
9.			
Total Cover: <u>75</u> 50% of total cover: <u>37.5</u> 20% of total cover: <u>15</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: Multiply by:
 OBL species: 43 X 1 = 43
 FACW species: 65 X 2 = 130
 FAC species: 18 X 3 = 54
 FACU species: 0 X 4 = 0
 UPL species: 0 X 5 = 0
 Column Totals: 126 (A) 227 (B)
 PI = B/A = 1.80

* Tree stratum combined with saplings because under 5% absolute cover.

VEGETATION (use scientific names of plants)			
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rubus chamaemorus</i>	8		FACW
2. <i>Fragaria virginiana</i>	1		OBL
3. <i>Carex microglochin</i>	40	Y	OBL
4. <i>Maianthemum ssp.</i>	2		FAC
5. <i>Geocaulon lividum</i>	1		FACU
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>52</u> 50% of total cover: <u>26</u> 20% of total cover: <u>10.4</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
80 % Cover of Wetland Bryophytes
80 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

false solomon seal

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-08-14</u> Feature ID <u>W60T1031</u>				Soil Pit Required (Y/N) <u>Y</u>	
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹		
0-10						Fibric	organics
10-22						Fibric-Hemic	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³	
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____						Other (Explain in Notes)	
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.							
⁴ Give details of color change in Notes.							
Restrictive Layer (if present): Type: _____ Depth (inches): _____							
Hydric Soil Present (Y/N): <u>Y</u>							
Notes: <u>22 inches of saturated organics</u>							

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>10</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>2</u> Sapling (<5 dbh, <6m tall) <u>40</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>13</u> Dwarf shrub (<0.5m) <u>10</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>62</u> Moss-Lichen <u>80</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>4</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

VW

GPS Technician QA/QC check:

ym

QAQC
OK

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1031 Field Target: 167 Date: 06-08-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade	X <i>Zoe Meade</i>
Wetland Scientist (print)	Signature / Date

X Valerie Watkins	X <i>Valerie Watkins</i>
Field Crew Chief (print)	Signature / Date

QAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: <u>166</u>	Map #: <u>113</u> Map Date: <u>5/27</u>
Date: <u>06-08-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1032</u>
Investigators: <u>Valerie Watkins, Dan LaPlant, Zoe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>678.3</u>	
Latitude: <u>62° 07' 22.76"</u>	Longitude: <u>-150° 09' 49.31"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>1</u>	Logbook Page No.: <u>26</u>	Picture No.: <u>P-W60T1032-W-E-pit-plug</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Flat</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>slightly concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS 412B</u>	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: <u>PFO4B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): <u>IA2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See site sketch for W60T1031

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>16</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <i>Picea mariana</i>	50	Y	FACW	
2.				
3.				
4.				
Total Cover: <u>50</u> 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>15</u> X 1 = <u>15</u> FACW species: <u>119</u> X 2 = <u>238</u> FAC species: <u>36</u> X 3 = <u>108</u> FACU species: <u>6</u> X 4 = <u>24</u> UPL species: <u>0</u> X 5 = <u>0</u> Column Totals: <u>176</u> (A) <u>385</u> (B) PI = B/A = <u>2.18</u> <i>Vaccinium vitis-idaea</i> <i>Vaccinium uliginosum</i> <u>10</u> Y FAC
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Rhododendron groenlandicum</i>	5	X	FAC	
2. <i>Betula nana</i>	4		FAC	
3. <i>Alnus</i> ssp.	10	Y	FAC	
4. <i>Vaccinium vitis-idaea</i>	2		FAC	
5. <i>Rhododendron tomentosum</i>	4		FACW	
6. <i>Empetrum nigrum</i>	2		FAC	
7. <i>Picea mariana</i>	10	Y	FACW	
8. <i>Betula nealaskana</i>	2		FACU	
9. <i>Menziesia ferruginea</i>	2		FACU	
Total Cover: <u>51</u> 50% of total cover: <u>25.5</u> 20% of total cover: <u>10.2</u>				

VEGETATION (use scientific names of plants)				
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic. <u>0</u> % Bare Ground <u>80</u> % Cover of Wetland Bryophytes <u>80</u> Total Cover of Bryophytes <u>0</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
1. <i>Rubus chamaemorus</i>	55	Y	FACW	
2. <i>Equisetum arvense</i>	2		FAC	
3. <i>Geocaulon lividum</i>	2		FACU	
4. <i>Equisetum sylvaticum</i>	1		FAC	
5. <i>Carex microglochin</i>	15	Y	OBL	
6.				
7.				
8.				
9.				
10.				
Total Cover: <u>75</u> 50% of total cover: <u>37.5</u> 20% of total cover: <u>15</u>				

WETLAND DETERMINATION DATA FORM

SOIL _____ Date 06-08 Feature ID W60T1032 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	—	—	—	—	—	—	Fibric	organics
10-23	—	—	—	—	—	—	Fibric/hemic	organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Color Change (TA4) ⁴ _____
Thick Dark Surface (A12) _____	Alaska Alpine Swales (TA5) _____
	Alaska Redox with 2.5Y Hue _____
	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: 23 inches of saturated organics

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>8</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	

Notes: water seeping into surface at 7" pit

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>50</u> Sapling (<5 dbh, <6m tall) <u>10</u> Tall shrub (2-6m) <u>10</u> Short shrub (0.5-2m) <u>21</u> Dwarf shrub (<0.5m) <u>39</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>20</u> Moss-Lichen <u>80</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

W

ym

QAQC
see

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W00T1032 Field Target: 166 Date: 06-08-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade
Wetland Scientist (print)

X Zoe Meade
Signature / Date

X Valerie Watkins
Field Crew Chief (print)

X Valerie Watkins
Signature / Date

QAQC
WEZ

Vegetation Classification Data Form

Site Description		
Date: 6/8/14	Project Name & #: Alaska LNG 26221306	Field Target: 166
Investigators: Valerie Watkins, Dan LaPoint, Zoe Moady		Feature ID: W60T1033
Latitude: 62° 07' 23.71"	Longitude: -150° 09' 52.48"	Datum: WGS84
Logbook #: 1	Logbook Page #: 26	Picture #: P-W60T1033-NW-SW
Location Description:		
North of W60T1033 in upland area		
Common Species Observed (Scientific Name)		
Betula neosalaskana	Picea mariana	
Alnus spp.		
Calamagrostis canadensis		
Dryopteris expansa		
Percent Cover of Dominant Structure Level: 45%		
Habitat Description:		
Birch/spruce forest		
Alaska Vegetation Classification: Level I, Level II, Level III		
I C 2		
Notes:		

Field Crew Chief: NW

Field Scientist/Technician: ym

QAQC
DCC

Vegetation Classification Data Form

Table I-Alaska vegetation classification to level III

Level I	Level II	Level III
I. Forest	A. Needleleaf (conifer) forest	(1) Closed needleleaf (conifer) forest
		(2) Open needleleaf (conifer) forest
		(3) Needleleaf (conifer) woodland
B. Broadleaf forest	C. Mixed forest	(1) Closed broadleaf forest
		(2) Open broadleaf forest
		(3) Broadleaf woodland
II. Scrub	A. Dwarf tree scrub	(1) Closed dwarf tree scrub
		(2) Open dwarf tree scrub
		(3) Dwarf tree scrub woodland
B. Tall scrub	C. Low scrub	(1) Closed tall scrub
		(2) Open tall scrub
		(1) Closed low scrub
D. Dwarf scrub	C. Low scrub	(2) Open low scrub
		(1) Dryas dwarf scrub
		(2) Ericaceous dwarf scrub
III. Herbaceous	A. Graminoid herbaceous	(1) Dry graminoid herbaceous
		(2) Mesic graminoid herbaceous
		(3) Wet graminoid herbaceous (emergent)
B. Forb herbaceous	C. Bryoid herbaceous	(1) Dry forb herbaceous
		(2) Mesic forb herbaceous
		(3) Wet forb herbaceous (emergent)
C. Bryoid herbaceous	D. Aquatic (nonemergent) herbaceous	(1) Mosses
		(2) Lichens
		(1) Freshwater aquatic herbaceous
D. Aquatic (nonemergent) herbaceous	D. Aquatic (nonemergent) herbaceous	(2) Brackish water aquatic herbaceous
		(3) Marine aquatic herbaceous

Descriptions of levels I, II, III, and IV follow the classification table.

1a. Trees over 3 meters (10 ft) tall are present and have a canopy cover of 10 percent or more	I Forest	2
1b. Trees over 3 meters (10 ft) tall are absent or nearly so. Less than 10 percent cover. (Dwarf trees, less than 3 meters [10 ft] tall may be present and abundant)		7
2a. Over 75 percent of tree cover contributed by needleleaf (conifer) species	I.A Needleleaf forest	3
2b. Less than 75 percent of tree cover contributed by needleleaf (conifer) species		4
3a. Tree canopy of 60-100 percent cover	I.A.1 Closed needleleaf forest	
3b. Tree canopy of 25-59 percent cover	I.A.2 Open needleleaf forest	
3c. Tree canopy of 10-24 percent cover	I.A.3 Needleleaf woodland	
4a. Over 75 percent of tree cover contributed by broadleaf species	I.B Broadleaf forest	5
4b. Broadleaf or needleleaf species contribute 25 to 75 percent of the tree cover		6
5a. Tree canopy of 60-100 percent cover	I.B.1 Closed broadleaf forest	
5b. Tree canopy of 25-59 percent cover	I.B.2 Open broadleaf forest	
5c. Tree canopy of 10-24 percent cover	I.B.3 Broadleaf woodland	
6a. Tree canopy of 60-100 percent cover	I.C.1 Closed mixed forest	
6b. Tree canopy of 25-59 percent cover	I.C.2 Open mixed forest	
6c. Tree canopy of 10-24 percent cover	I.C.3 Mixed woodland	
7a. Vegetation with at least 25 percent cover of erect to decumbent shrubs or with at least 10 percent cover of dwarf trees (less than 3 meters [10 ft] tall)		8
7b. Vegetation herbaceous (may have up to 25 percent shrub cover)		15

II. Scrub		
8a. Vegetation with at least 10 percent cover of dwarf trees	II A Dwarf tree scrub	9
8b. Vegetation with at least 25 percent cover of shrubs and less than 10 percent cover of dwarf trees		10
9a. Dwarf tree canopy of 60-100 percent cover	II.A.1 Closed dwarf tree scrub	
9b. Dwarf tree canopy of 25-59 percent cover	II.A.2 Open dwarf tree scrub	
9c. Dwarf tree canopy of 10-24 percent cover	II.A.3 Dwarf tree scrub woodland	
10a. Shrubs more than 1.5 meters (5 ft) tall	II B Tall scrub	11
10b. Shrubs less than 1.5 meters (5 ft) tall		12
11 a. Shrub canopy cover greater than 75 percent	II.B.1 Closed tall scrub	
11 b. Shrub canopy cover of 25-74 percent	II B.2 Open tall scrub	
12a. Shrubs 20 centimeters to 1.5 meters tall	II C Low scrub	13
12b. Shrubs under 20 centimeters in height	II D Dwarf scrub	14
13a. Shrub canopy cover greater than 75 percent	II C.1 Closed low scrub	
13b. Shrub canopy cover of 25-74 percent, or as low as 2 percent if little or no other vegetation cover present	II.C.2 Open low scrub	
14a. Dryas species dominant in the dwarf shrub layer	II.D.1 Dryas dwarf scrub	
14b. Ericaceous species dominant in the dwarf shrub layer	II D.2 Ericaceous dwarf scrub	
14c. Willow species dominant in the dwarf shrub layer	II D.2 Willow dwarf scrub	
III. Herbaceous		
15a. Terrestrial vegetation, or if growing in the water, dominated by emergent vegetation		16
15b. Dominant vegetation growing submerged in water or floating on the water surface, but not emerging above the water	III D Aquatic herbaceous	21

