APPENDIX E

WETLAND DELINEATIONS (2012 AND 2013)

GOLDBORO LNG

2012 / 2013 WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

GOLDBORO LNG PROJECT
-
NATURAL GAS LIQUEFACTION PLANT AND MARINE TERMINAL

Submitted to:
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1.0 INTRODUCTION

Pieridae Energy (Canada) Ltd. proposes to construct a liquefied natural gas (LNG) liquefaction plant and marine terminal in Goldboro, Guysborough County, Nova Scotia, referred to as the Goldboro LNG Project. The Project proposal also includes the development of a 180 MW on-site gas-fired power generation plant. The Goldboro LNG facility will have a capacity of 10 million tonnes per annum (Mtpa) (~1575 million cubic feet per day (Mcf/d)) and a gross LNG storage capacity of about 690,000 m3 in three 230,000 m3 tanks.

Pieridae Energy (Canada) Ltd. (Pieridae) is a Canadian energy infrastructure development company focused on LNG opportunities. The company's management team has extensive LNG experience and deep connections to the LNG industry worldwide. Pieridae operates as the project lead in the initial phases of development of a project.

1.1 Project Area

The Goldboro LNG Project (the Project) is located at the Atlantic Ocean coast, approximately 2 km from the communities of Goldboro in the west, and Drum Head in the east. The Project is situated on the same site as the LNG component of the formerly assessed Keltic Petrochemicals and LNG Facility Project (Keltic Project). The Keltic Project obtained provincial and federal EA approvals in 2007 and 2008, respectively. The Project, however, was never implemented and all approvals obtained to date have expired.

1.2 Scope of Work

In preparation for construction activities planned within the Goldboro LNG Project boundary, wetlands located within the Project area must be identified, delineated and assessed in terms of ecological functions they provide in order to conduct an accurate assessment of potential impacts the Project may have on wetland habitat. This data will also be used to prepare future wetland alteration applications to NSE. The following activities were conducted to identify and delineate wetland habitat present:

- Review aerial photographs and existing maps to identify location of wetlands;
- Determine wetlands in the field using three parameter approach (soil, vegetation, and hydrology);
- Mark wetland boundaries with physical markers and GPS;
- Conduct wetland habitat and functional assessments; and
- Reporting including photographs and field data sheets.

2.0 WETLANDS REGULATORY REQUIREMENT AND DEFINITIONS

Several definitions of “wetland” exist in literature:

- Lands that are seasonally or permanently covered by shallow water, including lands where the water table is at or close to the surface. The presence of abundant water causes the formation of hydric soils and favours the dominance of either hydrophytic or water-tolerant plants. The five major types of wetlands are: marshes, swamps, bogs, fens and shallow open waters (Environment Canada, 2013);
- A wetland is land “where the water table is at, near, or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation” (Environment Canada, 1996);
- A wetland is land that is “saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic (i.e., water-loving) vegetation and various kinds of biological activity which are adapted to a wet environment” (Government of Canada, 1991); and
- Wetlands are areas of “marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters” (UNESCO, 1987).

Although each definition is slightly different, the relevant common aspects adopted for the purpose of this report that define a wetland are:

- Land that is saturated or covered by water for some time during the growing season;
- Poorly drained soils; and
- Predominantly, hydrophytic vegetation.

From these features that define a wetland, it is clear that preserving wetland habitat is dependent on maintaining existing soil, vegetation, and hydrologic conditions at a site.

Wetlands are environmentally significant for several reasons, including: water filtration; water storage (water recharge); flood reduction and control; carbon absorption; erosion control; and wildlife habitat (Nova Scotia Museum, 1996). Loss of wetlands has resulted, to some degree, in increased flooding, decreased water quality, desertification, and declines of fish and wildlife (Lynch-Stewart, 1992).

2.1 Federal Policy on Wetland Conservation

The *Federal Policy on Wetland Conservation* (Government of Canada, 1991) directs all federal government departments to conserve or sustain wetland functions during delivery of their programs. One of the main considerations in developing the Policy was Canada’s membership in the Ramsar Convention on Wetlands (Revised 1987), signed by Canada in 1981. The Ramsar Convention is a global conservation treaty specifically dealing with wetland loss and sustainable use.

Another consideration in developing the Policy was Canada's commitments under the North American Waterfowl Management Plan and the potentially beneficial influences of land use decisions by federal departments and agencies (Lynch-Stewart *et al*., 1999).

The two key commitments in the federal wetland policy include:

- No net loss of wetland functions on federal lands through mitigation; and
- Enhancement and rehabilitation of wetlands where in areas wetland loss has reached critical levels.

Implementation of strategies contained in the Federal Policy on Wetland Conservation is outlined in the *Implementation Guide for Federal Land Managers* (Lynch-Stewart *et al*., 1996). The Guide also outlines the hierarchy for mitigation alternatives for meeting the goal of no net loss of wetland function:

- First – Avoid impacts;
- Second – Minimize unavoidable impacts; and
- Third, and last – Compensate for residual impacts that cannot be minimized.

In addition, the Guide provides advice on integrating wetlands into the project planning process, and details on the related process under the *Canadian Environmental Assessment Act 1992*.

2.2 Nova Scotia Wetland Policy

The *Nova Scotia Wetland Conservation Policy* (NSE, 2011) provides direction with respect to conservation, alteration or infilling of wetlands in Nova Scotia. The guiding principle is to achieve no loss in Wetlands of Special Significance and prevent net loss of wetland function in other wetlands. The Department designates infilling or alteration of wetlands as an "activity" under the NS *Environment Act* (Government of Nova Scotia, 1995) and requires approval of such activities prior to the occurrence.

