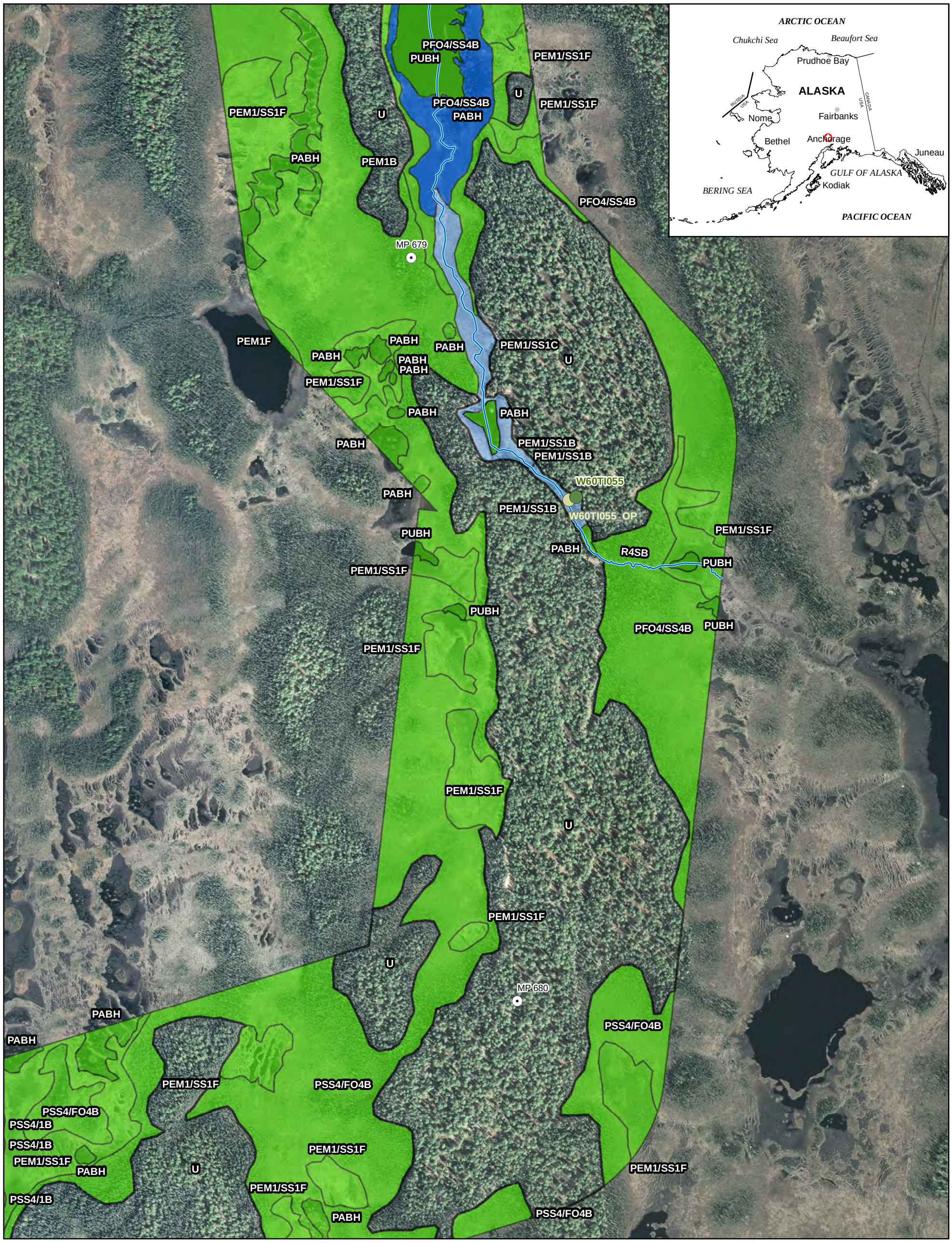
Part 6 of 19 of Appendix G of Resource Report No. 2



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0, 250, 500, 750, 1,000
Meters: 0, 100, 200, 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

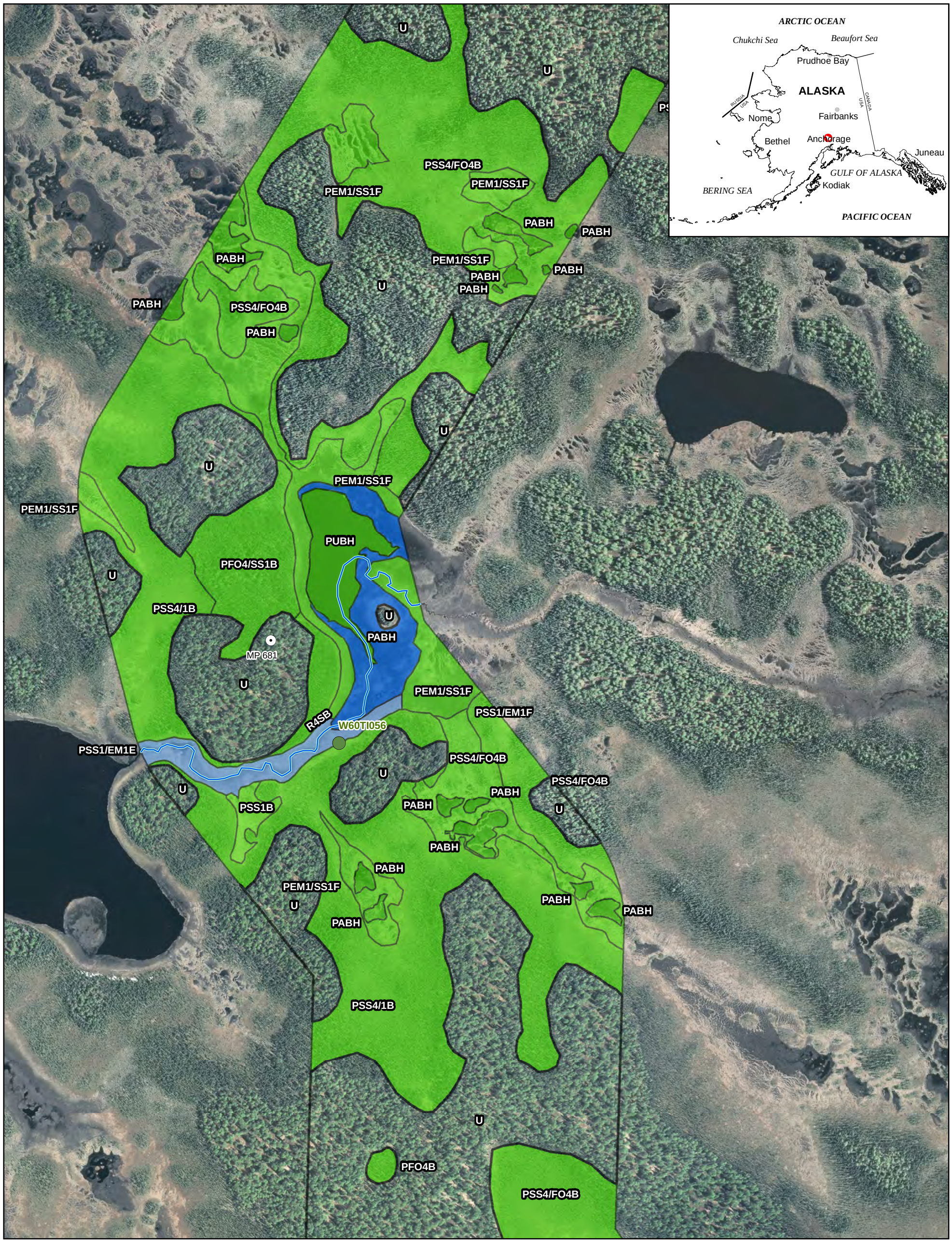
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	181 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope

- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation

- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	182 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

W60TI037

W60TI036

W60TI035

MP 678

W60TI033

W60TI032

W60TI031

W60TI034

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	183 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

PSS4/1B
PFO4B
U
MP 682
PUBH
PABH
PUBH
PSS1F
PUBH
PABH
PABH
PEM1/SS1F
PSS4/FO4B
PEM1/SS1F
U
PEM1/SS1F
PEM1/SS1F
PABH
PABH
PABH
PABH
PABH
PEM1/SS1F
PABH
PABH
PABH
PABH
PABH
PABH
U
PABH
PABH
PABH
PUBH
PABH
PABH
PABH
PUBH
PABH
U
PABH
PEM1/SS1F
PEM1/SS1F
PUBH
U
PEM1/SS1F
PSS4/FO4B
PABH
PUBH
PABH
PABH
PUBH
PABH
PABH
PUBH
PEM1/SS1F
PABH
PABH
PEM1/SS1F
MP 683
PABH
PABH
U
PABH
U
PABH
PEM1/SS1F
PSS4/FO4B
PEM1/SS1F
PABH
PABH
U

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

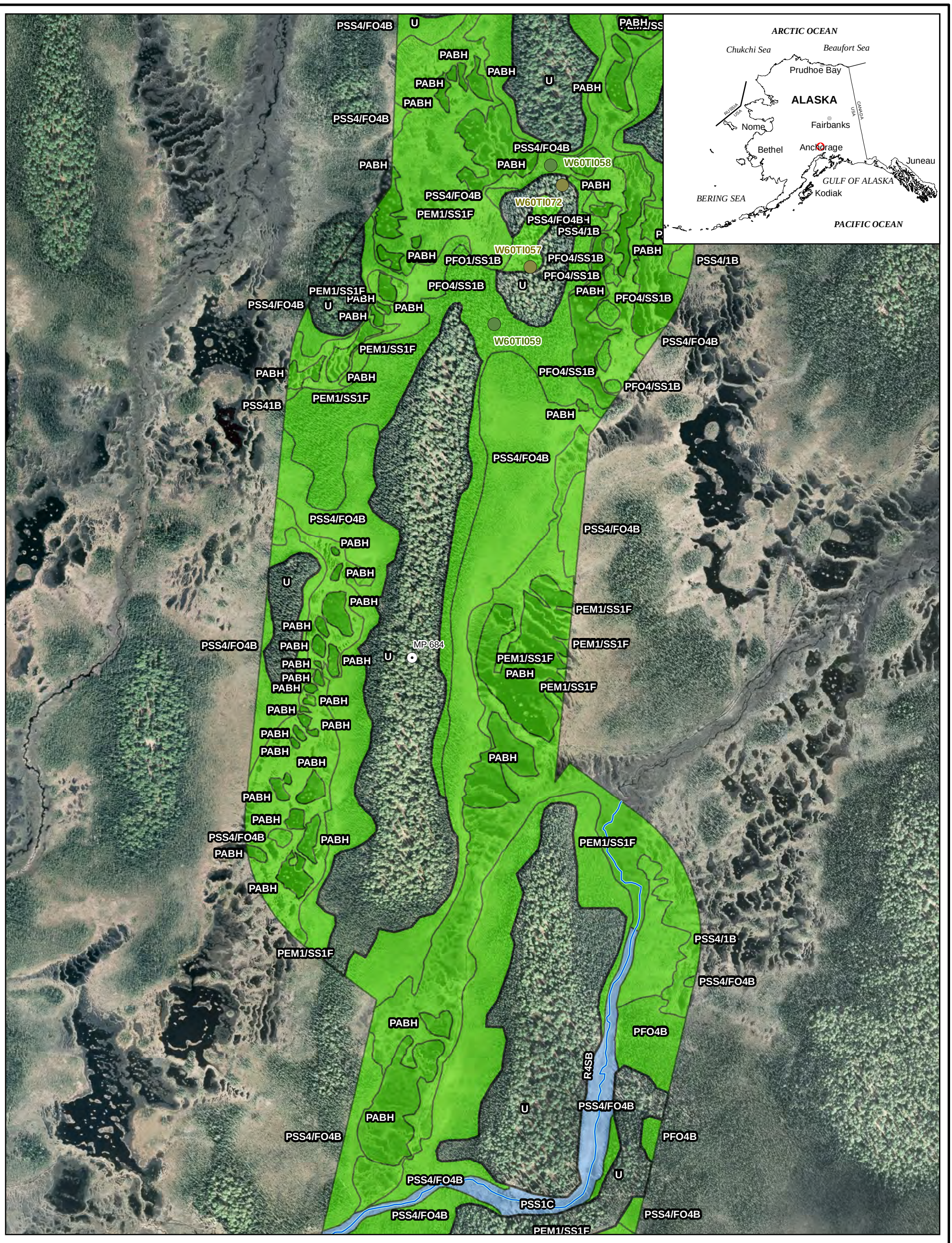
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	184 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0 250 500 750 1,000
Meters: 0 100 200 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

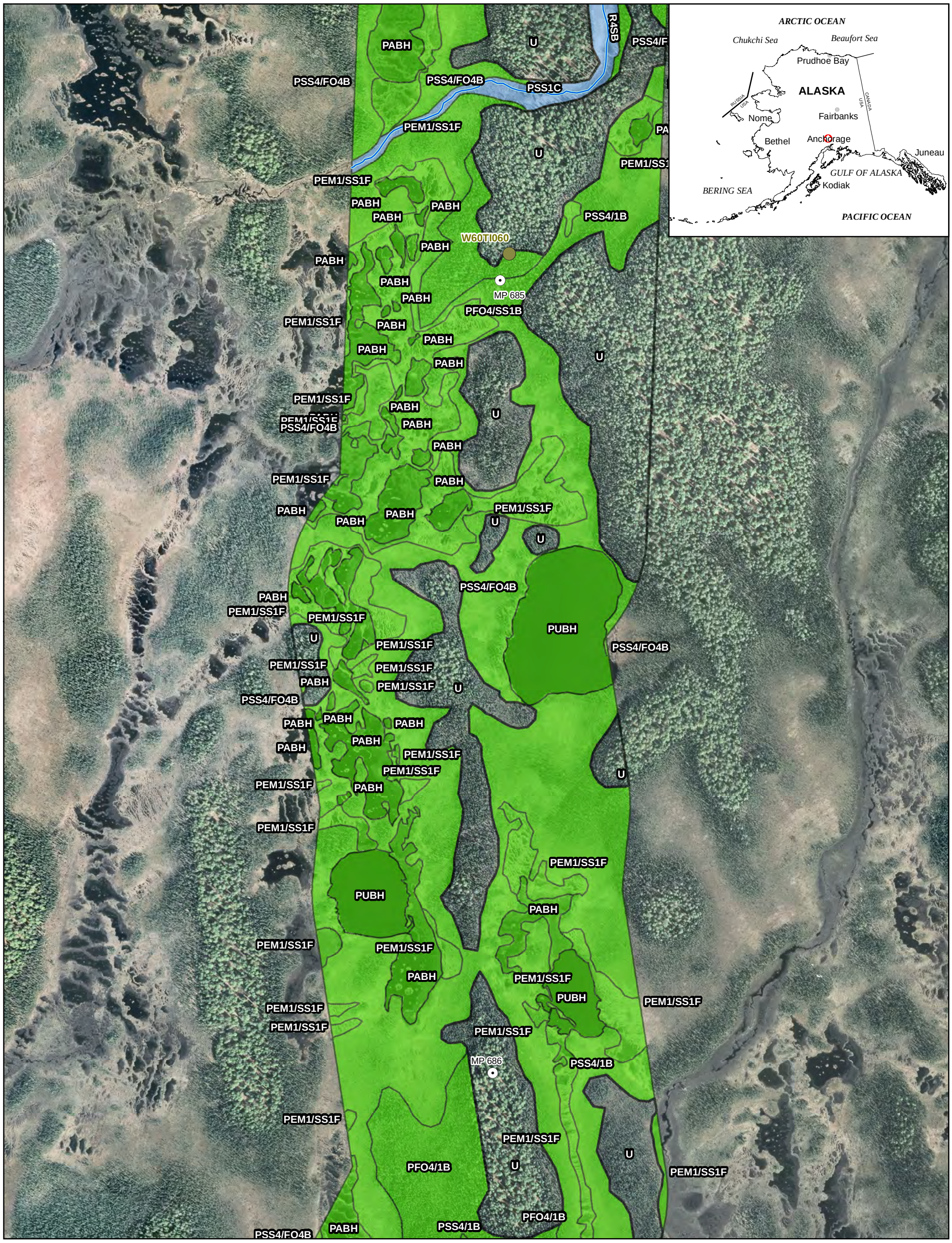
DRAWN	CHECK	DESIGN	APPR.
TCS		TCS	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	185 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0 250 500 750 1,000
Meters: 0 100 200 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	186 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

W60TI030
W60TI027
W60TI028
W60TI029
W60TI028_OP

MP 683

W60TI023_OP
W60TI023
W60TI026
W60TI024
W60TI025_OP
W60TI025

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

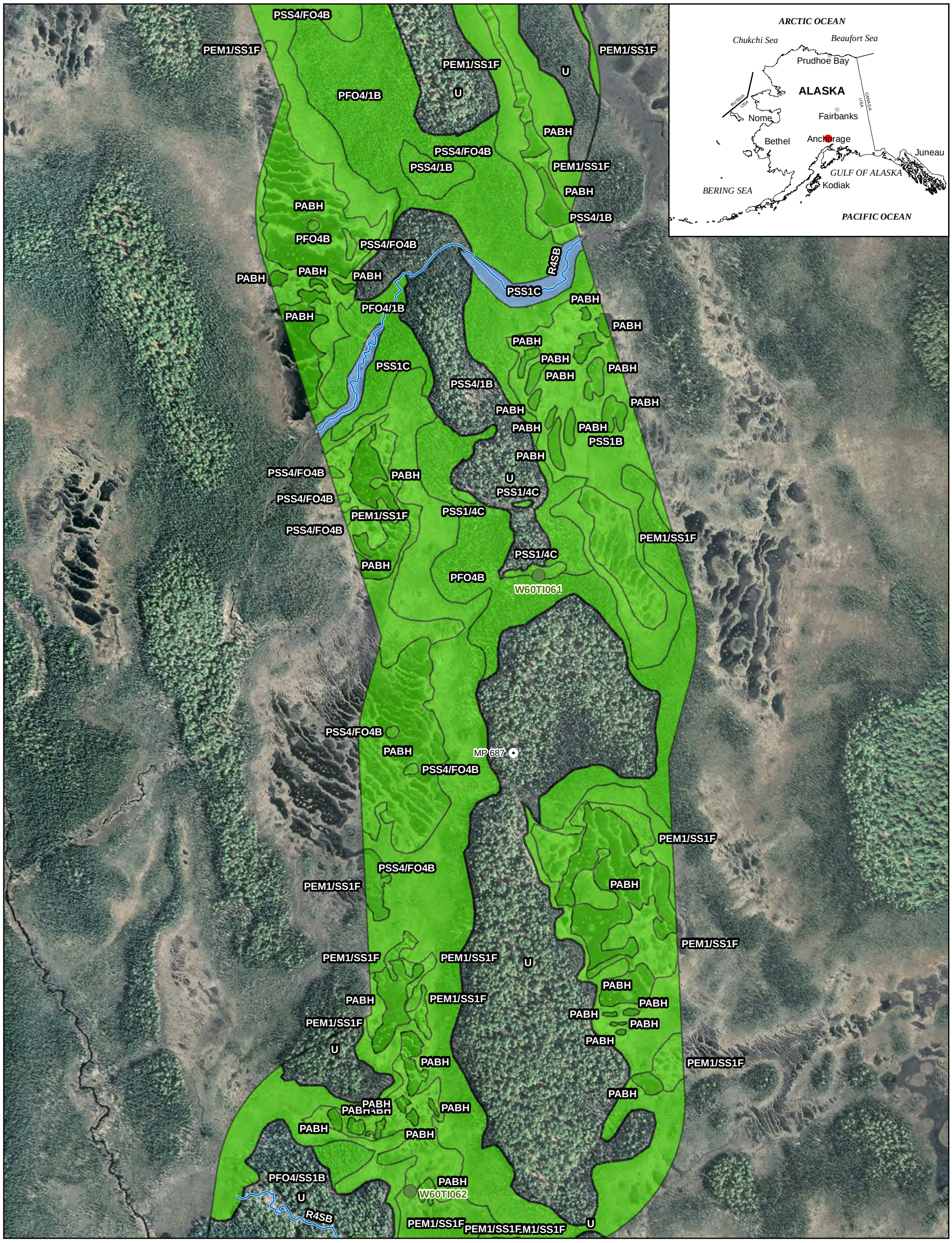
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	187 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

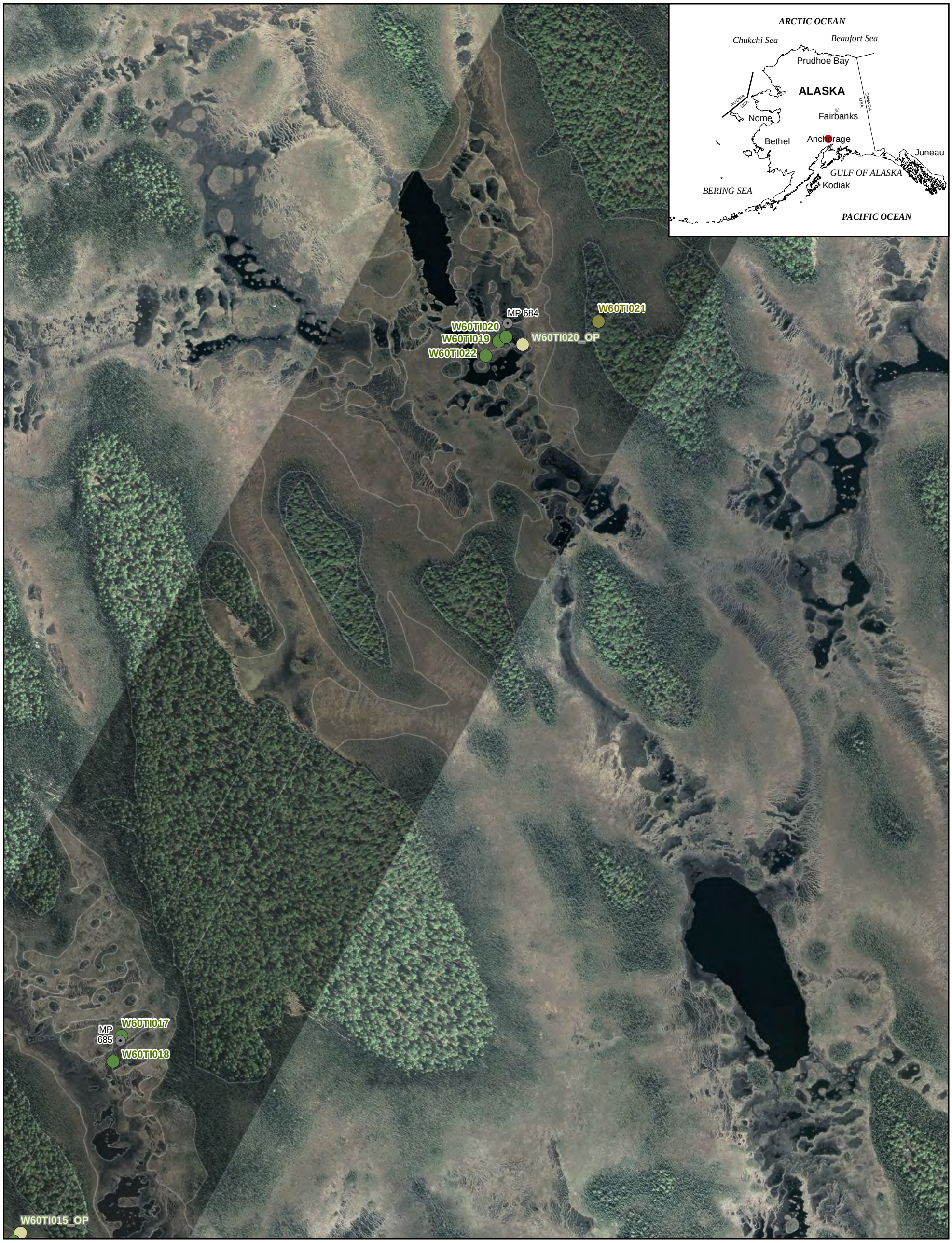
DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	188 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

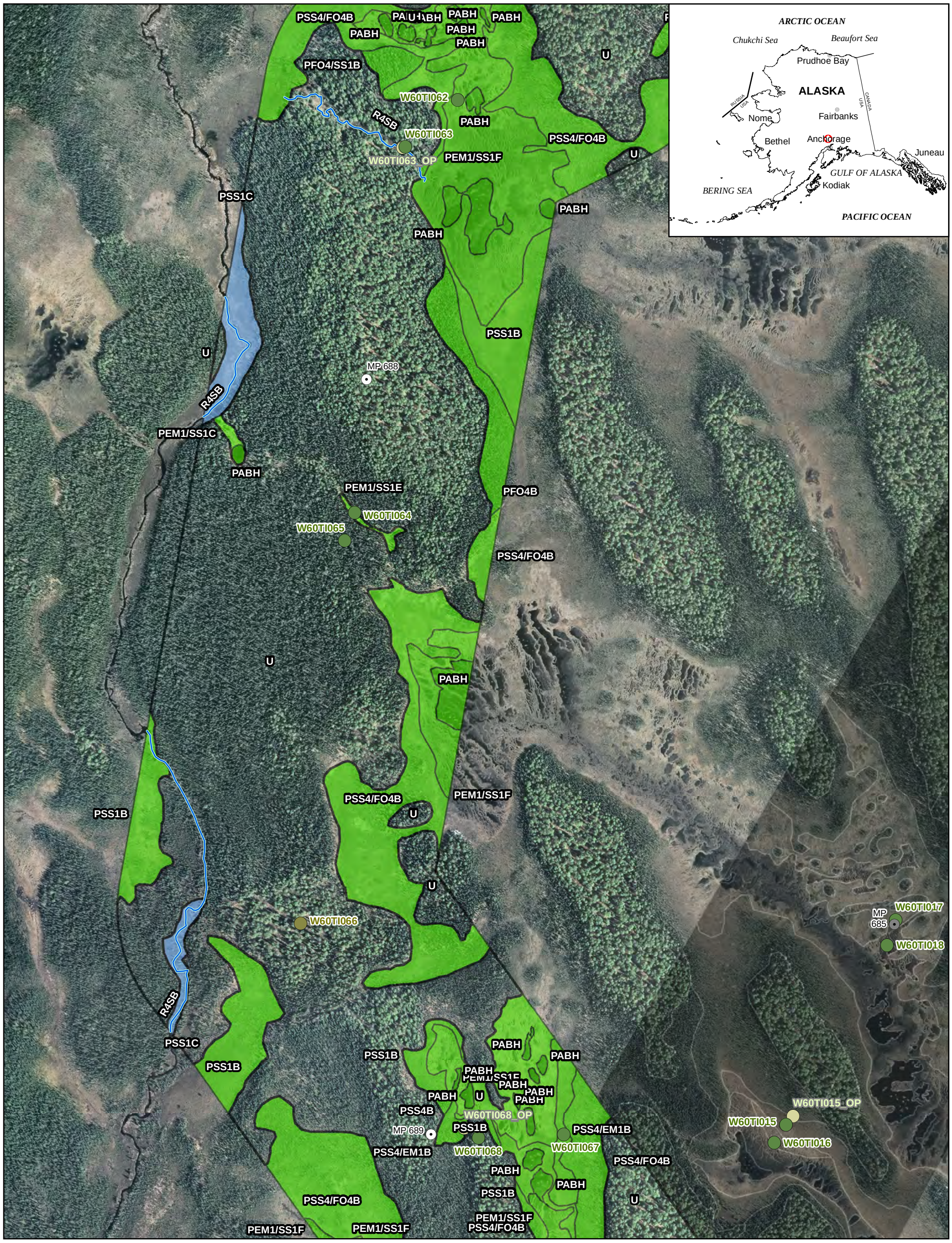
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	189 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope

- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation

- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

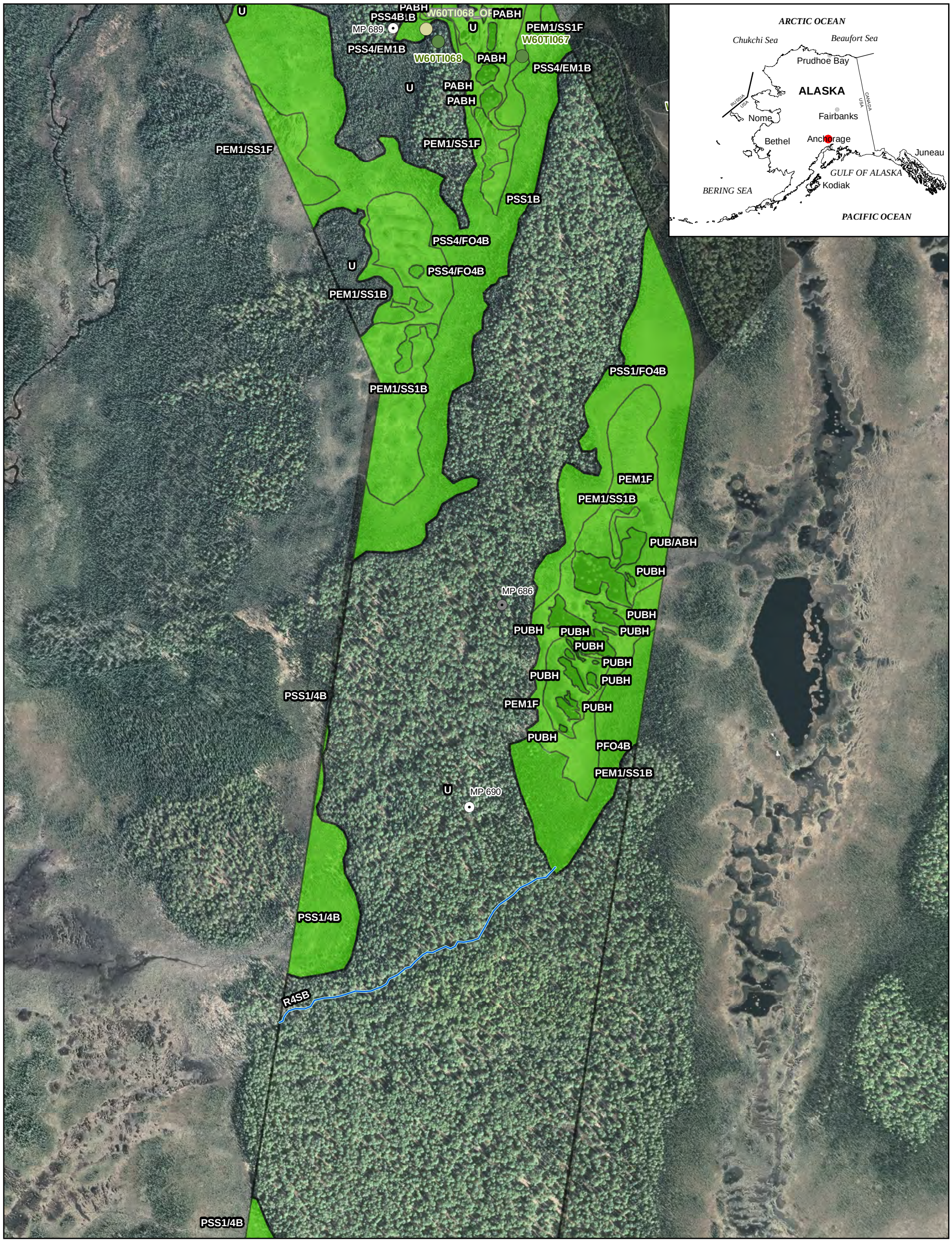
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	190 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class

- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data

- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0, 250, 500, 750, 1,000

Meters: 0, 100, 200, 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

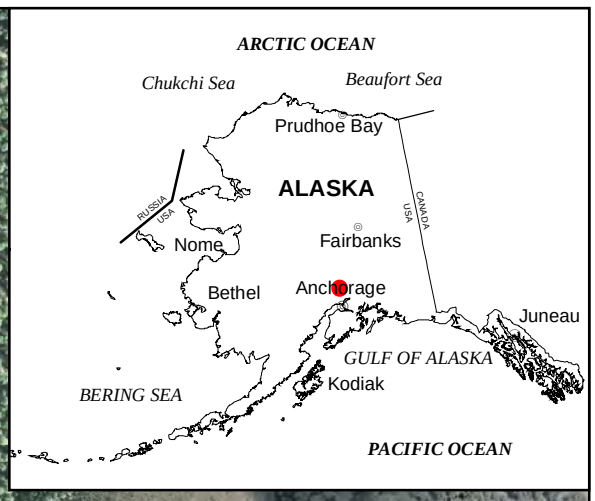
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	191 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



PSS1/4B
PSS1/FO4B
MP 687
PSS4/1B
PFO4B
PFO4B
PUBH
PEM1/SS1F
PSS1/FO4B
PUB/ABH
PUB/ABH
PUB/ABH
PSS1/FO4B
MP 691
PSS4B
PUB/ABH
PFO4B
PFO4B
PSS1/4B
PEM1/SS1B
PUBH
PSS1/4B
PSS1/4B
PUBH
PUB/ABH
U
PEM1B
PABH
PFO4B
PSS1/FO4B
R4SB
PSS1/FO4B
PSS1/4B
PFO4B
PFO4B
U
MP 688
PSS1/4B
U

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

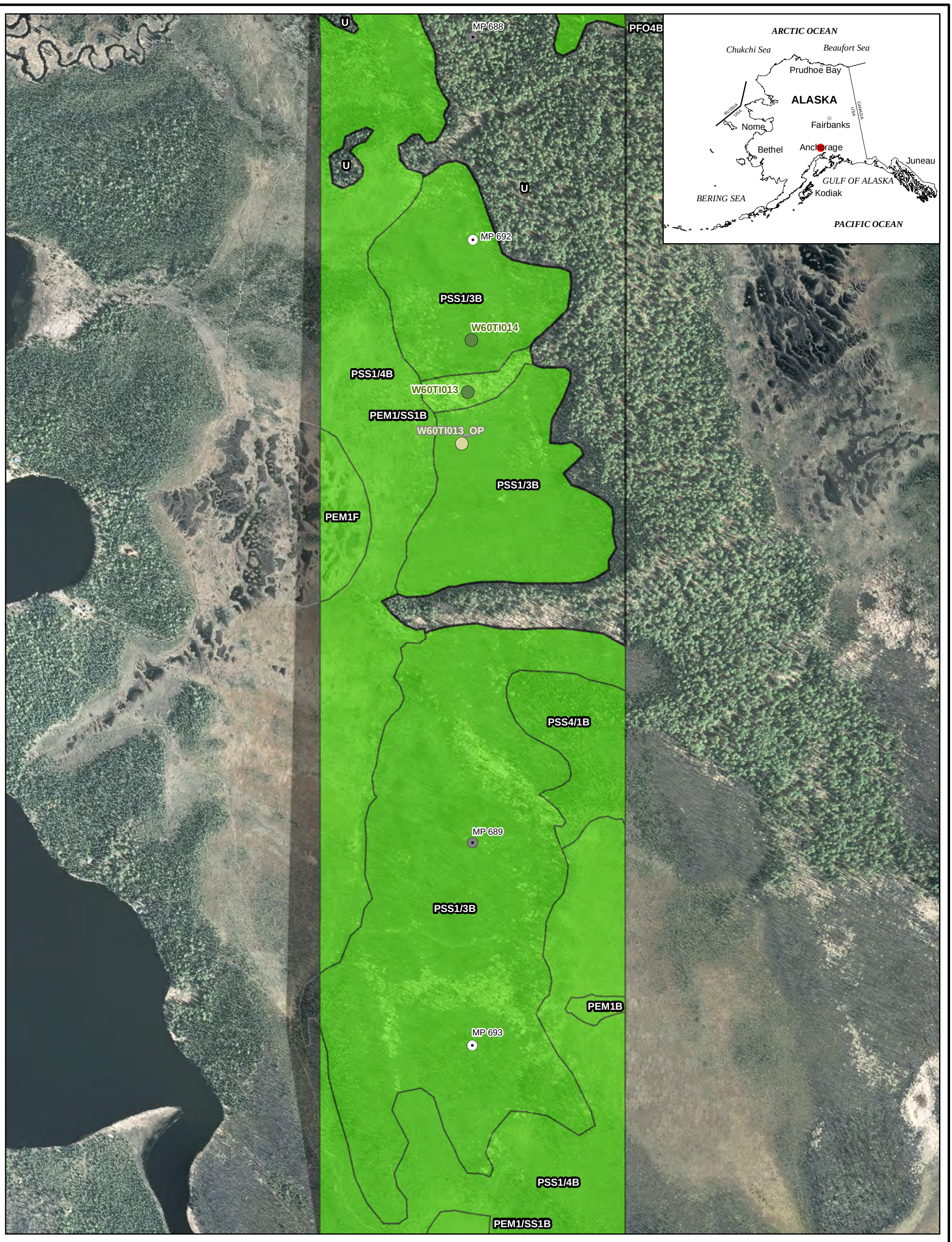
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	192 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0, 250, 500, 750, 1,000
Meters: 0, 100, 200, 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