16a. Grasses, sedges, or rushes (graminoid) plants dominant	III A Graminoid herbaceous	17
16b. Forbs or bryophytes dominant		18
17a. Grasslands of well-drained, dry sites, such as south-facing bluffs, old beaches, and sand dunes. Typically (but not always) dominated by <i>Elymus</i> spp., <i>Festuca</i> spp., and <i>Deschampsia</i> spp.	III A.1 Dry graminoid herbaceous	
17b. On moist sites, but usually not with standing water. Usually dominated by <i>Calamagrostis</i> spp., <i>Carex</i> spp. or <i>Eriophorum</i> spp.; tussocks often present	III A.2 Mesic graminoid herbaceous	
17c. On wet sites, standing water present for part of the year; dominated by either sedges or grasses; includes wet tundra, bogs, marshes, and fens	III A.3 Wet graminoid herbaceous	
18a. Vegetation dominated by forbs (broadleaf herbs, ferns, or horsetails)	III B Forb herbaceous	19
18b. Vegetation dominated by mosses or lichens	III C Bryoid herbaceous	20
19a. On dry sites, usually rocky and well drained; mostly tundra sites	III B.1 Dry forb herbaceous	
19b. On moist sites but without standing water, mostly within forested areas	III.B.2 Mesic forb herbaceous	
19c. On wet sites, usually with standing water for part of the year	III B.3 Wet forb herbaceous	
20a. Vegetation cover dominated by mosses	III C.1 Bryoid moss	
20b. Vegetation cover dominated by lichens	III C.2 Bryoid lichen	
21a. Vegetation submerged or floating in fresh water	III D.1 Freshwater aquatic herbaceous	
21 b. Vegetation submerged or floating in brackish water	III D.2 Brackish water aquatic herbaceous	
21c. Vegetation submerged or floating in salt water	III D.3 Marine aquatic herbaceous	

Vegetation Classification Data Form QA/QC Checklist

This form is to be completed before leaving the field site.

Feature ID: WLOT1033 Field Target: 11e1p Date: 6/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. General Information

- Location data recorded?
- Photo taken and photo number recorded?

2. Location Description

- Location of site recorded with enough detail to help relocate?

3. Common Species

- Scientific name of common species recorded?
- Percent cover of dominant structure level noted?

4. Habitat Description

- Habitat described?

5. Classification

- All three levels of classification recorded?

6. Field Log Book

- Field form entries consistent with log book?
- Logbook clearly identifies the Field Target ID and Feature ID?

X Zoe Meade

Field Technician (print)

X Zoe Meade

Signature

X Valerie Watkins

Field Crew Chief (print)

X Valerie Watkins

Signature

QA/QC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <u>corridor</u>	Field Target: <u>168</u>	Map #: <u>113</u> Map Date: <u>5/27/14</u>	
Date: <u>6/8/14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W60T1034</u>	
Investigators: <u>Valerie Watkins, Joel Meade, Dan fu Plant</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>678.3</u>	
Latitude: <u>62° 07' 20.37"</u>		Longitude: <u>-150° 09' 49.00"</u>	
Datum: <u>WGS84</u>			
Logbook No.: <u>1</u>	Logbook Page No.: <u>27</u>	Picture No.: <u>P-W60T1034-N-S-pit-plug</u>	

SITE PARAMETERS	
Subregion: <u>INTA0</u>	Landform (hillslope, terrace, hummocks, etc.): <u>Flat</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PEMIF</u>	Soil Map Unit Name: <u>-</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS4/EM 1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): <u>II A 3, III A 2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

The sketch shows an irregularly shaped area representing a wetland. A north arrow is drawn in the upper left corner. The area is labeled with 'PSS4/EM 1B' in several locations. Two smaller, irregular shapes within the main area are labeled 'PABH'. A circled '168' is located in the lower-left quadrant of the sketch.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet:
1.				No. of Dominant Species that are OBL, FACW, or FAC: <u>4</u> (A)
2.				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3.				% Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet:
<u>Sapling/Shrub Stratum</u> (<u>20'</u>)				Total % Cover of: _____ Multiply by: _____
1. <i>Rhododendron tomentosum</i>	8	Y	FACW	OBL species: <u>37</u> X 1 = <u>37</u>
2. <i>Picea mariana</i>	20	Y	FACW	FACW species: <u>34</u> X 2 = <u>68</u>
3. <i>Betula nana</i>	15	Y	FAC	FAC species: <u>16</u> X 3 = <u>48</u>
4. <i>Andromeda polifolia</i>	6		FACW	FACU species: <u>3</u> X 4 = <u>12</u>
5. <i>Vaccinium oxycocum</i>	2		OBL	UPL species: <u>0</u> X 5 = <u>0</u>
6. <i>Empetrum nigrum</i>	1		FAC	Column Totals: <u>90</u> (A) <u>165</u> (B)
7. <i>Spirea stevenii</i>	1		FACU	PI = B/A = <u>1.83</u>
8. <i>Chamaedaphne calyculata</i>	1			
9.				
Total Cover: <u>54</u> 50% of total cover: <u>27</u> 20% of total cover: <u>6.8</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators:
1. <i>Cornus canadensis</i>	2		FACU	<input checked="" type="checkbox"/> Dominance Test is > 50%
2. <i>Trentalium europaea</i>	T		FACU	<input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0
3. <i>Tricophorus caespitosum</i>	25	Y	OBL	____ Morphological Adaptations ¹ (Provide supporting data in Notes)
4. <i>Carex limosa</i>	5		OBL	____ Problematic Hydrophytic Vegetation ¹ (Explain)
5. <i>Carex microglochin</i>	5		OBL	¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
6. <i>Equisetum fluviale</i>	T		OBL	
7. <i>Viola</i> ssp.	T		FAC	<u>0</u> % Bare Ground
8. <i>Menyanthes trifoliata</i>	T		OBL	<u>85</u> % Cover of Wetland Bryophytes
9.				<u>85</u> Total Cover of Bryophytes
10.				<u>0</u> % Cover of Water
Total Cover: <u>37</u> 50% of total cover: <u>18.5</u> 20% of total cover: <u>7.4</u>				Hydrophytic Vegetation Present (Y/N): <u>Y</u>
				Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL _____ **Date** 6/8/14 **Feature ID** W60T1034 **Soil Pit Required (Y/N)** Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-9							Fibric	
9-22							Fibric/hemic	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³	
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____		Other (Explain in Notes)	

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes: 22 inches of saturated organics

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>11</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	

Notes: water table may rise higher.

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <u>X</u> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>20</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>34</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>31</u> Moss-Lichen <u>85</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>4</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <u>X</u>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <u>X</u> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <u>X</u>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <u>X</u> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <u>X</u> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <u>X</u> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <u>X</u> Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> ; Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <u>X</u> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <u>X</u> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <u>X</u> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>X</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <u>X</u> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <u>X</u> Large (>100 acres) _____	

Crew Chief QA/QC check:

rw

GPS Technician QA/QC check:

zm

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1034 Field Target: 168 Date: 06-08-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X zoe moade

Wetland Scientist (print)

X 06-08-14

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X Valerie Watkins

Signature / Date

QAQC
DCE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 704 ¹⁰⁵	Map #: 112 Map Date: 5/27/14
Date: 06-08-14	Project Name & No.: Alaska LNG 26221306	Feature Id: W60T1035	
Investigators: Valerie Watkins, Zoe Meade, Dan LaPlant			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 677.4	
Latitude: 62.08' 08.48"	Longitude: 150.09' 55.26"	Datum: WGS84	
Logbook No.: 1	Logbook Page No.: 27	Picture No.: P-W60T1035-SW-SE-pit-plot	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): slight hummocks
Slope (%): 0-3	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PAB/EM1H	Soil Map Unit Name: _____
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS1/4 / EM1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): IIC2, IIIA3

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	20	Y	FAC
2. <i>Spiraea stevenii</i>	1		FACU
3. <i>Rhododendron tomentosum</i>	8		FACW
4. <i>Picea mariana</i>	15	Y	FACW
5. <i>Andromeda polifolia</i>	3		FACW
6. <i>Vaccinium oxycoccus</i>	2		OBL
7.			
8.			
9.			
Total Cover: <u>49</u> 50% of total cover: <u>24.5</u> 20% of total cover: <u>9.8</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)
 Total Number of Dominant Species Across All Strata: 3 (B)
 % Dominant Species that are OBL, FACW, or FAC: 1.00 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 87 X 1 = 87
 FACW species: 27 X 2 = 54
 FAC species: 21 X 3 = 63
 FACU species: 3 X 4 = 12
 UPL species: 0 X 5 = 0
 Column Totals: 138 (A) 216 (B)
 PI = B/A = 1.57

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Trientalis europaea</i>	1		FACU
2. <i>Menyanthes trifoliata</i>	2		OBL
3. <i>Cornus canadensis</i>	2		FACU
4. <i>Trichophorum caespitosa</i>	50	Y	OBL
5. unidentified herb	1		—
6. <i>Carex microglochin</i>	5		OBL
7. <i>Rubus Chamaemorus</i>	1		FACW
8. <i>Calamagrostis Canadensis</i>	1		FAC
9. <i>Drosera rotundifolia</i>	3		OBL
10. <i>Carex limosa</i>	15		OBL
Total Cover: <u>91</u> 50% of total cover: <u>45.5</u> 20% of total cover: <u>18.2</u>			
<i>Carex chordorrhiza</i>	10		OBL
<i>Equisetum fluviatile</i>	1		OBL

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

8 % Bare Ground
100 % Cover of Wetland Bryophytes
100 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-08-14</u> Feature ID <u>W60T1035</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-11	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>Fibric</u>	<u>organics</u>
11-25	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>hemic</u>	<u>organic</u>
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) <u> </u>			Alaska Color Change (TA4) ⁴ <u> </u>		
Histic Epipedon (A2) <u> </u>			Alaska Redox (A14) <u> </u>			Alaska Alpine Swales (TA5) <u> </u>		
Black Histic (A3) <u> </u>			Alaska Gleyed Pores (A15) <u> </u>			Alaska Redox with 2.5Y Hue <u> </u>		
Hydrogen Sulfide (A4) <u> </u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) <u> </u>						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u> </u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>25 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u> </u>	Surface Soil Cracks (B6) <u> </u>	Water-stained Leaves (B9) <u> </u>	Stunted or Stressed Plants (D1) <u> </u>	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u> </u>	Drainage Patterns (B10) <u> </u>	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) <u> </u>	Oxidized Rhizospheres along Living Roots (C3) <u> </u>	Shallow Aquitard (D3) <u> </u>	
Water Marks (B1) <u> </u>	Marl Deposits (B15) <u> </u>	Presence of Reduced Iron (C4) <u> </u>	Microtopographic Relief (D4) <u> </u>	
Sediment Deposits (B2) <u> </u>	Hydrogen Sulfide Odor (C1) <u> </u>	Salt Deposits (C5) <u> </u>	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) <u> </u>	Dry-Season Water Table (C2) <u> </u>	Notes:		
Algal Mat or Crust (B4) <u> </u>	Other (Explain in Notes):			
Iron Deposits (B5) <u> </u>				
Surface Water Present (Y/N): <u>N</u>	Depth (in): <u> </u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>10</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>15</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>14</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>91</u> Moss-Lichen <u>60</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>5</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open <input checked="" type="checkbox"/> Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

mw

GPS Technician QA/QC check:

zmm

QA/QC
WCE

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60TI035 Field Target: 165 ~~064~~ ^{vw} Date: 6/8/2014