This Policy recognizes that freshwater wetlands and salt marshes are critical ecosystems that provide a suite of environmental and societal services including:

- Maintaining watershed health;
- Maintaining and improving water quality and quantity (surface and ground);
- Reducing impacts and damage due to flooding and storm surges;
- Providing habitat for wildlife and other wetland dependent species; and
- Providing opportunities for recreation and education.

Nova Scotia Environment (NSE) recognizes that wetlands are a particularly sensitive habitat and that alteration of wetlands can cause significant adverse environmental effects. The policy guides departmental decision making with respect to wetlands.

3.0 METHODOLOGY

3.1 Desktop Review

All wetlands noted to occur within the Project footprint form previous reports and databases, were mapped, and information on the location, size and type of these wetlands were extracted. This information has been augmented by information obtained from review of:

- NS Wetlands Atlas
- Aerial photos;
- Topographical maps;
- NSDNR Wet Areas Mapping (WAM); and
- Information collected during field work.

All known wetland locations as well as high potential areas identified during the desk top review were visited in the field to confirm the presence of wetland habitat within the Project area.

3.2 Wetland Delineation

Wetland delineations were conducted according to standard methodologies approved by NSE (NSE, 2013). The determination of wetland habitat in the field was based largely on the Corps of Engineers Wetland Delineation Manual (the Manual) (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual (USACE, 2012). Wetland areas within the Project area were identified and mapped using wetland indicators and definitions from the delineation approach approved by NSE (NSE, 2013). This consisted of using representative "paired data points" (i.e., one sample point in the wetland habitat and one sample point in the adjacent upland habitat) as described in the US Army Corps of Engineers Manual.

Wetland data were recorded on Wetland Delineation Data Sheets developed by the Maritimes College of Forestry Technology for the province of Nova Scotia (Appendix A). *Munsell Soil Color Charts* (Gretagmacbeth, 2000) were used to aid in identifying hydric soils in the field. The *Canadian System of Soil Classification* (SCWG, 1998) was used to aid in description of soil characteristics. The *Roland's Flora of Nova Scotia* (Zinc, 1998) and *Flora of New Brunswick* (Hinds, 2000) aided with plant nomenclature and identification. The location of data points and selected wetland boundary points were recorded by Global Positioning System (GPS) using a TRIMBLE Geo-XH GPS receiver capable of sub-metre accuracy. Accuracy of all saved data points were estimated by the receiver to be <1m.

At each sample site, two sample points were chosen; which represent wetland and upland habitat at the wetland boundary. The location of each sample point was recorded with the GPS and marked using pink flagging tape with a unique GPS waypoint name. The identified vegetation communities were then used to delineate the wetland boundary. Selected evenly spaced boundary flags were GPS'd, as indicated in the figures located at the end of this report. All recorded GPS points are presented in Appendix B. Representative site photos of wetland areas, adjacent upland areas, and soil pit exposures were also collected (Appendix C).

3.3 Wetland Determination

To be determined a wetland; the following three criteria should be met:

- Majority of dominant vegetation species are wetland associated species;
- Hydrologic conditions exist that result in periods of flooding, ponding, or saturation during the growing season; and
- Hydric soils are present.

3.3.1 Vegetation

Hydrophytic vegetation is defined as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (Environmental Laboratory 1987). The definition of wetlands includes the phrase "sustains aquatic processes as indicated by the presence of hydric soils, hydrophytic vegetation and biological activities adapted to wet conditions." Hydrophytic vegetation should be the dominant plant type and is characterized by the dominant plant species comprising the plant community (Environmental Laboratory 1987).

Dominant plant species observed at each data point were classified according to their Indicator Status Group (probability of occurrence in wetlands) (Table 3.1), in accordance with the Nova Scotia Wetland Indicator Plant List developed by Sean Blaney at the Atlantic Canada Conservation Data Center (ACCDC, 2011). This classification of plants follows methods developed by the US fish and Wildlife Service (Reed 1988). Further relevant information was reviewed in Roland's *Flora of Nova Scotia* 3rd Ed. (Zinc, 1998) and *Flora of New Brunswick* 2nd Ed. (Hinds, 2000).

Table 3.1: Classification of Wetland-Associated Plant Species

Plant Species Classification	Abbreviation	Probability of Occurring in Wetland
Obligate	OBL	>99%
Facultative Wetland	FACW	66-99%
Facultative	FAC	33-66%
Facultative Upland	FACU	1-33%
Upland	UPL	<1%
No indicator status	NI	Insufficient information to determine status
Plants That Are Not Listed (assumed upland species)	NL	Does not occur in wetlands in any region.

Source: USFWS 1988.

The Prevalence Index (PI) was the main indicator used to assess the dominance of hydrophytic vegetation at each data point location. The PI method assigns weighted values to each dominant species according to their Indicator Status Group. The total cover (% area) of species

in each group is then multiplied by the weighted values and product is divided by the sum of the unweighted total cover, yielding a value between 1 and 5. If the majority of the dominant vegetation on a site are classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC) then the PI will be equal to or less than 3, and the site is considered to be dominated by hydrophytic vegetation.

3.3.2 Soils

A hydric soil is defined as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA-NRCS, 2007). Indicators of hydric soil include; soil color (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regime, reducing soil conditions, sulfidic material (odour), soils listed on hydric soils list, iron and manganese concretions, organic soils (Histosols), histic epipedon, high organic content in surface layer in sandy soils, and organic streaking in sandy soils.

A soil pit was excavated to a minimum depth of 40 centimetres or refusal at each data point. The soil was then examined for hydric soil indicators. The matrix color and mottle color (if present) of the soil was determined using the Munsell Soil Color Charts.