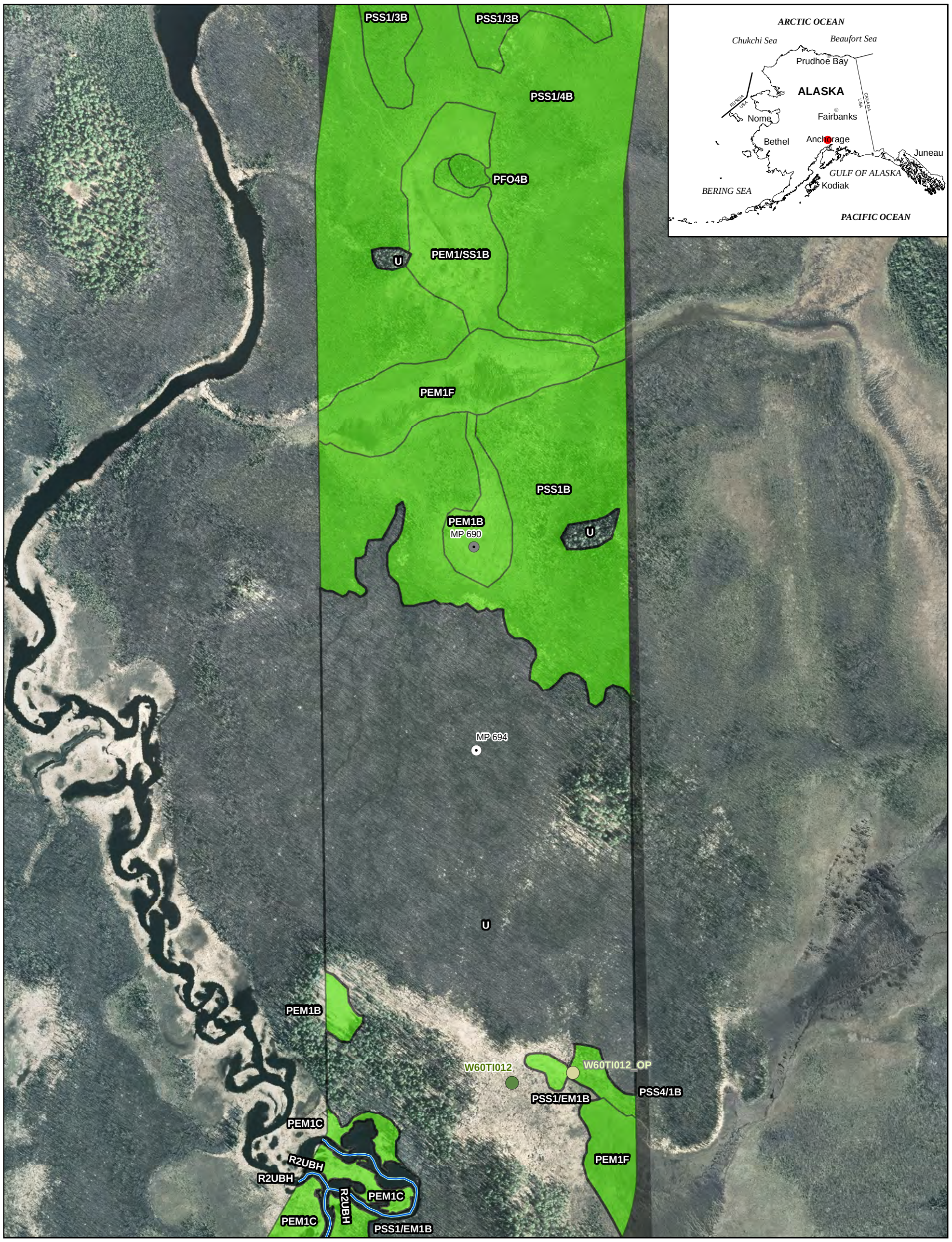
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	193 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope

- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation

- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet: 0, 250, 500, 750, 1,000
Meters: 0, 100, 200, 300

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

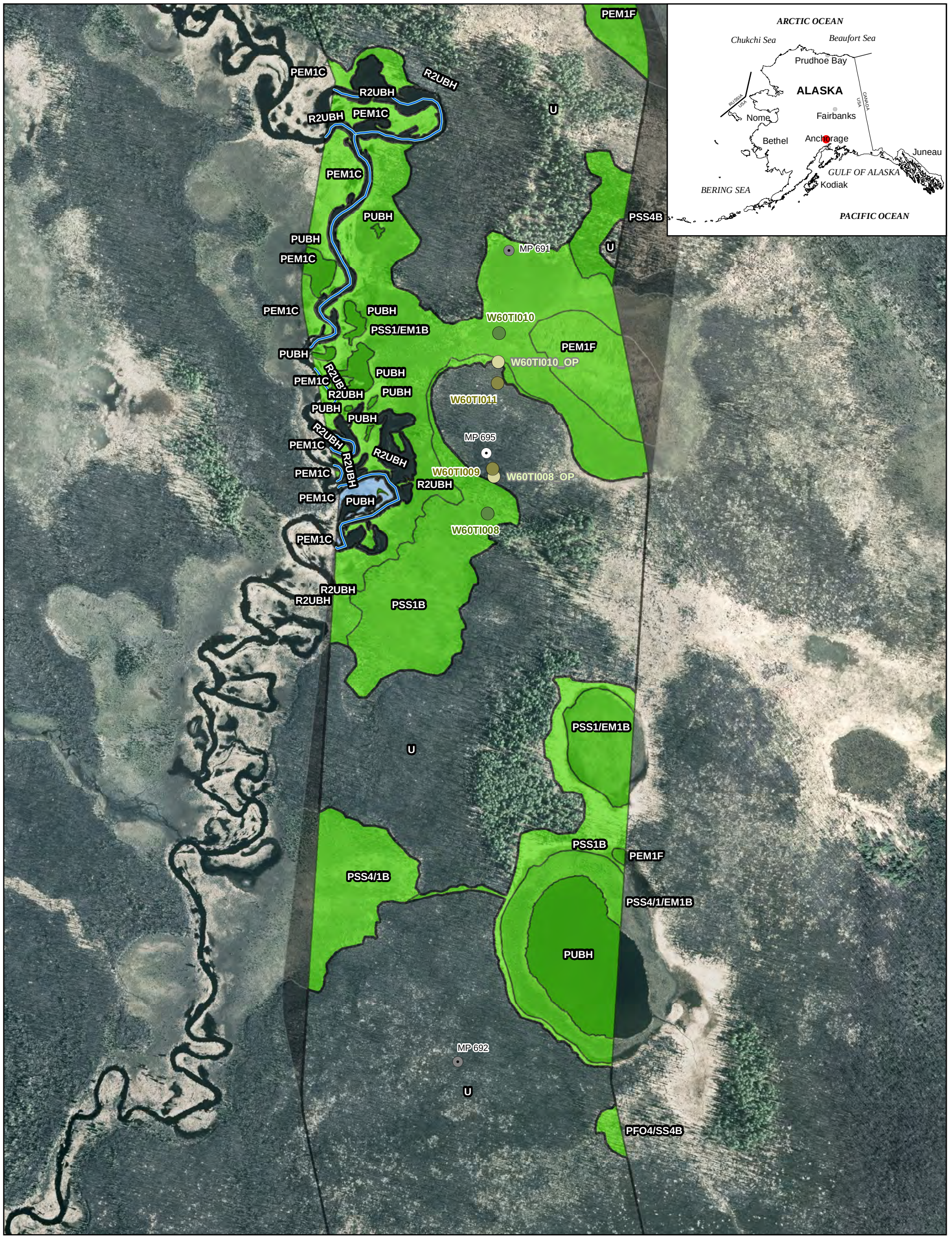
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	194 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	195 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

PFO4/S

MP 696

PEM1/SS1B

W60TI006

U

W60TI007

MP 693

MP 697

LEGEND

HGM Class

- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data

- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

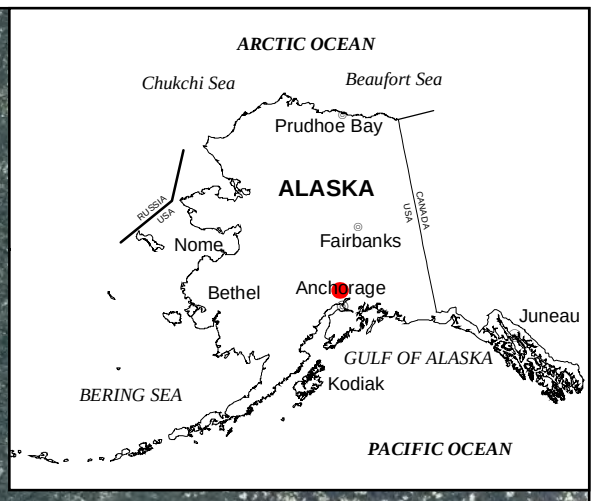
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	196 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



MP 694

PFO4/SS4B

PFO4/SS4B

U

MP 698

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

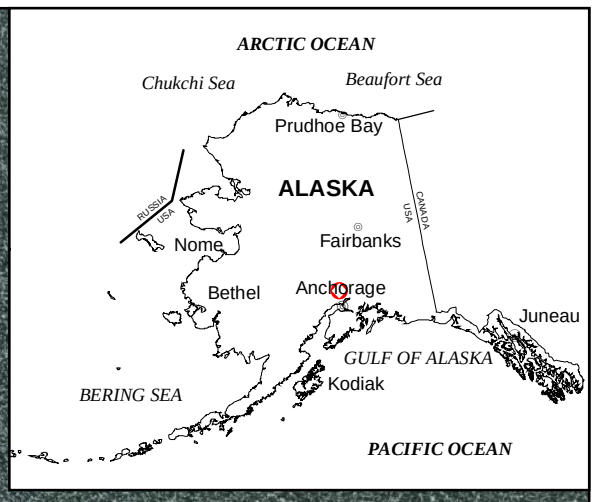
DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	197 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



MP 695

MP 699

MP 696

MP 700

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

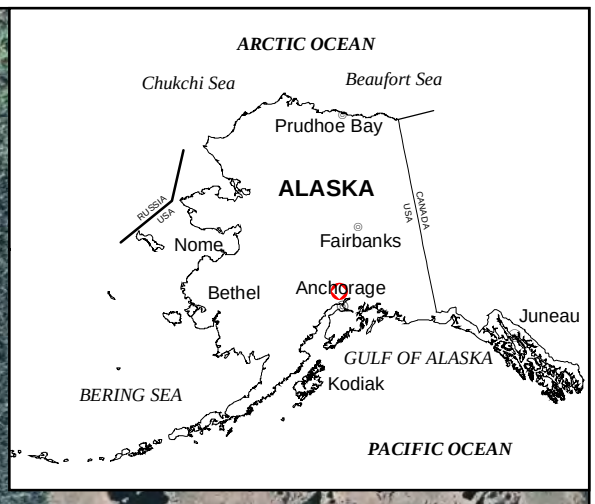
DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	198 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



MP 700

MP 697

MP 701

LEGEND

HGM Class

- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data

- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

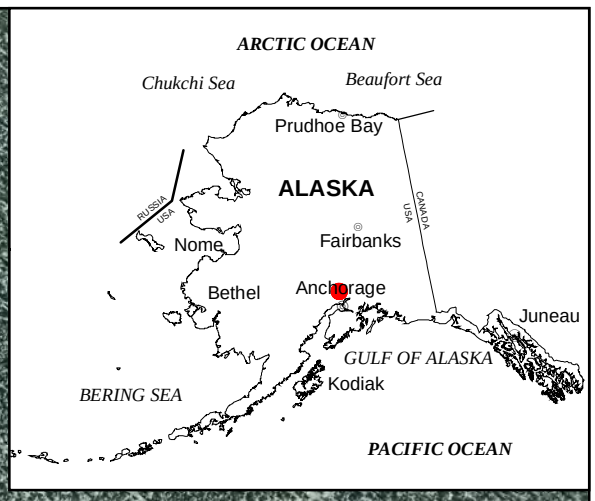
DRAWN	CHECK	DESIGN	APPR.
TCS		TCS	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	199 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



MP 698

PSS1/EM1B

PFO4B

PSS1/EM1B

PSS1/EM1B

MP 702

U

MP 699

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	200 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

MP 699

MP 703

PEM1B

U

PEM1B

PEM1B

PEM1/SS1B

W60TI005

W60TI004

PEM1B

PEM1B

MP 700

W60TI003

PEM1B

PSS1B

PSS1B

PSS4/1B

PEM1B

MP 704

PFO4B

PEM1B

U

PSS1/EM1B

U

PSS1/EM1B

LEGEND

HGM Class
- Flat
- Depressional
- Slope

- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation

- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

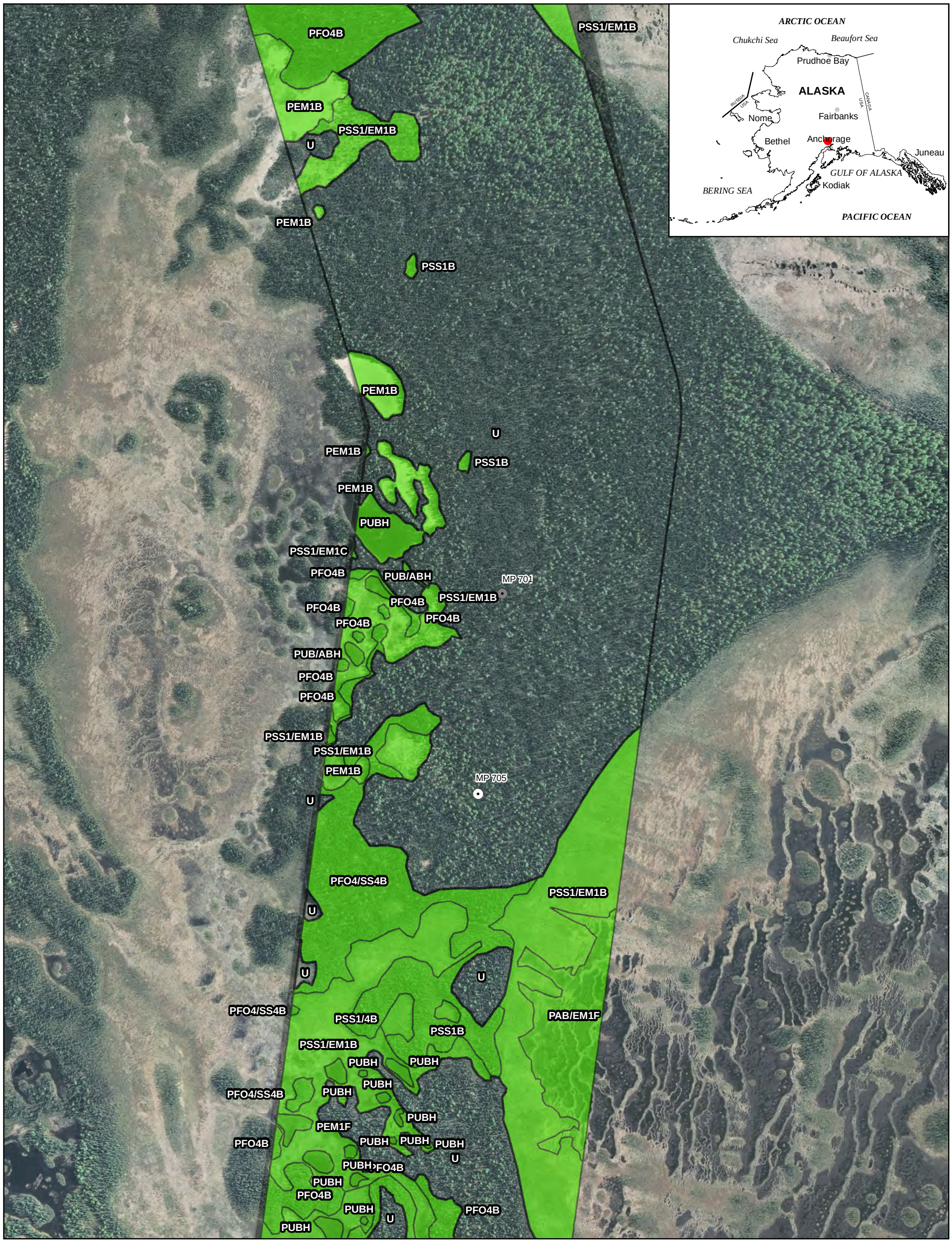
DRAWN TCS
CHECK
DESIGN TCS
APPR.

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	201 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class

- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data

- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

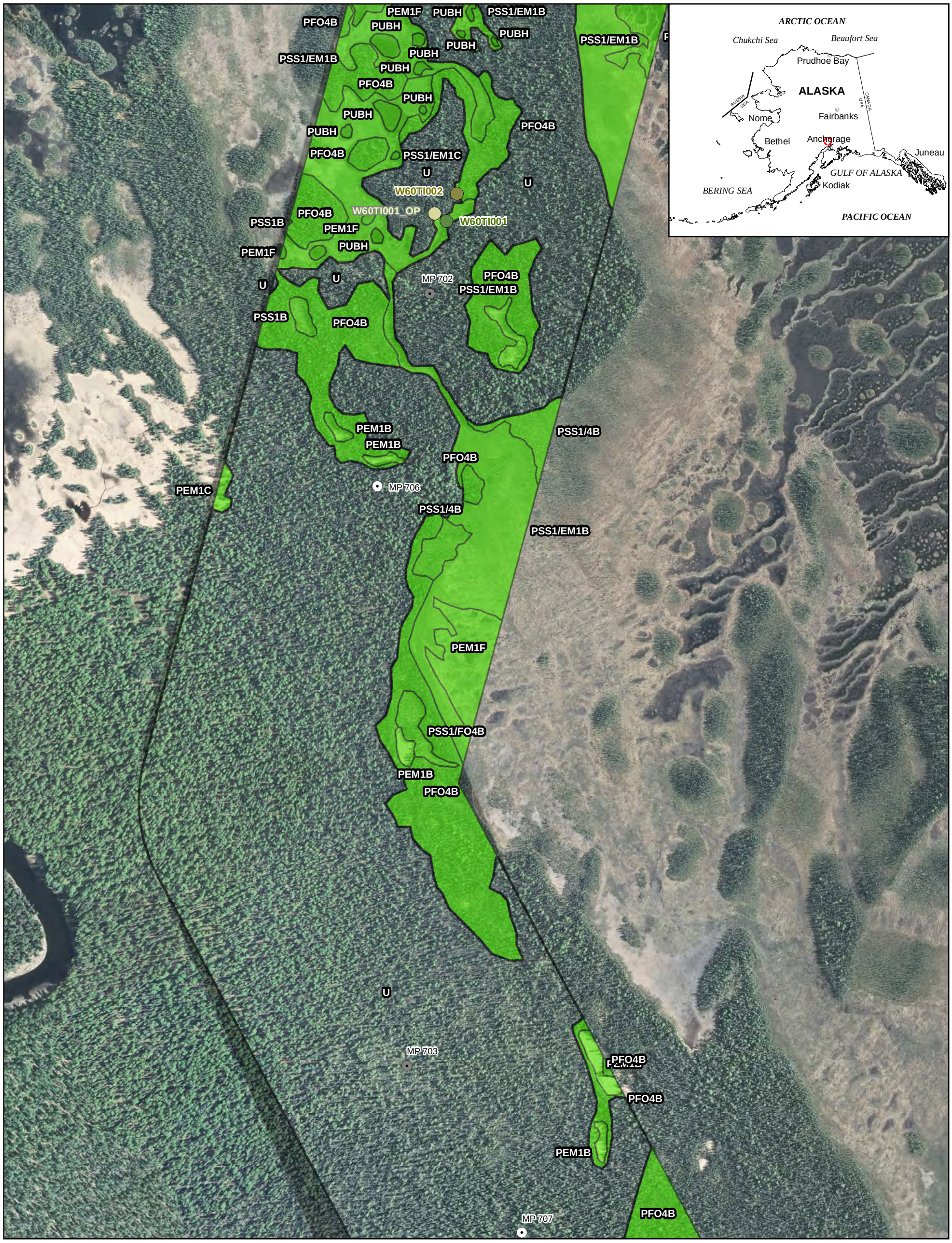
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	202 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

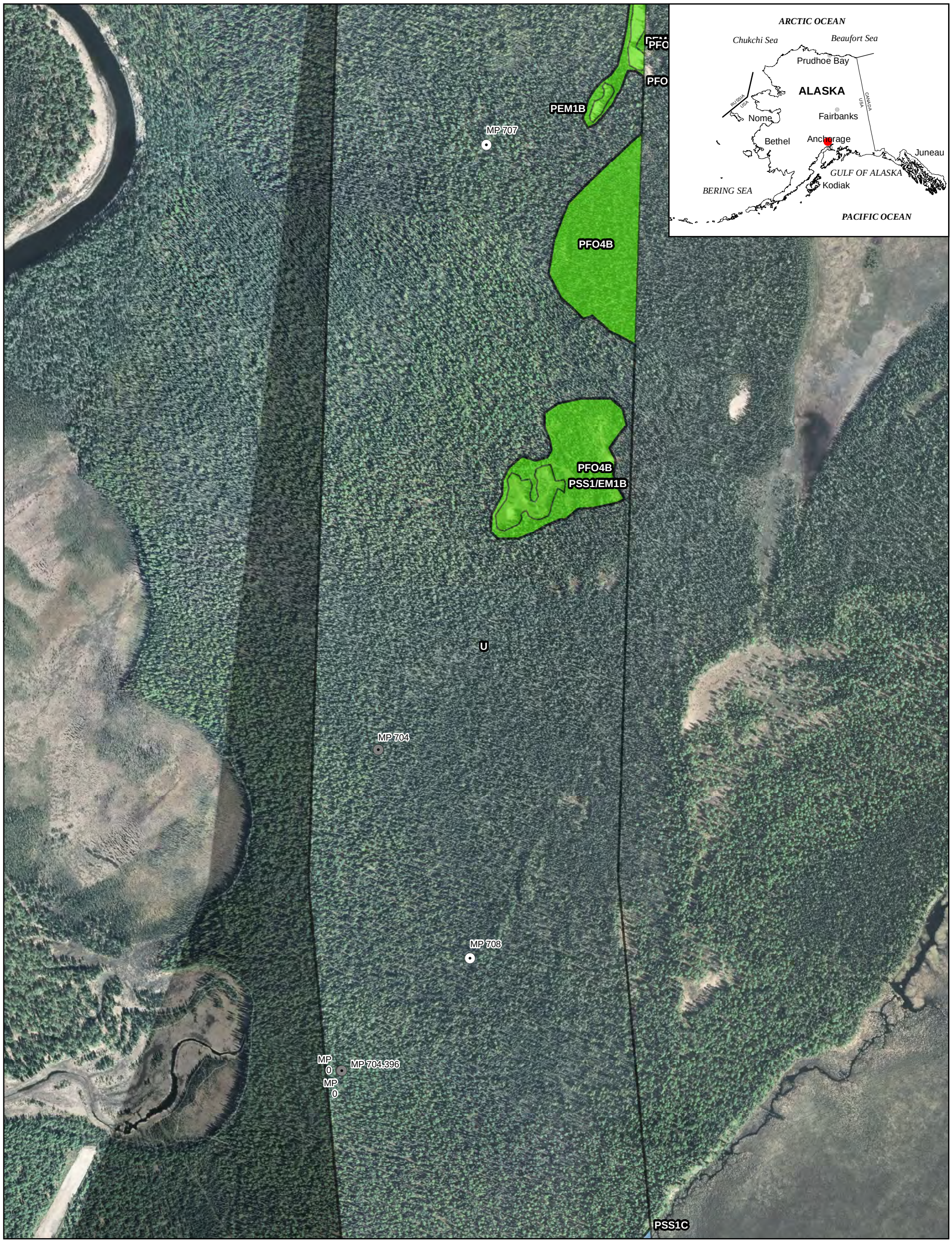
DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	203 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



LEGEND

HGM Class
- Flat
- Depressional
- Slope

- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation

- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

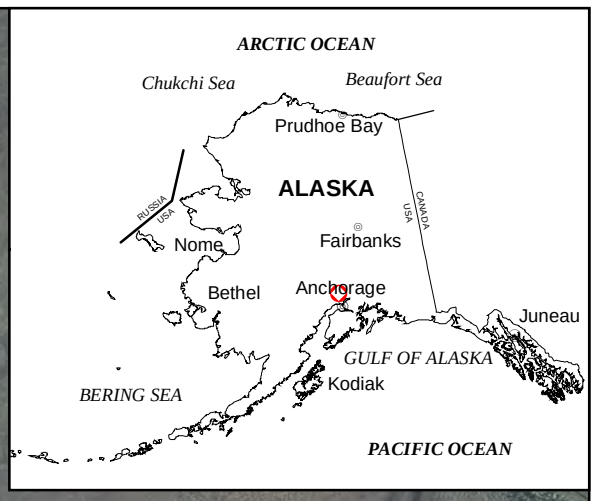
N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN: TCS	ALASKA LNG 2014 WETLAND MAPPING				
CHECK:	PROJECTION: AK 4	DATUM: NAD83	CONTRACTOR NAME: URS ALASKA	MAP NUMBER: 204 of 205	REV.: A
DESIGN: TCS	SCALE: 1:7,200	DATE: 14 Nov 2014	PROJECT NUMBER: 26221301	ORIG.PAGE SIZE: 11 X 17	
APPR.					

I:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd



U
PSS3/1B
PFO4/SS1B
W60TI069
R3UBH
U
PSS4/1B
PSS3/1B
U
PSS1/4B
PSS4/1B
PSS1C
MP 709
R3UBH
PSS4/1B
W60TI070
R3UBH
W60TI071
PSS1/USC
U
R3UBH
PSS3/1B
PSS1/USC
U
PEM1C
PSS1/USC
MP 709.5
MP 710

LEGEND

HGM Class
- Flat
- Depressional
- Slope
- Lacustrine Fringe
- Riverine
- N/A
- Mapped Streams

2014 Field Data
- Wetland
- Vegetation
- Observation
- Additional Wetlands Mapping
- Aerial Imagery Required
- Pre-Feed Rev A Mile Post (Current)
- Base Route (3/14/2014)

Feet
0 250 500 750 1,000
0 100 200 300
Meters

N

ALASKA LNG

NOTES:
Concept Information - Confidential. Produced by Alaska LNG team. The information used to create this product is based on the collected data on the date of issue; it is considered reliable only at the scale at which the data was created and the scale at which the map was published. This drawing is solely prepared for use by the contractual Alaska LNG team partners and the Alaska LNG team assumes no liability to any other party for any representations contained in these drawings. This map must be printed/viewed at full scale (100%) in order for the scale to remain correct.

DRAWN	TCS
CHECK	
DESIGN	TCS
APPR.	

ALASKA LNG
2014 WETLAND MAPPING

PROJECTION	DATUM	CONTRACTOR NAME	MAP NUMBER	REV.
AK 4	NAD83	URS ALASKA	205 of 205	A

SCALE	DATE	PROJECT NUMBER	ORIG.PAGE SIZE
1:7,200	14 Nov 2014	26221301	11 X 17

i:\26221163 SCLNG Studies\10 - Geospatial\10.06 - MXD\2014 Reporting\Wetlands\2014_Wetlands_Mapbook.mxd

APPENDIX C – 2015 WETLAND FIELD DATA SUMMARY TABLE AND US ARMY CORPS OF ENGINEERS ALASKA DISTRICT WETLAND DETERMINATION FORMS

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84AY001	WDF	7/1/2015	15225	67.2238	-150.2278	PSS1/4B	FLAT	II C 2, II A 3
W84AY001_OP	OP	7/1/2015	15225	67.2239	-150.2269	PSS4/1B	N/A	II A 2, II C 2
W84AY002	WDF	7/1/2015	15224	67.2231	-150.2286	PEM1/SS1B	FLAT	III A 2, II D 2
W84AY003	WDF	7/1/2015	15222	66.8630	-150.5490	PSS4/EM1B	FLAT	II A 2, III A 2
W84AY004	WDF	7/1/2015	15223	66.8644	-150.5461	PSS4/EM1B	FLAT	II A 2, III A 2
W84AY005	WDF	7/2/2015	15226	67.2328	-150.2005	U	N/A	II C 2, I A 3
W84AY005_OP	OP	7/2/2015	15226	67.2282	-150.2166	U	N/A	II C 2
W84AY006	WDF	7/2/2015	15301	67.1324	-150.3469	PSS1/EM1B	FLAT	II C 2, III A 2
W84AY007	WDF	7/2/2015	15300	66.8365	-150.5984	U	N/A	I A 2, II B 2
W84AY008	WDF	7/3/2015	15262	66.8195	-150.6714	U	N/A	II C 2, III A 2
W84AY009	WDF	7/3/2015	15234	67.5024	-149.8554	PEM1/SS4B	FLAT	II A 3, III A 2, II D 2
W84AY009_OP	OP	7/3/2015	15234	67.5028	-149.8555	U	N/A	I A 3, II C 2
W84AY010	WDF	7/3/2015	15233	67.4831	-149.8649	U	N/A	I A 3, II A 3
W84AY010_OP	OP	7/3/2015	15233	67.4831	-149.8666	PSS1/4B	N/A	II A 3, III A 2
W84AY011	WDF	7/4/2015	15302	67.6773	-149.7302	PSS1/EM1B	SLOPE	II C 2, III A 2
W84AY012	WDF	7/4/2015	15263	67.8882	-149.8239	U	N/A	I A 2, II C 2
W84AY012_OP	OP	7/4/2015	15263	67.8900	-149.8209	U	N/A	II B 2
W84AY013	WDF	7/4/2015	15316	67.5618	-149.8223	U	N/A	II A 3, II C 2
W84AY014	WDF	7/5/2015	15231	67.4659	-149.9518	PSS1/EM1B	FLAT	II C 2, III A 2
W84AY015	WDF	7/5/2015	15232	67.4795	-149.8821	U	N/A	I A 3, II C 2
W84AY016	WDF	7/5/2015	15227	67.2497	-150.1607	PFO4/SS1B	FLAT	I A 2, II C 2
W84AY017	WDF	7/6/2015	15317	68.0751	-149.5684	PSS1B	FLAT	II C 2
W84AY017_OP	OP	7/6/2015	15317	68.0757	-149.5696	U	N/A	II C 2, II B 2
W84AY017_OP2	OP	7/6/2015	15317	68.0748	-149.5673	R4SBA	N/A	NONE
W84AY018	WDF	7/6/2015	15264	68.0799	-149.5753	PSS1/ML1B	FLAT	III C 2
W84AY018_OP	OP	7/6/2015	15264	68.0796	-149.5751	R3UBH	N/A	NONE
W84AY019	WDF	7/12/2015	15228	67.4428	-150.0629	U	N/A	II A 3, II C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84AY020	WDF	7/12/2015	15230	67.4534	-150.0460	U	N/A	I A 3, II D 1
W84AY020_OP	OP	7/12/2015	15230	67.4532	-150.0449	U	N/A	II A 3, II D 3
W84AY021	WDF	7/12/2015	15229	67.4536	-150.0416	U	N/A	II A 3, II C 2
W84AY022	WDF	7/12/2015	15218	66.8118	-150.6317	PSS1/EM1C	FLAT	II C 2, III A 3
W84AY023	WDF	7/13/2015	15219	66.8180	-150.6209	PSS1/EM1E	SLOPE	II C 2, III A 2
W84AY024	WDF	7/13/2015	15220	66.8215	-150.6146	PSS1/EM1B	FLAT	II C 2, III A 2
W84AY025	WDF	7/13/2015	15221	66.8214	-150.6200	PSS1/EM1B	FLAT	II C 2, III A 2
W84AY026	WDF	7/14/2015	15261	66.5821	-150.7569	U	N/A	II C 2, III A 2
W84AY027	WDF	7/14/2015	15260	66.1408	-150.1762	U	N/A	II C 2
W84AY028	WDF	7/14/2015	15315	66.0819	-150.1721	PSS3/4B	FLAT	II D 2, II A 3
W84AY029	WDF	7/15/2015	15215	66.0760	-150.1770	PSS1/EM1B	FLAT	II C 2, III A 2
W84AY030	WDF	7/15/2015	15216	66.0756	-150.1759	U	N/A	II C 2
W84AY031	WDF	7/15/2015	15217	66.0830	-150.1804	PEM1/SS1B	FLAT	III A 2, II D 2
W84HT001	WDF	8/3/2015	15096	63.6813	-148.7706	PSS1/4B	FLAT	II C 2, II A 3
W84HT001_OP	OP	8/3/2015	15096	63.6808	-148.7685	U	N/A	I A 2, II C 2
W84HT001_OP2	OP	8/3/2015	15096	63.6818	-148.7716	R3USC/PSS1A	N/A	II B 2, II C 2
W84HT002	WDF	8/3/2015	15098	63.6702	-148.7626	U	N/A	I A 3, II C 2
W84HT002_OP	OP	8/3/2015	15098	63.6700	-148.7589	PEM1F	N/A	III A 3
W84HT002_OP2	OP	8/3/2015	15098	63.6690	-148.7600	PSS1/FO4B	N/A	I A 3, II C 2
W84HT003	WDF	8/3/2015	15083	63.2128	-149.3269	U	N/A	I C 2
W84HT003_OP	OP	8/3/2015	15083	63.2127	-149.3274	PUB/USF	N/A	NONE
W84HT004	WDF	8/3/2015	15082	63.2146	-149.3287	PSS1/EM1Cb	RIVERINE	II B 2, III A 2
W84HT005	WDF	8/4/2015	15110	63.8306	-149.0410	PSS1/EM1C	SLOPE	II B 2, II C 2
W84HT006	WDF	8/4/2015	15111	63.8305	-149.0402	PSS1/EM1B	FLAT	II C 2, III A 2
W84HT007	WDF	8/5/2015	15081	63.1783	-149.3613	PSS1/FO4B	SLOPE	II B 2, I A 3
W84HT007_OP	OP	8/5/2015	15081	63.1782	-149.3636	PEM1/SS1B	N/A	III A 3, II D 2
W84HT007_OP2	OP	8/5/2015	15081	63.1785	-149.3583	PEM1/ML2E	N/A	III A 3

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84HT008	WDF	8/5/2015	15079	63.1724	-149.3606	PSS1A	RIVERINE	II B 2
W84HT009	WDF	8/5/2015	15080	63.1730	-149.3603	U	N/A	I C 2, II B 2
W84HT009_OP	OP	8/5/2015	15080	63.1731	-149.3604	PSS1/EM1B	N/A	II B 2, III A 2
W84HT010	WDF	8/6/2015	15085	63.2183	-149.3323	U	N/A	III A 1
W84HT010_OP	OP	8/6/2015	15085	63.2186	-149.3313	U	N/A	III A 1
W84HT011	WDF	8/6/2015	15099	63.6956	-148.7843	PSS1/EM1B	SLOPE	II C 2, III A 2
W84HT011_OP	OP	8/6/2015	15099	63.6960	-148.7834	U	N/A	I A 2, II C 2
W84HT012	WDF	8/6/2015	15095	63.6905	-148.7791	PSS4/1B	SLOPE	II A 2, II C 2
W84HT012_OP	OP	8/6/2015	15095	63.6925	-148.7783	R4SBC	N/A	NONE
W84HT012_OP2	OP	8/6/2015	15095	63.6904	-148.7778	U	N/A	I A 2, II C 2
W84HT013	WDF	8/6/2015	15294	63.6885	-148.7744	PSS1/4C	SLOPE	II C 2, II A 3
W84HT013_OP	OP	8/6/2015	15294	63.6888	-148.7750	PSS4/1C	N/A	II A 2, II B 2
W84HT014	WDF	8/7/2015	15109	63.8305	-149.0340	U	N/A	I A 2, II B 2
W84HT014_OP	OP	8/7/2015	15109	63.8303	-149.0334	PSS4/FO4B	N/A	II A 2, I A 2
W84HT015	WDF	8/7/2015	15108	63.8304	-149.0280	PSS4/1B	SLOPE	II A 2, II C 2
W84HT015_OP	OP	8/7/2015	15108	63.8305	-149.0297	U	N/A	I A 2, II C 2
W84HT015_OP2	OP	8/7/2015	15108	63.8303	-149.0272	U	N/A	I A 2, II B 2
W84HT016	WDF	8/7/2015	15094	63.7081	-148.8204	PSS4/1B	SLOPE	II A 2, II C 2
W84HT016_OP	OP	8/7/2015	15094	63.7073	-148.8186	R3UBH	N/A	NONE
W84HT017	WDF	8/7/2015	15100	63.7043	-148.8165	U	N/A	I A 3, II C 2
W84HT017_OP	OP	8/7/2015	15100	63.7060	-148.8173	U	N/A	I A 2, II C 2
W84HT017_OP2	OP	8/7/2015	15100	63.7040	-148.8171	PEM1C	N/A	III A 3
W84HT018	WDF	8/9/2015	15113	63.8578	-149.0694	U	N/A	I A 2, II C 2
W84HT018_OP	OP	8/9/2015	15113	63.8583	-149.0680	PSS4/1B	N/A	II A 2, II C 2
W84HT018_OP2	OP	8/9/2015	15113	63.8579	-149.0705	PSS4/FO4B	N/A	II A 2, II C 2
W84HT019	WDF	8/9/2015	15114	63.8591	-149.0713	U	N/A	I A 2, II C 2
W84HT019_OP	OP	8/9/2015	15114	63.8597	-149.0717	PSS4/1B	N/A	II A 2, II C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84HT020	WDF	8/9/2015	15115	63.8699	-149.0800	U	N/A	I A 2, II C 2
W84HT021	WDF	8/9/2015	15116	63.8705	-149.0802	U	N/A	I A 2, II C 2
W84HT022	WDF	8/10/2015	15280	62.7210	-150.1912	U	N/A	I C 3, II B 1
W84HT022_OP	OP	8/10/2015	15280	62.7195	-150.1971	U	N/A	I B 3, II B 1
W84HT023	WDF	8/10/2015	15281	62.8786	-149.8061	PEM1/SS1Eb	RIVERINE	III A 2, II C 2
W84HT023_OP	OP	8/10/2015	15281	62.8781	-149.8068	PFO4/SS1B	N/A	I A 2, II B 2
W84HT024	WDF	8/11/2015	15102	63.7236	-148.8596	U	N/A	II B 2
W84HT025	WDF	8/11/2015	15103	63.7245	-148.8600	PFO4/SS1B	SLOPE	I A 2, II C 2
W84HT025_OP	OP	8/11/2015	15103	63.7245	-148.8596	U	N/A	I A 2
W84HT026	WDF	8/11/2015	15101	63.7189	-148.8513	U	N/A	I A 2, II C 2
W84HT026_OP	OP	8/11/2015	15101	63.7187	-148.8512	PSS4/1B	SLOPE	II A 2, II C 2
W84HT027	WDF	8/20/2015	15089	63.3922	-148.8814	PSS1/EM1B	SLOPE	II C 2, III A 2
W84HT028	WDF	8/20/2015	15283	63.0014	-149.5604	U	N/A	II C 2, II B 2
W84HT028_OP	OP	8/20/2015	15283	63.0009	-149.5603	U	N/A	II C 2
W84HT029	WDF	8/21/2015	15288	63.0315	-149.5520	PEM1/SS1C	SLOPE	III A 3, II C 2
W84HT029_OP	OP	8/21/2015	15288	63.0314	-149.5512	U	N/A	I B 1
W84HT030	WDF	8/21/2015	15289	63.0311	-149.5484	U	N/A	II B 1
W84HT030_OP	OP	8/21/2015	15289	63.0313	-149.5487	PSS1C	N/A	II B 1
W84HT031	WDF	8/21/2015	15067	63.0711	-149.4821	U	N/A	I C 3, II B 2
W84HT031_OP	OP	8/21/2015	15067	63.0715	-149.4819	R4SBC	N/A	NONE
W84HT032	WDF	8/21/2015	15068	63.0722	-149.4816	U	N/A	I A 2
W84HT033	WDF	8/22/2015	15073	63.1239	-149.4331	U	N/A	II B 1, I A 3
W84HT033_OP	OP	8/22/2015	15073	63.1247	-149.4271	PSS1B	N/A	II B 2, I A 3
W84HT034	WDF	8/22/2015	15074	63.1261	-149.4306	U	N/A	I A 3, II C 2
W84HT034_OP	OP	8/22/2015	15074	63.1248	-149.4333	U	N/A	II B 2, I A 3
W84HT034_OP2	OP	8/22/2015	15074	63.1262	-149.4319	PSS1/FO4B	N/A	II B 2, I A 3
W84HT035	WDF	8/22/2015	15075	63.1286	-149.4286	PSS1B	SLOPE	II B 1