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

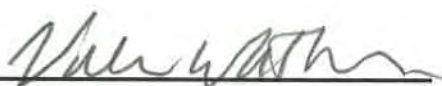
Wetland Scientist (print)

X 

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X 

Signature / Date

PAQC
DEC

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <u>corridor</u>		Field Target: <u>104</u>	Map #: <u>112</u> Map Date: <u>5/27/14</u>
Date: <u>06-08-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1036</u>
Investigators: <u>Valerie Watkins, Zoe Meade, Dan LaPlant</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>68</u>	
Latitude: <u>62° 08' 09.00"</u>		Longitude: <u>-150° 09' 54.90"</u>	Datum: <u>WGS84</u>
Logbook No.: <u>1</u>	Logbook Page No.: <u>28</u>	Picture No.: <u>P_W60T1036-E-W-pt-plug</u>	

SITE PARAMETERS	
Subregion: <u>Interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>flat</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PSS4/1B</u>	Soil Map Unit Name: <u>—</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS4/1B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>IIA2, IIC2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See site sketch for W60T1035

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>36</u> (A) Total Number of Dominant Species Across All Strata: <u>36</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>28</u> X 1 = <u>28</u> FACW species: <u>88</u> X 2 = <u>176</u> FAC species: <u>46</u> X 3 = <u>138</u> FACU species: <u>4</u> X 4 = <u>16</u> UPL species: <u>0</u> X 5 = <u>0</u> Column Totals: <u>166</u> (A) <u>358</u> (B) PI = B/A = <u>2.16</u>
1. <i>Picea mariana</i>	55	Y	FACW	
2. <i>Betula nana</i>	40	Y	FAC	
3. <i>Chamaedaphne calyculata</i>	5		FACW	
4. <i>Andromeda polifolia</i>	3		FACW	
5. <i>Rhododendron tomentosum</i>	20		FACW	
6. <i>Empetrum nigrum</i>	3		FAC	
7. <i>Vaccinium oxycoccus</i>	1		OBL	
8. <i>Spiraea stevenii</i>	2		FACU	
9. <i>Myrica gale</i>	1		OBL	
Total Cover: <u>130</u> 50% of total cover: <u>65</u> 20% of total cover: <u>26</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Meyanthes trifoliata</i>	1		OBL	
2. <i>Trichophorum caespitosum</i>	15	Y	OBL	
3. <i>Trientalis europaea</i>	1	—	FAC	
4. <i>Calamagrostis canadensis</i>	3		FAC	
5. <i>Cornus canadensis</i>	2		FACU	
6. <i>Rubus chamaemorus</i>	5	Y	FACW	
7. <i>Carex aquatilis</i>	5	Y	OBL	
8. <i>Carex microglochin</i>	5	Y	OBL	
9.				
10.				
Total Cover: <u>36</u> 50% of total cover: <u>18</u> 20% of total cover: <u>7.2</u>				
				_____ % Bare Ground <u>65</u> % Cover of Wetland Bryophytes <u>65</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-08-14</u> Feature ID <u>W001036</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12							Fibric	organics
12-22							hemc	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>22 inches of saturated organics</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>8</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <u>55</u> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <u>40</u> Dwarf shrub (<0.5m) <u>35</u> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <u>36</u> Moss-Lichen <u>65</u> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>5</u>	Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A <input checked="" type="checkbox"/>		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) <input checked="" type="checkbox"/>		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

VW

GPS Technician QA/QC check:

mm

QAQC

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1036

Field Target: 164

Date: 6/8/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Valerie Watkins

Field Crew Chief (print)

X *Valerie Watkins*

Signature / Date

QAQC
WEE

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 103	Map #: 112 Map Date: 5/27/14
Date: 06-09-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1037
Investigators: Dan Laplant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 677.4	
Latitude: 62° 08' 10.34 "		Longitude: 150° 09' 55.05 "	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 4	Picture No.: P_W60T103 ; E.NW, pit, plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): Lowland
Slope (%): 0-3	Local relief (concave, convex, none): none
Pre-mapped Alaska LNG/NWI classification: PSS 4/1B	Soil Map Unit Name: -
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PFO4B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Vioreck): IAZ

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)					
Tree Stratum (Plot sizes: <u>26'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>4.5</u> (A) Total Number of Dominant Species Across All Strata: <u>4.5</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.	<i>Picea Mariana</i>	60	Y	FACW	
2.					
3.					
4.					
Total Cover: <u>60</u>					Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>0</u> x 1 = <u>0</u> FACW species: <u>116</u> x 2 = <u>232</u> FAC species: <u>117</u> x 3 = <u>351</u> FACU species: <u>0</u> x 4 = <u>0</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>233</u> (A) <u>583</u> (B) PI = B/A = <u>2.50</u>
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>					
Sapling/Shrub Stratum (<u>26'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1.	<i>Chamaedaphne calyculata</i>	3		FACW	
2.	<i>Betula nana</i>	40	Y	FAC	
3.	<i>Rhododendron tomentosum</i>	5		FACW	
4.	<i>Picea mariana</i>	40	Y	FACW	
5.	<i>Empetrum nigrum</i>	30	Y	FAC	
6.					
7.					
8.					
9.					
Total Cover: <u>118</u>					
50% of total cover: <u>59</u> 20% of total cover: <u>23.6</u>					

VEGETATION (use scientific names of plants)					
Herb Stratum (<u>26'</u>)		Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1.	<i>Equisetum arvense</i>	2		FAC	
2.	<i>Rubus Chamaemorus</i>	6		FACW	
3.	<i>Geocaldon lividum</i>	7		FACU	
4.	<i>Similacina stellata</i>	5		FAC	
5.	<i>Carex capillaris</i>	2		FACW	
6.	<i>Carex microchaeta</i>	40	Y	FAC	
7.					
8.					
9.					
10.					
Total Cover: <u>55</u>					_____ % Bare Ground <u>85</u> % Cover of Wetland Bryophytes <u>85</u> Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):
50% of total cover: <u>27.5</u> 20% of total cover: <u>11</u>					

False Solomon's Seal (star flowered)

WETLAND DETERMINATION DATA FORM

SOIL Date 06-09 Feature ID W60T1031 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 8							Hemic	organics
8 - 17							Fibric	organics
17 - 2.2							Sapric	organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS	INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____
Hydrogen Sulfide (A4) _____	Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____	Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u> <i>see photo</i>	Depth (in): _____	
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>0</u>	

Notes:

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved <input checked="" type="checkbox"/> Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>60</u> Sapling (<5 dbh, <6m tall) <u>40</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>48</u> Dwarf shrub (<0.5m) <u>30</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>55</u> Moss-Lichen <u>85</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A <input checked="" type="checkbox"/>		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric <input checked="" type="checkbox"/> Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) <input checked="" type="checkbox"/>	

Crew Chief QA/QC check:

[Signature]

GPS Technician QA/QC check:

[Signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1037

Field Target: 163

Date: 6/9/2004

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

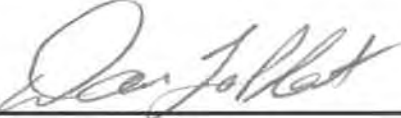
Wetland Scientist (print)

X 

Signature / Date

X Dan Laplant

Field Crew Chief (print)

X  6/9/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 153	Map #: 107 Map Date: 5/27/14
Date: 06-11-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1038
Investigators: Dan LaPlant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 109.5	
Latitude: 62° 14' 33.86"		Longitude: 150° 15' 05.00"	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 009	Picture No.: P-W, NE, Pit, plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): flood plain
Slope (%): 0-2	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PSS1EM1C	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1C
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): II C 1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch in logbook 002 page 009.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>92</u> x 1 = <u>92</u> FACW species: <u>46</u> x 2 = <u>92</u> FAC species: <u>81</u> x 3 = <u>243</u> FACU species: <u>1</u> x 4 = <u>4</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>220</u> (A) <u>431</u> (B) PI = B/A = <u>1.96</u>
1. <i>Myrica gale</i>	90	Y	OBL	
2. <i>Alnus ssp.</i>	6		FAC	
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>96</u> 50% of total cover: <u>48</u> 20% of total cover: <u>18</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (_____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Calamagrostis canadensis</i>	75	Y	FAC	
2. <i>Equisetum fluviatile</i>	T		OBL	
3. <i>Rubus chamaemorus</i>	6		FACW	
4. <i>viola palustris</i>	40	Y	FACW	
5. <i>Trientalis europaea</i>	1		FACU	
6. <i>Comarum palustre</i>	2		OBL	
7. <i>Athyrium cyclosorum</i>	T		FAC	
8. <i>Oxytropis deflexa?</i>	T		FACU	
9.				
10.				
Total Cover: <u>124</u> 50% of total cover: <u>62</u> 20% of total cover: <u>24.8</u>				
				% Bare Ground: <u>0</u> % Cover of Wetland Bryophytes: <u>0</u> Total Cover of Bryophytes: <u>0</u> % Cover of Water: <u>3</u> Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

pea family
↑
pendant pod locoweed

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-11-14</u> Feature ID <u>W60T1038</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	_____	—	_____	—	_____	_____	Fibric	organics
3-11	10YR 3/3	100					Sandy silt	
11-22	10YR 3/1	100					Fine sand	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ <u>X</u>		
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u> ? *			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: * Soil rechecked on 7/8/14 by J. Christopher. See logbook W60-3. confirmed Alaska Redox.								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) <u>X</u>	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>2</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>17"</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>10</u>			
Notes: pit next to stream bed				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>X</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>0</u> Tall shrub (2-6m) <u>5</u> Short shrub (0.5-2m) <u>90</u> Dwarf shrub (<0.5m) <u>0</u> Tall herb (≥1m) <u>75</u> Short herb (<1m) <u>0</u> Moss-Lichen <u>0</u> Floating <u>0</u> Submerged <u>0</u>			
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <u>X</u> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <u>X</u> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <u>N/A</u>			
Plant Species Diversity (P): Low (< 5 plant species) <u>X</u> Medium (5-25 species) _____ High (>25) _____			
Presence of Islands (M): Absent (none) <u>X</u> One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>X</u>			
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) <u>X</u> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <u>X</u> Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy <u>X</u> Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet <u>X</u>	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <u>X</u> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <u>X</u> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs <u>X</u> Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <u>X</u>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <u>X</u> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>5.75</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <u>X</u> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>X</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <u>X</u> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <u>X</u> Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1038 Field Target: 153 Date: 06-11-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

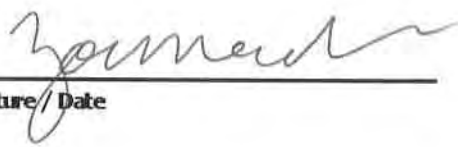
- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X 