3.3.3 Hydrology

Wetlands, by definition, either periodically or permanently have a water table at, near or above the land's surface or are saturated with water. To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology. Primary indicators of wetland hydrology may include, but are not limited to: water marks, drift lines, sediment deposition, drainage patterns, visual observation of saturated soils, and visual observation of inundation. In addition to the primary indicators, there is a variety of secondary wetland hydrology indicators. Secondary indicators include, but are not limited to: oxidized root channels in the upper 12 inches (30.5 centimetres), stunted vegetation, and local soil survey data. When no primary indicators of wetland hydrology are observed at a data point, two or more secondary indicators are required to confirm wetland hydrology.

3.3.4 Regional Supplement

There are a number of uncommon situations, often regional in nature that may cause difficulty in interpreting wetland indicators at a site. Some examples include recent disturbance (e.g. vegetation clearing, infilling), past land use (e.g. agricultural tillage or ditch drainage), recent extreme flooding (e.g. sediment deposits, hanging debris), and problematic soils (e.g. fluvial deposits, red parent material). The Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual (USACE, 2012) contains specific guidance for use in these situations. Although there was some minor disturbance noted in many of the wetlands assessed within the Project area, known were considered to be problematic in terms of interpreting wetland indicators.

3.4 Functional Assessment Method

Environment Canada and the US Army Corps of Engineers both describe wetland ecological functions as the natural processes (physical, chemical, biological) that a wetland provides that is independent from the benefits these processes provide to humans (Hanson et al., 2008; USACE, 1999). This is differentiated from wetland values which reflect the ecosystem services wetlands provide to humans and the associated societal value. These "values" are a product of the ecological function a wetland may provide, but may change depending on individual or community preference (Hanson et al., 2008).

NSE has developed the Nova Scotia Wetland Evaluation Technique (NovaWET) which is designed to assess the condition and functions of wetlands specifically in Nova Scotia (NSE 2013). This technique has been adapted using aspects of various methods successfully employed in other regions, in particular the US. This method uses a combination of landscape level information and site-specific characteristics of the wetland to determine the most significant wetland functions.

NovaWET consists of 11 major sections associated with key wetland functions. Each section contains a number of questions that pertain to that function which provide details that enable the assessor to determine to what degree the wetland provides significant functions (SF). This method identifies a total of 29 significant functions a wetland may provide depending on the specific characteristics of the wetland and surrounding landscape. The 11 major sections and associated 29 significant functions are as follows:

- Section 1 – Watershed Characteristics
    - SF1 – Watershed condition
    - SF2 – Proportion of wetland area in watershed & opportunity for floodwater detention
- Section 2 – Wetland Characteristics
    - SF3 – General wetland condition/integrity
- Section 3 – Adjacent Land Condition and Integrity
    - SF4 – Overall condition and integrity of adjacent land to wetland
- Section 4 – Documented Important Features
    - SF5 – Wetland a WSS
    - SF6 – Wetland support commercial/recreational fish/shellfish
    - SF7 – Species of concern
    - SF8 – Wetland has conservation/compensation agreement/activity
    - SF9 – Wetland is calcareous fen, black ash or cedar swamp
    - SF10 – Within Drinking Water Protected Area (designated watershed/wellfield)

- SF11 – Wetland within a floodplain and upstream or within a populated area
- SF12 – Fed/Prov/Municipal area of interest

- Section 5 – Hydrologic Condition and Integrity
  - SF13 – Wetland hydrologic condition
  - SF14 – Importance of maintaining stream flow
  - SF15 – Ability to detain surface water
- Section 6 – Water Quality
  - SF16 – Improves water quality
  - SF17 – Evidence of excess nutrient loading/contamination
  - SF18 – Contributes to water quality in downstream resources
- Section 7 – Groundwater Interactions
  - SF19 – Recharge site
  - SF20 – Discharge site
- Section 8 – Shoreline Stabilization and Integrity
  - SF21 – Ability to stabilize shoreline
- Section 9 – Plant Community
  - SF22 – Plant community unique or rare regionally or provincially
  - SF23 – Contain a diversity of plant communities
  - SF24 – Overall integrity of the plant community
  - SF25 – Presence of rare or endangered plant species
- Section 10 – Fish and Wildlife Habitat and Integrity
  - SF26 – Support fish/fish habitat
  - SF27 – Presence of rare or endangered fish/wildlife
  - SF28 – Overall fish and wildlife habitat quality
- Section 11 – Community Use/Value
  - SF29 – Wetland's community use/value

NovaWET goes further to identify critical wetland functions (SF rating highlighted in red on the data sheets) that are often unique or rare or associated with high risk to the watershed if lost and as such minimizing or compensating for this loss may be difficult. In many cases the rating of significant functions determines whether the wetland provides a critical function or if this function is just merely present. For example a wetland is considered to provide a critical function in terms of fish and wildlife habitat if that significant function is assessed to be of high quality. Alternatively, if habitat quality is determined to be low or moderate, the wetland is still

considered to offer that function, however it is not considered critical. Other significant functions only need to be present in order to be considered critical for example the presence of a rare or endangered species constitutes a critical function for that wetland. NSE should be consulted should a wetland be determined to provide a critical wetland function.

Functional Assessments of all wetlands encountered within the Project area were conducted using the NovaWET method. Appendix D provides the completed NovaWET evaluation forms for the eight wetlands assessed within the Project area as well as the two wetlands located outside of the Project boundary but hydrologically connected downstream from the site.

4.0 RESULTS

The field surveys were conducted between September 25th to the 28th, 2012 by AMEC Wetland Biologists, Scott Burley (M.Sc.) and Marion Sensen (Ph.D.). The weather was somewhat variable: The majority of the time, days consisted of sun mixed with clouds however the morning of September 27th received rain. Heavy rains were also received in the area on September 24th prior to the survey.