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84HT036	WDF	8/22/2015	15284	63.0016	-149.5618	U	N/A	III A 2
W84HT036_OP	OP	8/22/2015	15284	63.0011	-149.5585	PSS1B	N/A	II C 2
W84HT037	WDF	8/23/2015	15084	63.2069	-149.3331	PSS1C	SLOPE	II B 1
W84HT038	WDF	8/23/2015	15286	63.0077	-149.5856	PEM1/SS1E	SLOPE	III A 3, II D 2
W84HT039	WDF	8/23/2015	15287	63.0074	-149.5837	PSS1B	SLOPE	II B 1
W84HT039_OP	OP	8/23/2015	15287	63.0075	-149.5839	PSS1C	N/A	II B 1
W84HT039_OP2	OP	8/23/2015	15287	63.0082	-149.5871	PSS1B	N/A	II B 1
W84HT040	WDF	8/23/2015	15285	63.0088	-149.5889	U	N/A	II C 1
W84HT041	WDF	8/24/2015	15104	63.7726	-148.9079	PSS1/4B	SLOPE	II A 3, II C 2
W84HT042	WDF	8/24/2015	15291	63.1185	-149.4594	PEM1B	FLAT	III A 2
W84HT042_OP	OP	8/24/2015	15291	63.1184	-149.4590	PSS1B	FLAT	II B 1
W84HT043	WDF	8/24/2015	15282	62.7933	-149.9894	U	N/A	I C 2, II B 2
W84HT043_OP	OP	8/24/2015	15282	62.7919	-149.9877	PSS1/EM1B	N/A	II C 2, III A 3
W84LH001	WDF	7/18/2015	15148	64.4402	-149.2300	PEM1E	DEPRESSIONAL	III A 3
W84LH002	WDF	7/18/2015	15147	64.4394	-149.2305	PSS1/EM1C	FLAT	II B 2, III A 3
W84LH003	WDF	7/18/2015	15146	64.4373	-149.2313	PFO1/SS1B	FLAT	I B 2, II B 2
W84LH004	WDF	7/19/2015	15131	64.2532	-149.3031	PEM1C	DEPRESSIONAL	III A 2
W84LH004_OP	OP	7/19/2015	15131	64.2566	-149.3007	PSS1/EM1B	N/A	II C 2, III A 2
W84LH004_OP2	OP	7/19/2015	15131	64.2533	-149.3035	U	N/A	II B 1
W84LH005	WDF	7/19/2015	15130	64.2516	-149.3036	PSS1/EM1B	FLAT	II C 2, III A 2
W84LH005_OP	OP	7/19/2015	15130	64.2544	-149.3014	U	N/A	II B 2
W84LH006	WDF	7/19/2015	15129	64.2506	-149.3044	PSS3/1B	FLAT	II D 2, II C 2
W84LH007	WDF	7/20/2015	15143	64.4086	-149.2569	U	N/A	I C 3, II B 2
W84LH007_OP	OP	7/20/2015	15143	64.4090	-149.2530	U	N/A	I C 2, II B 2
W84LH008	WDF	7/20/2015	15142	64.4043	-149.2594	U	N/A	I A 2
W84LH009	WDF	7/20/2015	15141	64.4040	-149.2575	PFO4/SS4B	SLOPE	I A 2, II B 2
W84LH009_OP	OP	7/22/2015	15141	64.4044	-149.2572	PEM1/SS1E	N/A	III A 3, II B 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84LH010	WDF	7/20/2015	15140	64.4013	-149.2614	U	N/A	I C 2
W84LH011	WDF	7/21/2015	15205	65.2995	-148.5993	U	N/A	I A 2
W84LH011_OP	OP	7/21/2015	15205	65.3013	-148.6000	U	N/A	I A 2
W84LH012	WDF	7/21/2015	15211	65.3070	-148.5989	U	N/A	I A 2
W84LH013	WDF	7/21/2015	15206	65.3126	-148.5902	U	N/A	I A 2
W84LH014	WDF	7/21/2015	15210	65.3180	-148.5876	U	N/A	I C 2
W84LH015	WDF	7/22/2015	15207	65.3655	-148.6021	U	N/A	I A 2
W84LH016	WDF	7/22/2015	15208	65.3685	-148.6090	U	N/A	I A 2
W84LH016_OP	OP	7/22/2015	15208	65.3693	-148.6085	R4SBC	N/A	NONE
W84LH017	WDF	7/22/2015	15209	65.3725	-148.6087	PSS4/1B	SLOPE	II A 2, I A 3
W84LH017_OP	OP	7/22/2015	15209	65.3730	-148.6093	R4SB	N/A	NONE
W84LH018	WDF	7/22/2015	15214	65.3758	-148.6123	PSS4/FO4B	SLOPE	II A 2, I A 3
W84LH019	WDF	7/23/2015	15155	64.5042	-149.1646	PSS4/1B	FLAT	II A 2, II C 2
W84LH020	WDF	7/23/2015	15156	64.5079	-149.1631	PSS3/4B	FLAT	II C 2, II A 3
W84LH020_OP	OP	7/23/2015	15156	64.5078	-149.1632	PEM1E	N/A	III A 3
W84LH021	WDF	7/23/2015	15159	64.5260	-149.1490	PEM1/SS1E	DEPRESSIONAL	III A 3, II B 2
W84LH022	WDF	7/23/2015	15143	64.4107	-149.2526	U	N/A	I C 2, II B 2
W84LH023	WDF	7/30/2015	15189	65.0802	-148.6746	U	N/A	I B 2, II B 2
W84LH023_OP	OP	7/30/2015	15189	65.0803	-148.6727	U	N/A	I A 2
W84LH024	WDF	7/30/2015	15190	65.0791	-148.6745	U	N/A	I A 2
W84LH024_OP	OP	7/30/2015	15190	65.0792	-148.6766	PSS1/4B	N/A	II A 3, II C 2
W84LH025	WDF	7/30/2015	15198	65.1543	-148.6929	PSS4B	FLAT	II A 1
W84LH025_OP	OP	7/30/2015	15198	65.1546	-148.6927	PSS1/FO4B	N/A	II C 2, I A 3
W84LH026	WDF	7/31/2015	15213	65.2592	-148.5841	U	N/A	I A 2
W84LH027	WDF	7/31/2015	15200	65.2610	-148.5841	U	N/A	II B 2, I C 3
W84LH028	WDF	7/31/2015	15203	65.2641	-148.5842	U	N/A	I A 1
W84LH028_OP	OP	7/31/2015	15203	65.2658	-148.5864	U	N/A	I A 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84LH029	WDF	7/31/2015	15201	65.2677	-148.5871	PSS4/FO4B	FLAT	II A 2
W84LH029_OP	OP	7/31/2015	15201	65.2670	-148.5890	U	N/A	II A 2
W84LH030	WDF	7/31/2015	15202	65.2709	-148.5928	U	N/A	I A 2
W84LH030_OP	OP	7/31/2015	15202	65.2732	-148.5962	U	N/A	I A 3
W84LH031	WDF	8/1/2015	15312	64.6721	-149.0314	U	N/A	I C 2
W84LH031_OP	OP	8/1/2015	15312	64.6712	-149.0312	PSS1/FO1C	N/A	II B 1, I C 3
W84LH032	WDF	8/1/2015	15313	64.6709	-149.0312	PSS1/FO1C	FLAT	II B 2, I B 3, III A 2
W84LH033	WDF	8/2/2015	15256	64.2146	-149.3189	U	N/A	II A 1
W84LH034	WDF	8/2/2015	15126	64.1745	-149.2907	U	N/A	I A 2, I C 2
W84LH034_OP	OP	8/2/2015	15126	64.1743	-149.2903	PSS4B	N/A	II A 2
W84LH035	WDF	8/2/2015	15127	64.1780	-149.2929	U	N/A	I A 2
W84LH036	WDF	8/25/2015	15112	63.8393	-149.0604	PSS1/4B	FLAT	II A 3, II C 2
W84LH036_OP	OP	8/25/2015	15112	63.8399	-149.0621	U	N/A	I B 1
W84LH037	WDF	8/25/2015	15118	63.9125	-149.0737	U	N/A	II C 1
W84LH038	WDF	8/25/2015	15117	63.9060	-149.0794	PSS4/FO4B	FLAT	II A 2, II C 2
W84LH038_OP	OP	8/25/2015	15117	63.9082	-149.0792	PSS4/1B	N/A	II A 2, II C 2
W84PA001	WDF	7/6/2015	15265	68.4621	-149.4829	U	N/A	II D 1
W84PA002	WDF	7/8/2015	15235	68.7680	-148.8901	U	N/A	II C 2
W84PA002_OP	OP	7/8/2015	15235	68.7693	-148.8917	U	N/A	II B 2, II C 1
W84PA003	WDF	7/8/2015	15266	68.7612	-148.8777	PEM1/SS1B	FLAT	III A 2, II D 2
W84PA004	WDF	7/9/2015	15267	69.1456	-148.8304	U	N/A	II C 2, II D 1
W84PA005	WDF	7/9/2015	15307	68.6202	-149.3927	PSS1/EM1B	FLAT	II D 2, III A 2
W84PA006	WDF	7/9/2015	15309	68.6244	-149.3794	PSS1/EM1B	FLAT	II D 2, III A 3
W84PA007	WDF	7/9/2015	15308	68.5655	-149.4749	U	N/A	II D 1, III A 2
W84PA008	WDF	7/10/2015	15268	69.1462	-148.8400	U	N/A	II C 2, III A 2
W84PA008_OP	OP	7/10/2015	15268	69.1465	-148.8412	U	N/A	II C 2, III A 2
W84PA009	WDF	7/10/2015	15239	69.0075	-148.8535	PEM1/SS1B	FLAT	III A 2, II D 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84PA010	WDF	7/10/2015	15238	69.0079	-148.8514	U	N/A	II C 2, II D 2
W84PA011	WDF	7/10/2015	15304	69.1404	-148.8725	PEM1/SS1B	FLAT	III A 2, II D 2
W84PA012	WDF	7/10/2015	15305	69.1390	-148.8729	U	N/A	II C 2, II D 2
W84PA013	WDF	7/11/2015	15306	69.1367	-148.8749	PEM1/SS1B	FLAT	III A 2, II D 2
W84PA014	WDF	7/11/2015	15303	69.0957	-148.8094	PEM1/SS1B	FLAT	III A 2, II D 1
W84PA014_OP	OP	7/11/2015	15303	69.0964	-148.8078	U	N/A	II C 2, II D 1
W84PA015	WDF	7/11/2015	15237	68.7759	-148.8688	PEM1/SS1B	FLAT	III A 2, II D 2
W84TI001	WDF	6/5/2015	15050	61.5504	-150.5400	PEM1/SS1B	SLOPE	III A 2, II B 2
W84TI002	WDF	6/6/2015	15037	61.3719	-150.8392	PFO1/EM1C	SLOPE	I B 2, III A 2
W84TI003	WDF	6/6/2015	15036	61.3709	-150.8417	PFO1/EM1B	FLAT	I B 2, III A 2
W84TI004	WDF	6/8/2015	15047	61.4624	-150.6462	PFO1/SS1B	SLOPE	I B 2, II B 2
W84TI005	WDF	6/7/2015	15038	61.3764	-150.8249	PSS1/EM1C	SLOPE	II B 2, III A 2
W84TI005_OP	OP	6/7/2015	15038	61.3759	-150.8258	R4USF	N/A	NONE
W84TI006	WDF	6/7/2015	15039	61.3784	-150.8228	PFO1/SS1B	SLOPE	I B 2, II B 2
W84TI006_OP	OP	6/7/2015	15039	61.3784	-150.8242	R4SBF	N/A	NONE
W84TI006_OP2	OP	6/7/2015	15039	61.3783	-150.8269	PSS1/FO1B	SLOPE	I B 3, II B 2
W84TI007	WDF	6/8/2015	15048	61.4629	-150.6482	U	N/A	III A 2
W84TI007_OP	OP	6/8/2015	15048	61.4629	-150.6485	R3UBH	N/A	NONE
W84TI008	WDF	6/9/2015	15027	61.3386	-150.9290	U	N/A	I B 2, II B 2
W84TI008_OP	OP	6/9/2015	15027	61.3381	-150.9265	R4SBF	N/A	NONE
W84TI009	WDF	6/9/2015	15028	61.3398	-150.9194	PSS4/1B	DEPRESSIONAL	II A 2, I A 2
W84TI009_OP	OP	6/9/2015	15028	61.3394	-150.9191	U	N/A	I A 2, II B 2
W84TI010	WDF	6/9/2015	15029	61.3400	-150.9152	PSS1/FO1B	FLAT	I C 3, II B 2
W84TI011	WDF	6/10/2015	15065	61.7896	-150.3482	U	N/A	I A 2
W84TI012	WDF	6/10/2015	15064	61.7894	-150.3499	PFO4B	DEPRESSIONAL	I A 2
W84TI013	WDF	6/10/2015	15057	61.6690	-150.4897	PFO4B	FLAT	I A 2
W84TI014	WDF	6/16/2015	15275	61.4903	-150.6371	U	N/A	III A 2, II B 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84TI014_OP	OP	6/8/2015	15275	61.4885	-150.6337	PEM1B	N/A	III A 2
W84TI014_OP2	OP	6/8/2015	15275	61.4887	-150.6352	U	N/A	I B 3, III A 3
W84TI014_OP3	OP	6/16/2015	15275	61.4890	-150.6341	PSS1/FO1B	N/A	I B 3, II B 2
W84TI015	WDF	6/11/2015	15055	61.6528	-150.4881	U	N/A	I C 2
W84TI015_OP	OP	6/11/2015	15055	61.6543	-150.4872	PFO4B	N/A	I A 2
W84TI015_OP2	OP	6/11/2015	15055	61.6556	-150.4870	PSS4/FO4B	N/A	II A 2, II C 2
W84TI016	VEG	6/11/2015	15020	61.2998	-151.0353	None	*	I C 2, II C 2
W84TI017	WDF	6/11/2015	15020	61.3000	-151.0363	PSS1/EM1B	DEPRESSIONAL	II D 2, III A 3
W84TI018	WDF	6/14/2015	15009	61.2228	-151.1315	U	N/A	I B 3, II B 2
W84TI018_OP	OP	6/14/2015	15009	61.2227	-151.1316	R4SB	N/A	NONE
W84TI019	WDF	6/14/2015	15010	61.2262	-151.1301	U	N/A	I B 2, II B 2
W84TI020	WDF	6/15/2015	15033	61.3452	-150.8969	U	N/A	I C 2, III A 2
W84TI021	WDF	6/15/2015	15030	61.3411	-150.9093	U	N/A	III A 2, II B 2
W84TI022	WDF	6/15/2015	15031	61.3426	-150.9047	U	N/A	III A 2, II B 2
W84TI023	VEG	6/16/2015	15018	61.2695	-151.0883	None	*	I B 3, II B 2
W84TI024	WDF	6/16/2015	15011	61.2288	-151.1275	U	N/A	I B 2, II B 2
W84TI025	WDF	6/17/2015	15052	61.6060	-150.5030	U	N/A	III A 2
W84TI026	WDF	6/17/2015	15032	61.3439	-150.9012	U	N/A	I C 3, III A 2
W84TI026_OP	OP	6/17/2015	15032	61.3439	-150.9009	PEM1/2A	N/A	III A 2
W84TI026_OP2	OP	6/17/2015	15032	61.3429	-150.9017	R3UBH	N/A	NONE
W84TI027	WDF	6/19/2015	15063	61.7551	-150.3511	U	N/A	II B 2, III A 2
W84TI028	WDF	6/19/2015	15062	61.7507	-150.3517	U	N/A	I C 2
W84TI028_OP	OP	6/19/2015	15062	61.7494	-150.3551	PFO4B	N/A	I A 2
W84TI029	WDF	6/19/2015	15054	61.6403	-150.4869	U	N/A	I C 2
W84TI029_OP	OP	6/19/2015	15054	61.6419	-150.4874	PEM1B	N/A	III A 2
W84TI030	WDF	6/20/2015	15051	61.5889	-150.5192	PEM1/FO1B	SLOPE	III A 2, I B 3
W84TI030_OP	OP	6/20/2015	15051	61.5892	-150.5149	PEM1/SS1B	N/A	III A 2, II B 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W84TI031	WDF	6/20/2015	15244	61.9320	-150.1986	U	N/A	III A 2, II B 2
W84YL001	WDF	7/16/2015	15259	65.7068	-149.1735	U	N/A	II B 2, III A 2
W85HT001	WDF	8/15/2015	15254	63.6602	-148.7545	PFO4/SS1B	SLOPE	I A 2, II C 2
W85HT001_OP	OP	8/15/2015	15254	63.6611	-148.7552	PSS4/1B	N/A	II A 3, II C 2
W85HT001_OP2	OP	8/15/2015	15254	63.6616	-148.7558	PFO4/SS1B	N/A	I A 2, II C 2
W85HT002	WDF	8/15/2015	15253	63.6597	-148.7570	PFO4/SS1B	SLOPE	I A 2, II C 2
W85HT002_OP	OP	8/21/2015	15253	63.6590	-148.7580	PFO4/SS1B	N/A	I A 2, II C 2
W85HT003	WDF	8/16/2015	15088	63.2591	-149.2684	PSS1/FO4B	SLOPE	I A 2, II B 2
W85HT004	WDF	8/16/2015	15078	63.1586	-149.3753	PSS1C	RIVERINE	II B 1
W85HT005	WDF	8/16/2015	15076	63.1427	-149.4041	PFO4/SS1C	RIVERINE	I A 2, II B 2
W85HT005_OP	OP	8/16/2015	15076	63.1443	-149.4004	PFO4/SS1B	SLOPE	I A 2, II C 2
W85HT006	WDF	8/16/2015	15077	63.1486	-149.3942	PSS1C	SLOPE	II B 2
W85HT007	WDF	8/17/2015	15290	63.0949	-149.4789	U	N/A	II C 1, I A 3
W85HT007_OP	OP	8/17/2015	15290	63.0957	-149.4776	R4UBH	N/A	NONE
W85HT008	WDF	8/17/2015	15070	63.0959	-149.4744	PFO4/SS1C	RIVERINE	I A 2, II B 2
W85HT009	WDF	8/17/2015	15069	63.0923	-149.4725	PSS1C	SLOPE	II B 2
W85HT010	WDF	8/18/2015	15071	63.1111	-149.4644	PSS1/FO4B	SLOPE	II B 2, I A 3
W85HT010_OP	OP	8/18/2015	15071	63.1114	-149.4605	R3UBH	N/A	NONE
W85HT011	WDF	8/18/2015	15072	63.1133	-149.4556	PSS1B	RIVERINE	II B 2
W85HT011_OP	OP	8/18/2015	15072	63.1115	-149.4551	PEM1/SS1E	SLOPE	III A 3, II C 2
W85HT012	WDF	8/18/2015	15066	63.0202	-149.5362	PSS1B	SLOPE	II B 1, III A 2
W85IN001	WDF	6/22/2015	15326	60.6580	-151.3546	U	N/A	I B 1
W85IN002	WDF	6/22/2015	15323	60.6584	-151.3563	U	N/A	I C 3, III B 2
W85IN003	WDF	6/22/2015	15325	60.6599	-151.3545	U	N/A	III B 2, I A 3
W85IN003_OP	OP	6/22/2015	15325	60.6590	-151.3552	U	N/A	I C 3, III B 2
W85IN004	WDF	6/23/2015	15329	60.6747	-151.3628	U	N/A	I C 3, III B 2
W85IN005	WDF	6/23/2015	15335	60.6709	-151.3141	U	N/A	I C 2, III B 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85IN006	WDF	6/23/2015	15320	60.6636	-151.3444	U	N/A	I C 2, III A 2
W85IN006_OP	OP	6/23/2015	15319	60.6643	-151.3441	U	N/A	I B 1
W85IN007	WDF	6/24/2015	15318	60.6782	-151.3471	U	N/A	I C 2, III B 2
W85IN007_OP	OP	6/24/2015	15318	60.6779	-151.3455	PUBH	N/A	NONE
W85IN008	WDF	6/24/2015	15321	60.6608	-151.3442	U	N/A	I C 2
W85IN009	WDF	6/24/2015	15327	60.6601	-151.3617	U	N/A	I C 3, III A 2
W85IN010	WDF	6/24/2015	15324	60.6609	-151.3637	U	N/A	I C 3, III B 2
W85IN011	WDF	6/24/2015	15328	60.6563	-151.3489	U	N/A	I C 3, III B 2
W85IN012	WDF	6/25/2015	15002	60.7367	-151.3046	U	N/A	I B 3, II B 1
W85IN013	WDF	6/25/2015	15269	60.6811	-151.3563	U	N/A	I C 2, III A 2
W85IN014	WDF	6/25/2015	15336	60.6457	-151.3437	U	N/A	III B 2
W85IN015	WDF	6/25/2015	15331	60.6555	-151.3358	U	N/A	III A 2
W85IN016	WDF	6/26/2015	15270	60.7568	-151.2578	U	N/A	III B 1
W85IN016_OP	OP	6/26/2015	15270	60.7561	-151.2518	PEM1E	N/A	III A 3
W85IN016_OP2	OP	6/26/2015	15270	60.7547	-151.2505	PSS1/EM1B	DEPRESSIONAL	II C 2, III A 2
W85IN017	WDF	6/26/2015	15003	60.7536	-151.2495	PSS1/EM1B	DEPRESSIONAL	II B 2, III A 2
W85IN017_OP	OP	6/26/2015	15003	60.7520	-151.2550	PFO4/1B	N/A	I C 2, III A 2
W85IN017_OP2	OP	6/26/2015	15003	60.7516	-151.2532	PFO4/1B	N/A	I C 3, II B 2
W85IN017_OP3	OP	6/26/2015	15003	60.7526	-151.2541	PFO1/SS1A	N/A	I B 2, II B 2
W85IN018	WDF	9/8/2015	15338	60.6437	-151.3485	PSS4/EM1B	DEPRESSIONAL	II A 3, III A 3
W85IN019	WDF	9/8/2015	15322	60.6560	-151.3549	PEM1E	DEPRESSIONAL	III A 3
W85IN020	WDF	9/8/2015	15240	60.7089	-151.3550	U	N/A	I C 3, III B 2
W85IN021	WDF	9/8/2015	15004	60.7669	-151.2513	PEM1C	DEPRESSIONAL	III A 3
W85IN022	WDF	9/8/2015	15271	60.7660	-151.2533	PEM1F	DEPRESSIONAL	III A 3
W85IN023	WDF	9/9/2015	15001	60.6908	-151.3815	PEM1E	SLOPE	III A 3
W85IN023_OP	OP	9/9/2015	15001	60.6908	-151.3815	U	N/A	I B 1
W85IN024	WDF	9/9/2015	15332	60.6492	-151.3528	U	N/A	I C 2, III B 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85IN024_OP	OP	9/9/2015	15338	60.6448	-151.3465	U	N/A	I C 3, III B 2
W85IN024_OP2	OP	9/9/2015	15338	60.6437	-151.3471	U	N/A	I C 2, II C 2
W85IN025	WDF	9/9/2015	15334	60.6609	-151.3367	U	N/A	I C 2, III A 2
W85IN026	WDF	9/9/2015	15333	60.6877	-151.3465	U	N/A	I C 1
W85LH001	WDF	7/9/2015	15179	64.9090	-148.6807	U	N/A	II B 2
W85LH002	WDF	7/9/2015	15180	64.9106	-148.6807	U	N/A	I C 2
W85LH003	WDF	7/9/2015	15314	64.6761	-149.0171	PSS1/EM1B	FLAT	II B 2, III A 2
W85LH004	WDF	7/10/2015	15188	65.0648	-148.6692	PSS1C	FLAT	II B 2, II C 2
W85LH004_OP	OP	7/10/2015	15188	65.0655	-148.6672	PFO4/1B	FLAT	I C 2
W85LH005	WDF	7/10/2015	15187	65.0688	-148.6691	PEM1C	DEPRESSIONAL	III A 3
W85LH006	WDF	7/10/2015	15298	64.9260	-148.6983	U	N/A	I C 1
W85LH007	WDF	7/10/2015	15183	64.9297	-148.6959	U	N/A	I A 2
W85LH008	WDF	7/11/2015	15177	64.8920	-148.6784	U	N/A	I C 3
W85LH009	WDF	7/11/2015	15176	64.8943	-148.6774	U	N/A	II B 1
W85LH010	WDF	7/11/2015	15178	64.9000	-148.6793	U	N/A	I A 2
W85LH010_OP	OP	7/11/2015	15178	64.8985	-148.6780	U	N/A	I A 3, II C 2
W85LH011	WDF	7/12/2015	15175	64.8741	-148.7074	U	N/A	I A 2
W85LH012	WDF	7/12/2015	15174	64.8458	-148.7607	U	N/A	I A 2
W85LH013	WDF	7/12/2015	15172	64.8078	-148.7760	U	N/A	I A 3, II C 2
W85LH014	WDF	7/13/2015	15149	64.4522	-149.2164	PSS1B	SLOPE	II C 1
W85LH015	WDF	7/13/2015	15150	64.4530	-149.2153	PFO1/4B	FLAT	I C 2, II B 2
W85LH016	WDF	7/13/2015	15151	64.4637	-149.2037	PFO4/SS1B	FLAT	I C 2, II B 2
W85LH017	WDF	7/13/2015	15152	64.4636	-149.2022	U	N/A	I C 2, II B 2
W85LH018	WDF	7/14/2015	15173	64.8155	-148.7774	U	N/A	I A 2, II A 2
W85LH019	WDF	7/14/2015	15310	64.6510	-149.0458	PSS1/EM1E	FLAT	II C 1, III A 3
W85LH020	WDF	7/14/2015	15171	64.6408	-149.0711	U	N/A	I B 2, II B 2
W85LH021	WDF	7/15/2015	15136	64.3535	-149.2940	U	N/A	I A 3, II C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85LH022	WDF	7/15/2015	15138	64.3762	-149.2786	U	N/A	I C 2, II B 2
W85LH023	WDF	7/15/2015	15137	64.3747	-149.2800	U	N/A	I C 2, II C 2
W85LH024	WDF	7/15/2015	15145	64.4310	-149.2378	U	N/A	I B 2, II B 2
W85LH025	WDF	7/17/2015	15135	64.3445	-149.3065	U	N/A	I A 2, II B 2
W85LH026	WDF	7/17/2015	15134	64.3322	-149.3060	U	N/A	I A 2, II B 2
W85LH027	WDF	7/17/2015	15311	64.6575	-149.0353	U	N/A	I C 3, II B 2
W85LH028	WDF	7/18/2015	15154	64.4888	-149.1822	U	N/A	I C 2, II B 2
W85LH029	WDF	7/18/2015	15153	64.4881	-149.1828	PSS1/EM1B	FLAT	II C 2, III A 2
W85LH030	WDF	7/19/2015	15133	64.2843	-149.3022	U	N/A	II C 2
W85LH031	WDF	7/19/2015	15132	64.2810	-149.3021	U	N/A	I B 1
W85LH032	WDF	7/19/2015	15128	64.2361	-149.2987	PSS1B	FLAT	II B 1
W85LH033	WDF	7/19/2015	15139	64.3780	-149.2737	U	N/A	I A 2, II C 2
W85LH034	WDF	7/20/2015	15158	64.5204	-149.1492	U	N/A	I A 2, II B 2
W85LH035	WDF	7/20/2015	15157	64.5194	-149.1490	PSS1B	FLAT	II B 2, II C 2
W85LH036	WDF	7/20/2015	15160	64.5517	-149.1301	PSS1B	RIVERINE	II B 2
W85LH037	WDF	7/20/2015	15161	64.5506	-149.1309	PFO4/SS1B	SLOPE	I A 2, II B 2
W85LH038	WDF	7/21/2015	15191	65.1218	-148.6851	U	N/A	II A 2, II C 2
W85LH039	WDF	7/21/2015	15192	65.1229	-148.6857	U	N/A	II B 2
W85LH040	WDF	7/21/2015	15193	65.1294	-148.6881	U	N/A	II C 2
W85LH041	WDF	7/21/2015	15194	65.1241	-148.6813	U	N/A	II A 2, II B 2
W85LH041_OP	OP	7/21/2015	15241	65.1245	-148.6803	PSS1B	FLAT	II D 2
W85LH042	WDF	7/22/2015	15204	65.2539	-148.5865	U	N/A	I A 2
W85LH043	WDF	7/22/2015	15212	65.2501	-148.6038	U	N/A	I A 2
W85LH044	WDF	7/22/2015	15199	65.2506	-148.6037	PSS4/1B	FLAT	II A 2, II C 2
W85LH045	WDF	7/23/2015	15164	64.5614	-149.1203	U	N/A	I B 1
W85LH046	WDF	7/23/2015	15163	64.5629	-149.1182	PSS1A	SLOPE	II B 2
W85LH047	WDF	7/23/2015	15162	64.5651	-149.1177	U	N/A	I C 1, I C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85LH048	WDF	7/30/2015	15195	65.1792	-148.6736	U	N/A	I A 2
W85LH049	WDF	7/30/2015	15196	65.1781	-148.6735	U	N/A	II B 1
W85LH050	WDF	7/30/2015	15197	65.1739	-148.6808	U	N/A	I A 2
W85LH051	WDF	7/31/2015	15186	64.9420	-148.6970	PSS4/1B	FLAT	II A 2, II A 3
W85LH052	WDF	7/31/2015	15185	64.9416	-148.6978	PEM1/SS1B	SLOPE	III A 2, I C 3
W85LH052_OP	OP	7/31/2015	15184	64.9410	-148.6976	PEM1E	N/A	III A 3
W85LH053	WDF	7/31/2015	15184	64.9424	-148.6999	U	N/A	I A 2
W85LH054	WDF	7/31/2015	15313	64.6432	-149.0454	PFO1B	SLOPE	I B 2
W85LH055	WDF	8/1/2015	15169	64.6207	-149.0871	PFO1/SS1A	SLOPE	I B 3, II B 2
W85LH056	WDF	8/1/2015	15170	64.6227	-149.0862	PFO1/SS1A	SLOPE	I B 2, II B 2
W85LH057	WDF	8/1/2015	15181	64.9139	-148.6806	U	N/A	I A 2
W85LH058	WDF	8/5/2015	15182	64.9091	-148.6816	PSS1/EM1C	RIVERINE	II B 2, III A 2
W85LH059	WDF	8/2/2015	15167	64.5947	-149.1139	U	N/A	I B 2, II B 2
W85LH060	WDF	8/2/2015	15166	64.5956	-149.1127	PFO1B	SLOPE	I B 1, II B 2
W85LH061	WDF	8/2/2015	15165	64.5913	-149.1173	U	N/A	I B 2, II B 2
W85LH062	WDF	8/2/2015	15258	64.5845	-149.1119	U	N/A	I B 1
W85LH063	WDF	8/13/2015	15296	64.1189	-149.2426	PSS1/EM1Cb	RIVERINE	II C 1, III A 2
W85LH064	WDF	8/13/2015	15125	64.1021	-149.2185	PFO4B	FLAT	I A 2
W85LH064_OP	OP	8/13/2015	15125	64.1014	-149.2185	PFO4B	N/A	I A 2
W85LH065	WDF	8/13/2015	15123	64.0378	-149.1520	U	N/A	I A 2, II C 2
W85LH066	WDF	8/14/2015	15120	63.9212	-149.0804	U	N/A	I A 2, II C 2
W85LH066_OP	OP	8/14/2015	15120	63.9205	-149.0812	U	N/A	I A 2, II C 2
W85LH067	WDF	8/14/2015	15124	64.0665	-149.1843	PSS1/4E	SLOPE	II C 2, II A 3
W85LH067_OP	OP	8/21/2015	15124	64.0689	-149.1863	PSS4/1E	N/A	II A 2, II C 2
W85LH067_OP2	OP	8/14/2015	15124	64.0694	-149.1961	R3UBH	N/A	NONE
W85LH068	WDF	8/14/2015	15121	64.0204	-149.1384	U	N/A	I A 2
W85LH069	WDF	8/14/2015	15122	64.0222	-149.1400	PFO4B	SLOPE	I A 2, II C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85LH070	WDF	8/15/2015	15119	63.9115	-149.0761	U	N/A	II C 1, I A 3
W85LH071	WDF	8/15/2015	15295	63.9106	-149.0723	PSS1B	SLOPE	II C 1
W85LH071_OP	OP	8/15/2015	15295	63.9108	-149.0739	U	N/A	II C 1
W85TI001	WDF	6/5/2015	15050	61.5509	-150.5406	PEM1B	SLOPE	III A 2
W85TI002	WDF	6/6/2015	15021	61.3007	-151.0357	PSS4/1B	DEPRESSIONAL	II A 2, II C 2
W85TI003	WDF	6/6/2015	15022	61.3020	-151.0313	PFO4/SS1B	FLAT	I A 2, II B 2
W85TI003_OP	OP	6/6/2015	15022	61.3022	-151.0309	R4SB	N/A	NONE
W85TI004	VEG	6/14/2015	15008	61.1669	-151.1493	None	*	I B 3, II B 2
W85TI004_OP	OP	6/14/2015	15008	61.1695	-151.1486	PEM1B	N/A	III A 3
W85TI005	WDF	6/7/2015	15042	61.4099	-150.7342	PEM1/SS1A	SLOPE	III A 2, II B 2
W85TI005_OP	OP	6/7/2015	15042	61.4097	-150.7344	R4SB	N/A	NONE
W85TI006	WDF	6/14/2015	15023	61.3081	-151.0242	PSS1C	DEPRESSIONAL	II C 2
W85TI007	VEG	6/7/2015	15043	61.4112	-150.7299	None	*	II B 2, III A 2
W85TI008	WDF	6/7/2015	15046	61.4421	-150.6612	PFO4/1A	SLOPE	I C 2, II C 2
W85TI009	WDF	6/8/2015	15273	61.3522	-150.8788	U	N/A	I C 2, II B 2
W85TI009_OP	OP	6/8/2015	15273	61.3545	-150.8779	PSS4/1C	FLAT	II A 3, II C 2, III A 3
W85TI010	WDF	6/9/2015	15014	61.2401	-151.1120	U	N/A	I C 2, II C 1
W85TI010_OP	OP	6/9/2015	15014	61.2423	-151.1105	PFO4/1B	N/A	I C 2, II C 2
W85TI011	VEG	6/9/2015	15013	61.2395	-151.1123	None	*	I C 2, II B 2
W85TI011_OP	OP	6/9/2015	15013	61.2391	-151.1119	PFO4/1B	N/A	I C 2, II C 2
W85TI012	VEG	6/9/2015	15012	61.2372	-151.1145	None	*	I C 2 , II C 2
W85TI013	VEG	6/9/2015	15012	61.2383	-151.1144	None	*	I C 2, II C 3
W85TI014	WDF	6/10/2015	15059	61.7200	-150.3879	PSS1/EM1C	DEPRESSIONAL	II C 1, III A 2
W85TI014_OP	OP	6/10/2015	15060	61.7203	-150.3858	PFO4/SS1B	FLAT	I A 2, II C 2
W85TI015	WDF	6/10/2015	15061	61.7210	-150.3816	PSS4/1B	DEPRESSIONAL	II A 2, II C 2
W85TI016	WDF	6/11/2015	15056	61.6536	-150.4870	U	N/A	I C 2, II B 2
W85TI017	WDF	6/11/2015	15019	61.2909	-151.0529	PFO1/4C	SLOPE	I C 2, II C 2

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85TI018	VEG	6/14/2015	15024	61.3129	-151.0107	None	*	I C 2, II C 2
W85TI018_OP	OP	6/14/2015	15024	61.3131	-151.0092	PFO4/1A	N/A	I C 2, II B 2
W85TI019	WDF	6/15/2015	15242	61.3460	-150.8844	U	N/A	I C 2, II B 2
W85TI020	VEG	6/15/2015	15026	61.3260	-150.9840	None	*	III A 2
W85TI020_OP	OP	6/15/2015	15026	61.3260	-150.9840	R2UBH	N/A	NONE
W85TI020_OP2	OP	6/15/2015	15026	61.3257	-150.9842	R4SB	N/A	NONE
W85TI020_OP3	OP	6/15/2015	15025	61.3253	-150.9845	PFO1/EM1B	N/A	I B 3, III A 2
W85TI021	WDF	6/16/2015	15045	61.4436	-150.6601	U	N/A	I B 2, III A 2
W85TI021_OP	OP	6/16/2015	15045	61.4437	-150.6623	PSS1/EM1B	N/A	II C 2, III A 3
W85TI022	WDF	6/16/2015	15034	61.3559	-150.8726	PFO1/4B	SLOPE	I C 2, II B 2
W85TI022_OP	OP	6/16/2015	15034	61.3575	-150.8706	PFO1/4B	N/A	I C 2, II B 2
W85TI023	WDF	6/17/2015	15049	61.5498	-150.5462	PSS4/1B	SLOPE	II A 3, II C 2
W85TI024	WDF	6/17/2015	15035	61.3546	-150.8732	U	N/A	I C 2, II C 2
W85TI024_OP	OP	6/17/2015	15035	61.3544	-150.8730	PFO1B	N/A	I B 2, II B 2
W85TI024_OP2	OP	6/17/2015	15035	61.3546	-150.8736	U	N/A	I C 2, II C 2
W85TI025	WDF	6/18/2015	15058	61.7131	-150.4020	U	N/A	I C 2, II B 2
W85TI026	WDF	6/18/2015	15015	61.2469	-151.1099	U	N/A	I C 2, II B 2
W85TI026_OP	OP	6/18/2015	15015	61.2471	-151.1098	PFO1/4B	N/A	I C 2, II B 2
W85TI027	WDF	6/18/2015	15016	61.2501	-151.1086	U	N/A	I C 2, II B 2
W85TI028	WDF	6/19/2015	15277	61.8565	-150.2684	U	N/A	I B 3, II C 2
W85TI029	WDF	6/19/2015	15276	61.8554	-150.2644	U	N/A	I C 2, II C 2
W85TI030	WDF	6/19/2015	15279	61.8842	-150.2210	U	N/A	I A 2
W85TI030_OP	OP	6/19/2015	15279	61.8835	-150.2200	U	N/A	I A 2
W85TI031	WDF	6/20/2015	15053	61.6434	-150.4883	U	N/A	I C 2
W85TI031_OP	OP	6/20/2015	15053	61.6424	-150.4874	U	N/A	I A 2, II B 2
W85TI032	WDF	6/20/2015	15243	61.5994	-150.5107	U	N/A	I B 2, II B 2
W85TI032_OP	OP	6/20/2015	15243	61.5994	-150.5081	R4SB	N/A	NONE