Signature / Date

X 

Field Crew Chief (print)

X  6/11/2014

Signature / Date

WETLAND DETERMINATION DATA FORM

Soils check FT 103

SOIL		Date <u>7/8/14</u> Feature ID _____		Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 3/3	60	_____	_____	_____	_____	Fibric/	Organic 40%
7-10	10YR 3/3	100	coarse sand	_____	_____	_____	Coarse sand	
10-20	4/5GY	85	10YR 4/6	15	C	PL	Fine sandy loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u>			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N):	Depth (in):	Wetland Hydrology Present (Y/N): _____		
Water Table Present (Y/N):	Depth (in):			
Saturation Present (Y/N): (includes capillary fringe)	Depth (in):			
Notes:				

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 152	Map #: 106 Map Date: 5/27/14
Date: 06-11-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1039
Investigators: Dan LaPlant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 112.55	
Latitude: 62° 17' 08.60"		Longitude: 150° 14' 51.10"	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 010	Picture No.: P_E, SW, pit, plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): floodplain
Slope (%): 0-2	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: upland	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (If no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1C
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch in logbook 2 page 010,

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Myrica gale</i>	<u>50</u>	<u>Y</u>	<u>OBL</u>
2. <i>populus balsamifera</i>	<u>3</u>		<u>FACU</u>
3. <i>Salex pulchra</i>	<u>5</u>		<u>FACW</u>
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>58</u> 50% of total cover: <u>29</u> 20% of total cover: <u>11.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 52 X 1 = 52
 FACW species: 5 X 2 = 10
 FAC species: 75 X 3 = 225
 FACU species: 3 X 4 = 12
 UPL species: 0 X 5 = 0
 Column Totals: 135 (A) 299 (B)
 PI = B/A = 2.21

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Carex aquatilis</i>	<u>2</u>		<u>OBL</u>
2. <i>Calamagrostis canadensis</i>	<u>75</u>	<u>Y</u>	<u>FAC</u>
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>77</u> 50% of total cover: <u>38.5</u> 20% of total cover: <u>15.4</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
0 % Cover of Wetland Bryophytes
0 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-11</u> Feature ID <u>W60T1039</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2								organics
2-11	10YR 4/2						Sandy silt	
11-16+							gravel	saturated @ 8"
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u> *			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) <u>X</u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: * Rechecked soil on 7/9/14 by S. Christopher. See logbook W60-3. Confirmed Alaska Redox.								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) <u>X</u>	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) <u>X</u>	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>10</u>			
Saturation Present (Y/N): <u>Y</u> (includes capillary fringe)	Depth (in): <u>8</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking <input checked="" type="checkbox"/> Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input checked="" type="checkbox"/> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <input checked="" type="checkbox"/> Short herb (<1m) <input type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <input checked="" type="checkbox"/> 2	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) <input checked="" type="checkbox"/> Medium (5-25 species) _____ High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches <input checked="" type="checkbox"/> Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly <input checked="" type="checkbox"/> Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet <input checked="" type="checkbox"/> Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs <input checked="" type="checkbox"/> Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits <input checked="" type="checkbox"/> Low Permeability Stratified Deposits _____ Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W00T1039

Field Target: 152

Date: 06-11-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade
Wetland Scientist (print)

X *Zoemeade*
Signature / Date

X *Don Laplant*
Field Crew Chief (print)

X *Don Laplant* 6/11/2014
Signature / Date

WETLAND DETERMINATION DATA FORM

FT 152
soils check

SOIL		Date <u>7/7/14</u> Feature ID _____		Soil Pit Required (Y/N) <u>X</u>			
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹		
0-1							organic
1-12	5Y 4/1	90	7.5 YR 4/6	10	PC	PL	Med. sandy loam
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
HYDRIC SOIL INDICATORS				INDICATORS FOR PROBLEMATIC HYDRIC SOILS³			
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____	
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u> _____			Alaska Alpine Swales (TA5) _____	
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____	
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____	
Thick Dark Surface (A12) _____						Other (Explain in Notes)	
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.							
Restrictive Layer (if present): Type: <u>Rock cobble</u> Depth (inches): <u>12</u>							
Hydric Soil Present (Y/N): <u>Y</u>							
Notes: * drainage feature off banks to creek. No bed or bank							

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N):	Depth (in):	Wetland Hydrology Present (Y/N): _____		
Water Table Present (Y/N):	Depth (in):			
Saturation Present (Y/N): (includes capillary fringe)	Depth (in):			
Notes:				

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline___ Access Road (explain)___ Other (explain) X 2000 stud dor
Field Target: 151 Map #: 106 Map Date: 5/27/14
Date: 06-11-2014 Project Name & No.: Alaska LNG 26221306 Feature Id: W60T1040
Investigators: Dan LaPlant, Zoe Meade Team No.: W60
State: Alaska Region: Alaska Milepost: 112.7
Latitude: 62° 17' 17.69" Longitude: 150° 14' 58.10 Datum: WGS84
Logbook No.: 002 Logbook Page No.: 011 Picture No.: P_S, W, pit, dlu

SITE PARAMETERS

Subregion: interior Landform (hillslope, terrace, hummocks, etc.): hummocky
Slope (%): 0-3 Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PEM1B Soil Map Unit Name
Are climatic/hydrologic conditions on the site typical for this time of year? Are "Normal Circumstances" present:
Yes X No ___ (if no explain in Notes) Yes X No ___ (if no, explain in Notes.)
Are Vegetation ___, Soil ___, or Hydrology ___ Significantly Disturbed? No X (If yes, explain in Notes)
Are Vegetation ___, Soil ___, or Hydrology ___ Naturally Problematic? No X (If yes, explain in Notes.)

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? Yes X No ___ Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present? Yes X No ___ Wetland Type: PEM1B
Wetland Hydrology Present? Yes X No ___ Alaska Vegetation Classification (Viereck): III A ± 2 (see logbook)

Notes and Site Sketch: Please & North Arrow, Centerline, Length of feature, Distances ne, Photo Locations, and Survey corridor.

placed bath at recorded GPS location.

See sketch in Logbook 02 page 011.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species: <u>10</u> x 1 = <u>10</u> FACW species: <u>85</u> x 2 = <u>170</u> FAC species: <u>3</u> x 3 = <u>9</u> FACU species: <u>0</u> x 4 = <u>0</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>98</u> (A) <u>189</u> (B) PI = B/A = <u>1.93</u>
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) <small>¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.</small>
1. <u>Calamagrostis canadensis</u>	<u>85</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Equisetum arvense</u>	<u>3</u>		<u>FAC</u>	
3. <u>Comarum palustre</u>	<u>T</u>		<u>OBL</u>	
4. <u>Carex aquatalis</u>	<u>10</u>		<u>OBL</u>	
5.				
6.				
7.				
8.				
9.				
Total Cover: <u>98</u> 50% of total cover: <u>49</u> 20% of total cover: <u>19.6</u>				_____ % Bare Ground _____ % Cover of Wetland Bryophytes _____ Total Cover of Bryophytes _____ % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-11-14</u> Feature ID <u>W60T1040</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1								organics
1-15	10YR 5/2	75	10YR 3/6	25	C	PL, M	Silty clay	
15-22	10YR 6/2	90	10YR 3/6	10	C	PL	Silty clay	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ <u>X</u>		
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u> <u>?</u> <u>*</u>			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>* Soil rechecked on 7/9/14 by S. Christopher. See Logbook W60-3 confirmed Alaska Redox.</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) <u>X</u>	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) <u>X</u>	Shallow Aquitard (D3) _____	
Water Marks (B1) <u>X</u>	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____		
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>N</u>	Depth (in): _____	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>N</u>	Depth (in): <u>22</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>N</u>	Depth (in): <u>18</u>			
Notes: <u>evidence of standing water from earlier in the season</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <u>98</u> Short herb (<1m) <input type="checkbox"/> Moss-Lichen <input type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <u>1</u>	Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) <input checked="" type="checkbox"/> Medium (5-25 species) _____ High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey <input checked="" type="checkbox"/>	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water <input checked="" type="checkbox"/> Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated <input checked="" type="checkbox"/> Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) <input checked="" type="checkbox"/> Medium (10-100 acres) _____ Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: WGOT 1040

Field Target: 151

Date: 06-11-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoumeade

Wetland Scientist (print)

X

Signature / Date



X Dan LaPlante

Field Crew Chief (print)

X

Signature / Date



WETLAND DETERMINATION DATA FORM

FT 151
Soils check

SOIL		Date <u>7/9/14</u> Feature ID _____		Soil Pit Required (Y/N) <u>Y</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 4/2	95	10YR 5/8	5	C	PL	Silt loam	
4-20	5Y 5/1	90	10YR 4/6	10	C	PL	Silt loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) <u>X</u>			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: Tall cat can, (5'+) meadow								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N):	Depth (in):	Wetland Hydrology Present (Y/N): _____		
Water Table Present (Y/N):	Depth (in):			
Saturation Present (Y/N): (includes capillary fringe)	Depth (in):			
Notes:				

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 161	Map #: 111 Map Date: 5/27/14
Date: 06-30-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1041
Investigators: Sue Christoph 70° Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 674.5 (pipe)	
Latitude: 62° 10' 05.09"	Longitude: 150° 11' 42.20"	Datum: WGS84	
Logbook No.: 003	Logbook Page No.: 22	Picture No.: P-N.S.	

SITE PARAMETERS	
Subregion: DA Southcentral	Landform (hillslope, terrace, hummocks, etc.): TERRACE
Slope (%): 0-3	Local relief (concave, convex, none): CONCAVE
Pre-mapped Alaska LNG/NWI classification: PSS 4/1 B	Soil Map Unit Name: MA
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS 4/Em 1 B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): IIA2, IIC2 IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See PAGE 22

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: <u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			

Total Cover: 0
 50% of total cover: 0 20% of total cover: 0

Sapling/Shrub Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	40	X	FACW
2. <i>Rhododendron tomentosum</i>	2		FACW
3. <i>Betula nana</i>	7		FAC
4. <i>Chamaedaphne caliculata</i>	3		FACW
5. <i>Empetrum nigrum</i>	15	X	FAC
6. <i>Andromeda polifolia</i>	T		FACW
7. <i>Vaccinium uliginosum</i>	1		FAC
8.			
9.			

Total Cover: 60
 50% of total cover: 34 20% of total cover: 13.4

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by: _____
 OBL species: 29 X 1 = 29
 FACW species: 66 X 2 = 132
 FAC species: 4 X 3 = 12
 FACU species: 1 X 4 = 4
 UPL species: _____ X 5 = _____
 Column Totals: 100 (A) 177 (B)
 PI = B/A = 1.77

VEGETATION (use scientific names of plants)

Herb Stratum (<u>20'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rubus chamaemorus</i>	15	X	FACW
2. <i>Equisetum hyemale</i>	3		FACW
3. <i>Pedicularis labradorica</i>	T		FACW
4. <i>Drosera rotundifolia</i>	4		OBI
5. <i>Geocaulon lividum</i>	1		FACU
6. <i>Equisetum fluviatile</i>	3		FACW
7. <i>Carex microglochin</i>	25	X	OBI
8. <i>Spiranthes romanzoffiana</i>	T		OBI
9.			
10.			