A second round of field surveys was also conducted by Scott Burley and AMEC Environmental Technician Leah Darche (EPT) between June 18th and 21st, 2013. The weather during this round of surveys was a mix of sun and cloud with rain on the 19th.

A total of 13 wetlands were identified within the LNG Facility Footprint and/or determined to be hydrologically connected downstream. The majority of wetland habitat identified consists of small riparian fens none of which were found to be larger than 1 ha in size and most covered less than 0.5 ha. Other wetland types identified include swamp, bog, marsh and coastal saline pond as well as complexes including a combination of a number of these wetland types. The total area of wetland habitat identified within the LNG Facility is approximately 3.3 ha.

Wetland habitat was also identified along the proposed alignment for the Water Supply Pipeline during the June 2013 surveys. The final alignment of the water supply pipeline is not yet finalized and as such it is unclear which wetlands, if any, will be impacted as a result of the Water Supply Pipeline construction. Once the alignment is finalized, complete wetland surveys, including full delineations and functional assessments, will be conducted within the identified wetland habitat potentially impacted by the Project components.

The number of wetlands detected within the Project area in 2013 represents a significant increase in wetland habitat than what previous surveys of the area identified for the Keltic EA (AMEC, 2006). Two of the wetlands identified during the Keltic EA were re-surveyed during this recent field program. The wetland numbers assigned to wetlands during the 2013 survey are compared to the previous wetland numbering system for the Keltic EA in Table 4.1 below.

Table 4.1: Wetland Locations and Classification

Wetland # for Current Survey (AMEC 2013)	Wetland # for Keltic EA
WL1 – WL8 and WL11 – WL13	Not identified during previous survey
WL9	WL12
WL10 – Does not occur within the Project boundary but is hydrologically connected downstream	WL13
Determined to be a pond (not wetland) (Dung Pond)	WL1
These wetlands do not occur within the current Project area	WL2 – WL11 and WL14

Eleven (11) of the 13 wetlands surveyed were found to occur within the Project area, and complete delineations were conducted in addition to habitat and functional assessments (WL1 – WL8 and WL11-WL13 inclusive in Table 4.2). After the completion of the field surveys, the property boundary was changed and as such WL7 is no longer within the LNG Facility footprint, however given the proximity to the Project area and hydrological connectivity, this wetland is still included in the assessment as it may be impacted by Project activities.

WL9 constitutes the coastal saline ponds located at the southern end of the Study area. This wetland was identified in previous reports and as such field delineations were not conducted as this information already exists. One wetland was also located outside of the Project area but was found to be hydrologically connected downstream from the site via the unnamed stream located along the western end of the Project area (WL10). Functional assessments were completed for both WL9 and WL10.

Table 4.2 provides a summary of all wetlands assessed along with their general characteristics and corresponding coordinates (UTM Zone 20, NAD 83).

Table 4.2: Wetland Locations and Characterization

Wetland #	Coordinates		Type	Size (Ha)	Landscape Position	Water Flow Path	Landform
	Easting	Northing					
WL1	607441	5002595	Bog/Fen/Swamp/Marsh	0.17	Lotic Stream	Throughflow	Basin
WL2	607504	5002543	Herb Fen	0.20	Terrene	Outflow	Basin
WL3	607627	5002408	Fen/Bog/Marsh	0.19	Terrene Pond	Outflow	Basin
WL4	607114	5002089	Fen	0.15	Lotic Stream	Throughflow	Slope
WL5	607422	5001908	Fen	0.32	Lotic Stream	Throughflow	Slope
WL6	608135	5002011	Shrub/Treed Fen	0.10	Terrene	Isolated	Basin
WL7	608389	5002048	Shrub Bog	0.10	Lotic Stream	Throughflow	Basin

WL8	607318	5001668	Shrub Swamp/Fen	0.62	Lotic Stream	Throughflow	Slope
WL9	606913	5001574	Coastal Saline Pond	0.61	Terrene	Isolated	Basin
WL10	607037	5001949	Shrub Swamp	0.05	Lotic Pond	Throughflow	Slope
WL11	608129	5001772	Treed Bog	0.44	Terrene	Isolated	Basin
WL12	608268	5002104	Treed Swamp	0.17	Lotic Stream	Throughflow	Basin
WL13	607390	5002423	Treed Bog	0.19	Lotic Stream	Throughflow	Basin

4.1 Wetland Delineation

The following descriptions of sample test points are summarized from field data sheets presented in Appendix A. Site photos are included in Appendix C. The following description refers to GPS points in Appendix B and figures located at the end of this report.

4.1.1 Wetland 1 (WL1)

WL1 (Figure 3) is a fen/bog/swamp/marsh wetland complex approximately 0.17 ha in total area located adjacent to sable road (Figure 2). One paired sampling site was recorded. The wetland was determined to contain normal site conditions however the western boundary may be slightly influenced by Sable Road. The upland area around the northern, southern and eastern borders of the wetland is composed of a mixed forest.

The dominant vegetation at Data Point "WL1-WP1" in the overstory is Black Spruce (*Picea mariana*) with Speckled Alder (*Alnus incana*) dominating the shrub layer. The understory is dominated by a thick layer of sphagnum moss with Soft rush (*Juncus effuses*) as the dominant understory (Photo 1; Appendix C). The PI was observed to be 1.9. The soil was determined to be a histosol (A1) as there was more than 40 cm of organic matter accumulated (Photo 2; Appendix C). Surface water, soil saturation and the water table was to the surface (A1, A2 and A3).