FEATURE ID	Data Type[1]	SURVEY_DATE	Field Target #	LATITUDE	LONGITUDE	Cowardin Code	HGM Classification*	Vegetation Classification
W85TI033	WDF	7/3/2015	15274	61.3846	-150.7949	U	N/A	I B 2
W85TI034	WDF	7/5/2015	15278	61.9052	-150.2074	U	N/A	III A 2
W85TI034_OP	OP	7/5/2015	15278	61.9054	-150.2098	U	N/A	II C 2
W85TI035	WDF	7/5/2015	15040	61.3772	-150.7988	PSS4B	FLAT	II A 2
W85TI036	WDF	7/5/2015	15044	61.4127	-150.7270	U	N/A	I B 2, III A 2
W85TI036_OP	OP	7/5/2015	15044	61.4126	-150.7277	PSS1/EM1C	SLOPE	III A 2, II B 2
W85TI036_OP1	OP	7/5/2015	15044	61.4123	-150.7287	R4SB	N/A	NONE
W85TI036_OP2	OP	7/5/2015	15044	61.4121	-150.7290	R3UBH	N/A	NONE
W85TI037	WDF	7/6/2015	15045	61.4435	-150.6630	PEM1E	SLOPE	III A 3
W85TI038	WDF	7/7/2015	15245	62.1978	-150.2131	U	N/A	I C 1
W85TI039	WDF	8/6/2015	15007	61.1516	-151.1322	PEM1/SS1E	FLAT	III A 3, II C 2
W85TI039_OP	OP	8/11/2015	15007	61.1509	-151.1336	PSS4/1B	N/A	I C 2
W85TI040	WDF	8/6/2015	15006	61.1514	-151.1299	PFO1/4B	FLAT	I C 2, II C 2
W85TI040_OP	OP	8/6/2015	15006	61.1518	-151.1280	PSS1/EM1E	N/A	II C 2, III A 3
W85TI041	WDF	8/6/2015	15241	61.1304	-151.0850	U	N/A	I B 2, III A 2
W85TI041_OP	OP	8/6/2015	15241	61.1316	-151.0885	PSS1/EM1A	N/A	II C 2, III A 2
W85TI042	WDF	8/7/2015	15272	61.1426	-151.1040	U	N/A	I C 2, II B 2
W85TI042_OP	OP	8/7/2015	15272	61.1436	-151.1110	PSS1/EM1B	N/A	II C 2, III A 2
W85TI043	WDF	8/7/2015	15005	61.1451	-151.1109	PSS1/EM1C	RIVERINE	II B 2, III A 2
W85TI044	WDF	8/7/2015	15017	61.2861	-151.0605	PFO4B	FLAT	I A 2
W85TI044_OP	OP	8/7/2015	15017	61.2849	-151.0629	R3UBH	N/A	NONE
W85TI044_OP2	OP	8/7/2015	15017	61.2831	-151.0676	PSS4/1B	N/A	II A 2, II C 2
W85TI044_OP3	OP	8/7/2015	15017	61.2827	-151.0694	PSS1/EM1B	N/A	II C 2, III A 2
W85TI045	WDF	7/3/2015	15041	61.3916	-150.7781	U	N/A	II B 2, III A 2

[1]WDF = Wetland Determination Data Form Completed; Veg = Vegetation Classification Data Form Completed

OP = Observation Point. No Data Form Completed. *HGM Classification was not collected on Vegetation Forms or at Observation points

A7001

WETLAND DETERMINATION DATA FORM

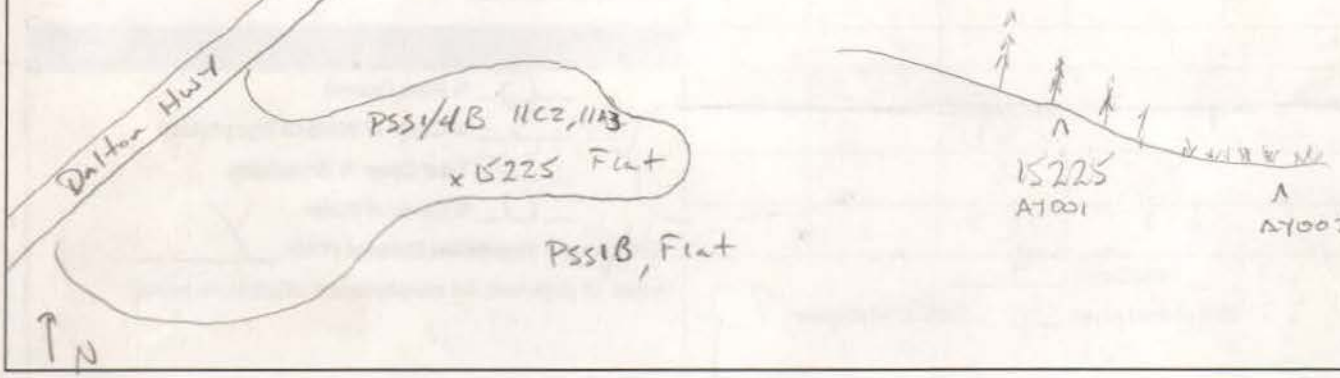
SITE DESCRIPTION			
Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: 15225	Map #: 27 Map Date: 6/29
Date: 7/1/15	Project Name & No.: Alaska LNG 60418403	Feature Id: W84A7001	
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 244.55	
Latitude: 67° 13' 25.78" N	Longitude: 150° 13' 40.46" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 27	Picture No.: P-W84A7001-VEG-VEG.PIT-PLOT	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 3 - measured	Local relief (concave, convex, none): flat to slightly concave hummocks moderate
Pre-mapped Alaska LNG/NWI classification: IIC2, IIA2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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 X, or Hydrology____ Naturally Problematic?	No____ (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:** PSS1/4B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): IIC2, IIA3

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

Marginal and potentially problematic site. Slope decreases from 3-4% near the highway to ~2% below the point where PICMAR canopy diminishes. Flat to slightly concave site with moderate hummocks and a few ERIVAG tussocks. Organics moist but not saturated. Active layer is shallow with saturation above the frost table (1.5"). and this material is alpha alpha positive. Permafrost has moderate ice content down to 18 inches. Permafrost/frozen active layer has a spotty positive reaction to alpha alpha in the upper 3 inches (<60% of 4" is reactive to alpha alpha). Low chroma soil is parent material colors



A1001

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	7	Y	FacW
2.			
3.			
4.			
Total Cover: 7			
50% of total cover: ____ 20% of total cover: ____			
Sapling/Shrub Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula ~~alaskana~~ nana	18	Y	Fac
2. Rhododendron tomentosum	40	Y	Fac
3. Vaccinum uliginosum	8		Fac
4. Vaccinum oxycoccus	T		OBL
5. Vaccinum vitis-idaea	3		Fac
6. Picea mariana	12		FacW
7. Salix pulchra	2		FacW
8. Picea glauca	2		FacU
9. Empetrum nigrum	2		Fac
Total Cover: 87			
50% of total cover: 43.5 20% of total cover: 17.4			

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: —	X 1 =	—
FACW species: 27	X 2 =	54
FAC species 101	X 3 =	303
FACU species 2	X 4 =	8
UPL species —	X 5 =	—
Column Totals: 130 (A)		365 (B)

PI = B/A = 2.81

VEGETATION (use scientific names of plants)

Herb Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Carex bigelowii	30	Y	Fac
2. Petasites frigidus	2		FacW
3. Rubus chamaemorus	1		FacW
4. Eriophorum vaginatum	3		FacW
5.			
6.			
7.			
8. Feather moss	80		
9. Sphagnum sp.	3		
10. Lichen	17		
Total Cover: 36			
50% of total cover: 18 20% of total cover: 7.2			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

3 % 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):

AY001

WETLAND DETERMINATION DATA FORM

W84AY001

SOIL Date 7/1/15 Feature ID _____ 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oe	0-7							Hemic	moist, not saturated
A	7-9	10YR 2/2	100					MkSiL	Field capacity-near saturation
Bg	9-10.5	5Y 5/1	96	7.5YR 4/6	4	C	PL	SiL	alpha alpha positive, saturated thixotropic
Bgf	10.5-18	5Y 5/1	97	7.5YR 4/6	3	C	PL/M	SiL	frozen. First ~3 inches has a spotty positive reaction to alpha alpha 20% of 4"

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y marginal	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 10.5

Hydric Soil Present (Y/N): Y marginal

Notes: Dry conditions

active layer saturated above the frost table. Alpha alpha positive above the frost table. Spotty positive reaction in the frozen material. Less than 60% of 4" Dry conditions at time of site visit. Problematic marginal site. A material marginal as mucky SiL. Frozen material has moderate ice content. Low chroma parent material Silty loess - low vfsand, low clay content

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) Y	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N - not 60% 4"	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) X
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Moderate hummocks mixed with ERIVAG tussocks	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): N / NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): N / NA	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): Y 9-10.5	**EC:** NA

Notes:

A-1001

AQUATIC SITE ASSESSMENT 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)__7__ Sapling (<5 dbh, <6m tall)__10__ Tall shrub (2-6m)__0__ Short shrub (0.5-2m)__70__ Dwarf shrub (<0.5m) __5__ Tall herb (≥1m) __0__ Short herb (<1m) __36__ Moss-Lichen__100__ Floating__0__ Submerged__0__

Number of Wetland Types (M): __3__ | **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%)_____ Very High Density (80-100%)_X_____

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) _X_____ 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_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)_X_____ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat_X_____ 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_X_____ 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_____ Fluvaquent 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_X_____ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable_X_____

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%)_X_____ (3%)

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_____ Only Connected Above_____ Connected Upstream & Downstream_X_____ 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)_____ Medium (10-100 acres)_____ Large (>100 acres)_X_____

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: W84A4001 Field Target: 15225 Date: 7/1/15

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 Abigayle Fisher X 7/6/15

Wetland Scientist (print) **Signature / Date**

X Brian Strong X 7/2/15

Field Crew Chief (print) **Signature / Date**

A7002

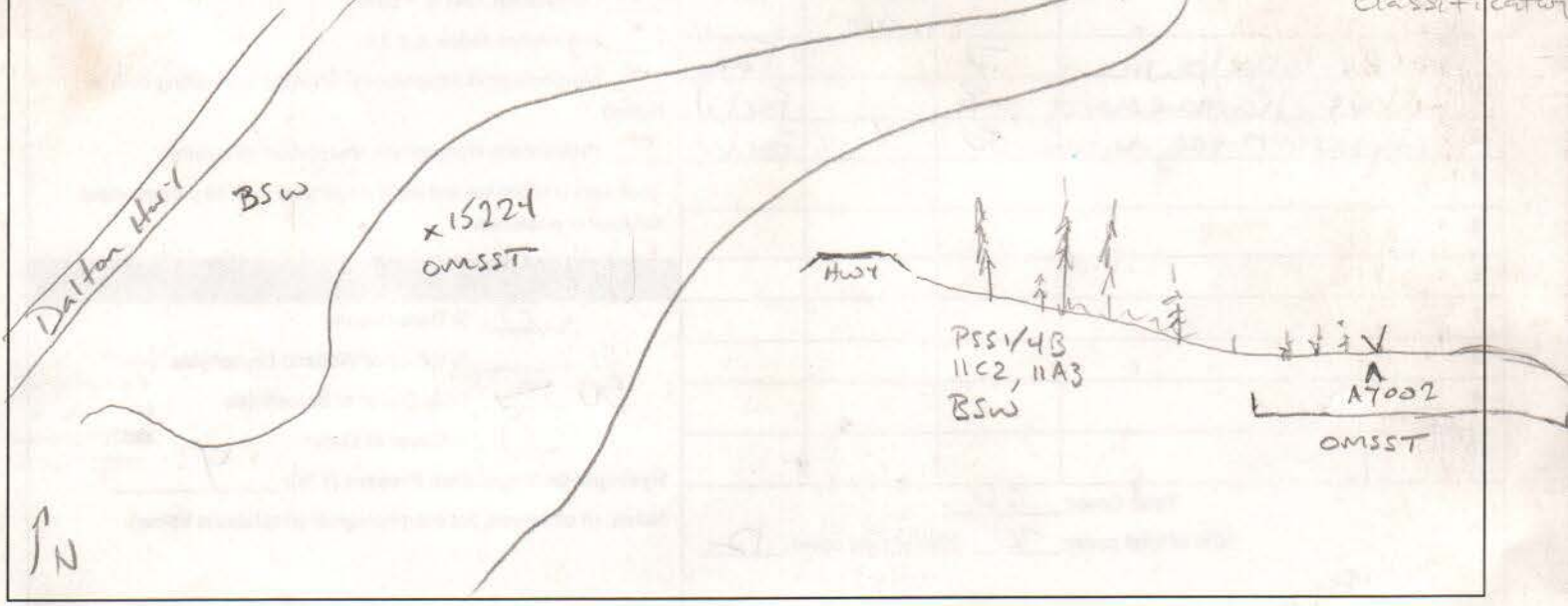
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: 15224	Map #: 27 Map Date: 6/29
Date: 7/1/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7002
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 244.5	
Latitude: 62° 13' 23.26" N	Longitude: 150° 13' 43.05" W		Datum: WGS84
Logbook No.: 1	Logbook Page No.: 27	Picture No.: P_W84A7002_VEG_VEG_PIT_PIC6	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Toeslope
Slope (%): 1 - 2	Local relief (concave, convex, none): Flat to slightly concave with moderate tussocks
Pre-mapped Alaska LNG/NWI classification: 11C2, PSS1/3B	Evidence of Wildlife Use: No - moose tracks near road
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) dry conditions, low snow year	Are "Normal Circumstances" present: Yes____ No X (If no, explain in Notes.) Dry conditions and a low snow year
Are Vegetation____, Soil____, or Hydrology____ Significantly Disturbed?	No X (If yes, explain in Notes)
Are Vegetation____, Soil X, or Hydrology____ Naturally Problematic?	No____ (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes Y No____	**Is the Sampled Area within a Wetland?** Yes X No____
Hydric Soil Present? Yes X No____	**Wetland Type:** PEM/SS1B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): III A2, II D2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Dry conditions low snow year. No saturation observed at time of the site visit. Alpha alpha positive in frozen A material (11-15") >60% of 4 inches. See soil/hydrology notes BETNAN 1-2.5' above FERIVAG but with only 7% cover herb ~~strata~~ is dominant in classification



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	1		FacW
2.			
3.			
4.			
Total Cover: 1 (moved to shrub)			
50% of total cover: ____ 20% of total cover: ____			
Sapling/Shrub Stratum (26ft)	**Absolute % Cover**	**Dominant Species? (Y/N)**	**Indicator Status**
1. Betula nana	7		Fac
2. Vaccinum vitis-idaea	40	Y	Fac
3. Vaccinum uliginosum	4		Fac
4. Picea mariana	3		FacW
5. Betula neoalaskana	T		FacU
6. Andromeda polifolia	T		FacW
7. Rhododendrum tomentosum	25	Y	FacW
8.			
9.			
Total Cover: 80			
50% of total cover: 40 ~~35~~ AP 20% of total cover: 16			

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: ____	X 1 = ____	
FACW species: 82	X 2 =	164
FAC species 58	X 3 =	174
FACU species ____	X 4 = ____	
UPL species ____	X 5 = ____	
Column Totals: 140	(A)	338 (B)

PI = B/A = 2.41

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Carex bigelowii	7		Fac
2. Rubus chamaemorus	3		FacW
3. Eriophorum vaginatum	50	Y	FacW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 60			
50% of total cover: 30 20% of total cover: 12			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

____ % Cover of Wetland Bryophytes Not recorded in field

50 ~~100~~ AP Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

AT 002

WETLAND DETERMINATION DATA FORM

SOIL Date 7/1/15 Feature ID WS4AT002 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
O: 0-6								
Oc 6-11								moist. Lost inch frozen
Af 11-15	7.5YR 2.5/2	100					SiL	frozen, alpha alpha positive - not quite mucky SiL
Bgf 15-18	5Y 5/1	100					SiL	ice lenses, parent material colors
								No redox features observed
								No positive rxn to alpha alpha

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y - marginal	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Y

[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: Permafrost Depth (inches): 11

Hydric Soil Present (Y/N): Y Reduced matrix from 11-15 inches in frozen material (>60%, 4")

Notes: Organics not saturated. Evidence of saturation from 6-11 inches above the frost table. Dry conditions in a low snow year. Saturation assumed early in the growing season and during normal precipitation years. Frozen A material (11-15 inches) is alpha alpha positive. Low chroma parent material

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Saturation assumed early in the growing season and during more normal precipitation years. Low snow fall and dry conditions.

A1002

AQUATIC SITE ASSESSMENT 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__X__ Aquatic Bed_____

Percent Cover (P): Tree (>5 dbh, >6m tall)__1__ Sapling (<5 dbh, <6m tall)__3__ Tall shrub (2-6m)__0__ Short shrub (0.5-2m)__40__ Dwarf shrub (<0.5m) __40__ Tall herb (≥1m) __0__ Short herb (<1m) __60__ Moss-Lichen__50__ Floating__0__ Submerged__0__

Number of Wetland Types (M): __3__ | **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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__ 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_____ Fluvaquent 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__

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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)_____ Large (>100 acres)__X__

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: W84A1002 Field Target: 15224 Date: 7/1/15

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 Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/2/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/2/15

A7003

WETLAND DETERMINATION DATA FORM

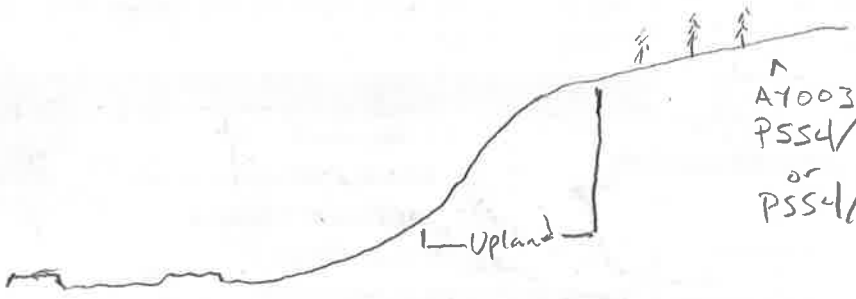
SITE DESCRIPTION			
Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: 1522	Map #: 29 Map Date: 6/29/15
Date: 7/1/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7003
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 274.7	
Latitude: 66°51'46.73"N	Longitude: 150°32'56.45"		Datum: WGS84
Logbook No.: 1	Logbook Page No.: 28	Picture No.: P_W84A7003_VEG_VEG_PTL_PLUG	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 3	Local relief (concave, convex, none): Slightly convex, tussocky moderate
Pre-mapped Alaska LNG/NWI classification: PSS4/EM1B, III A2, II A5	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) dry conditions	Are "Normal Circumstances" present: Yes____ No X (If no, explain in Notes.) dry conditions
Are Vegetation N, Soil N, or Hydrology N Significantly Disturbed?	No ✓ (If yes, explain in Notes)
Are Vegetation N, Soil Y, or Hydrology N Naturally Problematic?	~~No~~ Yes (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: PSS4/EM1B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): II A5?, III A2

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

Dry conditions. Low snow year. Lower 4 inches of organic mat is at field capacity (near saturation) over the frost table. Organic alpha alpha positive in bottom two inches indicating recent saturation. No thawed mineral soil material at the time of site visit. Saturation assumed early in the growing season and during more typical periods of precipitation.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	2		FacW
2.			
3.			
4.			

Total Cover: 2 (added to shrub)

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rhododendrum tomentosum	20	Y	FacW
2. Picea mariana	25	Y	FacW
3. Vaccinium uliginosum	3		Fac
4. Vaccinium vitis-idaea	2		Fac
5. Betula nana	2		Fac
6. Chamaedaphne calyculata	1		FacW
7. Andromeda polifolia	1		FacW
8. Vaccinium oxycoccus	1		Obl
9.			

Total Cover: 57

50% of total cover: 28.5 20% of total cover: 11.4

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: —	X 1 =	—
FACW species: 86	X 2 =	172
FAC species 9	X 3 =	27
FACU species —	X 4 =	—
UPL species —	X 5 =	—
Column Totals: 95	(A)	199 (B)

PI = B/A = 2.09

VEGETATION (use scientific names of plants)

Herb Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rubus chamaemorus	3		FacW
2. Eriophrum vaginatum	35	Y	FacW
3.			
4.			
5.			
6.			
7.			
8. Feather Moss	5		
9. Lichen	20		
10. Sphagnum	50		

Total Cover: 38

50% of total cover: 19 20% of total cover: 7.6

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

50 % 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):

AY003

WETLAND DETERMINATION DATA FORM

W84N-1003

SOIL Date 7/1/15 Feature ID W84N-1003 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-5							fibric	slightly moist
Oe 5-9							hemic	field capacity - near saturation
Ajf 9-12.5	7.5YR 2.5/2	100					SiL	frozen Alpha Alpha positive
								Darker band (1") at bottom of layer
BCjjf 12.5-16	2.5Y 4/1	100					SiL	frozen Alpha Alpha positive
								Ice lenses - fairly ice rich

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y marginal	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Y

[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: Permafrost Depth (inches): 9

Hydric Soil Present (Y/N): Y

Notes: Evidence of saturation from 5-9 inches in Oe material. Reduced matrix. Alpha alpha positive in frozen material from 9-16 inches. Alpha alpha reaction in organics above mineral as well indicating recent saturation in the lower 4" of organics

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) Y
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) Y	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Fairly low gradient at ~3% but not a concave landform. Slightly convex	
Algal Mat or Crust (B4) N	Other (Explain in Notes):	AY003 upland on shoulder slope	
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y	
Water Table Present (Y/N): N	Depth (in): NA		
Saturation Present (Y/N): (includes capillary fringe) N*	Depth (in): NA	EC: NA	

Notes: Saturation assumed early in the growing season and during periods of more normal precipitation.

A1003

AQUATIC SITE ASSESSMENT 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__X__ Emergent-Non-persistent_____ Emergent-Persistent_____ Aquatic Bed_____

Percent Cover (P): Tree (>5 dbh, >6m tall)__2__ Sapling (<5 dbh, <6m tall)__25__ Tall shrub (2-6m)__0__ Short shrub (0.5-2m)__25__ Dwarf shrub (<0.5m)__4__ Tall herb (≥1m)__0__ Short herb (<1m)__38__ Moss-Lichen__75__ 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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)__X__ Well Developed (6-18in.)_____ 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%)__X__

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_____ Only Connected Above__X__ 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)_____ Medium (10-100 acres)__X__ 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: W84A1003 Field Target: 15222 Date: 7/1/15

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

1. **Site Description**

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

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

   - [x] Wetland boundaries have been corrected if necessary?
   - [x] 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 Abigayle Fisher — **Wetland Scientist (print)**

X _____ 7/2/15 — **Signature / Date**

X Bryan Strong — **Field Crew Chief (print)**

X _____ 7/2/15 — **Signature / Date**

A1004

WETLAND DETERMINATION DATA FORM

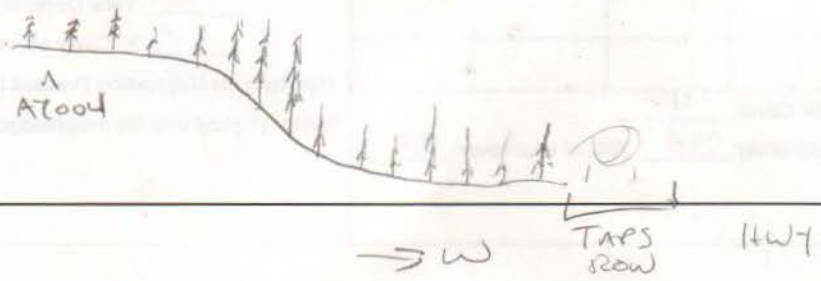
SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15223	Map #: 29 Map Date: 6/29
Date: 7/1/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84/A1004	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 274.6		
Latitude: 66° 51' 51.70"N		Longitude: 150°32'46.12"W		Datum: WGS84
Logbook No.: 1	Logbook Page No.: 28	Picture No.: P_W84A1004_VEG, VEG_PIT.PIC		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 1-2	Local relief (concave, convex, none): Flat to slightly convex tussocky - moderate
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B IIIA2, IIC2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions low snow year	Are "Normal Circumstances" present: 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 X, or Hydrology____ Naturally Problematic?	~~No~~ Yes (If yes, explain in Notes.) Reduced matrix

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: PSS4/EM1B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): II A2, III A2

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

Saturation assumed early in the growing season and during normal periods of precipitation. Alpha alpha positive in frozen material (>6°C of 4") PICMAR are smaller here due to an old fire scar. A few PICMAR snags and stumps give evidence of a very old fire. Tussocks are larger here than A1003 nearby. Less cover of sphagnum moss here and more feather moss and lichen. Borderline PSS4/EM1B vs PSS4/1B. All wet between A1004 and TAPS line west of the point as we walked a section line trail. ERIVAG exceeds dwarf ericacious shrub stratum height so, EM1 dominates in classification. Point in a burn signature - very old burn with scattered PICMAR bar snags and stumps. Canopy of PICMAR was taller before burn.



A7004

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	4		FacW
2.			
3.			
4.			
Total Cover: 4 (added to shrub)			
50% of total cover: —	20% of total cover: —		

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	3		Fac
2. Rhododendrum tomentosum	50	Y	FacW
3. Vaccinium vitis-idaea	6		Fac
4. Betula nana	4		Fac
5. Chamaedaphne calyculata	6		FacW
6. Picea mariana	30	Y	FacW
7. Vaccinium oxycoccus	T		OBL
8.			
9.			
Total Cover: 103			
50% of total cover: 51.5	20% of total cover: 20.6		

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: —	X 1 =	—
FACW species: 137	X 2 =	274
FAC species 13	X 3 =	39
FACU species —	X 4 =	—
UPL species —	X 5 =	—
Column Totals: 150	(A)	313 (B)

PI = B/A = 2.09

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	47	Y	FacW
2. Rubus chamaemorus	T		FacW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 47			
50% of total cover: 23.5	20% of total cover: 9.4		

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

50 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

W84A7004

SOIL Date 7/1/15 Feature ID _____ 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-7							Fibric	
Oef 7-9							Hemic	
A_{ij},f 9-11	7.5yr 2.5/2	100					Silt Loam	Alpha alpha positive
								Ice lenses
BC_{ij},f 11-14	2.5y 4/1	100					Silt Loam	Alpha alpha positive
								No ice lenses

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y Marginal	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Y Reduced matrix

[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: Permafrost Depth (inches): 9

Hydric Soil Present (Y/N): Y

Notes: Alpha alpha positive in frozen material. Some evidence of saturation above frost table.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) Y
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) Y	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: 1-2% slope. Enough of a low gradient to invoke geomorphic position although area is flat and not convex at point	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Saturation assumed early in the growing season and during normal periods of precipitation. Low snow year, Dry conditions.

AY004

AQUATIC SITE ASSESSMENT 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 X Emergent-Non-persistent_____ Emergent-Persistent_____ Aquatic Bed_____

Percent Cover (P): Tree (>5 dbh, >6m tall) 4 Sapling (<5 dbh, <6m tall) 30 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 67 Dwarf shrub (<0.5m) 6 Tall herb (≥1m) 0 Short herb (<1m) 42 Moss-Lichen 50 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%)_____ Very High Density (80-100%) X

Interspersion of Cover & Open Water (P): 100% Cover or Open Water X <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) X High (>25) _____

Presence of Islands (M): Absent (none) X 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 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) X Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat X 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 X 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_____ Fluvaquent 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 X Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable X

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: 355 Wetland Isolated_____ Wetlands within 400m, Not Connected_____ Only Connected Below_____ Only Connected Above_____ Connected Upstream & Downstream X 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)_____ Medium (10-100 acres)_____ Large (>100 acres) X

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

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W84A7004 Field Target: 15223 Date: 7/1/15

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 Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/1/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/1/15

A7005

WETLAND DETERMINATION DATA FORM

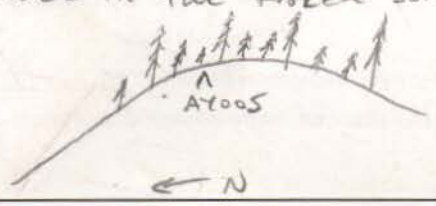
SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15226	Map #: 25 Map Date: 6/29
Date: 7/2/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7005	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 244.5		
Latitude: 67°13'57.93"N		Longitude: 150°12'01.88"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 29	Picture No.: P_W84A7005_VEG_VEG_PIT_P46		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Riser
Slope (%): 4 measured Aspect N 20°	Local relief (concave, convex, none): Slightly convex
Pre-mapped Alaska LNG/NWI classification: PSS4/1B 11A2, 11C2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) dry conditions	Are "Normal Circumstances" present: Yes X No____ (If no, explain in Notes.)
Are Vegetation____, Soil____, or Hydrology____ Significantly Disturbed?	No X (If yes, explain in Notes) dry conditions. Low snow year
Are Vegetation____, Soil____, or Hydrology____ Naturally Problematic?	No X (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes Y No____	Is the Sampled Area within a Wetland? Yes____ No X
Hydric Soil Present? Yes____ No N	Wetland Type: U
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): 11C2, ~~11A2~~ 1A3

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

On a ridge line. Slightly convex with a north trending aspect at the point. Spruce woodland with enough spruce saplings in the understory to meet or exceed 30%. Mostly PICMAR with PICGLA scattered throughout the area. Feather moss dominates bryophyte stratum (~75%) with lichen (20%) and occational sphagnum pillows. Shrub layer is 2.5-3' tall with BETNAN and SALPUL. Dominant CARBIG dominates the herb layer with 15-30% cover in the area. Soils have shallow permafrost with micro lows hosting thinner organic mats and deeper active layer. Microlows in some areas along the ridge may host hydric soils based on observations made at the point. Transitional, non-wetland site with limited saturation and reduction observed above the frost table. No positive reaction to alpha alpha observed in the frozen soil material. 4% slope 20° aspect



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	17	Y	FacW
2.			
3.			
4.			
Total Cover: 17			
50% of total cover: ____ 20% of total cover: ____			
Sapling/Shrub Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
Picea glauca 3'	3	N	FACU
1. Picea mariana 2-15'	15		FacW
2. Betula nana 2-3'	18	Y	Fac
3. Rhododendron tomentosum	22	Y	FacW
4. Vaccinium uliginosum	18	Y	Fac
5. Vaccinium vitis-idaea	6		Fac
6. Spiraea stevenii	1		FacU
7. Betula glandulosa	1		Fac
8. Salix pulchra 3'	3		FacW
9. Salix glauca	2		Fac
Vaccinium oxycoccus T Total Cover: 89			
50% of total cover: 44.5 20% of total cover: 17.8			

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: 59	X 2 = 118
FAC species 75	X 3 = 225
FACU species 4	X 4 = 16
UPL species —	X 5 = —
Column Totals: 138 (A)	359 (B)

PI = B/A = 2.6

Shrubs

Empetrum nigrum T Fac

PICMAR-T (>3"DBH) are between 20-35' tall less than 2% sphagnum pillows in 26' radius Plot. A few of these pillows support bog cranberry

VEGETATION (use scientific names of plants)

Herb Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Petasites frigidus	2		FacW
2. Carex bigelowii	30	X	Fac
3. Equisetum sylvaticum	T		
4. Calamagrostis canadensis	T		
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 32			
50% of total cover: 16 20% of total cover: 6.4			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

3 % 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):

A1005

WETLAND DETERMINATION DATA FORM

7/2/15 W84A1005 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-6							fibric	measures 4" Oi in microlow
A 6-9	10YR 3/1	100					SiL	not mucky
Bw 9-11.5	10YR 4/2	30	5Y 5/1	7	D	PL/RC	SiL	Alpha alpha positive in some
	2.5Y 4/2	58	10YR 4/4	5	C	M		depletions
BCf 11.5-19	2.5Y 5/3	100					SiL	frozen, Not positive for
								alpha alpha. Few or
								no ice lenses

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 11.5

Hydric Soil Present (Y/N): N

Notes: From 9-11.5inches where organic mat is somewhat thinner (hummock microlows) Soil is thixotropic, saturated, 2.5Y 4/2 w/depletions along PL and RC that are sometimes alpha alpha positive. Alpha alpha positive in less than 60% of ~3" above the frost table. Where organic mat is thicker, 9-11.5 inches is 10YR4/2, not saturated, No positive alpha alph

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N of mat 60% 4"	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) N
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes:	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y	
Water Table Present (Y/N): N	Depth (in): NA		
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 9-11.5	EC: NA	

Notes:

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A1005 Field Target: 15226 Date: 7/2/15

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

1. **Site Description**

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

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

   - [x] Wetland boundaries have been corrected if necessary?
   - [x] 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 Abigayle Fisher X 7/2/15

Wetland Scientist (print) **Signature / Date**

X Brian Strong X 7/2/15

Field Crew Chief (print) **Signature / Date**

A4006

WETLAND DETERMINATION DATA FORM

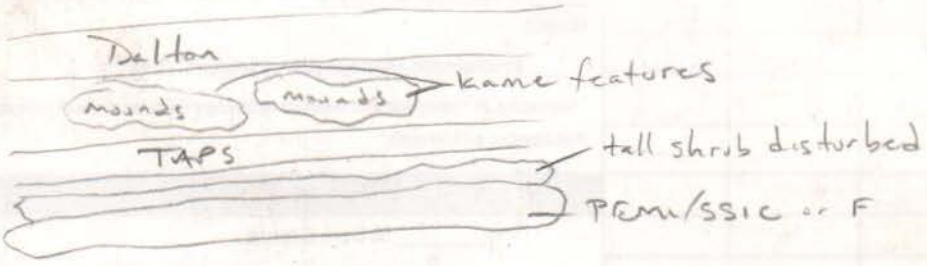
SITE DESCRIPTION			
Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: 15301	Map #: 28 Map Date: 6/29
Date: 7/2/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A4006
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 253	
Latitude: 67°07'56.48"N	Longitude: 150°20'49.04"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 30	Picture No.: P_W84A4006_VEG_VEG_PIT_PIC	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 1	Local relief (concave, convex, none): Tussocky - large to moderate
Pre-mapped Alaska LNG/NWI classification: PSS1/3B 11C2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No X (if no explain in Notes) dry conditions	Are "Normal Circumstances" present: 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: PSS1/EMIB
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): 11C2 111A2

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

Tussocks are 15-20" tall (large and moderate). Some evidence of standing water between a few tussocks. Shrub stratum rises 1-2.5 above ERIVAG tussocks. BETNAN/BETGLAN cover is 25-40% in area mixed with SALPUL and SALRIC.



OMSST, PSS1/EMIB 11C2, 111A2

X A4006

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. —	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana	40	Y	Fac
2. Vaccinium uliginosum	10		Fac
3. Dasiphora fruticosa	4		Fac
4. Rhododendrum groenlandicum	1		Fac
5. Salix pulchra	10		FacW
6. Salix richardsonii	5		FacW
7. Betula glandulosa	2		Fac
8.			
9.			
Total Cover: 72			
50% of total cover: 36	20% of total cover: 14.4		

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: 105	X 2 = 210
FAC species 62	X 3 = 186
FACU species —	X 4 = —
UPL species —	X 5 = —
Column Totals: 167 (A)	396 (B)

PI = B/A = 2.37

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	90	Y	FacW
2. Carex bigelowii	5		Fac
3. Rubus chamaemorus	T		FacW
4. Chamerion angustifolium	T		FacU
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 99			
50% of total cover: 47.5	20% of total cover: 19		

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

2 % Cover of Wetland Bryophytes

2 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

Litter covers the ground between hummocks with small amounts of moss/liverwort

A-1006

WETLAND DETERMINATION DATA FORM

7/2/15 W84A1006 Y

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					
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-5							Fibric	FERIVAG tussock top/thatch
Oa 5-8							Sapric	iron stained - high water mark
A 8-12	10yr 2/1	100					MK SiL	mixed with organic debris
Bf 12-15	2.5Y 5/3	20					SiL	Alpha alpha positive
	2.5Y 4/1	80						

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) All mucky SiL

[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: Permafrost Depth (inches): 12

Hydric Soil Present (Y/N): Y

Notes: Iron staining from 5-8" indicative of persistent high water table.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) Y	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) N*	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) ____	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) ~~N~~ Y 33S
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Large FERIVAG tussocks 18-24" with water stained leaves between tussocks large and moderate tussocks.	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y	
Water Table Present (Y/N): N	Depth (in): NA		
Saturation Present (Y/N): (includes capillary fringe) N*	Depth (in): NA	EC: NA	

Notes: 5-8" is at field capacity - near saturation. Dry conditions. Iron staining from 5-8 indicates high water table is persistent during normal periods of rainfall.