Total Cover: 49
 50% of total cover: 24 20% of total cover: 9.8

Hydrophytic Vegetation Indicators:

Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
— % Cover of Wetland Bryophytes
100 Total Cover of Bryophytes
— % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL Date 6/30/14 Feature ID W607 641 Soil Pit Required (Y/N) Y

SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-20							Fibric	organics

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.

⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes:
Hydric soil observed

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) <u>X</u>
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>N</u>	Depth (in): <u>N/A</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>3</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	

Notes:
Field Indicators & Hydrology observed

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES P= Plot, M= Matrix

Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____
 Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____
 Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved Emergent-Non-persistent _____ Emergent-
 Persistent _____ Aquatic Bed _____

Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) 40 Tall shrub (2-6m) Short shrub (0.5-2m)
 Dwarf shrub (<0.5m) 20 Tall herb (≥1m) _____ Short herb (<1m) 40 Moss-Lichen 100 Floating _____ Submerged

Number of Wetland Types (M): 2 Evenness of Wetland Type Distribution (M): Even Highly Uneven _____ Moderately even _____

Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) High Density (60-80%) _____ Very High Density (80-100%) _____

Interspersion of Cover & Open Water (P): 100% Cover or Open Water <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____

Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) High (>25) _____

Presence of Islands (M): Absent (none) One or Few _____ Several to Many _____ N/A _____

Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site
 Open _____ Small Scattered Patches _____ Continuous Cover

Dead Woody Material (P): Low Abundance (0-25% of surface) Moderately Abundant (25-50% of surface) _____
 Abundant (>50% of surface) _____

Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings)
 High (small groupings, diverse and interspersed) _____

HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional Riverine _____ Estaurine Fringe _____

SOIL VARIABLES

Soil Factors (P): Soil Lacking _____ Histosol:Fibric Histosol:Hemic _____ Histosol:Sapric _____
 Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES

Inlet/Outlet Class (P): No Inlet/Outlet No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____

Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated
 Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____

Evidence of Sedimentation (P): No Evidence Observed Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____

Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) Well Developed (6-18in.) _____ Pronounced (>18in.) _____

Frequency of Overbank Flooding (P): No Overbank Flooding Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____
 Return Interval >5 yrs _____

Degree of Outlet Restriction (P): No Outflow Restricted Outflow _____ Unrestricted Outflow _____

Water pH (P): No surface water Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading _____

Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits
 Glacial Till/Not Permeable _____

Basin Topographic Gradient (M): Low Gradient (<2%) High Gradient (≥2%) _____

Evidence of Seeps and Springs (P): No Seeps or Springs Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)

Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____
 Only Connected Above _____ Connected Upstream & Downstream Unknown _____

Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space)

Watershed Land Use: 0-5% Rural 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____

Size: Small (<10 acres) _____ Medium (10-100 acres) Large (>100 acres) _____

Crew Chief QA/QC check

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W160 T1 041

Field Target: 161

Date: 06-30-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade*

Signature / Date

X Joe Christopher

Field Crew Chief (print)

X *[Signature]* 9/30/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
<i>outside 2000' corridor</i>			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>	Field Target: <u>160</u>	Map #: <u>110</u>	Map Date: <u>5/27/14</u>
Date: <u>06-13-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>	Feature Id: <u>W60TI042</u>	
Investigators: <u>Dan LaPlant, Zoe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>673.25</u>	
Latitude: <u>62° 11' 18.42"</u>	Longitude: <u>150° 12' 57.52"</u>	Datum: <u>WGS84</u>	
Logbook No.: <u>002</u>	Logbook Page No.: <u>017</u>	Picture No.: <u>P_SE, W, pit, plug</u>	

SITE PARAMETERS	
Subregion: <u>interior</u>	Landform (hillslope, terrace, hummocks, etc.): <u>hummocks</u>
Slope (%): <u>0-1</u>	Local relief (concave, convex, none): <u>concave</u>
Pre-mapped Alaska LNG/NWI classification: <u>PEM1B</u>	Soil Map Unit Name: <u>-</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PSS1/4/EM1F</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>IC2, IIIA2</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch in logbook 002 page 018.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nana</i>	20	Y	FAC
2. <i>Myrica gale</i>	10	Y	OBL
3. <i>Picea mariana</i>	10	Y	FACW
4. <i>Rhododendron tomentosum</i>	T		FACW
5. <i>Dasiphora fruticosa</i>	5		FAC
6. <i>Chamaedaphne calyculata</i>	5		FACW
7. <i>Vaccinium oxycoccus</i>	2		OBL
8.			
9.			
Total Cover: <u>52</u> 50% of total cover: <u>26</u> 20% of total cover: <u>10.4</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 5 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 120 X 1 = 120
 FACW species: 15 X 2 = 30
 FAC species: 43 X 3 = 129
 FACU species: 0 X 4 = 0
 UPL species: 0 X 5 = 0
 Column Totals: 178 (A) 279 (B)
 PI = B/A = 1.57

* no seed heads on juncus ssp, unable to identify species.

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum fluviatile</i>	40	Y	OBL
2. <i>Valeriana capitata</i>	14		FAC
3. <i>Comarum palustre</i>	4		OBL
4. <i>Drosera rotundifolia</i>	1		OBL
5. <i>Juncus ssp.</i>	60	Y	OBL
6. <i>Carex aquatilis</i>	3		OBL
7. <i>Calamagrostis canadensis</i>	4		FAC
8.			
9.			
10.			
Total Cover: <u>126</u> 50% of total cover: <u>63</u> 20% of total cover: <u>25.2</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
80 % Cover of Wetland Bryophytes
80 Total Cover of Bryophytes
30 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-13-14</u> Feature ID <u>W60T1042</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 8							Histic	Fibric <i>vw</i>
8 - 16+							Fibric	Hemic

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	
Notes:		

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <u>X</u> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>10</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>42</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>126</u> Moss-Lichen <u>80</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>3</u> Evenness of Wetland Type Distribution (M): Even <u>X</u> Highly Uneven _____ Moderately even _____		
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <u>X</u> High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <u>X</u> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <u>X</u> High (>25) _____		
Presence of Islands (M): Absent (none) <u>X</u> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <u>X</u>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <u>X</u> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <u>X</u> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <u>X</u> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <u>X</u> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <u>X</u> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <u>X</u>	
Evidence of Sedimentation (P): No Evidence Observed <u>X</u> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <u>X</u> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <u>X</u> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <u>X</u> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <u>X</u> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>5.68</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <u>X</u> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <u>X</u> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <u>X</u> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <u>X</u> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <u>X</u>	
Watershed Land Use: 0-5% Rural <u>X</u> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) <u>X</u>	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60 T1 D42

Field Target: 160

Date: 6/13/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X

Zoe Meade 6/13/14

Signature / Date

X Dan Lobert

Field Crew Chief (print)

X

Dan Lobert 6/13/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/> <i>corridor</i>		Field Target: 159	Map #: 110 Map Date: 5/27/14
Date: 06-13-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1043
Investigators: Dan LaPlant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 673.2	
Latitude: 62° 11' 19.09"		Longitude: 150° 12' 48.50"	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 019	Picture No.: P_W, E, Pit, Plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): Flood plain
Slope (%): 29 < 2%	Local relief (concave, convex, none): Level
Pre-mapped Alaska LNG/NWI classification: PF04B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PF04/1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): I C II

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch in logbook 002, page 019.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula neoalaskana</i>	15	Y	FACU
2. <i>Picea glauca</i>	15	Y	FACU
3. <i>Picea mariana</i>	5		FACW
4.			
Total Cover: <u>35</u> 50% of total cover: <u>17.5</u> 20% of total cover: <u>7</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Picea mariana</i>	30	Y	FACW
2. <i>Empetrum nigrum</i>	T		FAC
3. <i>Betula neoalaskana</i>	15	Y	FACU
4. <i>Vaccinium vitis-idaea</i>	T		FAC
5. <i>Vaccinium uliginosum</i>	5		FAC
6. <i>Alnus ssp.</i>	T		FAC
7. <i>Rosa acicularis</i>	T		FACU
8.			
9.			
Total Cover: <u>50</u> 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 7 (B)
 % Dominant Species that are OBL, FACW, or FAC: 57 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 25 X 1 = 25
 FACW species: 60 X 2 = 120
 FAC species: 30 X 3 = 90
 FACU species: 45 X 4 = 180
 UPL species: 0 X 5 = 0
 Column Totals: 160 (A) 415 (B)
 PI = B/A = 2.59

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Chamaerion angustifolium</i>	T		FACU
2. <i>Rubus chamaemorus</i>	25	Y	FACW
3. <i>Comarum palustre</i>	15	Y	OBL
4. <i>Calamagrostis canadensis</i>	10		FAC
5. <i>Equisetum arvense</i>	15	Y	FAC
6. <i>Geocaulon lividum</i>	T		FACU
7. <i>Cornus canadensis</i>	T		FACU
8. <i>Carex aquatilis</i>	10		OBL
9.			
10.			
Total Cover: <u>75</u> 50% of total cover: <u>37.5</u> 20% of total cover: <u>15</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
85 % Cover of Wetland Bryophytes
85 Total Cover of Bryophytes
5 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-13-14</u> Feature ID <u>W60T1043</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 10							Histic	organics <u>Fibric</u>
10 - 22							Fibric	organics <u>Hemic</u>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes)

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	
Notes:		

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>35</u> Sapling (<5 dbh, <6m tall) <u>45</u> Tall shrub (2-6m) <u>0</u> Short shrub (0.5-2m) <u>0</u> Dwarf shrub (<0.5m) <u>5</u> Tall herb (≥1m) <u>0</u> Short herb (<1m) <u>75</u> Moss-Lichen <u>85</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>2</u> Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____		
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover <u>N/A</u>		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) <input checked="" type="checkbox"/> Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine <input checked="" type="checkbox"/> Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs <input checked="" type="checkbox"/>	
Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow <input checked="" type="checkbox"/>	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) <input checked="" type="checkbox"/> Alkaline (>7.4) _____ Acid (<5.5) _____ pH Reading <u>6.62</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below <input checked="" type="checkbox"/> Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60 T1043 Field Target: 159 Date: 6/13/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X *Noe Meade*

Wetland Scientist (print)

X *Noe Meade* 6/13/14

Signature / Date

X *Don LaPoint*

Field Crew Chief (print)

X *Don LaPoint* 6/13/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 154	Map #: 108 Map Date: 5/27/14
Date: 06-14-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1044
Investigators: Dan LaPlant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 108.5	
Latitude: 62° 13' 52.85"		Longitude: 150° 14' 25.76"	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 025	Picture No.: P-W, S, pit, plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.):
Slope (%): 0-3	Local relief (concave, convex, none): convex
Pre-mapped Alaska LNG/NWI classification: upland	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Wetland Type: upland
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Alaska Vegetation Classification (Viereck): IC1

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

see sketch in logbook 002 page 026.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>2.6'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula neoalaskana</i>	90	Y	FACU
2.			
3.			
4.			
Total Cover: <u>90</u> 50% of total cover: <u>45</u> 20% of total cover: <u>18</u>			
Sapling/Shrub Stratum (<u>2.0'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Rubus idaeus</i>	3		FACU
2. <i>Betula neoalaskana</i>	15	Y	FACU
3. <i>Ainus</i> ssp.	20	Y	FAC
4. <i>Rosa acicularis</i>	T		FACU
5. <i>Spiraea stevenii</i>	T		FACU
6.			
7.			
8.			
9.			
Total Cover: <u>38</u> 50% of total cover: <u>19</u> 20% of total cover: <u>7.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 0 x 1 = 0
 FACW species: 0 x 2 = 0
 FAC species: 107 x 3 = 321
 FACU species: 170 x 4 = 680
 UPL species: 0 x 5 = 0
 Column Totals: 277 (A) 1001 (B)
 PI = B/A = 3.61