The dominant vegetation at Data Point "WL1-UP1' in the overstory and sub canopy is Balsam Fir (*Abies balsamea*). Mountain Holy (*Nemopantus mucronatus*) was also found to be dominant in the understorey while Bunchberry (*Cornus canadensis*) and Twin Flower (*Linnea borealis*) dominated the understory (Photo 3; Appendix C). The PI was observed to be 3.0 although all species were found to have an indicator status of FAC or FACU. The substrate was found to consist of a 15 cm duff layer over rock (Photo 4, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

The presence of Sable Road, topographic relief and vegetation were the main criteria utilized in delineating the wetland boundary. WL1 is a shrub/open wetland and is bordered along its western boundary by Sable Road. Along the northern, eastern and southern boundaries of the wetland there is a noticeable transition in elevation (2-7% slope) and vegetation.

4.1.2 Wetland 2 (WL2)

WL2 (Figure 4) is an herb fen wetland approximately 0.20 ha in total area located in the northwest end of the Project area (Figure 2). One paired sampling site was recorded. The wetland was determined to contain normal site conditions however an accumulation of mine tailings was noted in the south end of the wetland. The upland area surrounding the entire wetland is composed of a mixed forest.

The dominant vegetation at Data Point "WL2-WP1" in the overstory and subcanopy is Black Spruce along with alder dominating the shrub layer. The understory is dominated by a thick layer of sphagnum moss with Labrador Tea (*Rhododendron groenlandicum*) and Lambkill (*Kalmia angustifolia*) as the dominant understory (Photo 5; Appendix C). The PI was observed to be 2.4. The soil was determined to be a histosol (A1) as there was more than 40 cm of organic matter accumulated (Photo 6; Appendix C). Although surface water was not present at the sample point, soil saturation was at surface (A3) and the water table was to 10 cm from surface (A2).

Balsam fir and White Spruce (*Picea glauca*) is the dominant vegetation at Data Point "WL2-UP1', in the overstory while Balsam Fir is also dominant in the subcanopy. Bunchberry was found to dominate the understory (Photo 7; Appendix C). The PI was observed to be 3.0 although all species were found to have an indicator status of FAC. The substrate was found to consist of a 30 cm duff layer over rock (Photo 8, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Delineation of WL2 relied primarily on an abrupt change in elevation and shift in vegetation composition. The wetland is located in a basin where the land slopes inward essentially on all sides. A small stream provides an outlet to the wetland on the west end which abruptly becomes a confined channel that flows through the bordering mixed wood forest.

4.1.3 Wetland 3 (WL3)

WL3 (Figure 5) is a fen/bog wetland complex approximately 0.19 ha in total area located in the northwest end of the Project area (Figure 2). One paired sampling site was recorded. The wetland was determined to contain normal site conditions however an accumulation of mine tailings was noted in the western side of the wetland. The upland area surrounding the entire wetland is composed of a mixed forest.

The dominant vegetation at Data Point "WL3-WP1" in the overstory is Black Spruce and Balsam Fir. Speckled Alder was found to dominate the subcanopy. The ground layer is dominated by a thick layer of sphagnum moss with Labrador Tea as the dominant species (Photo 9; Appendix C). The PI was observed to be 2.3. The soil was determined to be a histosol (A1) as there was more than 40 cm of organic matter accumulated (Photo 10; Appendix C). Although surface water was not present at the sample point, soil saturation was at surface (A3) and the water table was to 12 cm from surface (A2).

Balsam Fir and Red Spruce (*Picea rubra*) are the dominant vegetation at Data Point "WL3-UP1', in the overstory while Mountain Holy and Lambkill dominate the understorey. Bunchberry and Velvetleaf Blueberry (*Vaccinium myrtilloides*) was found to dominate the understory (Photo 11; Appendix C). The PI was observed to be 3.0. The substrate was found to consist of a 5 cm duff layer over rock (Photo 12, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

WL3 is located at the bottom of a steep sided valley where boundary delineation was determined primarily by the abrupt change in elevation and associated shift in plant species composition.

4.1.4 Wetland 4 (WL4)

WL4 (Figure 6) is a fen wetland approximately 0.15 ha in total area located in the southwest end of the Project area (Figure 2). Highway 316 runs along the south end of this wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions however Highway 316 may be an influence on hydrology along the south side. The upland area along the west side is composed of a mixed forest while forestry activities along the north and east sides have resulted in the development of early successional forest communities in this area.

The dominant vegetation at Data Point "WL4-WP1" is Speckled Alder and Flat-topped White Aster (*Doellingeria umbellata*) in the subcanopy while Soft Rush, Swamp Dewberry (*Rubus hispidus*) and Three-seeded Sedge (*Carex trisperma*) are the dominant species in the understory (Photo 13; Appendix C). The PI was observed to be 2.3. The soil was determined to be a histosol (A1) as there was more than 40 cm of organic matter accumulated (Photo 14; Appendix C). Surface water was found to be present at the sample point (A1), soil saturation was at surface (A3) and the water table was to 5 cm from surface (A2).

Balsam Fir and Red Spruce are the dominant species at Data Point "WL4-UP1', in the overstory while Blueberry (*Vaccinium angustifolium*) was found to dominate the understory (Photo 15; Appendix C). The PI was observed to be 2.8. The substrate was found to consist of a 5 cm duff layer over a 15cm silt-loam Ap layer (7.5YR 4/2) on top of a sand-loam Ae layer (7.5YR 6/3), overtop a sandy-loam B horizon (7.5YR 4/4) (Photo 16, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

WL4 is located along the north side of Highway 316 and as such the southern boundary of this wetland follows the highway. Wetland boundaries along the east and west sides were determined by an abrupt change in elevation. The boundary along the northern end of this wetland consists of a more gradual change in elevation which creates a wider transition from wetland to upland in this area. Forestry activities in this area have also altered the vegetation community where tall shrub species such as alder and American Ash (*Sorbus americana*) have replaced the previous forest community. Wetland boundary in this area was determined by a shift in dominance of sphagnum moss in the wetland to feather moss in the upland.