AY006

AQUATIC SITE ASSESSMENT 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)__15__ Short shrub (0.5-2m)__57__ Dwarf shrub (<0.5m)__0__ Tall herb (≥1m)__0__ Short herb (<1m)__35__ Moss-Lichen__2__ Floating__0__ Submerged__3__

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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)_____ Well Developed (6-18in.)_____ Pronounced (>18in.)__X__

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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)_____ Large (>100 acres)__X__

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: W84A7006 Field Target: 15301 Date: 7/2/15

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 Abigayle Fisher — **Wetland Scientist (print)**

X _____ 7/2/15 — **Signature / Date**

X Bryan Strong — **Field Crew Chief (print)**

X _____ 7/2/15 — **Signature / Date**

A1007

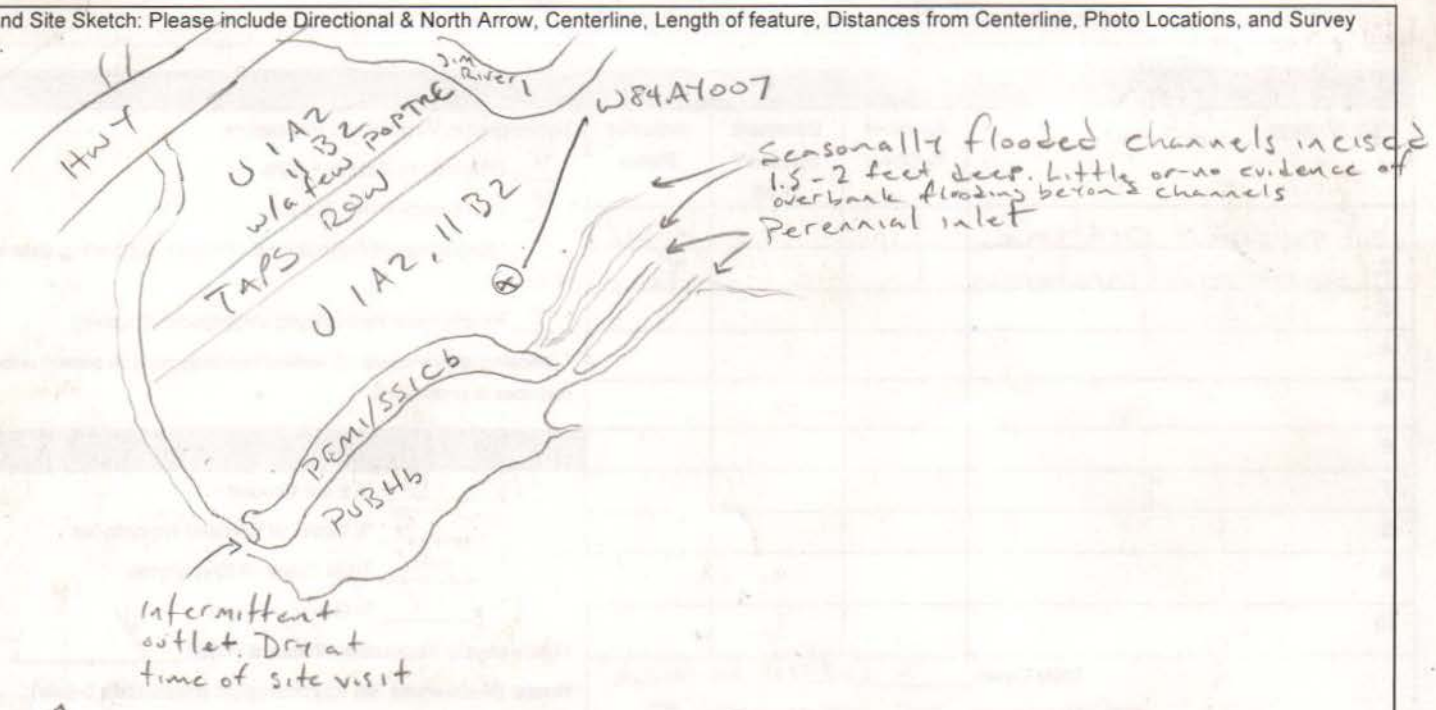
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline____ Access Road (explain) X Other (explain)_____			Field Target: 5300	Map #: 31 Map Date: 9/29
Date: 7/2/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1007	
Investigators: Bryan Stroney, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: N/A		
Latitude: 66°50'11.40"N	Longitude: 150° 35' 54.56" W		Datum: WGS84	
Logbook No.: 01	Logbook Page No.: 30	Picture No.: PW84A1007_VEG_VEGPIT=PLVG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 3 measured	Local relief (concave, convex, none): Undulating, hummocky - mod
Pre-mapped Alaska LNG/NWI classification: PFO4B / A2	Evidence of Wildlife Use: Yes beaver
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) dry conditions	Are "Normal Circumstances" present: 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____ No X
Hydric Soil Present? Yes____ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes____ No X	Alaska Vegetation Classification (Viereck): 1A2, 11B2

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



A-1007

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	15	Y	FacW
2. Picea glauca	10	Y	FacU
3.			
4.			

Total Cover: 25

50% of total cover: 12.5 20% of total cover: 5

Sapling/Shrub Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	75	Y	Fac
2. Empetrum nigrum	AF ~~54~~		Fac
3. Vaccinium vitis-idaea	4		Fac
4. Picea mariana	14		FacW
5. Picea glauca	6		FacU
6. Alnus viridis ssp. fruticosa	10		Fac
7. Chamaedaphne calyculata	1		FacW
8. Betula glandulosa	T		Fac
9. Salix pulchra	3		FacW

Total Cover: ~~AF~~ 120

50% of total cover: ~~AF~~ 60 20% of total cover: ~~AF~~ 24

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: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species: —	X 1 = —
FACW species: 39	X 2 = 68
FAC species 95	X 3 = 285
FACU species 16	X 4 = 64
UPL species —	X 5 = —
Column Totals: 145 (A)	417 (B)

PI = B/A = 2.88

Rhododendron tomentosum T FacW

Rhododendron groenlandicum 1 Fac

VEGETATION (use scientific names of plants)

Herb Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Equisetum pratense	1		FacW
2. Calamagrostis canadensis	1		Fac
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 2 (added to shrub)

50% of total cover: — 20% of total cover: —

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

5 % Cover of Wetland Bryophytes

40 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

AY007

WETLAND DETERMINATION DATA FORM

7/2/15 W84AY007

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
O1 0-8.5								fibric - no evidence of saturation
A 8.5-9	10YR 2/2	100					S.L	
C1 9-23	10YR 5/4	100					Sand	single grain - no fines or gravels - clean sand
C2 23-25	10YR 5/3	60					Sand	" "
	10YR 5/2	40						" "

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: NA Depth (inches): NA

Hydric Soil Present (Y/N): N

Notes: Organics powdery with silty material - possibly from the road or rare overbank events

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** N
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Several small seasonal channels just east of the plot

A1007

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84AY067 Field Target: 15300 Date: 7/2/15

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 Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/2/15

X Bryan Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/2/15

A7008

WETLAND DETERMINATION DATA FORM

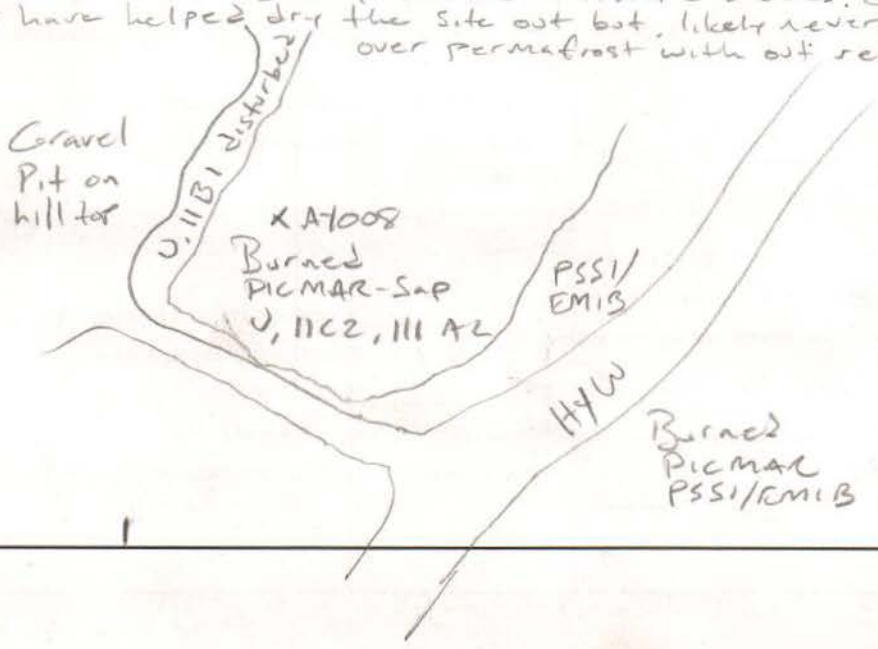
SITE DESCRIPTION				
Survey Type: Centerline ___ Access Road (explain) X Other (explain) ___			Field Target: 15262	Map #: 34 Map Date: 6/29
Date: 7/3/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7008	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: N/A		
Latitude: 66°49'09.94"N	Longitude: 150°40'17.27"W		Datum: WGS84	
Logbook No.: 01	Logbook Page No.: 31	Picture No.: PW84A7008_VEG, VEG_PIT_PLUG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Backslope
Slope (%): 7-8% Aspect: E	Local relief (concave, convex, none): Flat to slightly concave Hummocky - small
Pre-mapped Alaska LNG/NWI classification: PSSc1/1B IIA2, IIC2 (measured)	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes ___ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Dry conditions Yes X No ___ (If no, explain in Notes.) Low snow year
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 Y No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present? Yes ___ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes Y No ___	Alaska Vegetation Classification (Viereck): 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.

Dry conditions, low snow year. Burned PICMAR-Sap approximately 7 years old. Standing dead PICMAR-Snags with RHOTOM, VACULI, SALBEB, BETNAN, CARBIG, CHAANG Regen. PICMAR seedlings starting to come in (.5-1' tall) Wet below near highway where hillslope breaks. Gravel pit disturbance upslope may have helped dry the site out but, likely never a hydric soil, only saturated over permafrost with out reducing conditions.



A7008

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 14U Ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. —	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

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)

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
Picea glauca (.5')	T		
1. Vaccinium uliginosum	8		Fac
2. Rhododendron tomentosum	12	Y	FacW
3. Picea mariana (.5')	3		FacW
4. Vaccinium vitis-idaea	3		Fac
5. Chamaedaphne calyculata	1		FacW
6. Alnus viridis ssp. fruticosa	4		Fac
7. Betula nana (2')	12	Y	Fac
8. Betula neoalaskana	T		FacU
9. Salix pulchra (1.5')	T		FacW
Total Cover: 46			
50% of total cover: 23 20% of total cover: 9.2			

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species: —	X 1 =	—
FACW species: 15	X 2 =	30
FAC species 59	X 3 =	177
FACU species 8	X 4 =	32
UPL species —	X 5 =	—
Column Totals: 82 (A)		239 (B)

PI = B/A = 2.91

Shrub

Salix bebbiana 3 Fac

Spirea stevenii 1 FacU

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Chamerion angustifolium	75 ESS		FacU
2. Carex bigelowii	25	Y	Fac
3. Calamagrostis lapponica	4		Fac
4. Rubus chamaemorus	T		FacW
5. Festuca altaica	T		Fac
6.			
7.			
8.			
9. Polytrichum sp	5		
10. Fire moss	60		
Litter 35% Total Cover: 36			
50% of total cover: 18 20% of total cover: 7.2			
PICMAR SN 3%			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

0 % Cover of Wetland Bryophytes

70 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7008

WETLAND DETERMINATION DATA FORM

7/3/15 W84A7008 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-3							fibric	Sphagnum fibers - v. dry
Oi2 3-8							fibric	Sphagnum fibers - dry
Oa 8-11							Sapric	moist
Bw 11-15	10yr 3/4	100					Sol	moist
Cf 15-20	10yr 4/3	80						charcoal at ~18"
	10yr 3/4	20						low ice 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 SOILS[3]
Histosol or Histel (A1) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 15

Hydric Soil Present (Y/N): N

Notes: Organics did not burn significantly during wildfire. No living sphagnum observed at site. Organics composed of sphagnum fibers. Permafrost table appears to have dropped a few inches. No evidence of saturation or reduction in mineral soil. Well drained Sol. Before fire or before gravel pit disturbance above part, organics may have been periodically saturated at contact with the frost table. No evidence Or material saturated for extended periods

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A7008

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A008 Field Target: 15262 Date: 7/3/15

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

1. **Site Description**

   - [x] Site description, site parameters and summary of findings are complete?
   - [x] A detailed site sketch is included in ~~logbook~~ field form?

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

   - [x] Wetland boundaries have been corrected if necessary?
   - [x] 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)?

NA ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Margaret Fisher — **Wetland Scientist (print)**

X [signature] 7/4/15 — **Signature / Date**

X Bryan Strong — **Field Crew Chief (print)**

X [signature] 7/4/15 — **Signature / Date**

A7009

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline X Access Road (explain)____ Other (explain)_____		Field Target: 15234	Map #: 18 Map Date: 6/29
Date: 7/3/15	Project Name & No.: Alaska LNG 60418403	Feature Id: W84A7009	
Investigators: Bryan Strong, Abbeyle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 221	
Latitude: 67° 30' 08.68" N	Longitude: 149° 51' 19.44" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 30	Picture No.: P_W84A7009_VEG_VEG_PIT_PIC	

SITE PARAMETERS

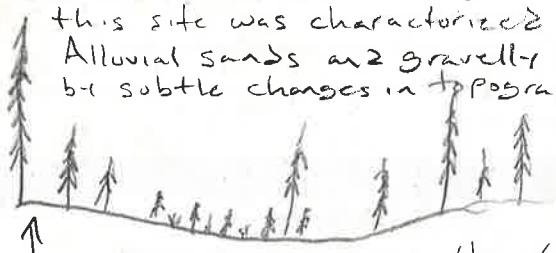
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Toeslope/Swale
Slope (%): 2 Aspect W 300°	Local relief (concave, convex, none): Slightly concave across + down tussocks - small
Pre-mapped Alaska LNG/NWI classification: PSS1/EM1C2, IIA2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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 Y No_____	Is the Sampled Area within a Wetland? Yes X No_____
Hydric Soil Present? Yes Y No_____	Wetland Type: PEM1/4B
Wetland Hydrology Present? Yes Y No_____	Alaska Vegetation Classification (Viereck): IIA3, IIIA2, ~~IIB2~~

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

Calcareous soils. Gleyed soil matrix with reducing conditions. High diversity white spruce are chlorotic - likely due to calcareous soils in addition to wet conditions. Dry conditions. Typically this site would support persistent water table near the soil surface. Veg classification fall on the border with a high proportion of sedges mixed with a significant dwarf ericaceous, dwarf dryas shrub character. Sedges (ERIVAG, CARROS etc...) have a more pronounced vertical presence therefore this site was characterized as emergent persistent/spruce woodland. Alluvial sands and gravelly sands throughout area. Wet condition strongly driven by subtle changes in topography with interfluve/convex sites non-wetland,



Up w/taller PICGLA, more BETGLA and SALPUL and fewer Carex sp.

N1009

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10014)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea ~~mariana~~ AF glauca	3		FacW
2.			
3.			
4.			
Total Cover: 3 (added to shrub)			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Dasiphora fruticosa	4		Fac
2. Betula glandulosa	2		Fac
3. Picea mariana	T		FacW
4. Picea glauca	7	Y	FacW
5. Andromeda polifolia	3		FacW
6. Arctous rubra	5	Y	Fac
7. BSS ~~Chamaedaphne calyculata~~			~~FacW~~
8. Dryas integrifolia	8	Y	FacW
9. Salix pulchra	5	Y	FacW
Total Cover: 47			
50% of total cover: 23.5 20% of total cover: 9.4			

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:	2	X 1 =	2
FACW species:	42	X 2 =	84
FAC species	19	X 3 =	57
FACU species	18	X 4 =	72
UPL species	—	X 5 =	—
Column Totals:	81 (A)		215 (B)

PI = B/A = 2.65

Shrub

Salix reticulata 3 Fac

Vaccinium uliginosum 1 Fac

AF Salix richardsonii 2 FacW

Rhododendron lapponicum 2 Fac

Rhododendron groenlandicum T Fac

Betula nana 2 Fac

VEGETATION (use scientific names of plants)

Herb Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	20 ~~18~~ BSS	Y	FacW
2. Carex bigelowii	T		Fac
3. Rumex arcticus	T		Fac
4. Festuca altaica	T		Fac
5. Carex membranacea	8 ~~5~~ BSS	Y	FACW
6. Carex gynocrates	2 T BSS		OBL
7. pedicularis sp.	T		FacW
8. Equisetum variegatum	4		FacW
9. Tofieldia sp.	T		Fac
10. Bistorta vivipara	T		Fac
Total Cover: 34			
50% of total cover: 17 20% of total cover: 6.8			

Pedicularis capitata T FacW

Anemone ~~richardsonii~~ T Fac

SP BSS (likely richardsonii)

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

? 85 % Cover of Wetland Bryophytes

95 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

Allocomnium ? 85

Feather moss 5

lichen 5

Litter 5

AT009

WETLAND DETERMINATION DATA FORM

7/3/15 W84AT009 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
0-3								
3-5	5YR 2.5/2						mkSiL	Iron stained - high water table iron staining
5-11	N4/0	95	5YR 4/4	5	C	M	vfSaL	Alpha alpha positive
11-14	N3/0	75	5YR 4/4	5	C	M	vfSaL	Alpha alpha positive
[illegible]	N2.5/	20						cryoturbated w/Oe + A material
14-16	N3/0	95	5YR 4/4	5	C	M	fSaL	Alpha alpha positive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) Y - slight		Alaska Gleyed without 5Y Hue or Redder Underlying Layer X
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced matrix

[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: Permafrost Depth (inches): 14

Hydric Soil Present (Y/N): Y

Notes: Weak H_2S odor. Profile at field capacity - near saturation. Dry conditions Alluvial sand deposits throughout area. Cryoturbated with Oe and mucky A material mixed/contacting permafrost table.

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Dry conditions

A7009

AQUATIC SITE ASSESSMENT 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__X__ Aquatic Bed_____

Percent Cover (P): Tree (>5 dbh, >6m tall)__3__ Sapling (<5 dbh, <6m tall)__7__ Tall shrub (2-6m)__6__ Short shrub (0.5-2m)__21__ Dwarf shrub (<0.5m)__19__ Tall herb (≥1m)__0__ Short herb (<1m)__39__ Moss-Lichen__95__ 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__X__ <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) __X__

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ Lacustrine Fringe_____ Depressional _____ Riverine _____ Estaurine 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)__X__ Well Developed (6-18in.)_____ 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)__X__ Large (>100 acres)_____

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

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W84A-1009 Field Target: 15234 Date: 7/3/15

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?~~ field form

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 Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/9/15

X Brenna Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/4/15

A7010
N

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 1523'	Map #: 19 Map Date: 6/29
Date: 7/3/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7010	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 221.2		
Latitude: 67° 28' 59.07" N		Longitude: 149° 51' 54.12"		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 32	Picture No.: P_W84A7010_VEG-VEG_PIT_PLUG		

SITE PARAMETERS

Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 4	Local relief (concave, convex, none): Rolling undulating, small hummocks
Pre-mapped Alaska LNG/NWI classification: Upland, 1A2, 1IC2	Evidence of Wildlife Use: Nd
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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

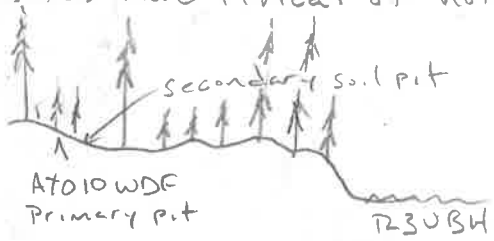
Hydrophytic Vegetation Present? Yes X No____	**Is the Sampled Area within a Wetland?** Yes____ No X
Hydric Soil Present? Yes____ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): 1A3, 11A3, ~~1C2~~

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

A few localized closed depressions host hydric soils in the area. Two soil pits dug at site. Pit described typical of the area with concave microsites more typical of notes describing second soil pit dug.

20% mixed spruce sapling; 10% mixed spruce tree (>20')

Signature on imagery is 1A2 but many 10-19' tall spruce in the area.



A7010

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana (20-50')	8	Y	FacW
2. Picea glauca (20-60')	2	Y	FacU
3.			
4.			
Total Cover: 10			
50% of total cover: 5	20% of total cover: 2		

Sapling/Shrub Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	1		Fac
2. Vaccinium vitis-idaea	9		Fac
3. Rhododendron groenlandicum	1		Fac
4. Rhododendron tomentosum	15	Y	FacW
5. Betula nana	5		Fac
6. Betula glandulosa	12	Y	Fac
7. Dryas integrifolia	1		FacU
8. Salix glauca	8		Fac
9. Picea glauca (2-19')	4		FacU
Total Cover: 78			
50% of total cover: 39	20% of total cover: 15.6		

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

% Dominant Species that are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species:	1	X 1 =	1
FACW species:	40	X 2 =	80
FAC species	40	X 3 =	120
FACU species	7	X 4 =	28
UPL species	—	X 5 =	—
Column Totals:	88 (A)		229 (B)

PI = B/A = 2.6

shrub

Picea mariana (2-19') 10 Y FacW

Empetrum nigrum 2 Fac

Salix reticulata 2 Fac

20% spruce saplings 10% spruce tree

VEGETATION (use scientific names of plants)

Herb Stratum (26)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Festuca altaica	1		Fac
2. Saussurea angustifolia	T		Fac
3. Equisetum arvense	T		Fac
4. Carex vaginata	1		OBL
5. Equisetum pratense	1		FacW
6. Bistorta plumosa	1		FacU
7.			
8.			
9.			
10.			
Total Cover: 3 (added to shrub)			
50% of total cover: —	20% of total cover: —		

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

— 0 % Bare Ground

10 % Cover of Wetland Bryophytes

10% Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A1010

WETLAND DETERMINATION DATA FORM

7/31 W84A1010 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
0-3								
3-11	10YR 4/3	98	10YR 4/4	2	C	M	SaL	a few concentrations at interface with coarser LSa below
								Moist
11-18	5Y 4/1	100					LSa	Parent material colors
								Moist
Cf 18-20	5Y 4/1	100					LSa	Parent material colors, Frozen
								Not alpha alpha positive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 18

Hydric Soil Present (Y/N): N Alluvial deposits of sandy materials - no gravels observed

Notes: 2x2 pit dug in a wetter concave microsite - 10' away had: O-5 Oi 5-9 Oa Permafrost at 9 inches. Sandy loam below organics is frozen 5Y 4/1 and not alpha alpha positive. Organics may be saturated in concave microsites for periods of the growing season but it does not appear reduction occurs.

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A-1010

AQUATIC SITE ASSESSMENT 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 Geologic 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: W81A4010 Field Target: 15233 Date: 7/13/15

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

1. **Site Description**

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

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

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

8. Photos

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

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/4/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/4/15

A-1011
Y

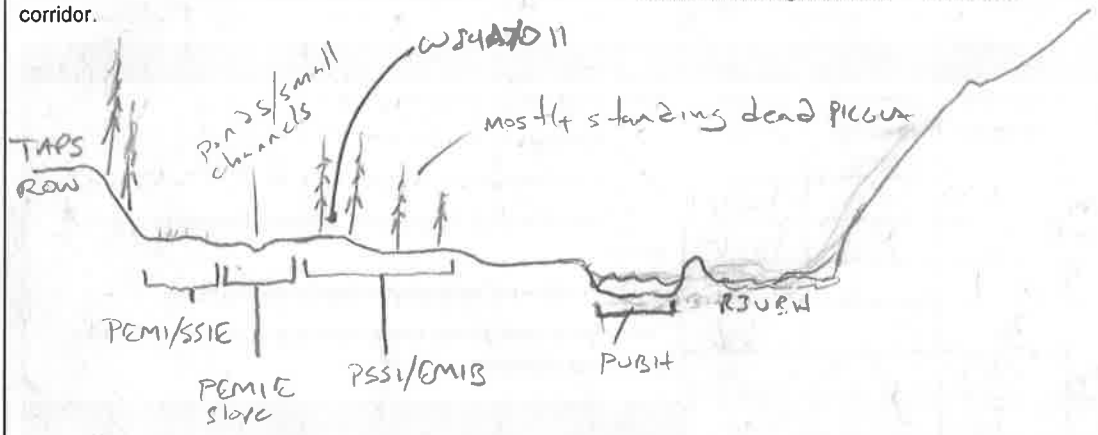
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline___ **Access Road** (explain) X **Other** (explain)_____		**Field Target:** 15302	**Map #:** 16 **Map Date:** 6/29
Date: 7/4/15	**Project Name & No.:** Alaska LNG 60418403	**Feature Id:** W84A/011	
Investigators: Bryan Strong, Abigayle Fisher			**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** 206.6	
Latitude: 67°40'38.47"N	**Longitude:** 149°43'48.96"W		**Datum:** WGS84
Logbook No.: 01	**Logbook Page No.:** 32	**Picture No.:** P-W84A011_VEG_VEG_PIT_PLUG	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 1.2	Local relief (concave, convex, none): Flat, small hummocks
Pre-mapped Alaska LNG/NWI classification: PSS1/EMIB 11C2,111A2	Evidence of Wildlife Use: Ducks, passerine birds
Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No X (if no explain in Notes) Dry Conditions	Are "Normal Circumstances" present: 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 Y No_____	**Is the Sampled Area within a Wetland?** Yes Y No_____
Hydric Soil Present? Yes Y No_____	**Wetland Type:** PSS1/EMIB
Wetland Hydrology Present? Yes Y No_____	Alaska Vegetation Classification (Viereck): 11 C2, 111 A2

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



Was a white spruce woodland. Trees and large saplings mostly standing dead. Site may be wetter now than in the past. Thixotropic, high n-value soils with a water table near the surface year round. No frost table in ~30" Slope HGM EC 507mS pH 7.23. Limestone and marble mountains flank the valley. Calcareous soils.

A-10n

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea glauca	2		FacW
2.			
3. Standing dead picea	5		
4.			

Total Cover: 2 (added to shrub)

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana	AF T		Fac
2. Betula glandulosa	~~30~~ 30	Y	Fac
3. Dryas integrifolia	8		FacU
4. Arctous rubra	5		Fac
5. Salix pulchra	1		FacW
6. Salix richardsonii	3		FacW
7. Salix reticulata	2		Fac
8. Vaccinium uliginosum	1		Fac
9. Picea glauca	5		FacU

Total Cover: 56

50% of total cover: 28 20% of total cover: 11.2

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:	11	X 1 =	11
FACW species:	43	X 2 =	86
FAC species	37	X 3 =	111
FACU species	15	X 4 =	60
UPL species	—	X 5 =	—
Column Totals:	106 (A)		268 (B)

PI = B/A = 2.52

shrub

Picea mariana T FacW

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	1		FacW
2. Carex membranacea	18	Y	FacW
3. Eriophorum angustifolium	1		OBL
4. Carex Vaginata	3		Obl
5. Equisetum palustre	20	✓	FacW
6. Bistorta vivipara	T	✓	Fac
7. Equisetum Variegatum	T		FacW
8. Pedicularis labradorica	T		FacW
9. Carex aquatilis	7		OBL
10. Equisetum arvense	T		Fac

Total Cover: 50

50% of total cover: 25 20% of total cover: 10

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

90 Total Cover of Bryophytes

T % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7011

WETLAND DETERMINATION DATA FORM

7/4/15 WB4A7011 1 Y

SOIL Date 7/4/15 Feature ID WB4A7011 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
A 0-3	10yr 2/1	100					MiCL	
Cs 3-30	N4/0	97	10yr 5/6	3	C	RC/PL	vfSaL	Alpha alpha positive massive - restrictive layer

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer Y
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced matrix

[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: massive vf'SaL Depth (inches): 3

Hydric Soil Present (Y/N): Y

Notes: Thixotropic - high n-value soils. No frost table found in 30".

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

Surface Water Present (Y/N): Y	Depth (in): 1	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): Y	Depth (in): 3	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 1	EC: 508 @ 11.7°C soil pit pH 6.8
Notes:		EC surface: 507 @ 9.4°C pH 7.23

A-011

AQUATIC SITE ASSESSMENT 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)_2_ Sapling (<5 dbh, <6m tall)_5_ Tall shrub (2-6m)_0_ Short shrub (0.5-2m)_36_ Dwarf shrub (<0.5m) _15_ Tall herb (≥1m) _0_ Short herb (<1m) _50_ Moss-Lichen_90_ Floating_0_ Submerged_0_

Number of Wetland Types (M): _3_ | **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_X_ <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) _X_ High (>25) _____

Presence of Islands (M): Absent (none) _X_ 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_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)_X_ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_X_ 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_X_ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)_X_ Well Developed (6-18in.)_____ Pronounced (>18in.)_____ small hummocks

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_____ Surface 7.23 pH

Water pH (P): No surface water_____ Circumneutral (5.5-7.4)_X_ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** 6.8 Soil pH

Surficial Geologic 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_____ Only Connected Above_____ Connected Upstream & Downstream_X_ 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)_____ Medium (10-100 acres)_X_ 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: W84A4011 Field Target: 15302 Date: 7/4/15

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~~ Form?

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)?

NA ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/9/15

X Bryan Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/9/15

A-1012
N-T

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline___ Access Road (explain)___ Other (explain) X-footing			Field Target: 15263	Map #: 15 Map Date: 6/29
Date: 7/4/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1012	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: N/A		
Latitude: 67°53'17.44"N		Longitude: 149°49'25.99		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 32	Picture No.: P-W84A1012_VEG-VEG-PIT-PLUG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Kame terrace
Slope (%): 9% W 300° = Aspect	Local relief (concave, convex, none): Slightly convex, hummocky moderate
Pre-mapped Alaska LNG/NWI classification: Upland 1A2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes___ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Dry conditions Yes X No___ (If no, explain in Notes.) Low snow year
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___ No X	**Is the Sampled Area within a Wetland?** Yes___ No X
Hydric Soil Present? Yes___ No X*	**Wetland Type:** U
Wetland Hydrology Present? Yes X No___	Alaska Vegetation Classification (Viereck): 1A2, 11C2

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

Glacial terrace. Undulating and convex landform with subtle swales hosting hydric soils. The point described has 3.5" low chroma alpha alpha positive Clay loam (massive) glacial till. This acts as an impeding layer to the looser and more gravelly material below 6.5 inches. Point has convex slope shape. Nearby areas with concave slopes are expected to meet reduced matrix criteria with >4" of low chroma reducing and saturated soil material. PICGLA-T are mostly 30-50' with saplings mostly 10-19' tall. SALGLA ~5' BETGLA ~2.5-3'.

Cypripedium passerinum observed east of plot in dry White Spruce

Carex concinna

A7012

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea glauca	20	Y	FacU
2.			
3.			
4.			
Total Cover: 20			
50% of total cover: ____ 20% of total cover: ____			
Sapling/Shrub Stratum (26 ft)	**Absolute % Cover**	**Dominant Species? (Y/N)**	**Indicator Status**
1. Vaccinium uliginosum	40	Y	Fac
2. Betula glandulosa	5		Fac
3. Rhododendrum tomentosum	2		FacW
4. Empetrum nigrum	4		Fac
5. Dryas integrifolia	4		FacU
6. Salix reticulata	1		Fac
7. Salix glauca	12	Y	Fac
8. Vaccinium vitis-idaea	8		Fac
9. Picea glauca	10		FacU
Total Cover: 90			
50% of total cover: 45 20% of total cover: 18			

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:	1	X 1 =	1
FACW species:	2	X 2 =	4
FAC species	75	X 3 =	225
FACU species	38	X 4 =	152
UPL species	—	X 5 =	—
Column Totals:	116 (A)		382 (B)

PI = B/A = 3.29

Shrubs

Alnus viridis ssr fruticosa 8 Fac

Rhododendron lapponicum T Fac

Artous ruber 2 Fac

VEGETATION (use scientific names of plants)

Herb Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Saussurea angustifolia	T		Fac
2. Cassiope tetragona	1		FacU
3. Festuca altaica	1		Fac
4. Carex vaginata	1		OBL
5. Carex scirpoidea	3	Y	FACU
6. Carex canescens	T		Fac
7. Hedysarum alpinum	T		FacU
8. Pedicularis capitata	T		FacU
9. Pedicularis lapponica Yellow	T		Fac
10. Pyrola asarifolia	T		FacU
Total Cover: 6			
50% of total cover: 3 20% of total cover: 1.2			

Hydrophytic Vegetation Indicators:

— Dominance Test is > 50%

— 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.

0 % Bare Ground

0 % Cover of Wetland Bryophytes

90 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N

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

Feather moss	75
Lichen	10
litter	10
Moss	5

A7012

WETLAND DETERMINATION DATA FORM

7/4/15 W84 A7012 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oe 0-2							Hemic	
A 2-3	10YR 2/2	100					SiL	
Bg 3-6.5	N5/0	95	2.5Y 5/4	5	C	M/PL/RC	Clay Loam	Alpha alpha positive. Moist. Massive
A'' 6.5-8	2.5Y 3/1	100					vfSaL	Wavy boundary. A few gravels
BC 8-15	5Y 5/1	100					GRLoam	Granular structure ~25% gravel
C 15-19	2.5Y 5/1	100					GRSaL	loose - somewhat granular struct

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Massive Clay Loam Depth (inches): 3 - 6.5"

Hydric Soil Present (Y/N): N Transitional, Misses the reduced matrix by 0.5"

Notes: Glacial till, low chroma parent material. Bg colors due to reduced matrix. Along RC in Bg are 7.5YR 4/6 concentrations ~1%. Bg has ~5% fine gravel. Bg is Clay loam with a massive structure. An impeding layer that retains/perches precipitation during normal periods of precipitation. Moist alpha alpha positive. Only 3.5 inches. Not 4" in depth needed for

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required) Reduced Matrix indicator	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N * 3.5" >60%	Microtopographic Relief (D4) Y Moderate Hummocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) N
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Saturation will occur in upper 6.5 inches due to an impeding layer - Clay Loam massive structure.	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Saturation will be present in the upper 4 inches of horizon with reducing conditions

A-7012

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A4012 Field Target: 15263 Date: 7/4/15

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~~ Form?

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 Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/4/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/4/15

A-1013
N

WETLAND DETERMINATION DATA FORM

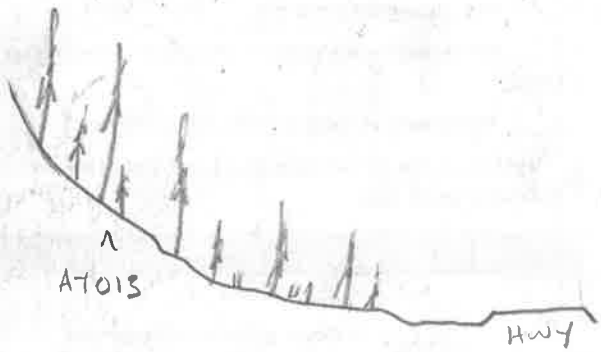
SITE DESCRIPTION				
Survey Type: Centerline X **Access Road** (explain)____ **Other** (explain)____			**Field Target:** 15316	**Map #:** 17 **Map Date:** 6/29
Date: 7/4/15	**Project Name & No.:** Alaska LNG 60418403		**Feature Id:** W84A4013	
Investigators: Bryan Strong, Abigayle Fisher				**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** 215.8		
Latitude: 67°35'42.66"N	**Longitude:** 149°49'20.31"W		**Datum:** WGS84	
Logbook No.: 01	**Logbook Page No.:** 33	**Picture No.:** P_W84A4013_VEG-VEG-PIT_PIC6		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Backslope - slight concave
Slope (%): 19% Aspect: W	Local relief (concave, convex, none): Undulating, hummocky - Mod
Pre-mapped Alaska LNG/NWI classification: U IC3	Evidence of Wildlife Use: N/a
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Dry conditions Yes X No____ (If no, explain in Notes.) Low snow year
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____ No X
Hydric Soil Present? Yes____ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): II A3, II C2

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

Soil pit has been open and melting under the hot sun. Soil above frost table is moist, but not saturated. No free water at the time of site visit. Tussocky below Point where the slope toes out above the highway. No positive alpha alpha or evidence of saturation in organics



Dryas appears to be hybridizing

AY013

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea glauca (20-50')	3		FacU
2. Picea mariana (~20')	T		FacW
3.			
4.			
Total Cover: 3 (added to shrub)			
50% of total cover: —	20% of total cover: —		

Sapling/Shrub Stratum (16ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Salix glauca (3')	10	Y	Fac
2. Vaccinium uliginosum	13	Y	Fac
3. Vaccinium vitis-idaea	6		Fac
4. Rhododendrum groenlandicum	T		Fac
5. Andromeda polifolia	T		FacW
6. Alnus viridis ssp. fruticosa	4		Fac
7. Picea glauca	1		FacU
8. Salix reticulata	1		Fac
9. Betula glandulosa	1		Fac
Total Cover: 78			
50% of total cover: 39/2	20% of total cover: 15.8		

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 4/1 (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:	—	X 1 =	—
FACW species:	22	X 2 =	44
FAC species	46	X 3 =	141
FACU species	8	X 4 =	32/40
UPL species	—	X 5 =	—
Column Totals:	76 (A)		220 (B)

PI = B/A = 2.82

Shrub

Arctous ruber	2	Fac
Salix richardsonii	T	FacW
Empetrum nigrum	2	Fac
Dryas integrifolia	1	FacU
Picea mariana	22 Y	FacW
Dryas sp.	T	FacU

VEGETATION (use scientific names of plants)

Herb Stratum (2614)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Equisetum scirpoides	1		FacU
2. Saussurea angustifolia	T		Fac
3. Carex bigelowii	2	Y	Fac
4. Boschniakia rossica	T		FacU
5. Pyrola asarifolia	T		FacU
6. Eriophorum vaginatum	1		FacW
7. Carex scirpoidea	2	Y	FacW
8. Bistorta plumosa	1		Fac
9. Tofieldia sp.	T		
10.			
Total Cover: 5 added to shrub			
50% of total cover: 2.5	20% of total cover: 1.0		

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

90 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7013

WETLAND DETERMINATION DATA FORM

7/4/15 WS4A7013 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-4								
Oe 4-7								
A 7-8	10YR 2/2	100						
Bw 8-12	2.5Y 5/3	100					Loam	~7% gravels
BCjf 12-16+	2.5Y 5/3	99					GR Loam 15% gravel	1% lithochromic mottles rotten rock fragments

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

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS[3]
Histosol or Histel (A1) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 12

Hydric Soil Present (Y/N): N

Notes: lithochromic mottles. No positive reaction to alpha alpha. Soil is moist above frost table. No redox features observed. No evidence of saturation in the organic mat. Organic mat variable - ~6" in microlows and ~8" in turf hummock microhighs

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

Surface Water Present (Y/N):	Depth (in): N	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N):	Depth (in): N	
Saturation Present (Y/N): (includes capillary fringe)	Depth (in): N	EC: NA

Notes:

A703

AQUATIC SITE ASSESSMENT 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 Geologic 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: BTG

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W81A4013 Field Target: 15316 Date: 7/14/15

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?~~ Form

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)?

N/A ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/4/15

X — **Field Crew Chief (print)**

X Brean Strong 7/4/15 — **Signature / Date**

A4014
1

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 1231	Map #: 21 Map Date: 6/29
Date: 7/5/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A4014	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 224.1		
Latitude: 67°27'57.06"N	Longitude: 149°52'06.86"W		Datum: WGS84	
Logbook No.: 01	Logbook Page No.: P34	Picture No.: P_W84A4014_VEG_VEG_PIT_PLOT		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Toeslope
Slope (%): 2 Aspect: Northwest	Local relief (concave, convex, none): Flat, tussocky-moderate
Pre-mapped Alaska LNG/NWI classification: PSS1/EM1B 11C2, 111A2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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: PSS1/EM1B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): 11C2, 111A2 OMSST

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

Open mixed shrub-tussock sedge. Large homogeneous tussock-shrub wetland. Dry conditions. Very shallow permafrost. Small amounts of standing water in the area/polygon but not in the plot. Overall, PSS1/EM1B, Flat HGM.