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>2.0'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum arvense</i>	85	Y	FAC
2. <i>Cornus canadensis</i>	20		FACU
3. <i>Dryopteris expansa</i>	30	Y	FACU
4. <i>Gymnocarpium dryopteris</i>	10		FACU
5. <i>Chamerion angustifolium</i>	2		FACU
6. <i>Calamagrostis canadensis</i>	2		FAC
7.			
8.			
9.			
10.			
Total Cover: <u>149</u> 50% of total cover: <u>74.5</u> 20% of total cover: <u>29.8</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
0 % Cover of Wetland Bryophytes
0 Total Cover of Bryophytes
0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-14-14</u> Feature ID <u>W60T1044</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2								
2-8	10YR 3/6	100					silt loam	organics
8-9								organics
9-9.5								Ash
9.5-15.5	10YR 5/6	100					silt loam	
15.5-20	10YR 5/4	50	10YR 3/3	50	C	PL	silt loam	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) _____			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>N</u>								
Notes:								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) _____	Surface Soil Cracks (B6) _____		Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) _____	Inundation Visible on Aerial Imagery (B7) _____		Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) _____	Sparsely Vegetated Concave Surface (B8) _____		Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____		Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____		Salt Deposits (C5) _____	FAC-Neutral Test (D5) _____
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____		Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>NO</u>	Depth (in): <u>N/A</u>	Wetland Hydrology Present (Y/N): <u>N</u>		
Water Table Present (Y/N): <u>No</u>	Depth (in): <u>N/A</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>NO</u>	Depth (in): <u>N/A</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

Upland

VEGETATION VARIABLES P= Plot, M= Matrix

Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____
 Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____
 Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____

Percent Cover (R): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____
 Dwarf shrub (<0.5m) _____ Tall herb (≥1m) _____ Short herb (<1m) _____ Moss-Lichen _____ Floating _____ Submerged _____

Number of Wetland Types (M): _____ **Evenness of Wetland Type Distribution (M):** Even _____ Highly Uneven _____ Moderately even _____

Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____

Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____

Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) _____ High (>25) _____

Presence of Islands (M): Absent (none) _____ One or Few _____ Several to Many _____ N/A _____

Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site
 Open _____ Small Scattered Patches _____ Continuous Cover _____

Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _____
 Abundant (>50% of surface) _____

Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) _____
 High (small groupings, diverse and interspersed) _____

HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____

SOIL VARIABLES

Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric _____
 Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____

HYDROLOGIC VARIABLES

Inlet/Outlet Class (P): No Inlet/Outlet _____ No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____

Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____
 Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____

Evidence of Sedimentation (P): No Evidence Observed _____ Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____

Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) _____ Pronounced (>18in.) _____

Frequency of Overbank Flooding (P): No Overbank Flooding _____ Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____
 Return Interval >5 yrs _____

Degree of Outlet Restriction (P): No Outflow _____ Restricted Outflow _____ Unrestricted Outflow _____

Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) _____ **pH Reading** _____

Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits _____
 Glacial Till/Not Permeable _____

Basin Topographic Gradient (M): Low Gradient (<2%) _____ High Gradient (≥2%) _____

Evidence of Seeps and Springs (P): No Seeps or Springs _____ Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____

LANDSCAPE VARIABLES (M)

Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____
 Only Connected Above _____ Connected Upstream & Downstream _____ Unknown _____

Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) _____

Watershed Land Use: 0-5% Rural _____ 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____

Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) _____

Crew Chief QA/QC check:

GPS Technician QA/QC check:

[Handwritten signature]

[Handwritten signature]

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1044

Field Target: 154

Date: 06-14-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland? upland-

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoe Meade* 06-14-14

Signature / Date

X *Don Lapoint*

Field Crew Chief (print)

X *Don Lapoint* 6/14/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
2000' study corridor			
Survey Type: Centerline	Access Road (explain)	Other (explain) <input checked="" type="checkbox"/>	Field Target: 155
Date: 06-14-14	Project Name & No.: Alaska LNG 26221306	Map #: 108 Map Date: 5/27/14	
Investigators: Dan LaPlant, Zoe Meade			Feature Id: W60T1045
State: Alaska			Team No.: W60
Region: Alaska		Milepost: 118.5	
Latitude: 62° 13' 52.94"		Longitude: 150° 14' 23.73"	
Datum: WGS84			
Logbook No.: 002	Logbook Page No.: 027	Picture No.: P-W, S, pit, plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummock
Slope (%): 0-2	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PSS 4/1B	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PSS 4/1B
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): II A2, II B2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch logbook 002 page 026.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
<u>Tree Stratum</u> (Plot sizes: _____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Ainus ssp.</i>	40	Y	FAC
2. <i>Betula nana</i>	15		FAC
3. <i>Spirea stevenii</i>	5		FACU
4. <i>Myrica gale</i>	40	Y	OBL
5. <i>Rosa acicularis</i>	5		FACU
6. <i>Picea mariana</i>	15		FAC
7.			
8.			
9.			
Total Cover: <u>120</u> 50% of total cover: <u>60</u> 20% of total cover: <u>24</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 5 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species: 100 X 1 = 100
 FACW species: 0 X 2 = 0
 FAC species: 120 X 3 = 360
 FACU species: 10 X 4 = 40
 UPL species: 0 X 5 = 0
 Column Totals: 230 (A) 500 (B)
 PI = B/A = 2.17

VEGETATION (use scientific names of plants)			
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Comarum palustre</i>	10		OBL
2. <i>Equisetum fluviatile</i>	25	Y	OBL
3. <i>Calamagrostis Canadensis</i>	50	Y	FAC
4. <i>Trientalis europaea</i>	T		FACU
5. <i>Carex aquatilis</i>	25	Y	OBL
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>110</u> 50% of total cover: <u>55</u> 20% of total cover: <u>22</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 _____ Morphological Adaptations¹ (Provide supporting data in Notes)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)
¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic

0 % Bare Ground
15 % Cover of Wetland Bryophytes
15 Total Cover of Bryophytes
10 % Cover of Water
Hydrophytic Vegetation Present (Y/N): Y
 Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-14-14</u> Feature ID <u>W60T1045</u>					Soil Pit Required (Y/N) <u>Y</u>	
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	—	—	—	—	—	—		organics
3-7	—	—	—	—	—	—	Histic	organics
7-14	—	—	—	—	—	—	Fibric	organics
14-23	—	—	—	—	—	—	Sapric	organics, densely packed
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS							INDICATORS FOR PROBLEMATIC HYDRIC SOILS³	
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes)		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u>Sapric organics</u> Depth (inches): <u>14+</u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>water table above sapric layer, saturated to surface</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____	
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____	
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>	
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:		
Algal Mat or Crust (B4) _____	Other (Explain in Notes):			
Iron Deposits (B5) _____				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>13 and above</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes:				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved <input checked="" type="checkbox"/> Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>0</u> Sapling (<5 dbh, <6m tall) <u>15</u> Tall shrub (2-6m) <u>40</u> Short shrub (0.5-2m) <u>65</u> Dwarf shrub (<0.5m) <u>0</u> Tall herb (≥1m) <u>50</u> Short herb (<1m) <u>60</u> Moss-Lichen <u>15</u> Floating <u>0</u> Submerged <u>0</u>		
Number of Wetland Types (M): <u>4</u>		Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) <input checked="" type="checkbox"/> Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems <input checked="" type="checkbox"/> 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover _____		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) _____ Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic _____ Histosol: Sapric <input checked="" type="checkbox"/> Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Micorelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.40</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) <input checked="" type="checkbox"/>	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1095 Field Target: 155 Date: 6/14/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade
Wetland Scientist (print)

X *Zoe Meade*
Signature / Date

X *Don Lapoint*
Field Crew Chief (print)

X *Don Lapoint* 6/14/14
Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: 156	Map #: 108 Map Date: 5/27/14
Date: 06-14-14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60T1046
Investigators: Dan LaPlant, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 118.5	
Latitude: 62° 13' 53.13"		Longitude: 150° 14' 21.87"	Datum: WGS84
Logbook No.: 002	Logbook Page No.: 028 37	Picture No.: P-N, S, Pit, Plug	

SITE PARAMETERS	
Subregion: interior	Landform (hillslope, terrace, hummocks, etc.): hummocks
Slope (%): 0-2	Local relief (concave, convex, none): concave
Pre-mapped Alaska LNG/NWI classification: PEM1F	Soil Map Unit Name:
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)
SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: PSS1F
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Vioreck): IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See sketch in logbook 002 page 026.

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)				
<u>Tree Stratum</u> (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Dominance Test worksheet: No. of Dominant Species that are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) % Dominant Species that are OBL, FACW, or FAC: <u>100</u> (A/B)
1.				
2.				
3.				
4.				
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species: <u>89</u> x 1 = <u>89</u> FACW species: <u>15</u> x 2 = <u>30</u> FAC species: <u>82</u> x 3 = <u>246</u> FACU species: <u>2</u> x 4 = <u>8</u> UPL species: <u>0</u> x 5 = <u>0</u> Column Totals: <u>188</u> (A) <u>373</u> (B) PI = B/A = <u>1.98</u>
<u>Sapling/Shrub Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	
1. <i>Chamaedaphne calyculata</i>	15		FACW	
2. <i>Betula nana</i>	60	Y	FAC	
3. <i>Myrica gale</i>	15		OBL	
4. <i>Dasiphora fruticosa</i>	15		FAC	
5. <i>Vaccinium oxycoccus</i>	1		OBL	
6.				
7.				
8.				
9.				
Total Cover: <u>106</u> 50% of total cover: <u>53</u> 20% of total cover: <u>21.2</u>				

VEGETATION (use scientific names of plants)				
<u>Herb Stratum</u> (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is ≤ 3.0 _____ Morphological Adaptations ¹ (Provide supporting data in Notes) _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.
1. <i>Comarum palustre</i>	T		OBL	
2. <i>Trientalis europaea</i>	2		FACU	
3. <i>Valeriana capitata</i>	2		FAC	
4. <i>Mnemonthes trifoliata</i>	—	—	OBL	
5. <i>Drosera rotundifolia</i>	T		OBL	
6. <i>Equisetum fluviatile</i>	3		OBL	
7. <i>Eriophorum angustifolium</i>	T		OBL	
8. <i>Carex gynocrates</i>	50	Y	OBL	
9. <i>Carex aquatilis</i>	20	Y	OBL	
10. <i>Rubus</i> ssp.	5		FAC	
Total Cover: <u>82</u> 50% of total cover: <u>41</u> 20% of total cover: <u>16.4</u>				_____ % Bare Ground <u>85</u> % Cover of Wetland Bryophytes <u>85</u> Total Cover of Bryophytes <u>10</u> % Cover of Water Hydrophytic Vegetation Present (Y/N): <u>Y</u> Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-14-14</u> Feature ID <u>W6071046</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2							organics	
2-12							Histic	Fibric
12-22							Fibric	Hemic

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS ³
Histosol or Histel (A1) <u>X</u>	Alaska Gleyed (A13) _____	Alaska Color Change (TA4) ⁴ _____
Histic Epipedon (A2) _____	Alaska Redox (A14) _____	Alaska Alpine Swales (TA5) _____
Black Histic (A3) _____	Alaska Gleyed Pores (A15) _____	Alaska Redox with 2.5Y Hue _____
Hydrogen Sulfide (A4) _____		Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____
Thick Dark Surface (A12) _____		Other (Explain in Notes) _____

³One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic.
⁴Give details of color change in Notes.