4.1.5 Wetland 5 (WL5)

WL5 (Figure 7) is a fen/bog wetland complex approximately 0.32 ha in total area located in the southern end of the Project area, north of Highway 316 (Figure 2). Highway 316 runs along the south end of this wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions however Highway 316 may have an influence on hydrology along the south side. The upland area along the north and east boundaries is composed of a mixed forest while forestry activities along the west side have resulted in the development of an early successional forest community in this area.

The dominant vegetation at Data Point "WL5-WP1" is Black Spruce in the canopy while Three-seeded Sedge is the dominant species in the understory (Photo 17; Appendix C). The PI was observed to be 1.7. The soil was determined to be a histosol (A1) as there was more than 40 cm of organic matter accumulated (Photo 18; Appendix C). Surface water was found to be present at the sample point (A1), soil saturation was at surface (A3) and the water table was to 5 cm from surface (A2).

Balsam Fir is the dominant species at Data Point "WL5-UP1', in the canopy while Bunchberry was found to dominate the understory (Photo 19; Appendix C). The PI was observed to be 3.0. The substrate was found to consist of a 5 cm duff layer over a 3cm loam-sand Ae layer (5YR 5/1), overtop a coarse sand B horizon (5YR 4/4) (Photo 20, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

WL5 is located along the north side of Highway 316 and as such the southern boundary of this wetland follows the highway. Wetland boundaries along the north and west sides were determined by an abrupt change in elevation. The boundary along the eastern end of this wetland consists of a more gradual change in elevation which creates a wider transition from wetland to upland in this area. Wetland boundary in this area was determined by a shift in dominance of sphagnum moss in the wetland to feather moss in the upland.

4.1.6 Wetland 6 (WL6)

WL6 (Figure 8) is a fen/bog wetland complex approximately 0.10 ha in total area located in the northeast end of the Project area (Figure 2). An old skidder trail is evident within the wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions although forestry operations adjacent to and within the wetland may have altered the vegetation structure. The upland area along the south boundary is composed of a mixed forest while forestry activities along the remaining three sides have resulted in the development of an early successional forest community.

The dominant vegetation at Data Point "WL6-WP1" is Black Spruce in the canopy while Swamp Dewberry is the dominant species in the understory (Photo 17; Appendix C). The PI was observed to be 2.4. The soil was determined to be a histosol (A1) as there was 30 cm of organic matter overtop of bedrock (Photo 18; Appendix C). Although no surface water was found at the sample point, soil saturation was at surface (A3) and the water table was to 3 cm from surface (A2).

Balsam Fir is the dominant species at Data Point "WL6-UP1', in the canopy while Wild Raisin (*Vibirnum nudum*) was the dominant species in the subcanopy and Bunchberry dominated the understory (Photo 19; Appendix C). The PI was observed to be 2.9. The substrate was found to consist of a 16 cm duff layer over bedrock (Photo 20, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the north, south and west sides of WL6 were determined by an abrupt change in elevation. The boundary along the eastern end of this wetland consists of a more gradual change in elevation which creates a wider transition from wetland to upland in this area. Forestry activities have also created an early successional forest community in this area. Wetland boundary in this area was determined by a shift in dominance of sphagnum moss in the wetland to feather moss in the upland.

4.1.7 Wetland 7 (WL7)

WL7 (Figure 9) is a bog wetland approximately 0.10 ha in total area located outside of the Project area along the northeast boundary (Figure 2). A natural gas pipeline right of way is located along the eastern side of the wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions although tree harvesting adjacent to and within the wetland may have altered the vegetation structure in the buffer zone. The upland area along the western boundary is composed of a mixed forest while forestry activities along the north and south sides have resulted in the development of an early successional forest community.

The dominant vegetation at Data Point "WL7-WP1" is Black Spruce, Mountain Holy and Speckled Alder in the subcanopy while Sweet Gale (*Myrica gale*) is the dominant species in the understory (Photo 21; Appendix C). The PI was observed to be 1.6. The soil was determined to be a histosol (A1) as there was more than 40 cm of accumulated organic matter (Photo 22; Appendix C). Surface water was found to be present (A1) and soil saturation was at surface (A3).

Balsam Fir and Red Spruce are the dominant species at Data Point "WL7-UP1', in the canopy while Lambkill and Mountain Holy was the dominant species in the subcanopy. Lambkill and Bunchberry dominated the understory (Photo 23; Appendix C). The PI was observed to be 3.0. The substrate was found to consist of a 8 cm duff layer over an 11 cm sandy-loam Ae layer (5YR 7/1), overtop of a silty-clay B horizon (10YR 4/3) (Photo 24, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the south, east and west sides of WL7 were determined by an abrupt change in elevation. The boundary along the northern end of this wetland consists of a more gradual change in elevation which creates a wider transition from wetland to upland in this area.

Wetland boundary in this area was determined by a shift in dominance of sphagnum moss in the wetland to feather moss in the upland.

4.1.8 Wetland 8 (WL8)

WL8 (Figure 10) is a shrub swamp/sloped fen wetland complex approximately 0.62 ha in total area located in the southern end of the Project area (Figure 2). One paired sampling site was recorded. The wetland was determined to contain normal site conditions although tree harvesting adjacent to and within the wetland has altered the vegetation structure. Forestry activities surrounding the wetland have resulted in the development of an early successional forest community in the upland area while a barrier beach borders a portion of the south side of the wetland.