A4014

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana	1		Fac
2. Betula glandulosa	25	Y	Fac
3. Rhododendrum tomentosum	4		FacW
4. Vaccinium uliginosum	7		Fac
5. Vaccinium vitis-idaea	3		Fac
6. Salix richardsonii	1		FacW
7. Salix glauca	4		Fac
8. Andromeda polifolia	T		FacW
9.			
Total Cover: 45			
50% of total cover: 22.5 20% of total cover: 9			

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: 87	X 2 =	174
FAC species 48	X 3 =	144
FACU species —	X 4 =	—
UPL species —	X 5 =	—
Column Totals: 135	(A)	318 (B)

PI = B/A = 2.36

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	82	Y	FacW
2. Carex bigelowii	8		Fac
3. Arctagrostis latifolia	T		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 90			
50% of total cover: 45 20% of total cover: 18			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

2 % Cover of Wetland Bryophytes

4 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7014

WETLAND DETERMINATION DATA FORM

7/5/15 W84A7014 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
O1 0-5							fibric	sphagnum and feather moss fibers
OA 5-8							Sapric	Sapric - borderline Mesic
Bg 8-12	5Y 5/1	100					Silt ↓	moist ↑ Alpha alpha positive
Cgf 12-14	5Y 5/1	100					Silt ↓	frozen Alpha alpha positive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced matrix

[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: Permafrost Depth (inches): 12

Hydric Soil Present (Y/N): Y A2, Reduced matrix

Notes: Between many of the tussocks, organics are thin and permafrost is <1" deep. Dry conditions. 8-12 is wavy boundary with variable depth of organics vs mineral soil. Ruptic histic. Typically, saturation would be present, small amounts of standing water observed in the area but not in plot

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A7014

AQUATIC SITE ASSESSMENT 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)__41__ Dwarf shrub (<0.5m)__4__ Tall herb (≥1m)__6__ Short herb (<1m)__90__ Moss-Lichen__A__ 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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__ 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_____ Fluvaquent 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)__X__ 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: W84AY014 Field Target: 15231 Date: 7/15/15

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~~ Form?

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)?

N/A ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/5/15

X Brian Strang — **Field Crew Chief (print)**

X — **Signature / Date** 7/5/15

A-1015

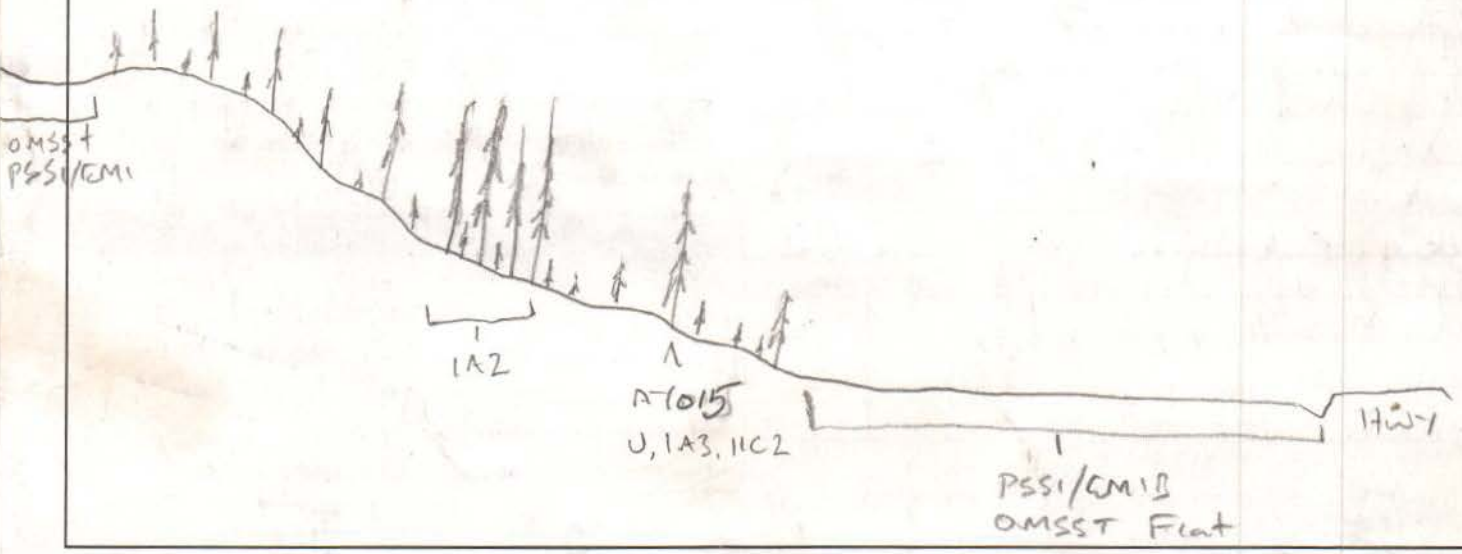
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15237	Map #: 20 Map Date: 6/29
Date: 7/9/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1015	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 222.2		
Latitude: 67°28'46.04"N		Longitude: 149°52'55.69"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 33	Picture No.: P-W84A1015-VEG_VEG-PIT_P16		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Footslope
Slope (%): 8	Local relief (concave, convex, none): Undulating - hummocky mod
Pre-mapped Alaska LNG/NWI classification: U, 1A2 11C2	Evidence of Wildlife Use: Yes, game trails
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry Conditions	Are "Normal Circumstances" present: 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____ No X	**Is the Sampled Area within a Wetland?** Yes____ No N
Hydric Soil Present? Yes____ No N	**Wetland Type:** U
Wetland Hydrology Present? Yes ? No____	Alaska Vegetation Classification (Viereck): 1A3, 11C2.

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor: Thixotropic massive structured soils. Permafrost table at 16". No actual saturation. Some possible wetland inclusions in concave microsites. Soils mostly moderately well drained. Site is mostly a slightly convex landform with undulating/rolling topography due to mass wasting (solufluction) and frost heaving.



WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea glauca	10	Y	FacU
2. Picea mariana	2		FacW
3.			
4.			
Total Cover: 12			
50% of total cover: 6	20% of total cover: 2.4		

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Salix reticulata	3		Fac
2. Arctous rubel	5		FacU
3. Dryas integrifolia	3		FacU
4. Vaccinium uliginosum	3		Fac
5. Vaccinium vitis-idaea	1		Fac
6. Rhododendron groenlandicum	12	Y	Fac
7. Salix glauca	5		Fac
8. Salix richardsonii	1		FacW
9. Picea mariana	2		FacW
Total Cover: 52			
50% of total cover: 26	20% of total cover: 10.4		

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

% Dominant Species that are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species:	6	X 1 = 6
FACW species:	11	X 2 = 22
FAC species	40	X 3 = 120
FACU species	31	X 4 = 124
UPL species	—	X 5 = —
Column Totals:	88 (A)	272 (B)

PI = B/A = 3.09

Shrub

Picea glauca 15 Y Fac

Rhododendron Lapponicum T Fac

Empetrum nigrum T Fac

Andromeda polifolia 1 FacW

Shepherdia Canadensis 1 FacU

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Cassiope tetragona	7	Y	FacU
2. Equisetum arvense	1		Fac
3. Equisetum scirpodes	T		FacU
4. Eriophorum vaginatum	T ~~1~~		FacW
5. Pedicularis labradorica	T		FacW
6. Boykinia Richardsonii	3		NI
7. Gentianella propinqua	T		FacU
8. Carex membranacea	3		FacW
9. Carex sp.	T		
10. Equisetum variegatum	T		FacW
Total Cover: 27			
50% of total cover: 13.5	20% of total cover: 5.4		
Arctagrostis latifolia	2		FacW
Hedysarum alpinum	T		FacU
Carex scirpoidea	5	Y	FacU
Papaver Macounii	T		
Anemone Richardsonii	T		FacU

Hydrophytic Vegetation Indicators:

— Dominance Test is > 50%

— 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.

0 % Bare Ground

0 % Cover of Wetland Bryophytes

90 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N

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

Carex gynocrates T OBL

Carex vaginata 6 Y OBL

Tofieldia pusilla T Fac

Saussurea angustifolia T Fac

AT015

WETLAND DETERMINATION DATA FORM

7/5/15 W84AT015 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oa 0-5							Saprist	
Bw1 5-12	5Y 4/3	85					GrLoam	~15% gravel - Thixotropic
	5Y 3/2	15						No positive alpha alpha
Bw2 12-16	5Y 4/2	75					GrLoam	~17% gravel - Thixotropic
	5Y 3/2	25						No positive alpha alpha
Cjf 16-20	5Y 4/3	98					Loam	~5% gravel. Frozen
	10YR 2/2	2						No positive alpha alpha

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) N

[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: Permafrost Depth (inches): 16

Hydric Soil Present (Y/N): N

Notes: Thixotropic soils. Peds non-saturated in the interiors. Glissen when disturbed. Slight slumping of soil pit walls. Massive structure

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A1015

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A401S Field Target: 15232 Date: 7/15/15

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

1. **Site Description**

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

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

- [x] Wetland boundaries have been corrected if necessary?
- [x] 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)?

NA ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X _____ 7/5/15 — **Signature / Date**

X Bryan Strong — **Field Crew Chief (print)**

X _____ 7/5/15 — **Signature / Date**

A-1016
Y-T marginal

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: LS227	Map #: 24 Map Date: 6/29
Date: 7/5/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1016
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: 211.9	
Latitude: 67° 14' 58.67" N	Longitude: 150° 09' 38.76" W		Datum: WGS84
Logbook No.: 1	Logbook Page No.: 34	Picture No.: P_W84A1016_VEG_VEG_PIT_PLOT	

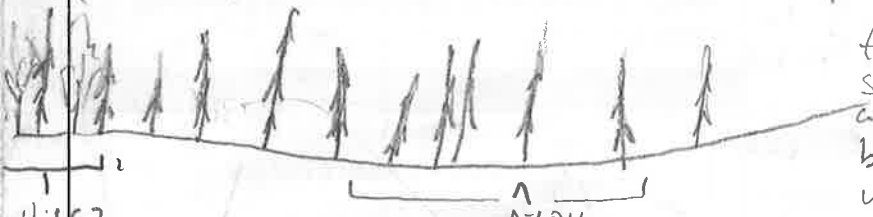
SITE PARAMETERS

Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Saddle on ridge
Slope (%): 1-2%	Local relief (concave, convex, none): Flat to slightly concave Hummocky - moderate
Pre-mapped Alaska LNG/NWI classification: PSS4/1B IIA2, IIC2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Dry conditions. Yes X No____ (If no, explain in Notes.) Low snow year
Are Vegetation____, Soil____, or Hydrology____ Significantly Disturbed?	No X (If yes, explain in Notes)
Are Vegetation____, Soil X, or Hydrology____ Naturally Problematic?	No X (If yes, explain in Notes.) Soil; Potentially problematic

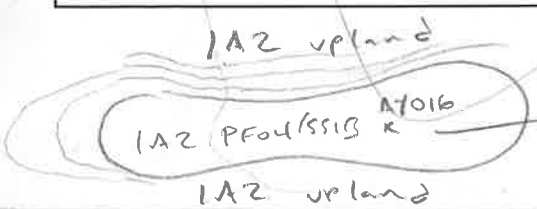
SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? Yes X No____	Is the Sampled Area within a Wetland? Yes X No____
Hydric Soil Present? Yes X No____	Wetland Type: PF04/SS1B
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): 1A2 ~~IIIA2~~ IIC2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Saddle. Flat to slightly concave down and flat to slightly convex across slope. Very little sphagnum present. A couple sphagnum pillows observed. ~60% Feather moss and ~40% Lichen. No bog cranberry associated with sphagnum pillows. The site likely has minimal reduction but will be saturated early in the growing season over frost table. Very weak and very spotty positive alpha alpha reaction observed in the frozen mineral soil material. No reaction in the A material above frost. Spruce (black) 15-30' tall mostly. A few snags (picea) show evidence of forest fire (very old) No charcoal observed in soil profile. Given the landscape position is favorable for the formation of a hydric soil to a reasonable extent (low gradient and slightly convex in one direction) best professional judgement supports a wetland call here. Isolated wetlands as steep slopes are better drained. Supplemental test pits West and East of point support this assertion



Backslopes below point dry out, wetland isolated



marginally wet in the saddle of the ridge. See field map for delineation

A-1016

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	25	Y	FacW
2.			
3.			
4.			

Total Cover: 25

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	5		Fac
2. Vaccinium vitis-idaea	10	Y	Fac
3. Rhododendrum tomentosum	12	Y	FacW
4. Spiraea stevenii	1		FacW
5. Betula glandulosa	2		Fac
6. Picea mariana	10	Y	FacW
7. Salix pulchra	T		FacW
8.			
9.			

Total Cover: 40

50% of total cover: 20 20% of total cover: 8

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:	2	X 1 =	2
FACW species:	47	X 2 =	94
FAC species	44	X 3 =	132
FACU species	1	X 4 =	4
UPL species	—	X 5 =	—
Column Totals:	94 (A)		232 (B)

PI = B/A = 2.47

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rubus chamaemorus	T		FacW
2. Carex bigelowii	27	Y	Fac
3. Equisetum sylvaticum	T		Fac
4. Carex vaginata	2		OBL
5. Eriophorum vaginatum	T		FacW
6.			
7.			
8. Sphagnum sp	3		
9. Feather moss	56		
10. Lichen	40		

Total Cover: 29

50% of total cover: 14.5 20% of total cover: 5.8

Lichen mostly Cladonia and Nephroma

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

3 % Cover of Wetland Bryophytes

99 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7016

WETLAND DETERMINATION DATA FORM

7/8/15 W84A7016

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
0-4							fibric	
4-5								
5-9	10yr 2/2	100					Mk SiL	Moist - borderline Oa - mucky SiL
9-10	10yr 2/2	100					Mk SiL	Moist - near field capacity
10-12	7.5yr 2.5/3	100					SiL	No positive alpha alpha rxn.
12-16	2.5y 5/1	96	7.5yr 4/6	4	C	M/PL	Silt	A couple spots of very weak positive alpha alpha reaction observed

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) M-T: A10

[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: Permafrost Depth (inches): 10

Hydric Soil Present (Y/N): Y - marginal Marginally meets indicator A10, possibly A2. Borderline Mk SiL / Sapric material from 4-10" w/evidence of saturation.

Notes: Very weak, very spotty reaction to alpha alpha in upper 3" of frozen mineral soil. Moist - near field capacity above frost table. A few thin ice lenses at the top of frost table, low chroma parent material - loess. Moderate ice content.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) N*	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N <60% 4"	Microtopographic Relief (D4) Y moderate hummocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y some small
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Saturation assumed early in the growing season over frost table and during periods of wet weather. Dry conditions, low snow year	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes: Dry conditions. Site will be saturated early in the growing season above the frost table. Saturation also likely to occur during wet periods. Reduction appears to be very limited and <4% <60% of mineral matrix

A-1015
Y-T marginal

AQUATIC SITE ASSESSMENT 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__X__ 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) 25 Sapling (<5 dbh, <6m tall) 10 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 20 Dwarf shrub (<0.5m) 10 Tall herb (≥1m) 0 Short herb (<1m) 20 Moss-Lichen 99 Floating 0 Submerged 6

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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__ 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_____ Fluvaquent 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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__X__ Wetlands within 400m, Not Connected_____ Only Connected Below__X__ RSS 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: [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: W84A4016 Field Target: 15227 Date: 7/15/15

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

1. **Site Description**

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

2. **Vegetation**

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

3. **Soil**

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

4. **Hydrology**

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

5. **Functions and Values**

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

6. **Field Logbook**

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

7. **Maps**

   - [x] Wetland boundaries have been corrected if necessary?
   - [x] 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)?

N/A ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date**

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/5/15

A-1017

WETLAND DETERMINATION DATA FORM

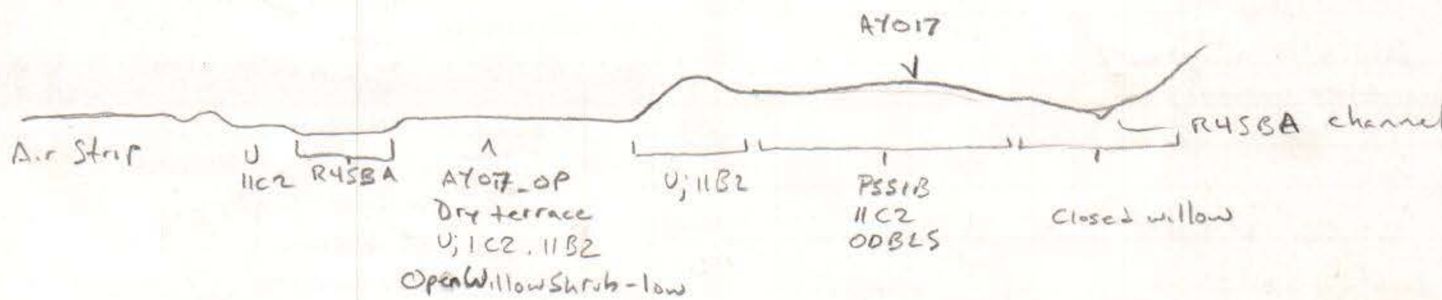
SITE DESCRIPTION				
Survey Type: Centerline____ Access Road (explain)____ Other (explain) X		Field Target: 15317	Map #: 14 Map Date: 6/29	
Date: 7/6/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84AY017	
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84	
State: Alaska	Region: Alaska	Milepost: N/A off ROW		
Latitude: 68°04'30.96" N	Longitude: 149°34'06.37"W		Datum: WGS84	
Logbook No.: 01	Logbook Page No.: 36	Picture No.: P-W84AY017-VEG_VEG_PIT_PLUG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 2	Local relief (concave, convex, none): Flat to slightly convex hummocky small with a few cottonx tussocks
Pre-mapped Alaska LNG/NWI classification: PSS1C, II D1	Evidence of Wildlife Use: Y wolf, spinal
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Dry Conditions 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 Y No____	Is the Sampled Area within a Wetland? Yes X No____
Hydric Soil Present? Yes Y-Marginal No____	Wetland Type: PSS1B
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): II C2 ODBLS

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

Dry conditions, Marginal site. Appears to be a seasonally wet site in normal years. Very little positive reaction to alpha alpha observed (<10%). Low chroma parent material. Gley page colors (N5/0) in active layer interperated as a depleted matrix (A14 indicator) with 2.5Y hue below.



A-7017

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. —	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: —	20% of total cover: —		

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rhododendron tomentosum	11	N	FacW
2. Vaccinium vitis-idaea	7	N	Fac
3. Betula nana (1')	65	Y	Fac
4. Salix richardsonii (1')	T	N	FacW
5. Salix pulchra (1')	3	N	FacW
6. Empetrum nigrum	2 BSS	N	FAC
7.			
8.			
9.			
Total Cover: 88			
50% of total cover: 44	20% of total cover: 17.6		

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: —	X 1 =	—
FACW species: 22	X 2 =	44
FAC species 84	X 3 =	252
FACU species 1	X 4 =	4
UPL species —	X 5 =	—
Column Totals: 107	(A)	300 (B)

PI = B/A = 2.80

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Cassiope tetragona	1		FacU
2. Eriophorum vaginatum	6 BSS	Y	FacW
3. Petasites frigidus	T		FacW
4. Stellaria brayipes	T		Fac
5. Carex bigelowii	10	Y	Fac
6. ~~Calamagrostis sp~~ BSS	—		
7. Bistorta plumosa	T		FacU
8. Poa sp.	T		
9. Arctagrostis latifolia	1		FACW
10. Festuca altaica	T		Fac
Saucerea angustifolia T FAC			
Total Cover: 19			
50% of total cover: 9.5	20% of total cover: 3.8		

Lichen 35
Moss 62
} Bryophytes

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

0 % Bare Ground

— % Cover of Wetland Bryophytes

97 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

AY017

WETLAND DETERMINATION DATA FORM

7/6/15 WP4AY017

SOIL Date 7/6/15 Feature ID WP4AY017 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-4							fibric	
Bw 4-5	10YR 4/4	100					SiL	Not alpha alpha positive
B_y 5-9.5	N5/0	55	7.5YR 4/6	10	C	M	SiL	<10% alpha alpha positive
	2.5Y 4/2	35						
B_{cf} 9.5-11	2.5Y 5/1		5Y 5/1	3	D	PL	SiL	ice lenses. <10% alpha alpha positive
C_{cf} 11-16	2.5Y 4/3		5Y 5/1				SiL	ice lenses. Not alpha alpha positive

[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) N	Alaska Gleyed (A13) Y marginal	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 9.5"

Hydric Soil Present (Y/N): Y - marginal low chroma parent material. Some evidence of saturation and reduction between 5-11 inches.

Notes: 9-11 B_{cf} 2nd matrix color 2.5Y 4/3 40%; 11-16 C_{cf} 2nd matrix color 2.5Y 5/1. The first few inches of frozen mineral material is soft and more diggable active layer. Becomes firmer with depth. Moderate ice content. Only limited spotty positive alpha alpha positive in upper 3 inches of frozen soil (~10% spotty). Dry conditions. No saturation observed at time of site visit

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N <10% 5"	Microtopographic Relief (D4) N small hummocks w a few sm tussocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: No saturation observed at time of site visit. Dry conditions. Saturation assumed in normal years over frost table	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A-1017

AQUATIC SITE ASSESSMENT 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)_79_ Dwarf shrub (<0.5m) _9_ Tall herb (≥1m) _0_ Short herb (<1m) _18_ Moss-Lichen_97_ 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%)_____ Very High Density (80-100%)_X_

Interspersion of Cover & Open Water (P): 100% Cover or Open Water_X_ <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) _X_ High (>25) _____

Presence of Islands (M): Absent (none) _X_ 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_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)_X_ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat_X_ 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_X_ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)_X_ Well Developed (6-18in.)_____ 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_X_ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable_X_ Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream_X_ 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)_____ Medium (10-100 acres)_X_ 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: W84A1017 Field Target: 15317 Date: 7/6/15

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~~ form?

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 Abigayle Fisher X 7/6/15

Wetland Scientist (print) **Signature / Date**

X Brean Strong X 7/6/15

Field Crew Chief (print) **Signature / Date**

A-1018
7

WETLAND DETERMINATION DATA FORM

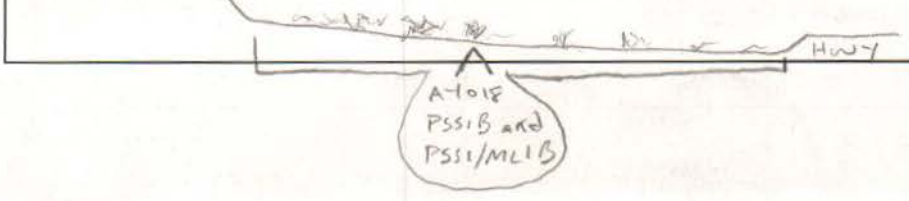
SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15864	Map #: 13 Map Date: 6/29
Date: 7/6/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1018	
Investigators: Bryan Storey, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 174.8		
Latitude: 68°04'47.61"N	Longitude: 149°34'31.25"W		Datum: WGS84	
Logbook No.: 01	Logbook Page No.: 36	Picture No.: P-W84A1015_VEG_VEG-PT_PLOG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Toeslope
Slope (%): 2	Local relief (concave, convex, none): Flat to slightly concave
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B M1A2,1K2	Evidence of Wildlife Use: Sea gulls Hummocky small-a few moderate w/ a few tussocks
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: Yes X No____ (If no, explain in Notes.) Dry conditions
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 Y marginal No____	**Wetland Type:** PSS1/ML1B
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): II C2 OWLS

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

Flat to slightly concave downslope and flat to slightly convex across slope. Site was a old glacial lake. Area appears to have dried out as the adjacent perennial drainages (R3USH) streams have thawed the permafrost (thermokarsting) due to the culverts at the highway. Moss is drying as is equisetum variagatum. Marginal site. Dry conditions. Based on low gradient, shallow permafrost and fine textured soils (clay loam) this area is likely seasonally wet under normal precipitation. Drainages on either side of plot appear to be perennial. Swales containing the streams are thermokarsting and back-cutting. Culverts installed to high creating ponding at road and excellerated thermokarsting. Islands of OWLS surrounded by a network of small channels and small patches of PEMIC. Islands of PSS1 do not show evidence of flooding (no rack/drift/sediment deposits). Stream substrate is silty. Water is turbid with sediment load.



A-018

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10x FT)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: —	20% of total cover: —		

Sapling/Shrub Stratum (26 FT)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Salix richardsonii	47 SSS		FacW
2. Salix pulchra	60 SSS	Y	FacW
3. Salix reticulata	~~30~~ 15 SSS		Fac
4. Vaccinium uliginosum	T		Fac
5. Dryas integrifolia	T		FacU
6. ~~Salix Richardsonii SSS~~	~~8 SSS~~		~~FacW~~ SSS
7.			
8.			
9.			
Total Cover: 82			
50% of total cover: 41	20% of total cover: 16.4		

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: 67	X 2 =	134
FAC species 30	X 3 =	90
FACU species	X 4 =	
UPL species	X 5 =	
Column Totals: 97	(A)	224 (B)

PI = B/A = 2.33

Moss is drying - very dry, cracked from frost action. Equisetum variegatum drying

VEGETATION (use scientific names of plants)

Herb Stratum (26 FT)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
Eriophorum vaginata	1		FacW
1. Pedicularis	T		FacW
2. Stellaria longipes	T		Fac
3. Carex bigelowii	15	Y	Fac
4. Equisetum arvense	T		Fac
5. Pedicularis capitata	T		FacU
6. Bistorta vivipara	T		Fac
7. Pyrola asarifolia	T		FacU
8. Equisetum variegata	T		FacW
9. Saxifraga hieraciifolia	T		OBL
10. Petasites frigidus	+		FacW
Poa sp T			
Total Cover: 16			
50% of total cover: ~~7.5~~ 8	20% of total cover: 3.2		

Sphagnum sp T

Bare T (frost boil)

Moss 90

Litter 3

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

T-0 % Bare Ground

? % Cover of Wetland Bryophytes

90 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A-7018

WETLAND DETERMINATION DATA FORM

7/5/15 W84A-7018

SOIL	Date	Feature ID	Soil Pit Required (Y/N)
	7/5/15	W84A-7018	Y

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
O1 0-2								
Oe 2-5								
Bw 5-7	N4/0	85	7.5YR 4/6	15		M	S.CL	No positive alpha alpha
Bg 7-9.5	N5/0	90	7.5YR 4/6	10	C	PL	S.CL	Weak spotty positive alpha alpha rx
Cgf 9.5-12	N4/0	95	7.5YR 4/6	5	C	PL	S.CL	Weak spotty positive alpha alpha ice lenses
Cf 12-16	N5/0	95	7.5YR 4/6		C	M	S.CL	Very weak, very spotty alpha alpha rxn no ice lenses

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) Y	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer Y
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 9.5

Hydric Soil Present (Y/N): Y - marginal

Notes: Low chroma parent material. Lacustrin glacial sediments. Flat to slightly convex across slope draining to incised/thermokarsting perennial drainages 40' on either side of soil pit. Old glacial lake. Alpha alpha positive in ~20% between 7-12". Weak reaction. No saturation currently. Dry conditions.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) N	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N* at 60% 4"	Microtopographic Relief (D4) N small hummocks and few small tussocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5)
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Dry conditions. Saturation assumed early in the growing season and in normal years of rainfall.	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: N/A

Notes: Saturation assumed in normal years and early in the growing season

A-7018

AQUATIC SITE ASSESSMENT 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)__32__ Dwarf shrub (<0.5m) __0__ Tall herb (≥1m) __0__ Short herb (<1m) __16__ Moss-Lichen__90__ Floating__0__ Submerged__0__

Number of Wetland Types (M): __2__

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__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__

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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)__X__ Well Developed (6-18in.)_____ 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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:

GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W84A1018 Field Target: 15264 Date: 7/6/15

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~~ form?

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 Abigayle Fisher | X 7/6/15

Wetland Scientist (print) | **Signature / Date**

X Brian Strong | X 7/6/15

Field Crew Chief (print) | **Signature / Date**

A7019

WETLAND DETERMINATION DATA FORM

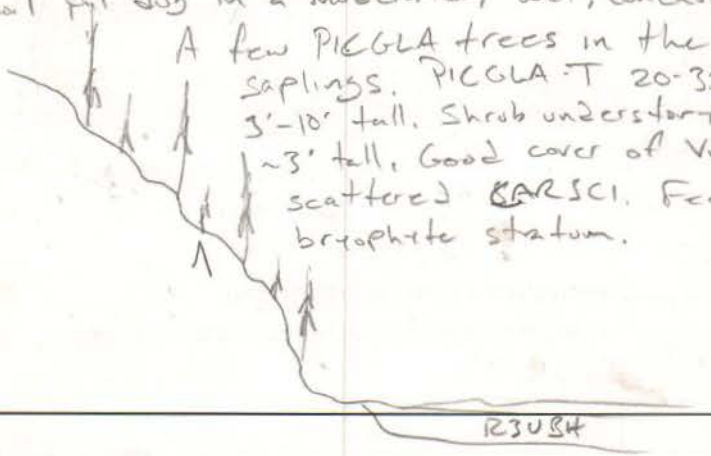
SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15228	Map #: 23 Map Date: 6/29
Date: 7/12/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A7019	
Investigators: Bryan Strong, Morgayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 227.8		
Latitude: 68° 26' 34.16"N		Longitude: 150°03'46.49"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 45	Picture No.: P-W84A7019-VEG, VEG-PIT-PLUG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Backslope, Solufluction
Slope (%): 38 measured Aspect: NW	Local relief (concave, convex, none): Convex hillslope Undulating w/ moderate hummocks
Pre-mapped Alaska LNG/NWI classification: PSS4/1B, 11A2 11C2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No____ (if no explain in Notes)	Are "Normal Circumstances" present: 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____ No X
Hydric Soil Present? Yes____ No X N	**Wetland Type:** U
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): 11A3, 11C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Slightly convex downslope, slightly concave across slope. Undulating solifluction topography with moderate hummocks. Steep NW facing slope. Downslope, a few sediment plumes indicate surface water discharge during wet periods and during spring break up. Precipitation driven discharge. Steep slopes do not support stagnation of water long enough to create anerobic/reducing conditions. Saturation will occur periodically but no evidence of reduction. Persistent rains over the past 5 days creating seepage of free water over the permafrost table. Ephemeral saturation. Soil pit dug in a moderately wet, concave microsite on a solifluction bench.

A few PICGLA trees in the area with a mix of PICGLA and PICMAR saplings. PICGLA-T 20-35' tall, PICGLA-Sps 7-15' tall, PICMAR-Sps 3'-10' tall. Shrub understory of SALGLA, SALPUL, SALRIC, ALNVIR is ~3' tall. Good cover of VACULI, RHOGRO, VACVIT, CARBIG with scattered BARSCI. Feather moss and Cladonia Lichen dominates bryophyte stratum.



A-1019

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea Mariana	T		FacW
2. Picea glauca	4		FacU
3.			
4.			

Total Cover: 4 (added to shrub)

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
Salix glauca	10		Fac
1. Vaccinium uliginosum	35	Y	Fac
2. Rhododendron groenlandicum	18	Y	Fac
3. Salix richardsonii	AF 45		FacW
4. Vaccinium vitis-idaea	12	Y	Fac
5. Picea Mariana	10+2 SS		FacW
6. Dasiphora fruticosa	T		Fac
7. Rosa acicularis	T		FacU
8. Alnus viridis ssp fruticosa	7 SS		Fac
9. Betula glandulosa	1		Fac

Total Cover: 115 23

50% of total cover: 57.5 20% of total cover: ~~30~~ AF

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 4/4 (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: —	X 1 =	—
FACW species: 20	X 2 =	40
FAC species 113	X 3 =	339
FACU species 14	X 4 =	56
UPL species —	X 5 =	—
Column Totals: 147 (A)		435 (B)

PI = B/A = 2.96

Shrubs

Arctous rubra	1	Fac
Salix pulchra	4	FacW
Dryas integrifolia	T	FacU
Andromeda polifolia	1	FacW
Picea glauca	5 SS 8	FacU
	AF	

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Carex bigelowii	30	Y	Fac
2. Cassiope tetragona	T		FacU
3. Carex scirpoidea	1		FacU
4. Equisetum scirpoides	1		FacU
5. Carex vaginata	T		OBL
6. Calamagrostis canadensis	T		Fac
7. Pyrola asarifolia	T		FacU
8.			
9.			
10.			

Total Cover: 32

50% of total cover: 16 20% of total cover: 6.4

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

95 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

Feather Moss	40
Lichen	20
Moss	35

A7019

WETLAND DETERMINATION DATA FORM

7/12/15 W84A7019 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
O: 0-5								Moist
A: 5-7	10YR 2/2	100					SiL	Granular, Saturated
7-9	10YR 3/1	100					vfSaL	Saturated No positive reaction to alpha alpha
BAjf 9-16	10YR 3/2	80					SiL	cryoturbated A, B and Oe
	10YR 2/2	20						material, Organic fibers
								incorporated. No positive alpha

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

HYDRIC SOIL INDICATORS		INDICATORS FOR PROBLEMATIC HYDRIC SOILS[3]
Histosol or Histel (A1) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 9

Hydric Soil Present (Y/N): N Soil pit dug in a wet microsite - micro/local relief is concave on a solifluction bench Overall, hillside is slightly convex down slight concave across

Notes: Saturation from persistent rains over the last 5 days. No mucky mineral material. Fibric - near hemic organic mat (~5" deep). No redox features observed. No reaction to alpha alpha dipiridyl. No reducing conditions. 38% slope NW

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) Y*	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N	Microtopographic Relief (D4) Y Moderate hummocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) N
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Small amount of free water seeping out at interface with frost table. Several days of persistent rain in the past 5 days has ended dry conditions and created above normal saturation for this site.	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in):	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N at 9" free water	Depth (in): 9" free water	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 7	EC: NA not enough water collecting to measure FC in the soil pit. - Recent persistent rain

Notes: Downslope a few sediment plumes showing surface discharge of precipitation will occur periodically, 38% slope NW aspect Undulating solifluction topography Solifluction bench, wet microsite (concave) overall, slightly convex downslope, slightly concave across slope. Undulations due to solifluction topography and moderate hummocks.

A-7019

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84AT019 Field Target: 15228 Date: 7/12/15

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~~ form?

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)?

NA ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher X 7/12/15

Wetland Scientist (print) **Signature / Date**

X Brian Strong X 7/12/15

Field Crew Chief (print) **Signature / Date**

AY020
N

WETLAND DETERMINATION DATA FORM

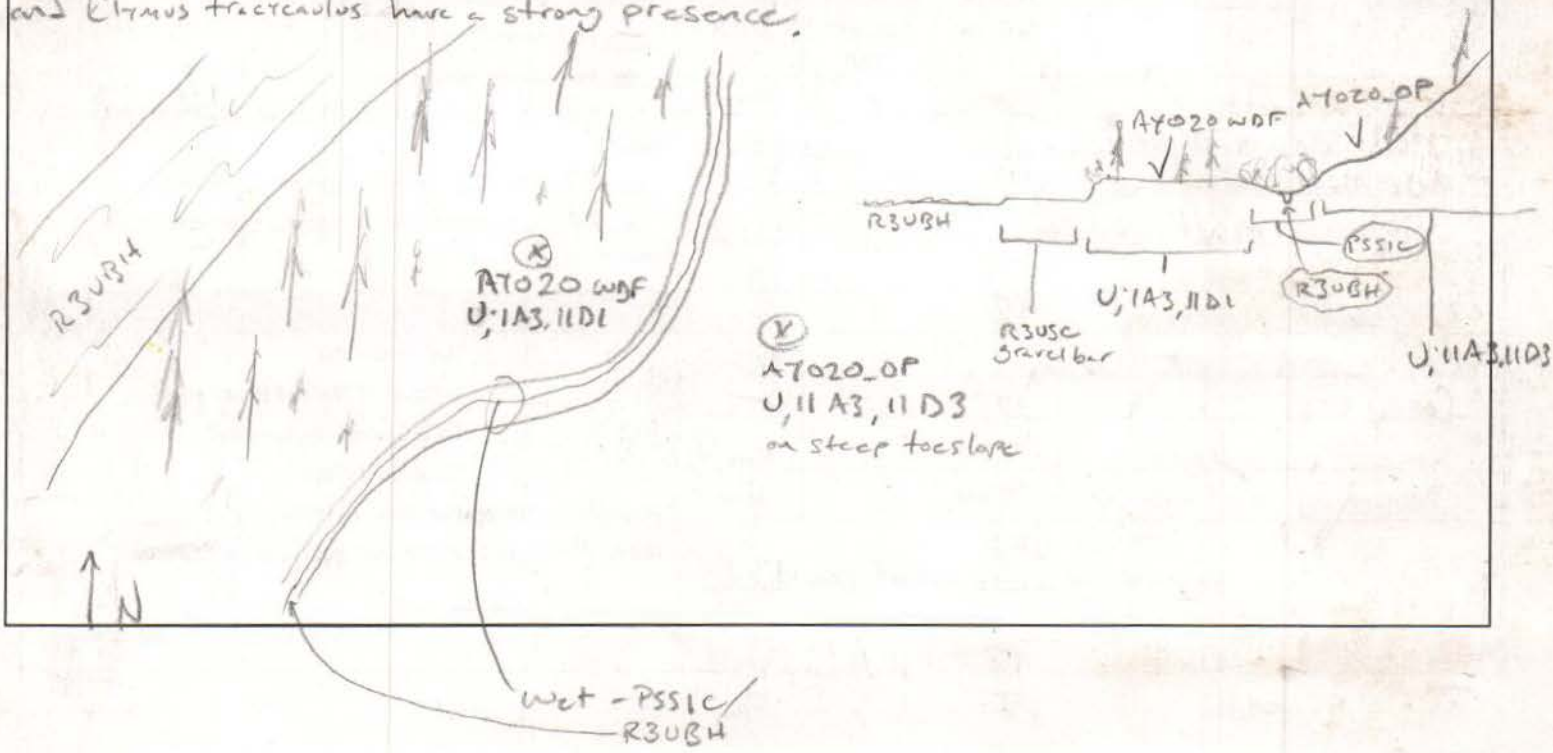
SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 1530	Map #: 22 Map Date: 6/29
Date: 7/12/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84AY020	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 726.9		
Latitude: 67° 2' 12.07" N		Longitude: 150° 02' 45.73" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 46	Picture No.: P-W84AY020_VEG_VEG_PT_PC116		

SITE PARAMETERS	
Subregion: Interior Highlands	Landform (hillslope, terrace, hummocks, etc.): Terrace - River
Slope (%): 1-2%	Local relief (concave, convex, none): Flat
Pre-mapped Alaska LNG/NWI classification: PSS4/1B, 11A3, 11C2	Evidence of Wildlife Use: ground varmit - squirel?
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No____ (if no explain in Notes) Several days of rain in the past 5 days	Are "Normal Circumstances" present: 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____ No X	**Is the Sampled Area within a Wetland?** Yes____ No X
Hydric Soil Present? Yes____ No X	**Wetland Type:** U White Spruce Woodland
Wetland Hydrology Present? Yes____ No X	Alaska Vegetation Classification (Viereck): 1A3, 11D1

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

Dry terrace. White spruce woodland with understory of white spruce saplings. Scattered willow (4-6' tall) with common juniper, Dryas integrifolia, bearberry, FESTALT and Elymus tracycaulus have a strong presence.