Restrictive Layer (if present): Type: _____ Depth (inches): _____

Hydric Soil Present (Y/N): Y

Notes:

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) _____	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes:	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			

Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	Wetland Hydrology Present (Y/N): <u>Y</u>
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>	
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>	
Notes:		

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent _____ Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) <input type="checkbox"/> Sapling (<5 dbh, <6m tall) <input type="checkbox"/> Tall shrub (2-6m) <input type="checkbox"/> Short shrub (0.5-2m) <input type="checkbox"/> Dwarf shrub (<0.5m) <input type="checkbox"/> Tall herb (≥1m) <input type="checkbox"/> Short herb (<1m) <input checked="" type="checkbox"/> Moss-Lichen <input checked="" type="checkbox"/> Floating <input type="checkbox"/> Submerged <input type="checkbox"/>		
Number of Wetland Types (M): <input checked="" type="checkbox"/> 4		Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) <input checked="" type="checkbox"/> Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) _____		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site _____ Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat _____ Lacustrine Fringe _____ Depressional <input checked="" type="checkbox"/> Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>5.28</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) _____ Large (>100 acres) <input checked="" type="checkbox"/>	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1046 Field Target: 156 Date: 6/14/14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?

Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X Zoe Meade 6/14/14

Signature / Date

X Dan Laplant

Field Crew Chief (print)

X Dan Laplant 6/14/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input checked="" type="checkbox"/> Access Road (explain) _____ Other (explain) _____		Field Target: 162	Map #: 111 Map Date: 5/21/14
Date: 6/30/14	Project Name & No.: Alaska LNG 26221306		Feature Id: W60TI047
Investigators: Joe Christopher, Zoe Meade			Team No.: W60
State: Alaska	Region: Alaska	Milepost: 674.8 (LNG)	
Latitude: 62° 10' 03.80"	Longitude: 150° 11' 39.30"		Datum: WGS84
Logbook No.: 003	Logbook Page No.: 023	Picture No.: P-N, S, ground	

SITE PARAMETERS	
Subregion: South central	Landform (hillslope, terrace, hummocks, etc.): TERRACE
Slope (%): 0 - 2	Local relief (concave, convex, none): CONCAVE
Pre-mapped Alaska LNG/NWI classification: PEM1F	Soil Map Unit Name: N/A
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No _____ (if no explain in Notes)	Are "Normal Circumstances" present? Yes <input checked="" type="checkbox"/> No _____ (if no, explain in Notes.)
Are Vegetation _____, Soil _____, or Hydrology _____ Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation _____, Soil _____, or Hydrology _____ Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	Wetland Type: PEM1F
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Alaska Vegetation Classification (Viereck): III A3

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

See page 22

See map of 621 + 622

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.			
2.			
3.			
4.			
Total Cover: <u>0</u> 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Chamaedaphne calyculata</i>	2	* N	FACW
2. <i>Betula nana</i>	1	* N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>3</u> 50% of total cover: <u>1.5</u> 20% of total cover: <u>0.6</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 31 (A)
 Total Number of Dominant Species Across All Strata: 31 (B)
 % Dominant Species that are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 109 X 1 = 109
 FACW species: 2 X 2 = 4
 FAC species: 1 X 3 = 3
 FACU species: _____ X 4 = _____
 UPL species: _____ X 5 = _____
 Column Totals: 112 (A) 116 (B)
 PI = B/A = 1.03

* Shrub stratum added to herb stratum since they was < 5% cover.

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Carex rotundata</i>	90	X	OBL
2. <i>Carex magellanica</i>	15		OBL
3. <i>Drosera rotundifolia</i>	4		OBL
4. <i>Eriophorum vaginatum</i>	T		FACW
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: <u>105</u> <u>112</u> 50% of total cover: <u>52.5</u> <u>56</u> 20% of total cover: <u>21</u> <u>22.4</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

_____ % Bare Ground
 _____ % Cover of Wetland Bryophytes
100 Total Cover of Bryophytes
15 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>1/20/14</u>	Feature ID <u>W601047</u>	Soil Pit Required (Y/N) <u>X</u>				
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
<u>0-2</u>								
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) _____			Alaska Color Change (TA4) ⁴ _____		
Histic Epipedon (A2) _____			Alaska Redox (A14) _____			Alaska Alpine Swales (TA5) _____		
Black Histic (A3) _____			Alaska Gleyed Pores (A15) _____			Alaska Redox with 2.5Y Hue _____		
Hydrogen Sulfide (A4) _____						Alaska Gleyed without 5Y Hue or Redder Underlying Layer _____		
Thick Dark Surface (A12) _____						Other (Explain in Notes) _____		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: _____ Depth (inches): _____								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>Assume Histosol - standing H₂O + 100 sphagnum</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) _____	Water-stained Leaves (B9) _____	Stunted or Stressed Plants (D1) _____
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u>X</u>	Drainage Patterns (B10) _____	Geomorphic Position (D2) _____
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) _____	Oxidized Rhizospheres along Living Roots (C3) _____	Shallow Aquitard (D3) _____
Water Marks (B1) _____	Marl Deposits (B15) _____	Presence of Reduced Iron (C4) _____	Microtopographic Relief (D4) _____
Sediment Deposits (B2) _____	Hydrogen Sulfide Odor (C1) _____	Salt Deposits (C5) _____	FAC-Neutral Test (D5) <u>X</u>
Drift Deposits (B3) _____	Dry-Season Water Table (C2) _____	Notes: _____	
Algal Mat or Crust (B4) _____	Other (Explain in Notes): _____		
Iron Deposits (B5) _____			
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>1-2'</u>	Wetland Hydrology Present (Y/N): <u>Y</u>	
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>0</u>		
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>		
Notes: _____			

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved _____ Forested-Deciduous-Broad-leaved _____ Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved _____ Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent- Persistent <input checked="" type="checkbox"/> Aquatic Bed _____		
Percent Cover (P): Tree (>5 dbh, >6m tall) _____ Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) <u>3</u> Tall herb (≥1m) _____ Short herb (<1m) <u>105 109</u> Moss-Lichen <u>102</u> Floating _____ Submerged _____		
Number of Wetland Types (M): <u>2</u>		Evenness of Wetland Type Distribution (M): Even <input checked="" type="checkbox"/> Highly Uneven _____ Moderately even _____
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) _____ High Density (60-80%) _____ Very High Density (80-100%) <input checked="" type="checkbox"/>		
Interspersion of Cover & Open Water (P): 100% Cover or Open Water _____ <25% Scattered/Peripheral Cover <input checked="" type="checkbox"/> 26-75% Scattered or Peripheral Cover <input checked="" type="checkbox"/> >75% Scattered or Peripheral Cover _____ N/A _____		
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____		
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____		
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>		
Dead Woody Material (P): Low Abundance (0-25% of surface) <input checked="" type="checkbox"/> Moderately Abundant (25-50% of surface) _____ Abundant (>50% of surface) _____		
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) _____ High (small groupings, diverse and interspersed) _____		
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____		

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric <input checked="" type="checkbox"/> Histosol:Hemic _____ Histosol: Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated _____ Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded <input checked="" type="checkbox"/>	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvaquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) <input checked="" type="checkbox"/> Well Developed (6-18in.) _____ Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>4.0</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W60T1 0 47

Field Target: 162

Date: 06-30-14

For all items not checked, please provide detailed explanation in the notes section of data form.

1. Site Description

- Site description, site parameters and summary of findings are complete?
- A detailed site sketch is included in logbook?

2. Vegetation

- At least 80% of onsite vegetation has been keyed to species, or collected for later identification?
- Vegetation names are entered legibly for all strata present?
- Cover calculations are complete and correct?
- All dominant species have been determined and recorded per strata?
- Indicator status is correct for each species?
- Dominance Test and Prevalence Index have been completed?

3. Soil

- Soil profile is complete?
- Appropriate hydric soil indicators are marked?

4. Hydrology

- Appropriate hydrology indicators are marked?
- Surface water, water table, and saturation depths are recorded if present?

5. Functions and Values

- Vegetation, soil, hydrologic variables, and landscape variables complete if site is a wetland?

6. Field Logbook

- Notes have been recorded at each site, including general description, sketch, and accuracy of pre-mapped wetland boundary as appropriate?
- Each logbook page is initialed and dated?

7. Maps

- Wetland boundaries have been corrected if necessary?
- Maps are initialed and dated?

8. Photos

- Four photos were taken for each Wetland Determination Data Form (2 vegetation, 1 soil pit, 1 soil plug)?
- Two photos were taken for each Observation Point (vegetation/site overview)?

X Zoe Meade

Wetland Scientist (print)

X *Zoemeade* 6/30/14

Signature / Date

X Joe Christoph

Field Crew Chief (print)

X *[Signature]* 6/30/14

Signature / Date

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline <input type="checkbox"/> Access Road (explain) <input type="checkbox"/> Other (explain) <input checked="" type="checkbox"/>		Field Target: <u>162</u>	Map #: <u>111</u> Map Date: <u>5/27/14</u>
Date: <u>06-30-14</u>	Project Name & No.: <u>Alaska LNG 26221306</u>		Feature Id: <u>W60T1048</u>
Investigators: <u>Joe Christopher, Zoe Meade</u>			Team No.: <u>W60</u>
State: <u>Alaska</u>	Region: <u>Alaska</u>	Milepost: <u>674.8 (unc)</u>	
Latitude: <u>62° 10' 03.04"</u>		Longitude: <u>150° 11' 31.99"</u>	Datum: <u>WGS84</u>
Logbook No.: <u>003</u>	Logbook Page No.: <u>23</u>	Picture No.: <u>P-N, -S, P-P</u>	

SITE PARAMETERS	
Subregion: <u>Southcentral</u>	Landform (hillslope, terrace, hummocks, etc.): <u>PLAIN</u>
Slope (%): <u>0-3</u>	Local relief (concave, convex, none): <u>none</u>
Pre-mapped Alaska LNG/NWI classification: <u>Upland</u>	Soil Map Unit Name: <u>NA</u>
Are climatic/hydrologic conditions on the site typical for this time of year? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no explain in Notes)	Are "Normal Circumstances" present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (if no, explain in Notes.)
Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Significantly Disturbed?	No <input checked="" type="checkbox"/> (If yes, explain in Notes)
Are Vegetation <input checked="" type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> Naturally Problematic?	No <input checked="" type="checkbox"/> (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Type: <u>PFO1/4B</u>
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Alaska Vegetation Classification (Viereck): <u>IC2, ICX</u>

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor.

Spruce + Birch morphologically adapted to wetland by growing multiple trunks + buttressed root balls.