The dominant vegetation at Data Point "WL8-WP1" is Speckled Alder in the subcanopy while Three-seeded Sedge is the dominant species in the understory (Photo 25; Appendix C). The PI was observed to be 1.6. The soil was determined to be a sandy mucky mineral (S1) as there was 35 cm of black fine sand/organic soil present over rock (Photo 26; Appendix C). Although Surface water was not found at the sample point, the water table and soil saturation was at surface (A2 and A3).

White Spruce is the dominant species at Data Point "WL8-UP1', in the canopy Bunchberry and Wild-lily-of-the-valley (*Mainanthemum canadensis*) dominates the understory (Photo 27; Appendix C). The PI was observed to be 3.0. The substrate was found to consist of a 10 cm duff layer over 5 cm sandy-loam Ae layer (7.5YR 7/1), overtop of a silty-clay-loam B horizon (5YR 5/4) (Photo 28, Appendix C). The soil appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the shrub swamp portion of WL8 were determined by an abrupt change in elevation and associated shift in dominant plant species. The boundaries of the sloped fen portion of this wetland located in the southwest end consists of a more gradual shift in elevation and dominant plant species. Wetland boundary in this area was determined by a shift in dominance of sphagnum moss in the wetland to feather moss in the upland.

4.1.9 Wetland 9 (WL9)

WL9 (Figure 11) consists of two coastal saline ponds connected by a temporarily flooded channel. This wetland is located at the southeast end of the peninsula and is bordered by a barrier beach on three sides. The northwest side is bordered by a coastal forest consisting of compact shrubs and stunted spruce trees. Delineation data sheets were not completed for this wetland since this area has been previously identified in the Keltic EA (AMEC, 2006).

4.1.10 Wetland 10 (WL10)

WL10 (Figure 12) is a riparian shrub swamp located along an unnamed stream at the point where it flows into the northwest corner of Dung Pond. The wetland is bordered on three sides by a mixed forest while Dung Pond borders the southern boundary. This wetland was identified in the Keltic EA (AMEC, 2006) and is located outside of the Project boundary and as such

delineation data sheets were not completed however the wetland boundary was geo-referenced using a GPS in order to depict the approximate location relative to proposed Project activities.

4.1.11 Wetland 11 (WL11)

WL11 (Figure 13) is a treed/shrub bog wetland approximately 0.44 ha in total area located at the LNG Facility boundary on northeast side (Figure 2). Forestry activity is evident within and adjacent to the wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions although tree harvesting adjacent to and within the wetland has altered the vegetation structure. The upland area along the eastern boundary has cleared of trees while older forestry activities along the north, west and south sides have resulted in the development of an early successional forest community dominated primarily with Balsam Fir.

The dominant vegetation at Data Point "WL11-WP1" is Black Spruce in the canopy, Lambkill in the subcanopy and Three-seeded Sedge in the understory (Photo 29; Appendix C). The PI was observed to be 1.9. The soil was determined to be a histosol (A1) as there was more than 40 cm of accumulated organic matter (Photo 30; Appendix C). A high water table was found to be present (A2) and soil saturation was at surface (A3).

Balsam Fir was the dominant species at Data Point "WL11-UP1', in the subcanopy while Bunchberry dominated the understory (Photo 32; Appendix C). The PI was observed to be 2.9. The substrate was found to consist of a 15 cm duff layer over rock (Photo 33, Appendix C). The area appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the south, and north sides of WL11 were determined by an abrupt change in elevation. The boundary along the eastern and western ends of this wetland consists of a more gradual change in elevation however a distinct change in dominant vegetation and soil characteristics determined the boundary.

4.1.12 Wetland 12 (WL12)

WL12 (Figure 14) is a treed swamp/fen wetland approximately 0.17 ha in total area located in the northeast corner of the LNG Facility Footprint (Figure 2). Forestry activity is evident within and adjacent to the wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions although tree harvesting adjacent to and within the wetland has altered the vegetation structure. Forestry activities surrounding this wetland have resulted in the development of an early successional forest community.

The dominant vegetation at Data Point "WL12-WP1" is Red Maple and Black Spruce in the canopy, Black Spruce, Mountain Holy and Labrador Tea in the subcanopy and Three-seeded Sedge in the understory (Photo 34; Appendix C). The PI was observed to be 2.0. The soil was determined to be a histosol (A1) as there was more than 40 cm of accumulated organic matter

(Photo 35; Appendix C). Surface water was found to be present (A1) and soil saturation was at 10cm (A3).

Black Spruce was the dominant species at Data Point "WL12-UP1', in the canopy while Balsam Fir, Lambkill and Black Spruce dominated the subcanopy. Bunchberry dominated the understory (Photo 36; Appendix C). The PI was observed to be 2.8. The substrate was found to consist of a 15 cm duff layer over a 10 cm silt loam Ae layer (7.5YR 6/2) (Photo 37, Appendix C). Rock was encountered at 25 cm where water was detected however the area appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the south, and north sides of WL13 were determined by an abrupt change in elevation. The boundary along the eastern and western ends of this wetland consisted of a more gradual change in elevation however a distinct change in dominant vegetation and soil characteristics determined the boundary.

4.1.13 Wetland 13 (WL13)

WL13 (Figure 15) is a treed/shrub bog wetland approximately 0.19 ha in total area located along the unnamed stream that flows along the western boundary of the LNG Facility Footprint (Figure 2). Forestry activity is evident on the eastern end adjacent to the wetland. One paired sampling site was recorded. The wetland was determined to contain normal site conditions.

The dominant vegetation at Data Point "WL13-WP1" is Black Spruce in the canopy and Speckled Alder in the subcanopy (Photo 38; Appendix C). The PI was observed to be 2.2. The soil was determined to be a histic epipedon (A2) as there was 30 cm of accumulated organic matter over a silt loam layer with a colour of 7.5YR 4/2 (Photo 39; Appendix C). A high water table was found to be present (A2) and soil saturation was at surface (A3).