AY020

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea glauca	17	Y	FACU
2.			
3.			
4.			
Total Cover: 17			
50% of total cover: ____ 20% of total cover: ____			

Sapling/Shrub Stratum (36 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Dryas integrifolia	37	Y	FACU
2. Dasiphora fruticosa	4		Fac
3. Arctous rubber	5		Fac
4. Picea glauca	20	Y	FACU
5. Vaccinium uliginosum	7		Fac
6. Juniperus communis	7		UPL
7. Salix interior	12		FacW
8. Shepherdia canadensis	T		FacU
9. Arctostaphylos uva-ursi	1		UPL
Total Cover: 93			
50% of total cover: 46.5 20% of total cover: 18.6			

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

% Dominant Species that are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species:	— X 1 =	—
FACW species:	12 X 2 =	24
FAC species	17 X 3 =	51
FACU species	92 X 4 =	368
UPL species	8 X 5 =	40
Column Totals:	129 (A)	483 (B)

PI = B/A = 3.74

VEGETATION (use scientific names of plants)

Herb Stratum (2 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Festuca altaica	7	Y	FACU
2. Hedysarum alpinum	1		FacU
3. Anemone parviflora	1		FacU
4. Solidago multiradiata	T		FacU
5. Zygadenus elegans	T		UPL
6. Geocaulon lividum	2		FacU
7. Carex ~~vaginata~~ AF concinna	1		Fac
8. Carex sp	T		—
9. Carex scirpoida	T		FacU
10. Senecio sp. (lugens?)	T		—
Total Cover: 14			
50% of total cover: 9.5 20% of total cover: 3.8			
Elymus trachycaulus	8	Y	FacU
Tofieldia pusilla	T		Fac

Hydrophytic Vegetation Indicators:

— Dominance Test is > 50%

— 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

80 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N

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

A7020

WETLAND DETERMINATION DATA FORM

SOIL	Date 7/12/15	Feature ID A7020	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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi	0-1								
C	1-2	5Y 5/1	99	2.5Y 5/6	1	C	M	vfSaL	
Oe	2-3	buried Oe		5Y 6/1 ↑	1	D↑	PL↑		
BC	3-9.5	5Y 5/1	96	2.5Y 5/6	3	C	M	vfSaL	
				5Y 6/1 ↑	1 ↑	D↑	PL↑		
C1	9.5-11	5Y 5/2	100					LfSa	
C2	11-22	5Y 5/2	100					VGRSand	River gravel and 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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: NA Depth (inches): NA

Hydric Soil Present (Y/N): N

Notes:

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

Surface Water Present (Y/N): N	Depth (in): NA	Wetland Hydrology Present (Y/N): N
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA

Notes:

A1020

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A1020 Field Target: 15230 Date: 7/12/15

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~~ form?

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 Micayla Fisher — **Wetland Scientist (print)**

X — **Signature / Date**

X Brean Strong — **Field Crew Chief (print)**

X — **Signature / Date**

A-1021

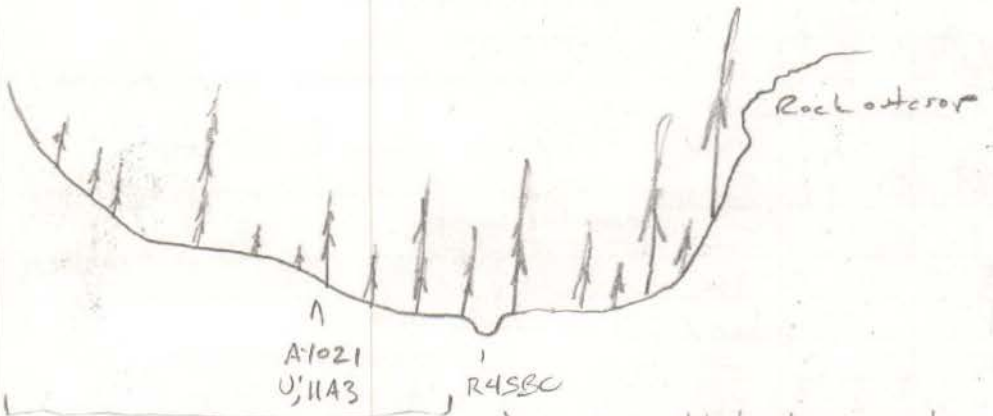
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)___ Other (explain)___			Field Target: 15229	Map #: 22 Map Date: 6/29
Date: 7/12/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1021	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 226.8		
Latitude: 67° 27' 12.88" N		Longitude: 150° 02' 29.99" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 46	Picture No.: PW84A1021_VEG_VEG_PIT_PLUG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Gulch - Terrace
Slope (%): 27 measured Aspect N	Local relief (concave, convex, none): Concave, hummocky - moderate
Pre-mapped Alaska LNG/NWI classification: PSS4/1B, 11A, 11C2	Evidence of Wildlife Use: game trails
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No___ (if no explain in Notes)	Are "Normal Circumstances" present: 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___ No X
Hydric Soil Present? Yes___ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes X No___	Alaska Vegetation Classification (Viereck): 11A3, 11C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Mostly PICGLA Trees and saplings. Trees 25-45' tall. Saplings mostly ≤ 10' tall. Sparse understory. Hillside of gulch is terraced/benching down to a small stream. All upland between A-1021 and stream.



A7021

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	T		FacW
2. Picea glauca	5		FacW
3.			
4.			

Total Cover: 5 (added to shrub)

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Salix richardsonii	2		FacW
2. Rhododendron groenlandicum	10	Y	Fac
3. Vaccinium uliginosum	10	Y	Fac
4. Salix reticulata	T		Fac
5. Dryas integrifolia	2		FacU
6. Salix pulchra	1		FacW
7. Salix glauca	7		FacU
8. Andromeda polifolia	T		FacW
9. Dasiphora fruticosa	T		Fac

Total Cover: 57

50% of total cover: 28.5 20% of total cover: 11.4

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:	—	X 1 =	—
FACW species:	6	X 2 =	12
FAC species	58	X 3 =	174
FACU species	26	X 4 =	104
UPL species	—	X 5 =	—
Column Totals:	90 (A)		290 (B)

PI = B/A = 3.2

Shrubs

Alnus viridis ssp fruticosa 4 Fac

Vaccinium vitis-idaea T Fac

Arctous rubra 3 Fac

Picea mariana 13 FacW

Picea glauca 18 Yes FacU

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Carex bigelowii	25	Y	Fac
2. Bistorta vivipara	T		Fac
3. Carex scirpoidea	2		FacU
4. Cassiope tetragona	T		FacU
5. Festuca altaica	1		Fac
6. Equisetum arvense	5		Fac
7. Equisetum scirpoides	T		FacU
8. Tofieldia sp.	T		—
9. Calamagrostis canadensis	T		Fac
10. Carex membranacea	T		FacW

Eriophorum vaginatum T FacW

Total Cover: 33

50% of total cover: 16.5 20% of total cover: 6.6

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

— 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

95 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

Moss 10

Feather Moss 60

lichen 25

Sphagnum T

A7021

WETLAND DETERMINATION DATA FORM

7/12/15 W84A7021 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-2.5							fibric	
Oe 2.5-4							hemic	
A/Bg 4-9	10YR 2/2 10YR 4/2	85 15					vfSaL	
Ag 9-10	2.5Y 2.5/1	100					MKSiL	Saturated
Bwg 10-16.5	10YR 4/3 10YR 3/1	20 80					vfSaL	Saturated
CMgf 16.5-16	10YR 3/1	90					vfSaL	frozen, permafrost
	10YR 4/2	10						No positive reaction to alpha alpha

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Permafrost Depth (inches): 16.5

Hydric Soil Present (Y/N): N

Notes: Saturation from recent persistent rains (past 5 days) small amount of free water seeping over the frost table No positive alpha alpha reaction.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) Y *	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N	Microtopographic Relief (D4) Y moderate hummocks
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) N
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Small amount of free water seeping over the frost table due to recent persistent rains over the past 5 days	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 10	EC: NA

Notes:

A7021

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A7021 Field Target: 15229 Date: 7/12/15

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~~ form?

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)?

N/A☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/12/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/12/15

A-1022

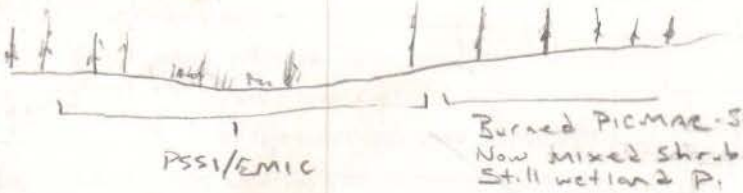
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15218	Map #: 36 Map Date: 6/29
Date: 7/12/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84AY022	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 279.2		
Latitude: 66° 48' 42.26" N		Longitude: 150° 37' 54.47" W		Datum: WGS84
Logbook No.: 1	Logbook Page No.: 46	Picture No.: P_W84AY022_VEG_VEG_PIT_PLOT		

SITE PARAMETERS			
Subregion: Interior		Landform (hillslope, terrace, hummocks, etc.): Swale	
Slope (%): 2		Local relief (concave, convex, none): Concave - slight	
Pre-mapped Alaska LNG/NWI classification: PEMI/SSIE IIIA2, IIC2		Evidence of Wildlife Use: No	
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No____ (if no explain in Notes)		Are "Normal Circumstances" present: 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 Y No____		Is the Sampled Area within a Wetland? Yes Y No____	
Hydric Soil Present? Yes Y No____		Wetland Type: PSSI/EMIC	
Wetland Hydrology Present? Yes Y 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. Highly interspersed PSSI and EMI. Burned, stunted Black Spruce throughout area. Site is wetter than surrounding burned PICMAR-Sap. Surrounding area is now Mixed shrub-sedge-tussock with small pockets of low ericaceous shrub tundra. Moderate sized tussocks in adjacent polygons. At point, Dwarf birch and SALPUL stands are interspersed with wetter ERIANG seasonally flooded wetlands. Some of these ERIANG patches would be semi-permanently flooded. Shrub component of the swaling area has a histic epipedon while wetter areas have minimal organic surfaces.



PH 6.0 EC: 60 ms at 18°C

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea Mariana	2		FacW
2.			
3.			
4.			

Total Cover: 2 (added to shrubs)

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	30	Y	Fac
2. Betula nana	25	Y	Fac
3. Rhododendron tomentosum	sum 5		FacW
4. Salix Pulchra	18		FacW
5. Picea Mariana	1		FacW
6. Betula glandulosa	T		Fac
7. Chamaedaphne calyculata	20		FacW
8.			
9.			

Total Cover: 91

50% of total cover: 49.5 20% of total cover: 18.2

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:	37	X 2 =	74
FAC species	62	X 3 =	186
FACU species	—	X 4 =	—
UPL species	—	X 5 =	—
Column Totals:	114 (A)		275 (B)

PI = B/A = 2.41

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum angustifolium	15	Y	OBL
2. Calamagrostis canadensis	7	Y	Fac
3. Comarum palustre	1		OBL
4. Chamaedaphne calyculata	AF		
5. Rubus chamaemorus	1		FacW
6.			
7.			
8.			
9.			
10.			

Total Cover: 23

50% of total cover: 11.5 20% of total cover: 4.6

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

0 % Bare Ground

— % Cover of Wetland Bryophytes

40 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7022

WETLAND DETERMINATION DATA FORM

7/12/15 W84A7022 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
0-2	5YR 3/4	100						2 inch band of iron staining indicating persistent high water table
2-8	N 4/0		7.5YR 4/6	5	ox/c	RC/PL	S.CL	massive saturated
8-9								Sphagnum fibers
9-19	N 4/0		7.5YR 4/6	10	ox/c	RC/PL	S.CL	massive - saturated
19-21							S.CL	

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) Y	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) M - faint		Alaska Gleyed without 5Y Hue or Redder Underlying Layer Y
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced Matrix

[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: Permafrost Depth (inches): 19

Hydric Soil Present (Y/N): Y

Notes: Alpha alpha positive. High in clay content. Borderline Clay Loam. fines include vf sand that are difficult to differenciate from Silt.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) Y	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) Y	Stunted or Stressed Plants (D1) N
High Water Table (A2) Y	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) Y	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) Y	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) Y	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) Y - faint	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Surface water present in mapping unit/polygon ~20 feet from soil pit	
Algal Mat or Crust (B4) N	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): Y	Depth (in): 5	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): Y	Depth (in): 8 free water	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 1	**EC:**

Notes:

A-7022

AQUATIC SITE ASSESSMENT 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) 2 Sapling (<5 dbh, <6m tall) 1 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 89 Dwarf shrub (<0.5m) 6 Tall herb (≥1m) 7 Short herb (<1m) 16 Moss-Lichen 40 Floating 0 Submerged 0

Number of Wetland Types (M): 2

Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven X 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%) X

Interspersion of Cover & Open Water (P): 100% Cover or Open Water X <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) X High (>25) _____

Presence of Islands (M): Absent (none) X 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 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 X 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 X

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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.) X Well Developed (6-18in.)_____ 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 X Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable X Permafrost at 19"

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%) X

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_____ Only Connected Above_____ Connected Upstream & Downstream X 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)_____ Medium (10-100 acres) X 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: W84AY022 Field Target: 15218 Date: 7/12/15

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~~ form?

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)?

NA☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/12/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7.12.15

A-1023

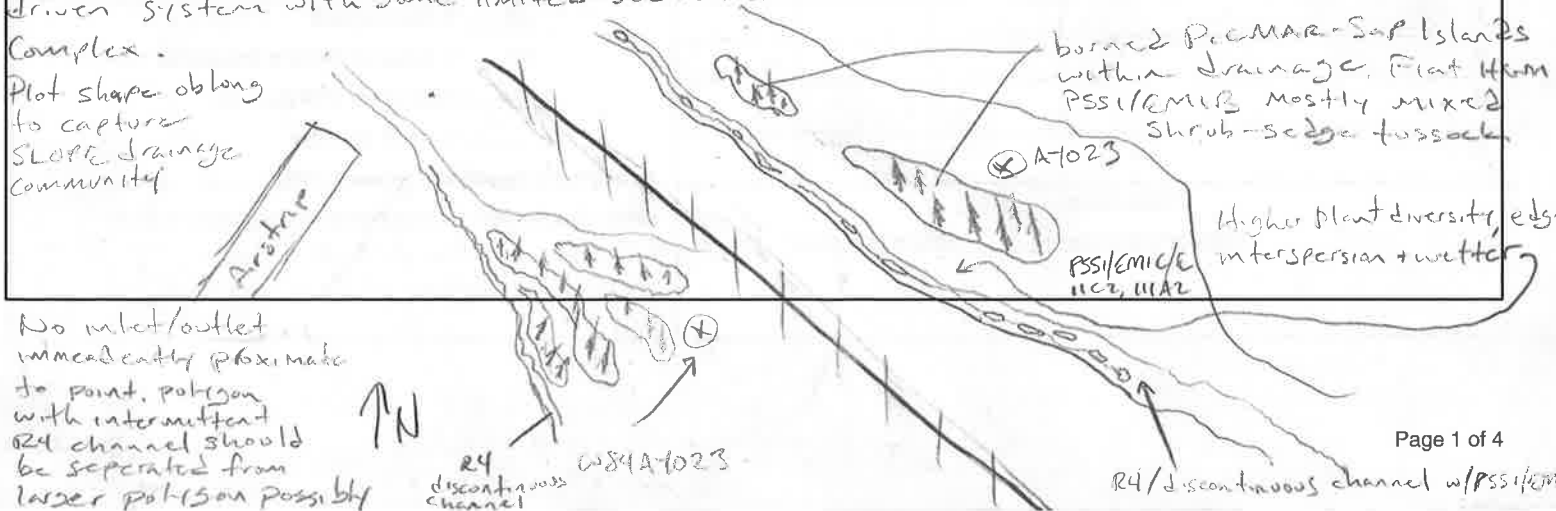
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15219	Map #: 35 Map Date: 6/24
Date: 7/13/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1023	
Investigators: Bryan Strong, Abigayle Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 278.7		
Latitude: 66°49'04.63"N		Longitude: 150°37'15.48"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 47	Picture No.: PW84A1023_VEG, VEG_PIT_PLOT		

SITE PARAMETERS	
Subregion: Interior Highlands	Landform (hillslope, terrace, hummocks, etc.): Swale,
Slope (%): ~2% estmated NW aspect	Local relief (concave, convex, none): Concave w/ small undulations
Pre-mapped Alaska LNG/NWI classification: PEMI/SSIE, IIIA2, IIC2	Evidence of Wildlife Use: Bear tracks
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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 Y No____
Hydric Soil Present? Yes X No____	**Wetland Type:** PSS1/EM1E OLWS with bluejoint
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): IIC2, IIIA2 OLWS

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Some rain in the past 5 days to the north. Unknown how much it rained here. Appears that dry conditions remain in this area, evidence of persistent standing water in microlows now hosting iron stained surfaces with COMPAL and bare ground. Islands of burned PICMAR-Sap throughout area are slightly convex features with Flat Horn histic epipedons and IIC2, IIIA2 veg communities - Open Low willow-shrub birch typically with some mixed shrub-sedge tussock occuring in some areas (IID1, IIIA2) At point, fairly low diversity and interspersion but, in other parts of the drainage, higher plant diversity, more edge and interspersion of PEMI and PSS1 with discontinuous drainage features and semipermanently flooded ponds/depressions entained within the swale drainage. Permafrost at ~20". Alluvial soils. mostly precipetation driven system with some limited sediment trasport and outlet function. Slope/Flat Complex.



A1025

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft*)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Salix pulchra (2.5-3')	65	Y	FacW
2. Betula nana	5		Fac
3. Chamaedaphne calyculata	1		FacW
4. Vaccinium uliginosum	T		Fac
5. Betula neoalaskana (4')	T		FacU
6. ~~Eriophorum vaginata~~	T		—
7.			
8.			
9.			
Total Cover: 71			
50% of total cover: 35.5 20% of total cover: 14.2			

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:	2	X 1 =	2
FACW species:	66	X 2 =	132
FAC species	97	X 3 =	291
FACU species	—	X 4 =	—
UPL species	—	X 5 =	—
Column Totals:	165 (A)		425 (B)

PI = B/A = 2.58

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Calamagrostis canadensis	92	Y	Fac
2. Comarum palustre	2		OBL
3. Eriophorum vaginata	T		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 94			
50% of total cover: 47 20% of total cover: 18.8			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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 % Bare Ground

— % Cover of Wetland Bryophytes

2 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

*Shape of tree plot is oblong to stay within landscape being sampled

A7023

WETLAND DETERMINATION DATA FORM

7/13/15 · W48A7023

SOIL	Date	Feature ID	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					
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Bg 0-2	5Y 4/2	75	5YR 3/4	15	C	PL/M	loam	high clay content, iron staining in a band at surface
			7.5YR 4/6	10	C	PL		
Cg 2-20	N 4/0	93	7.5YR 4/6	7	OX/PL	PL/RC	loam	massive. Alpha alpha positive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N*	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer Y
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced Matrix

[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: Permafrost Depth (inches): 20

Hydric Soil Present (Y/N): Y — Meets the concept of A14 but, not quite enough redox concentrations to satisfy the indicator. Higher clay content. Borderline vfSL and C Loam, Not quite enough clay however. Slightly sticky, slightly plastic.

Notes: Alluvium

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): Y	Depth (in): 10"	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 1"	**EC:** NA

Notes:

AY023

AQUATIC SITE ASSESSMENT 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)__71__ Dwarf shrub (<0.5m) __0__ Tall herb (≥1m) __0__ Short herb (<1m) __94__ Moss-Lichen__2__ 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%)_____ Very High Density (80-100%)__X__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__X__ <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) __X__ High (>25) _____

Presence of Islands (M): Absent (none) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope__X__ 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__X__ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)__X__ Well Developed (6-18in.)_____ 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%)__X__ ~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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)__X__ 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: W84A1023 Field Target: 15219 Date: 7/13/14

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~~ Form?

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)?

N/A☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/13/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/13/15

A-7024
Y

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline X **Access Road** (explain)____ **Other** (explain)____		**Field Target:** 1S220	**Map #:** n/a **Map Date:** 6/29
Date: 7/13/15	**Project Name & No.:** Alaska LNG 60418403	**Feature Id:** W84A7024	
Investigators: Bryan Strong, Abigayle Fisher			**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** 279	
Latitude: 66°49'17.52	**Longitude:** 150°36'52.76"W		**Datum:** WGS84
Logbook No.: 01	**Logbook Page No.:** 47	**Picture No.:** PW84A7024-VEG, VEG+PIT, VEG	

SITE PARAMETERS

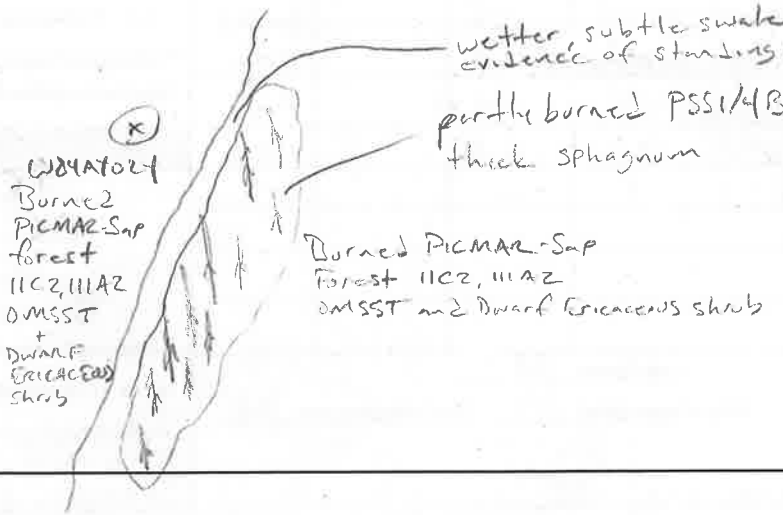
Subregion: Interior Highlands	Landform (hillslope, terrace, hummocks, etc.): Terrace, Rolling
Slope (%): ~2-3 estimated	Local relief (concave, convex, none): Slightly concave - tussock Moderate
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B, IIIA2, IIC2	Evidence of Wildlife Use: None observed
Are climatic/hydrologic conditions on the site typical for this time of year? Yes__X__ No__X__ (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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__Y__ No____	**Is the Sampled Area within a Wetland?** Yes__X__ No____
Hydric Soil Present? Yes__Y__ No____	**Wetland Type:** PSS1/EM1B Mixed shrub sedge-tussock
Wetland Hydrology Present? Yes__Y__ No____	Alaska Vegetation Classification (Viereck): IIC2, IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Overall, the area is best characterized as IIC2, IIIA2 Mixed shrub-sedge-tussock Mostly burned PICMAR-Sap forest with a few pockets that survived the burn generally in tact. Some of the area will retain >8" of organics, Small areas of standing water occur in the area but, primarily a saturated water regime. A few PICGLA seedlings are becoming established. Few or no PICMAR seedlings have become established. Hummocky topography with moderate tussocks. No evidence of wildlife observed. Some rain to the north over the past week. Appears drier here. Still dry conditions.

Point location adjusted to accomodate access issues No field map available for the point in new location



A-1024

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			

Total Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana 3'	15	Y	FAC
2. Salix bebbiana 2'	3		FAC
3. Picea glauca 1-2'	T		FACU
4. Rhododendron tomentosum 20		Y	FACW
5. Betula neoalaskana 2'	T		FACU
6. Vaccinium uliginosum	3		FAC
7. Vaccinium vitis-idaea	7		FAC
8. Salix pulchra 4'	2		FACW
9. Betula glandulosa 3'	T		

Total Cover: 50

50% of total cover: 25 20% of total cover: 10

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

% Dominant Species that are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species: —	X 1 = —
FACW species: 51	X 2 = 102
FAC species 43	X 3 = 129
FACU species 10	X 4 = 40
UPL species —	X 5 = —
Column Totals: 104 (A)	271 (B)

PI = B/A = 2.61

VEGETATION (use scientific names of plants)

Herb Stratum (2 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	23	Y	FACW
2. Chamerion angustifolium	10	Y	FACU
3. Rubus chamaemorus	6		FACW
4. Calamagrostis canadensis	4		FAC
5. Carex bigelowii	6		FAC
6. Calamagrostis lapponica	5		FAC
7. Anemone sp	T		
8.			
9.			
10.			

Total Cover: 54

50% of total cover: 27 20% of total cover: 10.8

Picea mariana snag 15

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

15 % Bare Ground

— % 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):

Polytrichum 30
Fire moss 30
Sphagnum sp T

Bare 15
litter 25

A1024

WETLAND DETERMINATION DATA FORM

7/13/15 W84A1024 Y

SOIL Date 7/13/15 Feature ID W84A1024 **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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oa 0-1								charcoal = organic-texture
A 1-2	7.5YR 2.5/1	100						charcoal rich
Bw 2-4	7.5YR 4/6	100						Band of iron stained mineral
Cg1 4-15	N4/0	88	7.5YR 4/6	12	OX/C	RC/PL	loam	high clay content - saturated - massive
Cg2 15-20	5Y 4/1	70	7.5YR 4/6	30	C	PL	loam	saturated, massive, alpha alpha pos.
Cg f 20-21+	N4/0							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) N	Alaska Gleyed (A13) Y	Alaska Color Change (TA4)[4]
Histic Epipedon (A2) N	Alaska Redox (A14) Y	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced matrix

[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: Permafrost Depth (inches): 20

Hydric Soil Present (Y/N): Y

Notes: Slightly sticky, plastic, slightly thixotropic. Strongly reducing in all mineral horizons. Borderline vf Sandy Clay Loam but, not quite enough clay here.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2)	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) N
Saturation (A3) Y	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) Y	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) Y	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Evidence of standing water in one area ~20' from soil pit - algal mat crust webbed into thatch/debris.	
Algal Mat or Crust (B4) Y	Other (Explain in Notes):		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): N/A	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N):	Depth (in): 8	
Saturation Present (Y/N): (includes capillary fringe) Y	Depth (in): 4	EC: N/A not enough water to collect EC and pH in bottom of pit

Notes:

A-7024

AQUATIC SITE ASSESSMENT 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)_23_ Dwarf shrub (<0.5m) _27_ Tall herb (≥1m) _4_ Short herb (<1m) _50_ 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%)_____ Very High Density (80-100%)_X_

Interspersion of Cover & Open Water (P): 100% Cover or Open Water_X_ <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) _X_ High (>25) _____

Presence of Islands (M): Absent (none) _X_ 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_X_

Dead Woody Material (P): Low Abundance (0-25% of surface) _____ Moderately Abundant (25-50% of surface) _X_ Abundant (>50% of surface) _____

Vegetative Interspersion (P): Low (large patches, concentric rings)_X_ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat_X_ 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_X_ 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_____ Fluvaquent 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_X_ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable_X_ Permafrost

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%)_X_ 2-3%

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_____ Only Connected Above_____ Connected Upstream & Downstream_X_ 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)_____ Medium (10-100 acres)_X_ 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: W84A7024 Field Target: 15220 Date: 7/13/15

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

1. Site Description

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

2. Vegetation

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

3. Soil

- [x] Soil profile is complete?
- [x] 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

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

6. Field Logbook

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

7. Maps

- [ ] Wetland boundaries have been corrected if necessary? 3 point mound, no map
- [ ] 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)?

N/A ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/13/15

X Brennan Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/13/15

A-1025
Y

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline X **Access Road** (explain)____ **Other** (explain)____		**Field Target:** 1522	**Map #:** NA **Map Date:** 6/29
Date: 7/13/15	**Project Name & No.:** Alaska LNG 60418403	**Feature Id:** W84A1025	
Investigators: Bryan Strong, Abigayle Fisher			**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** 278.9	
Latitude: 66°49'16.98"N	**Longitude:** 150°37'12.12"W		**Datum:** WGS84
Logbook No.: 01	**Logbook Page No.:** 47	**Picture No.:** P-W84A1025 ~~VEG~~-VEG-PIT-Plot	

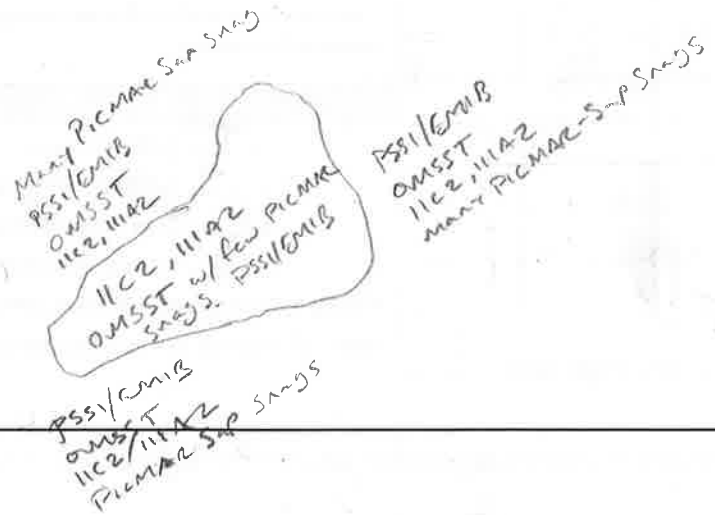
SITE PARAMETERS

Subregion: Interior Highlands	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 1-3% estimated	Local relief (concave, convex, none): Flat to slightly convex tussock - moderate
Pre-mapped Alaska LNG/NWI classification: PEM1/SS1B, IIIA2, IIC2	Evidence of Wildlife Use: No
Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No____ (if no explain in Notes) Dry Conditions	Are "Normal Circumstances" present: 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 Y No____	**Is the Sampled Area within a Wetland?** Yes X No____
Hydric Soil Present? Yes Y No____	**Wetland Type:** PSS1/EM1B Mixed shrub-sedge tussock
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): 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. Mixed shrub-sedge tussock tundra. Fire grazed through burning the few PICMAR-Snp that occured here but, left the organic mat and scrub-tussock veg intact. Just a few very small PICMAR saps remain. Surrounding area almost completly burned. Good blueberry patch here. Rain came through north of here ~5 days ago but, this area appears to have gotten less rain. Still dry conditions. Slightly drier here than surrounding burned stunted PICMAR-Spr forest surrounding this area. Permafrost is more shallow (9.5") and saturation is more ephemeral.



Plot location adjusted to accomodate access issues, No field map available for new location

A7025

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			

Total Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Vaccinium uliginosum	35	Y	FAC
2. Betula nana	17	Y	FAC
3. Rhododendrum tomentosum	20	Y	FACW
4. Andromeda polifolia	T		FacW
5. Vaccinium oxycoccus	T		OBL
6. Picea mariana	2		FACW
7. Vaccinium vitis idaea	T		Fac
8.			
9.			

Total Cover: 74

50% of total cover: 37 20% of total cover: 14.8

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:	—	X 1 =	—
FACW species:	90	X 2 =	180
FAC species	53	X 3 =	159
FACU species	—	X 4 =	—
UPL species	—	X 5 =	—
Column Totals:	143	(A)	339 (B)

PI = B/A = 2.37

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginata	65	Y	FACW
2. Rubus Chamemorus	3		FACW
3. Carex bigelowii	T		Fac
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 69

50% of total cover: 34.5 20% of total cover: 13.8

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

T % Bare Ground

— % 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):

47-Sphagnum

A-7025

WETLAND DETERMINATION DATA FORM

7/13/15 WB4A7025 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi	0-7							fibric	dense/compact
Oe	7-9.5							hemic	dense - some evidence of Saturation
Oif	9.5-13							fibric	frozen Alpha alpha positive
ABf	13-16	7.5YR 2.5/3						S.L	Alpha alpha positive-frozen
									ice lenses - ice rich

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) Reduced matrix

[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: Permafrost Depth (inches): 9.5

Hydric Soil Present (Y/N): Y

Notes: Some evidence of saturation in organics above frost table. Alpha alpha positive in all frozen material. Dry conditions. Organics are near field capacity above the frost table.

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	**EC:** N/A

Notes:

W84A1025

AQUATIC SITE ASSESSMENT 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)__2__ Tall shrub (2-6m)__0__ Short shrub (0.5-2m)__52__ Dwarf shrub (<0.5m)__20__ Tall herb (≥1m)__0__ Short herb (<1m)__69__ 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%)_____ Very High Density (80-100%)__x__

Interspersion of Cover & Open Water (P): 100% Cover or Open Water__x__ <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) __x__ High (>25) _____

Presence of Islands (M): Absent (none) __x__ 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__x__ Continuous Cover_____

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)__x__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__x__ 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__x__ 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_____ Fluvaquent Soils Sediment Created_____

Microrelief of Wetland Surface (P): Absent_____ Poorly Developed (6in.)_____ Well Developed (6-18in.)__x__ Pronounced (>18in.)_____ Hummock

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__x__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__x__ Remarks +

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%)__x__ 2-3%

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_____ Only Connected Above_____ Connected Upstream & Downstream__x__ 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: GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: L584AY025 Field Target: 15221 Date: 7/17/15

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?~~ Form

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

- NA ☐ Wetland boundaries have been corrected if necessary? } Point moved, no map
- ☐ 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)?

N/A ☐ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — 7/13/15 — **Signature / Date**

X Brean Strang — **Field Crew Chief (print)**

X — **Signature / Date**

A1026

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline____ **Access Road** (explain)_____ **Other** (explain) Facility		**Field Target:** 1526 (	**Map #:** 37 **Map Date:** 6/29
Date: 7/14/15	**Project Name & No.:** Alaska LNG 60418403	**Feature Id:** W84A1026	
Investigators: Bryan Strong, Abigayle Fisher			**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** N/A off R/W	
Latitude: 66°34'55.61" N	**Longitude:** 150°45'24.84"W		**Datum:** WGS84
Logbook No.: 01	**Logbook Page No.:** 48	**Picture No.:** P_W84A1026_VEG_VEG_PIT_PLUG	

SITE PARAMETERS

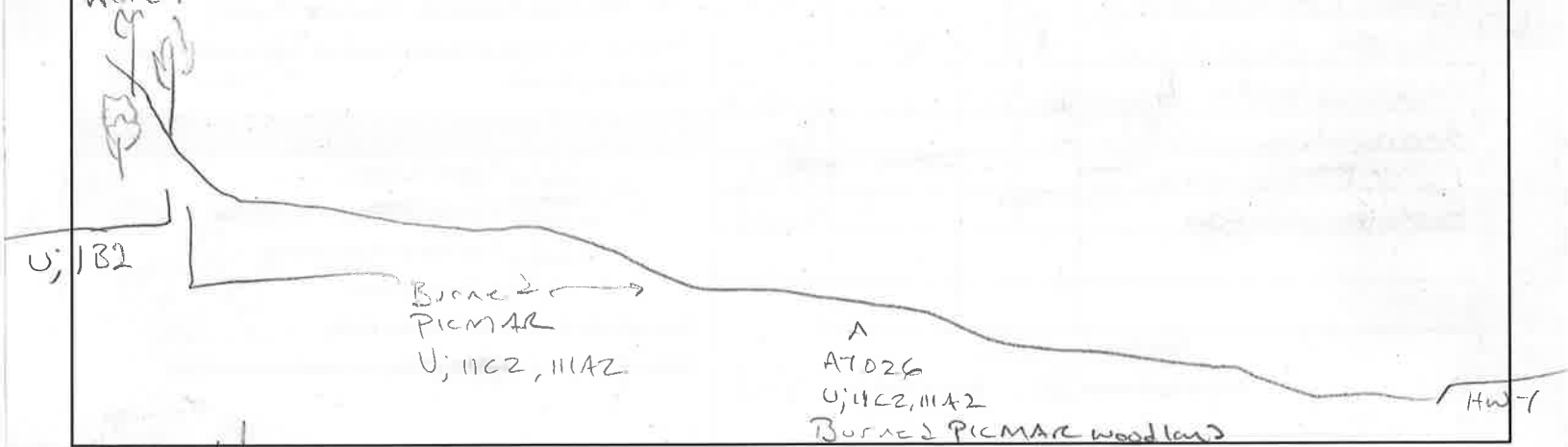
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Backslope
Slope (%): 7% measured aspect: W 280°	Local relief (concave, convex, none): Flat, Hummocky - moderate some CAREX and ERIVAG tussocks -
Pre-mapped Alaska LNG/NWI classification: Upland, 11C2, 11A1	Evidence of Wildlife Use: None
Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No__X__ (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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.)

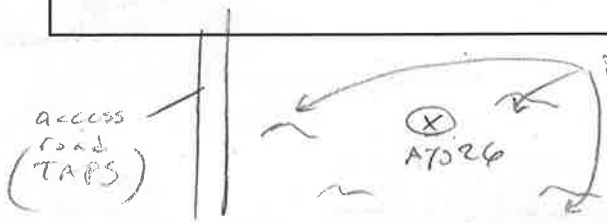
SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? Yes X No_____	**Is the Sampled Area within a Wetland?** Yes_____ No N
Hydric Soil Present? Yes_____ No X	**Wetland Type:** U
Wetland Hydrology Present? Yes X No_____	Alaska Vegetation Classification (Viereck): 11C2, 11A2

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

Burned PICMAR-Sap. Woodland, Alnus viridis 3-7' with scrub birch, VACULI, SALBEB, RUBTOM, Frost table appears to have dropped since the fire 5-10 years ago. The ground has numerous frost heaves and boils creating undulating topography. Tops of frost heaves are largely bare of vegetation with gravels at/near the surface. Soil pit dug in a concave microsite. No gravels encountered in profile. Frost sorting significant here.