See PAS 91 for Diagram

Plot taken just outside 300'

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)			
Tree Stratum (Plot sizes: <u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Betula nealaskana</i>	20	X	FACU*
2. <i>Picea glauca</i>	20	X	FAC
3.			
4.			
Total Cover: <u>40</u> 50% of total cover: <u>20</u> 20% of total cover: <u>8</u>			
Sapling/Shrub Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Menziesia ferruginea</i>	8	X	FACU
2. <i>Vaccinium vitis-idaea</i>	1		FAC
3. <i>Alnus</i> ssp.	7	X	FAC
4.			
5.			
6.			
7.			
8.			
9.			
Total Cover: <u>16</u> 50% of total cover: <u>8</u> 20% of total cover: <u>3.2</u>			

Dominance Test worksheet:
 No. of Dominant Species that are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 % Dominant Species that are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species: 5 X 1 = 5
 FACW species: 3 X 2 = 6
 FAC species: 133 X 3 = 399
 FACU species: 10 X 4 = 40
 UPL species: 0 X 5 = 0
 Column Totals: 151 (A) 450 (B)
 PI = B/A = 2.98

* moved *Bet. neo* & *Pic. gla.* to fac due to morphological adaptations.

VEGETATION (use scientific names of plants)			
Herb Stratum (<u>26'</u>)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. <i>Equisetum arvense</i>	75	X	FAC
2. <i>Calamagrostis canadensis</i>	10		FAC
3. <i>Cornus canadensis</i>	2		FACU
4. <i>Carex</i> ssp.	3		—
5. <i>Comarum palustre</i>	5		OBL
6. <i>Rubus chamaemorus</i>	3		FACW
7.			
8.			
9.			
10.			
Total Cover: <u>98</u> 50% of total cover: <u>49</u> 20% of total cover: <u>19.6</u>			

Hydrophytic Vegetation Indicators:
 Dominance Test is > 50%
 Prevalence Index is ≤ 3.0
 Morphological Adaptations¹ (Provide supporting data in Notes)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

0 % Bare Ground
0 % Cover of Wetland Bryophytes
30 Total Cover of Bryophytes
1 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

Notes: (If observed, list morphological adaptations below):

WETLAND DETERMINATION DATA FORM

SOIL		Date <u>06-30-14</u> Feature ID <u>WOT1048</u>				Soil Pit Required (Y/N) <u>Y</u>		
SOIL PROFILE DESCRIPTION: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Notes
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-18	<u> </u>	<u>-</u>	<u> </u>	<u>-</u>	<u> </u>	<u> </u>	Hemic <u>-1</u>	organics
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
HYDRIC SOIL INDICATORS						INDICATORS FOR PROBLEMATIC HYDRIC SOILS³		
Histosol or Histel (A1) <u>X</u>			Alaska Gleyed (A13) <u> </u>			Alaska Color Change (TA4) ⁴ <u> </u>		
Histic Epipedon (A2) <u> </u>			Alaska Redox (A14) <u> </u>			Alaska Alpine Swales (TA5) <u> </u>		
Black Histic (A3) <u> </u>			Alaska Gleyed Pores (A15) <u> </u>			Alaska Redox with 2.5Y Hue <u> </u>		
Hydrogen Sulfide (A4) <u> </u>						Alaska Gleyed without 5Y Hue or Redder Underlying Layer <u> </u>		
Thick Dark Surface (A12) <u> </u>						Other (Explain in Notes) <u> </u>		
³ One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present unless disturbed or problematic. ⁴ Give details of color change in Notes.								
Restrictive Layer (if present): Type: <u> </u> Depth (inches): <u> </u>								
Hydric Soil Present (Y/N): <u>Y</u>								
Notes: <u>Hemic soils down to 18"</u>								

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)			SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) <u>X</u>	Surface Soil Cracks (B6) <u> </u>	Water-stained Leaves (B9) <u> </u>	Stunted or Stressed Plants (D1) <u>X</u>	
High Water Table (A2) <u>X</u>	Inundation Visible on Aerial Imagery (B7) <u> </u>	Drainage Patterns (B10) <u> </u>	Geomorphic Position (D2) <u> </u>	
Saturation (A3) <u>X</u>	Sparsely Vegetated Concave Surface (B8) <u> </u>	Oxidized Rhizospheres along Living Roots (C3) <u> </u>	Shallow Aquitard (D3) <u> </u>	
Water Marks (B1) <u> </u>	Marl Deposits (B15) <u> </u>	Presence of Reduced Iron (C4) <u> </u>	Microtopographic Relief (D4) <u>X</u>	
Sediment Deposits (B2) <u> </u>	Hydrogen Sulfide Odor (C1) <u> </u>	Salt Deposits (C5) <u> </u>	FAC-Neutral Test (D5) <u> </u>	
Drift Deposits (B3) <u> </u>	Dry-Season Water Table (C2) <u> </u>	Notes: <u> </u>		
Algal Mat or Crust (B4) <u> </u>	Other (Explain in Notes): <u> </u>			
Iron Deposits (B5) <u> </u>				
Surface Water Present (Y/N): <u>Y</u>	Depth (in): <u>3</u>	Wetland Hydrology Present (Y/N): <u>Y</u>		
Water Table Present (Y/N): <u>Y</u>	Depth (in): <u>4</u>			
Saturation Present (Y/N): (includes capillary fringe) <u>Y</u>	Depth (in): <u>0</u>			
Notes: <u>Pockets of standing H₂O between Birch + grass + under Buttressed Birch Root Mat.</u>				

WETLAND DETERMINATION DATA FORM

VEGETATION VARIABLES		P= Plot, M= Matrix	
Primary Vegetation Type (P): Vegetation Lacking _____ Forested-Deciduous-Needle-leaved <input checked="" type="checkbox"/> Forested-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Forested-Evergreen-Needle-leaved _____ Scrub Shrub-Deciduous-Needle-leaved _____ Scrub Shrub-Deciduous-Broad-leaved <input checked="" type="checkbox"/> Scrub Shrub-Evergreen-Broad-leaved _____ Scrub Shrub-Evergreen-Needle-leaved _____ Emergent-Non-persistent _____ Emergent-Persistent <input checked="" type="checkbox"/> Aquatic Bed _____			
Percent Cover (P): Tree (>5 dbh, >6m tall) <u>40</u> Sapling (<5 dbh, <6m tall) _____ Tall shrub (2-6m) _____ Short shrub (0.5-2m) _____ Dwarf shrub (<0.5m) <u>10</u> Tall herb (≥1m) _____ Short herb (<1m) <u>98</u> Moss-Lichen <u>30</u> Floating _____ Submerged _____			
Number of Wetland Types (M): <u>1</u>		Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven _____ Moderately even <input checked="" type="checkbox"/>	
Vegetation Density/Dominance (P): Sparse (0-20%) _____ Low Density (20-40%) _____ Medium Density (40-60%) <input checked="" type="checkbox"/> High Density (60-80%) _____ Very High Density (80-100%) _____			
Interspersion of Cover & Open Water (P): 100% Cover or Open Water <input checked="" type="checkbox"/> <25% Scattered/Peripheral Cover _____ 26-75% Scattered or Peripheral Cover _____ >75% Scattered or Peripheral Cover _____ N/A _____			
Plant Species Diversity (P): Low (< 5 plant species) _____ Medium (5-25 species) <input checked="" type="checkbox"/> High (>25) _____			
Presence of Islands (M): Absent (none) <input checked="" type="checkbox"/> One or Few _____ Several to Many _____ N/A _____			
Cover Distribution of Dominant Layer (P): No Veg. _____ Solitary, Scattered Stems _____ 1 or More Large Patches; Parts of Site Open _____ Small Scattered Patches _____ Continuous Cover <input checked="" type="checkbox"/>			
Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) <input checked="" type="checkbox"/> Abundant (>50% of surface) _____			
Vegetative Interspersion (P): Low (large patches, concentric rings) <input checked="" type="checkbox"/> Moderate (broken irregular rings) <input checked="" type="checkbox"/> High (small groupings, diverse and interspersed) _____			
HGM Class (P): Slope _____ Flat <input checked="" type="checkbox"/> Lacustrine Fringe _____ Depressional _____ Riverine _____ Estaurine Fringe _____			

SOIL VARIABLES	
Soil Factors (P): Soil Lacking _____ Histosol:Fibric _____ Histosol:Hemic <input checked="" type="checkbox"/> Histosol:Sapric _____ Mineral: Gravelly _____ Mineral: Sandy _____ Mineral: Silty _____ Mineral: Clayey _____	

HYDROLOGIC VARIABLES	
Inlet/Outlet Class (P): No Inlet/Outlet <input checked="" type="checkbox"/> No Inlet/Intermittent Outlet _____ No Inlet/Perennial Outlet _____ Intermittent Inlet/No Outlet _____ Intermittent Inlet/Intermittent Outlet _____ Intermittent Inlet/Perennial Outlet _____ Perennial Inlet/No Outlet _____ Perennial Inlet/Intermittent Outlet _____ Perennial Inlet/Perennial Outlet _____	
Wetland Water Regime (P): Drier: Seasonally Flooded, Temporarily Flooded, Saturated <input checked="" type="checkbox"/> Wet: Perm. Flooded, Intermittently Exposed, Semiperm. Flooded _____	
Evidence of Sedimentation (P): No Evidence Observed <input checked="" type="checkbox"/> Sediment Observed on Wetland Substrate _____ Fluvuquent Soils Sediment Created _____	
Microrelief of Wetland Surface (P): Absent _____ Poorly Developed (6in.) _____ Well Developed (6-18in.) <input checked="" type="checkbox"/> Pronounced (>18in.) _____	
Frequency of Overbank Flooding (P): No Overbank Flooding <input checked="" type="checkbox"/> Return Interval 1-2 yrs _____ Return Interval 2-5 yrs _____ Return Interval >5 yrs _____	
Degree of Outlet Restriction (P): No Outflow <input checked="" type="checkbox"/> Restricted Outflow _____ Unrestricted Outflow _____	
Water pH (P): No surface water _____ Circumneutral (5.5-7.4) _____ Alkaline (>7.4) _____ Acid (<5.5) <input checked="" type="checkbox"/> pH Reading <u>4.6</u>	
Surficial Glacial Deposit Under Wetland (P): High Permeability Stratified Deposits _____ Low Permeability Stratified Deposits <input checked="" type="checkbox"/> Glacial Till/Not Permeable _____	
Basin Topographic Gradient (M): Low Gradient (<2%) <input checked="" type="checkbox"/> High Gradient (≥2%) _____	
Evidence of Seeps and Springs (P): No Seeps or Springs <input checked="" type="checkbox"/> Seeps Observed _____ Intermittent Spring _____ Perennial Spring _____	

LANDSCAPE VARIABLES (M)	
Wetland Juxtaposition: Wetland Isolated _____ Wetlands within 400m, Not Connected _____ Only Connected Below _____ Only Connected Above _____ Connected Upstream & Downstream <input checked="" type="checkbox"/> Unknown _____	
Wetland Land Use: High Intensity (i.e., ag.) _____ Moderate Intensity (i.e., forestry) _____ Low Intensity (i.e. open space) <input checked="" type="checkbox"/>	
Watershed Land Use: 0-5% Rural <input checked="" type="checkbox"/> 5-25% Urbanized _____ 25-50% Urbanized _____ >50% Urbanized _____	
Size: Small (<10 acres) _____ Medium (10-100 acres) <input checked="" type="checkbox"/> Large (>100 acres) _____	

Crew Chief QA/QC check: 

GPS Technician QA/QC check: 