A7025

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
AF 1. Picea mariana			FacW
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			
Sapling/Shrub Stratum (26 ft)	**Absolute % Cover**	**Dominant Species? (Y/N)**	**Indicator Status**
1. Vaccinium uliginosum	28	Y	Fac
2. Rhododendron tomentosum	5		FacW
3. Alnus viridis ssp. fruticosa	11	Y	Fac
4. Vaccinium vitis-idaea	1		Fac
5. Betula nana	6		FAC
6. Betula glandulosa	5		FAC
7. Salix bebbiana	1		FAC
8. Andromeda polifolia	T		FacW
9. Populus tremuloides (1.5)	T		FacU
Total Cover: 57			
50% of total cover: 28.5 20% of total cover: 11.4			

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: —	X 1 =	—
FACW species: 20	X 2 =	40
FAC species 76	X 3 =	228
FACU species 3	X 4 =	12
UPL species —	X 5 =	—
Column Totals: 99 (A)		280 (B)

PI = B/A = 2.82

Shrub

Vaccinium oxycoccus ST OBL

Loiseleuria procumbens ST

VEGETATION (use scientific names of plants)

Herb Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	8	X	FacW
2. Chamerion angustifolium	3		FacU
3. Rubus chamaemorus	7		FACW
4. Carex bigelowii	18	X	FAC
5. Calamagrostis lapponica	5		FAC
6. Aconagonon alaskanum	1		Fac
7. Carex vaginata	T		OBL
8. Bistorta plumosa	T		FacW
9.			
10.			
Total Cover: 42			
50% of total cover: 21 20% of total cover: 8.4			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X 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.

10 % Bare Ground

— % Cover of Wetland Bryophytes

30 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7026

WETLAND DETERMINATION DATA FORM

7/14/15 W84A7026 Y

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 Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Notes
Oi 0-4							fibric	
Bw 4-9	10YR 3/3	100					S.L	Thin A at mineral surface
BW/AJ 9-16	10YR 3/3	30					S.L	cryoturbated. Organics mixed
	10YR 4/1	70						with 10YR 3/3 material
NBwj 16-22	2.5Y 3/1	70					S.L	
	5Y 4/1	30						
BCf 22-24	10YR 3/1	100					S.L	Seasonal Frost - soft, gravelly

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) N

[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: Seasonal Frost Depth (inches): 22

Hydric Soil Present (Y/N): N granular, good soil structure well drained soil. Frost

Notes: table may have dropped after fire. Many areas have gravels at the surface. Slightly wetter microsite chosen for soil pit. No evidence of saturation. Organics incorporated into mineral soil - cryoturbated. No positive alpha alpha reaction

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	**EC:** NA

Notes:

A1026

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A7026 Field Target: 15261 Date: 7/14/15

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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/14/15

X — **Field Crew Chief (print)**

X — **Signature / Date**

A7027
N

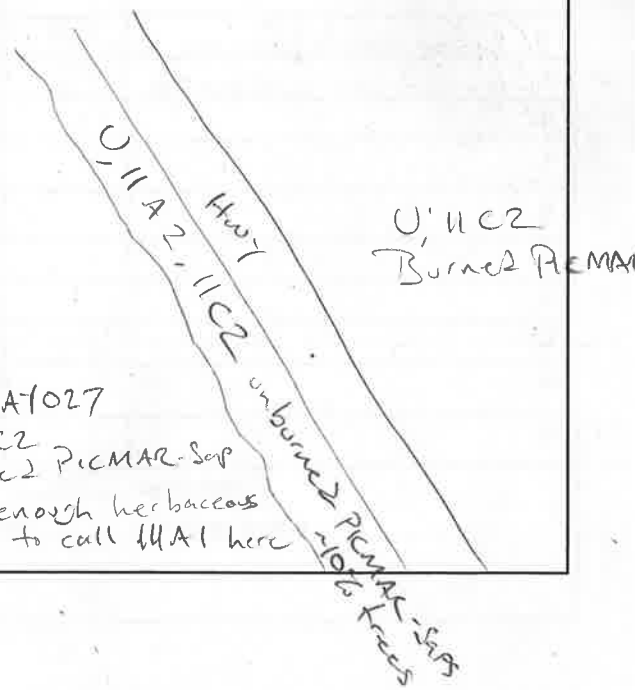
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline____ **Access Road** (explain)_____ **Other** (explain) Facility			**Field Target:** 1526°	**Map #:** 38 **Map Date:** 6/29
Date: 7/14/15	**Project Name & No.:** Alaska LNG 60418403		**Feature Id:** W84A7027	
Investigators: Bryan Strong, Abigayle Fisher				**Team No.:** W84
State: Alaska	**Region:** Alaska	**Milepost:** N/A off ROW		
Latitude: 66°08'26.99" N		**Longitude:** 150°10'34.18"W		**Datum:** WGS84
Logbook No.: C01	**Logbook Page No.:** 48	**Picture No.:** P-W84A7027_VEG_VEG_PIT_DWG		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Flat to slightly convex
Slope (%): 2-3 estimated	Local relief (concave, convex, none): Flat
Pre-mapped Alaska LNG/NWI classification: U, IIC2, IIA2	Evidence of Wildlife Use: Woodfrog
Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No__X__ (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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_____ No__X__	**Is the Sampled Area within a Wetland?** Yes_____ No__X__
Hydric Soil Present? Yes_____ No__X__	**Wetland Type:** U Deciduous sapling regeneration
Wetland Hydrology Present? Yes_____ No__X__	Alaska Vegetation Classification (Viereck): II C2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Burned PICMAR. Regeneration of TSUHET-Sap (4-7' tall) POPTRE (1-6' tall) Bebb willow (1-5' tall) with CHAANG, EQUARV. Lots of downed wood + debris and limited standing dead at the point. More standing dead in other parts of the area. Smoker conditions



A-1027

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			

Total Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula neoalaskana	42	X	FacW
2. Alnus viridis ssp. fruticosa	12		Fac
3. Salix bebbiana	10		Fac
4. Vaccinium uliginosum	3		Fac
5. Rhododendrum groenlandicum	2		Fac
6. Picea glauca	T		FacU
7. Rhododendrum tomentosum	1		FacW
8. Salix pulchra	T		FacW
9.			

Total Cover: 70

50% of total cover: 35. 20% of total cover: 14

Dominance Test worksheet:

No. of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

% Dominant Species that are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species:	—	X 1 =	—
FACW species:	1	X 2 =	2
FAC species	41	X 3 =	123
FACU species	42	X 4 =	168
UPL species	—	X 5 =	—
Column Totals:	84 (A)		293 (B)

PI = B/A = 3.49

VEGETATION (use scientific names of plants)

Herb Stratum (2cm)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Chamerion latifolium	12	X	Fac
2. Equisetum arvense	2		Fac
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 14

50% of total cover: 7 20% of total cover: 2.8

Hydrophytic Vegetation Indicators:

— Dominance Test is > 50%

— 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.

3 % Bare Ground

— % Cover of Wetland Bryophytes

80 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): N

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

40% - Litter

1% Lichen

A7027

WETLAND DETERMINATION DATA FORM

7/14/15 W84A7027 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-2							fibric	
Bw1 2-9	2.5Y 5/3	89	10YR 5/6	4	C	M	SiL	frost mottles
	5Y 6/1	7						
Bw2 9-22	2.5Y 5/3	85					SiL	cryoturbated, ~3% gravel
	10YR 3/1	15						

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) N

[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: NA Depth (inches): NA

Hydric Soil Present (Y/N): N

Notes: No frost table in 26". More gravel below 22". ~7%. Very dry soil profile

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** N
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	**EC:** NA

Notes:

A7027

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84AT027 Field Target: 15260 Date: 7/14/15

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~~ form?

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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/14/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/14/15

A-1028
Y

WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION

Survey Type: Centerline___ Access Road (explain)_X_ Other (explain)_____		Field Target: 15315	Map #: 40 Map Date: 6/29
Date: 7/14/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1028
Investigators: Bryan Strong, Abigayle Fisher			Team No.: W84
State: Alaska	Region: Alaska	Milepost: N/A off ROW	
Latitude: 60° 04' 54.64" N	Longitude: 150° 10' 19.43" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 48	Picture No.: P_W84A1028_VEG_VEG_PIT_PLUG	

SITE PARAMETERS

Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace - Flat
Slope (%): 1-2%	Local relief (concave, convex, none): Hummocky - moderate
Pre-mapped Alaska LNG/NWI classification: PSS3/4B 11C2 11A2	Evidence of Wildlife Use: No

Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No_X_ (if no explain in Notes) Dry conditions

Are "Normal Circumstances" present: Yes_X_ No_____ (If no, explain in Notes.)

Are Vegetation_____, Soil_____, or Hydrology_____ Significantly Disturbed? No_X_ (If yes, explain in Notes)

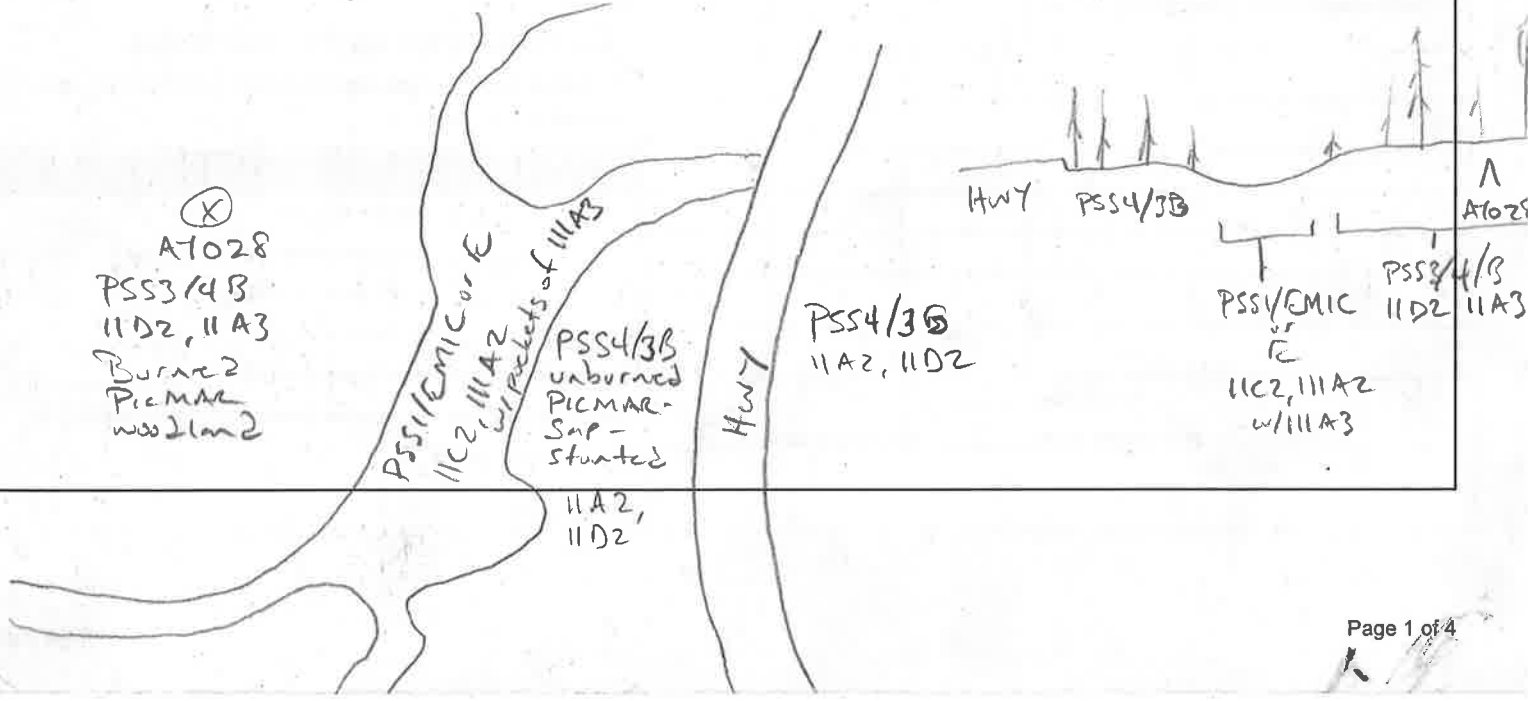
Are Vegetation_____, Soil_____, or Hydrology_____ Naturally Problematic? No_X_ (If yes, explain in Notes.)

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? Yes_Y_ No_____	Is the Sampled Area within a Wetland? Yes_X_ No_____
Hydric Soil Present? Yes_Y_ No_____	Wetland Type: PSS3/4B
Wetland Hydrology Present? Yes_Y_ No_____	Alaska Vegetation Classification (Viereck): 11D2, 11A3

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

Histisol. Dry conditions, typically saturated to the surface for extended periods. Microlows between sphagnum hummocks are frequently poorly vegetated with a few standing waterstained leaves. ANDPOL is shrubby here ~6" tall. No saturation at time of site visit. PICMAR woodland - mostly burned. Fire was primarily confined to the canopy. PICMAR - Sapling survivors/regen is somewhat less than 10% although some areas would qualify as woodland within polygon. Not many trees survive.



A-1028

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Picea mariana	T		FacW
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rhododendrum tomentosum	70	Y	FacW
2. Rhododendrum groenlandicum	1		Fac
3. Andromeda polifolia	4		FacW
4. Vaccinium uliginosum	10		Fac
5. Vaccinium vitis-idaea	1		Fac
6. Vaccinium oxycoccus	1		OBL
7. Picea mariana	T		FacW
8. Betula nana	5		Fac
9. Betula neoalaskana	T		FacW
Total Cover: 92			
50% of total cover: 46 20% of total cover: 18.4			

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: 1	X 1 =	1
FACW species: 84	X 2 =	168
FAC species 17	X 3 =	51
FACU species —	X 4 =	—
UPL species —	X 5 =	—
Column Totals: 102 (A)		220 (B)

PI = B/A = 2.16

~~Vaccinium oxycoccos 5 + OBL 355~~

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Rubus chamaemorus	10	Y	FacW
2. Chamerion angustifolium	T		
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Total Cover: 10			
50% of total cover: 5 20% of total cover: 2			

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

X Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

18 % Bare Ground

— % Cover of Wetland Bryophytes

~~73~~ Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

Sphagnum 70
Bare 18
lichen 3
litter 9

A-1028

WETLAND DETERMINATION DATA FORM

7/14/15 WBHA-1028 Y

SOIL Date 7/14/15 Feature ID WBHA-1028 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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oi 0-2							fibric	
Oe 2-12							hemic	
Oa 12-17							sapric	
Oaf 17-21							sapric	
Oa 21-25							sapric	unfrozen - talik material
Oaf 25-27+							sapric	

[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) Y	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Active layer seasonal frost Depth (inches): 17-21 Permafrost below 25 inches

Hydric Soil Present (Y/N): Y

Notes: Histisol. Site is typically saturated to the surface. Dry conditions, 21-25 is particularly red in color - appears to be iron stained organic material. Mineral soil not found in 29". Talik material between 21-25". Seasonal frost 17-21" Active layer appears to extent below 29 inches based on soft consisency.

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9)	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10) N	Geomorphic Position (D2) Y
Saturation (A3) N *	Sparsely Vegetated Concave Surface (B8) Y	Oxidized Rhizospheres along Living Roots (C3) N	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) N	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Surface water nearby but not within 75 feet of soil pit. *Saturated to the surface in normal years.	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y	
Water Table Present (Y/N): N	Depth (in): NA		
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA	typically saturated to surface

Notes:

A-1028

AQUATIC SITE ASSESSMENT 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 ~~X~~ 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) 6 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 16 Dwarf shrub (<0.5m) 76 Tall herb (≥1m) 6 Short herb (<1m) 10 Moss-Lichen 75 Floating 0 Submerged 0

Number of Wetland Types (M): 2

Evenness of Wetland Type Distribution (M): Even _____ Highly Uneven X 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%) X

Interspersion of Cover & Open Water (P): 100% Cover or Open Water X <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) X High (>25) _____

Presence of Islands (M): Absent (none) X 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 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) X Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat X Lacustrine Fringe_____ Depressional _____ Riverine _____ Estaurine Fringe_____

SOIL VARIABLES

Soil Factors (P): Soil Lacking_____ Histosol:Fibric_____ Histosol:Hemic_____ Histosol: Sapric X Mineral: Gravelly_____ Mineral: Sandy_____ 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_____ Fluvaquent 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 X Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable X Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream X 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)_____ Medium (10-100 acres) X 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: W84AY028 Field Target: 15315 Date: 7/14/15

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

1. Site Description

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

2. Vegetation

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

3. Soil

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

4. Hydrology

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

5. Functions and Values

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

6. Field Logbook

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

7. Maps

- [x] Wetland boundaries have been corrected if necessary?
- [x] 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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher X 7/14/15

Wetland Scientist (print) **Signature / Date**

X Brian Strong X 7/14/15

Field Crew Chief (print) **Signature / Date**

A1029

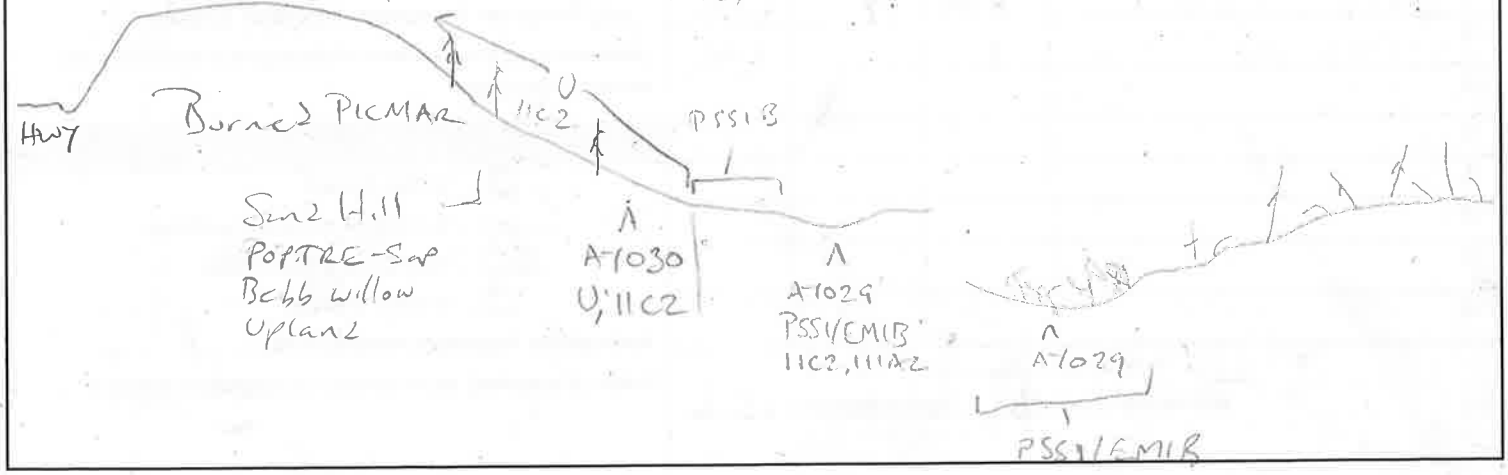
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION				
Survey Type: Centerline X Access Road (explain)____ Other (explain)____			Field Target: 15015	Map #: 41 Map Date: 6/29
Date: 7/15/15	Project Name & No.: Alaska LNG 60418403		Feature Id: W84A1029	
Investigators: Bryan Strong, Morgan Fisher				Team No.: W84
State: Alaska	Region: Alaska	Milepost: 337.65		
Latitude: 66°04'33.53"N		Longitude: 150°10'37.41"W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 49	Picture No.: P_W84A1029_VEG_VEG_PIT_PLUG		

SITE PARAMETERS	
Subregion: Interior Highlands	Landform (hillslope, terrace, hummocks, etc.): Swale
Slope (%): ~2%	Local relief (concave, convex, none): concave, tussocky - Moderate
Pre-mapped Alaska LNG/NWI classification: PSS1/EMIB IIC2, IIIA2	Evidence of Wildlife Use: None observed
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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: PSS1/EMIB
Wetland Hydrology Present? Yes X No____	Alaska Vegetation Classification (Viereck): IIC2, IIIA2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Rainy day, Soil profile is not saturated at time of site visit. Rain has wetted down the profile, Matrix colors of soil have been influenced by rain. Dry conditions, but raining currently. Profile typically wetter. Concave across slope, swale, Burned PICMAR-Sap forest. Most of area is very dry. "Sand Hill" with coarse sand/gross at surface between A1029 and Dalton Hwy. Change in soil type as one approaches the site/swale.



A-7029

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 10ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			

Total Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana DSS	4560	Y	Fac.
2. Salix glauca	2		Fac.
3. Dasiphora fruticosa	1		Fac.
4. Rhododendron groenlandicum	1		FAC.
5. Picea glauca	1		FACU
6. Salix pulchra	70	Y	FACW
7. Arctous rubef	T		Fac
8.			
9.			

Total Cover: 135

50% of total cover: 67.5 20% of total cover: 27

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:	—	X 1 =	—
FACW species:	73	X 2 =	146
FAC species	137	X 3 =	411
FACU species	1	X 4 =	4
UPL species	—	X 5 =	—
Column Totals:	211	(A)	561 (B)

PI = B/A = 2.66

VEGETATION (use scientific names of plants)

Herb Stratum (_____)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Chamerion angustifolium	T		FacU
2. Rubus chamaemorus	3		FacW
3. Carex bigelowii	72	Y	Fac
4. Pyrola asarifolia	1		FAC
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 76

50% of total cover: 38 20% of total cover: 15.2

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

0 % Bare Ground

— % Cover of Wetland Bryophytes

50 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A7029

WETLAND DETERMINATION DATA FORM

7/15/15 W84A7029 Y

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					
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oe 0-5								
Oa 5-12								
Cj 12-15	2.5Y 5/1		7.5YR 4/6	7	C	PL	vfSaL	near SiL massive
Cgf 15-22	2.5Y 5/1		7.5YR 4/6	3	C	M	vfSaL	frozen - soft seasonal or active layer

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) Y	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N - close
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		Other (Explain in Notes) N

[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: Permafrost / Seasonal frost Depth (inches): 15 Soft frost, Seasonal. Permafrost likely but not found in 24"

Hydric Soil Present (Y/N): Y No saturation or positive alpha alpha reaction at time of site visit. Raining today but dry conditions.

Notes: Dry conditions. Saturated to the surface for extended periods in normal years. Standing water will occur between hummocks (CARBIC) and sphagnum hummocks for extended periods of time early in the growing season.

Slightly sticky, slightly plastic

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	**EC:** NA

Notes:

N1029

AQUATIC SITE ASSESSMENT 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) 1 Tall shrub (2-6m) 0 Short shrub (0.5-2m) 134 Dwarf shrub (<0.5m) 0 Tall herb (≥1m) 6 Short herb (<1m) 70 Moss-Lichen 50 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%)_____ Very High Density (80-100%) X

Interspersion of Cover & Open Water (P): 100% Cover or Open Water X <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) X High (>25) _____

Presence of Islands (M): Absent (none) X 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 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) X Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat X 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 X 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_____ Fluvaquent 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 X Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable X Frost double –

Basin Topographic Gradient (M): Low Gradient (<2%)_____ High Gradient (≥2%) X

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_____ Only Connected Above_____ Connected Upstream & Downstream X 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: GPS Technician QA/QC check:

Wetland Determination Form QA/QC Checklist

This form to be completed before leaving the field site.

Feature ID: W84A1029 Field Target: 15215 Date: 7/15/15

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

1. Site Description

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

2. Vegetation

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

3. Soil

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

4. Hydrology

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

5. Functions and Values

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

6. Field Logbook

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

7. Maps

- [x] Wetland boundaries have been corrected if necessary?
- [x] 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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/15/15

X Brian Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/15/15

A-1030

WETLAND DETERMINATION DATA FORM

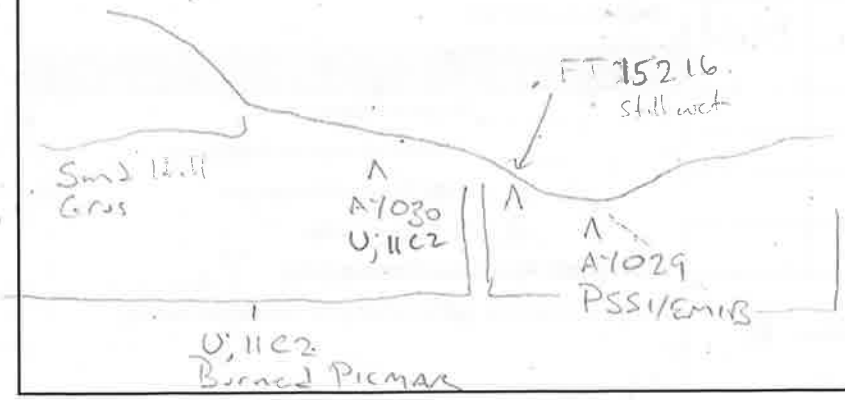
SITE DESCRIPTION				
Survey Type: Centerline X **Access Road** (explain)_____ **Other** (explain)_____			**Field Target:** 15216	**Map #:** 41 **Map Date:** 6/29
Date: 7/15/15	**Project Name & No.:** Alaska LNG 60418403		**Feature Id:** W184A4030	
Investigators: Bryan Strong, Abigayle Fisher				**Team No.:** W184
State: Alaska	**Region:** Alaska	**Milepost:** 337.7		
Latitude: 56°04'32.09"N	**Longitude:** 150°10'33.25"W		**Datum:** WGS84	
Logbook No.: 01	**Logbook Page No.:** 49	**Picture No.:** P_W184A4030_VEG, VEG_PIT_PLOT		

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Footslope
Slope (%): 4%	Local relief (concave, convex, none): Flat, Flat
Pre-mapped Alaska LNG/NWI classification: U | IIIB1 | IIIA1	Evidence of Wildlife Use: Owl - medium sized - greyish wht.
Are climatic/hydrologic conditions on the site typical for this time of year? Yes_____ No_X_ (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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_____ No_X_
Hydric Soil Present? Yes_____ No_X_	**Wetland Type:** U
Wetland Hydrology Present? Yes_____ No_X_	Alaska Vegetation Classification (Viereck): II C2

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

Raining today but, dry conditions. PICMAR snags mostly 15-30' tall. Standing dead and deadfall. Organics burned off. Fire moss, liverwort, some lichen. Soil surface cracking - likely due to dry conditions in plastic soil with some shrink-swell potential. Regen of trembling aspen seedlings 1'-2.5' tall and 2 Bebb willow 1-4' feet/ac evenly distributed. Downfall ~10% cover. Moved point to delineate wet/dry ground. Still marginally wet at FT location 15216.



A-1030

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			
Total Cover: —			
50% of total cover: — 20% of total cover: —			

Sapling/Shrub Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. ~~Betula neoalaskana~~	~~15~~		
2. Salix pulchra	8		FACW
3. Salix bebbiana BGS 15 ~~15~~	~~15~~	Y	FAC
4. Picea glauca (.5-1.5')	5		FAC
5. Populus tremuloides	17	Y	FACU
6.			
7.			
8.			
9.			
Total Cover: 45			
50% of total cover: 22.5 20% of total cover: 9			

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: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species:	—	X 1 =	—
FACW species:	12	X 2 =	24
FAC species	50	X 3 =	150
FACU species	23	X 4 =	92
UPL species	—	X 5 =	—
Column Totals:	85	(A)	266 (B)

PI = B/A = 3.13

VEGETATION (use scientific names of plants)

Herb Stratum (26ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Chamerion angustifolium	6		FACU
2. Equisetum arvense	30	Y	FAC
3. Carex media	1		FACW
4. Arctagrostis latifolia	3		FACW
5. Equisetum scirpoides	T		FacU
6.			
7.			
8.			
9.			
10.			
Total Cover: 40			
50% of total cover: 20 20% of total cover: 8			

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

N Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N 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

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A1030

WETLAND DETERMINATION DATA FORM

7/15/15 W84A1030

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]		
0-1								Charcoal
1-6	2.5Y 4/2	92	2.5Y 5/1	5			Loam	Sticky, plastic
~~6-26 sss~~	2.5		7.5YR 4/6	3				
6-26+	2.5Y 4/2	100					Loam	Massive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) N	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer N
Thick Dark Surface (A12) N		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: Massive loam Depth (inches): 6"

Hydric Soil Present (Y/N): N

Notes: No frost in 32" Massive, sticky, plastic, slowly permiable loam No saturation No positive alpha alpha. Raining ~60°F. Dry conditions

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

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** N
Water Table Present (Y/N): N	Depth (in): NA	
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	**EC:** NA

Notes:

A-1030

AQUATIC SITE ASSESSMENT 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 Geologic 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: W84A-1030 Field Target: 15215 Date: 7/15/15

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~~ form?

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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X [signature] 7/15/15 — **Signature / Date**

X Bryan Strong — **Field Crew Chief (print)**

X [signature] 7/15/15 — **Signature / Date**

A7031

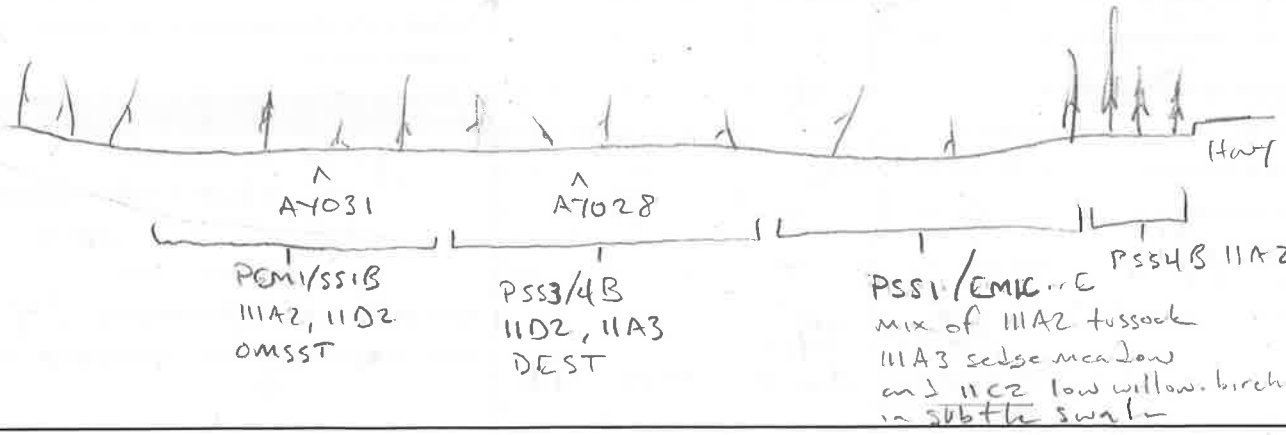
WETLAND DETERMINATION DATA FORM

SITE DESCRIPTION			
Survey Type: Centerline X Access Road (explain)____ Other (explain)____		Field Target: 15217	Map #: 40 Map Date: 6/29
Date: 7/15/15	Project Name & No.: Alaska LNG 60418403		Feature Id: WB4A7031
Investigators: Bryan Strong, Abigayle Fisher			Team No.: WB4
State: Alaska	Region: Alaska	Milepost: 337.1	
Latitude: 66° 04' 58.68" N	Longitude: 150° 16' 49.33" W		Datum: WGS84
Logbook No.: 01	Logbook Page No.: 49	Picture No.: P_WB4A7031_VEG_WB_AT_A000	

SITE PARAMETERS	
Subregion: Interior	Landform (hillslope, terrace, hummocks, etc.): Terrace
Slope (%): 2-3% estimated	Local relief (concave, convex, none): Flat, Tussocky, moderate
Pre-mapped Alaska LNG/NWI classification: Upland IIIB1, IIIA1	Evidence of Wildlife Use: Wood frog ~0.20 mi from plot (E)
Are climatic/hydrologic conditions on the site typical for this time of year? Yes____ No X (if no explain in Notes) Dry conditions	Are "Normal Circumstances" present: 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 Y (If yes, explain in Notes.)

SUMMARY OF FINDINGS	
Hydrophytic Vegetation Present? Yes Y No____	Is the Sampled Area within a Wetland? Yes Y No____
Hydric Soil Present? Yes Y No____	Wetland Type: PEMI/SS1B
Wetland Hydrology Present? Yes Y No____	Alaska Vegetation Classification (Viereck): III A2, II D2

Notes and Site Sketch: Please include Directional & North Arrow, Centerline, Length of feature, Distances from Centerline, Photo Locations, and Survey corridor. Burned PICMAR. Mostly 15-25' snags with sparce 3-8' snags scattered. Thick cover of ERIVAG mixed with RHOTOM and scattered BETNNN (1.5-3' tall) Point moved to better inform mapping updates. Pockets of unburned PICMAR-Sap occur in the area. PICMAR seedings becoming established (~0.5' tall)



A-1031

WETLAND DETERMINATION DATA FORM

VEGETATION (use scientific names of plants)

Tree Stratum (Plot sizes: 100 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1.	—	—	—
2.			
3.			
4.			

Total Cover: —

50% of total cover: — 20% of total cover: —

Sapling/Shrub Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Betula nana	6		FAC
2. Vaccinium uliginosum	6		FAC
3. Vaccinium vitis-idaea	7		FAC
4. Rhododendron tomentosum	20	Y	FACW
5. Picea mariana (1')	1		FACW
6.			
7.			
8.			
9.			

Total Cover: 40

50% of total cover: 20 20% of total cover: 8

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:	108	X 2 =	216
FAC species	19	X 3 =	57
FACU species	—	X 4 =	—
UPL species	—	X 5 =	—
Column Totals:	127	(A)	273 (B)

PI = B/A = 2.15

VEGETATION (use scientific names of plants)

Herb Stratum (26 ft)	Absolute % Cover	Dominant Species? (Y/N)	Indicator Status
1. Eriophorum vaginatum	85	Y	FACW
2. Rubus chamaemorus	2		FACW
3. Chamerion angustifolium	T		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Total Cover: 87

50% of total cover: 43.5 20% of total cover: 17.4

Hydrophytic Vegetation Indicators:

Y Dominance Test is > 50%

Y Prevalence Index is ≤ 3.0

N Morphological Adaptations[1] (Provide supporting data in Notes)

N Problematic Hydrophytic Vegetation[1] (Explain)

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

0 % Bare Ground

— % Cover of Wetland Bryophytes

15 Total Cover of Bryophytes

0 % Cover of Water

Hydrophytic Vegetation Present (Y/N): Y

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

A-1031

WETLAND DETERMINATION DATA FORM

7/15/15 W84A1031 Y

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Notes
Oa 0-3								charcoal/charcoal rich
Bw 3-4	7.5 YR 4/6	100					Clay Loam	
Cg 4-30	N 4/0	90	7.5 YR 4/6	10	C/Ox	PL/RC	Clay Loam	Massive, Alpha alpha positive

[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) N	Alaska Gleyed (A13) N	Alaska Color Change (TA4)[4] N
Histic Epipedon (A2) N	Alaska Redox (A14) Y	Alaska Alpine Swales (TA5) N
Black Histic (A3) N	Alaska Gleyed Pores (A15) N	Alaska Redox with 2.5Y Hue N
Hydrogen Sulfide (A4) N		Alaska Gleyed without 5Y Hue or Redder Underlying Layer Y
Thick Dark Surface (A12) N		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: Massive Clay Loam - Permafrost at 12 inches over most of area Depth (inches): 12

Hydric Soil Present (Y/N): Y

Notes: Permafrost deeper than 30" where soil pit was dug. Other test pits show histic epipedons with permafrost at ~12" Pit dug in subtle concave microsite amongst the ERIVAG fussocks

HYDROLOGY PRIMARY INDICATORS (any one indicator is sufficient)		SECONDARY INDICATORS (2 or more required)	
Surface Water (A1) N	Surface Soil Cracks (B6) N	Water-stained Leaves (B9) N	Stunted or Stressed Plants (D1) N
High Water Table (A2) N	Inundation Visible on Aerial Imagery (B7) N	Drainage Patterns (B10)	Geomorphic Position (D2) Y
Saturation (A3) N *	Sparsely Vegetated Concave Surface (B8) N	Oxidized Rhizospheres along Living Roots (C3) Y	Shallow Aquitard (D3) Y
Water Marks (B1) N	Marl Deposits (B15) N	Presence of Reduced Iron (C4) Y	Microtopographic Relief (D4) Y
Sediment Deposits (B2) N	Hydrogen Sulfide Odor (C1) N	Salt Deposits (C5) N	FAC-Neutral Test (D5) Y
Drift Deposits (B3) N	Dry-Season Water Table (C2) N	Notes: Not quite saturated. Dry conditions. Saturation/high water table typically present	
Algal Mat or Crust (B4) N	Other (Explain in Notes): Y		
Iron Deposits (B5) N			

Surface Water Present (Y/N): N	Depth (in): NA	**Wetland Hydrology Present (Y/N):** Y	
Water Table Present (Y/N): N	Depth (in): NA		
Saturation Present (Y/N): (includes capillary fringe) N	Depth (in): NA	EC: NA	

Notes:

W84N7031

AQUATIC SITE ASSESSMENT 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__X__ Aquatic Bed_____

Percent Cover (P): Tree (>5 dbh, >6m tall)__0__ Sapling (<5 dbh, <6m tall)__1__ Tall shrub (2-6m)__0__ Short shrub (0.5-2m)__13__ Dwarf shrub (<0.5m)__27__ Tall herb (≥1m)__0__ Short herb (<1m)__87__ Moss-Lichen__15__ Floating__0__ Submerged__0__

Number of Wetland Types (M): __2__ **Evenness of Wetland Type Distribution (M):** Even _____Highly Uneven _____Moderately even __X__

Vegetation Density/Dominance (P): Sparse (0-20%)_____ Low Density (20-40%)_____ Medium Density (40-60%)_____ High Density (60-80%)_____ Very High Density (80-100%)__X__

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) __X__ 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__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)__X__ Moderate (broken irregular rings)_____ High (small groupings, diverse and interspersed)_____

HGM Class (P): Slope_____ Flat__X__ 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__X__

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_____ Fluvaquent 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__X__ Circumneutral (5.5-7.4)_____ Alkaline (>7.4)_____ Acid (<5.5)_____ **pH Reading** _____

Surficial Geologic Deposit Under Wetland (P): High Permeability Stratified Deposits_____ Low Permeability Stratified Deposits_____ Glacial Till/Not Permeable__X__ Permafrost

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_____ Only Connected Above_____ Connected Upstream & Downstream__X__ 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)_____ Medium (10-100 acres)__X__ 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: W84A-1031 Field Target: 15216 Date: 7/15/15

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~~ form?

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)?

NA ☒ Two photos were taken for each Observation Point (vegetation/site overview)?

X Abigayle Fisher — **Wetland Scientist (print)**

X — **Signature / Date** 7/15/15

X Bryan Strong — **Field Crew Chief (print)**

X — **Signature / Date** 7/15/15