Black Spruce and Balsam Fir was the dominant species at Data Point "WL13-UP1' in the canopy while Balsam Fir, Mountain Holy and Black Spruce dominated the subcanopy. Velvet-leaf Blueberry dominated the understory (Photo 40; Appendix C). The PI was observed to be 2.6. The substrate was found to consist of a 20 cm duff layer over a 5 cm silt loam Ae layer (7.5YR 6/1) which overlaid a silt loam B layer (10YR 4/3) (Photo 41, Appendix C). The area appeared to be well drained with no presence of saturation. Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Wetland boundaries along the south, and north sides of WL12 were determined by an abrupt change in elevation. The boundary along the eastern and western ends of this wetland consists of a more gradual change in elevation however a distinct change in dominant vegetation and soil characteristics determined the boundary.

4.2 Functional Assessments

The resulting description of wetland functions will provide the baseline for further assessment and monitoring of project impacts. The description of wetland functions is intended to be conservative. Completed assessment forms are located in Appendix D.

4.2.1 Ecological Characterization

The Project area occurs along a tertiary watershed divide where both 1EP-SD and 1EQ-SD cover portions of the Project area. The tertiary watershed (1EP-SD) within which the western portion of the Project area is located is relatively large covering approximately 220 km^2 and encompasses both sides of Isaac's Harbour and Country Harbour in Guysborough County, NS. Land cover (based on the Nova Scotia Forest inventory Database: NSDNR, 2012) within the majority of this watershed is forested and open natural areas (e.g. barrens) comprising approximately 70% of the tertiary watershed. Wetlands also constitute a relatively moderate component of this wetland covering approximately 14% of the total area. Anthropogenic development in this area is relatively low with residential, gravel pits, roads and landfills combining for a total coverage of approximately 7% of the tertiary land cover.

The tertiary watershed (1EQ-SD) within which the eastern portion of the Project area is located is the larger of the two watersheds covering approximately 518 km^2 and encompasses the land east of the Project site to the eastern end of Guysborough County. Land cover within the majority of this watershed is also forested and open natural areas (e.g. barrens) with a combined coverage of approximately 86% of tertiary watershed 1EQ-SD. Wetlands also constitute a relatively moderate component of this wetland covering approximately 11% of the total area. Anthropogenic development in this area is relatively low with residential, gravel pits, roads and landfills combining for a total coverage of approximately 7% of the tertiary land cover.

Forestry is the greatest stress within both tertiary watersheds where large clear cut and partial cut blocks are noted to occur throughout the area. The overall watershed condition is relatively unaltered with a low percentage of impervious surfaces. The reliance on individual wetlands to contribute to flood water detention is moderate given the proportion of total wetland area in both watersheds.

Land cover in the Project area consists primarily of coniferous / mixed forest in various successional stages intermixed with open shrub dominated areas and clear cuts. This habitat distribution is primarily a result of forestry activity as well as historic mining that has occurred within the site. A number of small streams are located within the Project area the largest occurring along the western side which originates at WL2 and WL3 and flows south before discharging into Dung Pond. Fish surveys conducted in this stream found Brook trout (*Salvinelis fontinalis*) (in the lower reaches) and American Eel (*Anguilla rostrata*).

Vegetation surveys conducted during previous years and supplemented during the 2012 / 2013 field surveys indicated that no plant species at risk listed under the federal Species at Risk Act (SARA0 or Nova Scotia Endangered Species Act (NSESA) were recorded in the Project area.

One plant species of conservation concern, Variegated Horsetail (*Equisetum variegatum* – ACCDC rank; S3) was recorded in wetland 2 and 3 (WL2 and WL3).

Surface hydrology in the area flows in two major directions eventually reaching the coast to the south of the property. The western portion of the site drains in a southwest direction, while the eastern section of the site flows in a southeast direction towards Betty's Brook and eventually reaching the coast.

Groundwater flow is inferred to follow similar directional flow as surface drainage patterns. Based on various characteristics such as wetland soils, land use in the subwatershed upstream, topographic relief surrounding wetlands and hydroperiod of wetland, 12 of the 13 wetlands assessed are likely groundwater discharge sites. Wetland 11 (WL11) was found to potentially serve as a groundwater recharge site. A total of 13 wells are recorded in the NS well log database, however given the relative small size of wetland 12 and since the remaining wetlands in the Project area are likely discharge wetlands, it is unlikely that the Project impacts on wetlands will have any significant impact on the ground water flow regime and potable water wells of the area.

4.2.2 Significant Wetland Functions

4.2.2.1 Wetland 1 (WL1)

WL1 is characterized as a wetland complex comprised of a mix of bog, fen, swamp, and marsh types. The integrity of this wetland and surrounding buffer is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state and fully vegetated (SF3 and SF4). The buffer zone surrounding the wetland provides high quality wildlife habitat and water quality function.

The hydrologic condition of this wetland is considered natural despite the presence of Sable Road along the western side as this was determined to have little to no impact on wetland hydrology. The wetland was also determined to improve water quality (SF16) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with high species diversity and little to no influence of invasive/non-native species. This complex consists of a number of different wetland types and as such it is considered to have a high diversity of high quality vegetation communities (SF23 and SF24).

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows from this wetland (SF7, SF26 and SF27) and as such this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. This wetland may provide open aesthetic functions as well as berry picking and plant gathering opportunities as it is accessible to the public via Sable Road (SF29).

Red rated functions provided by this wetland include supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel) (SF7).

4.2.2.2 Wetland 2 (WL2)

WL2 is characterized as a terrene outflow fen. The integrity of this wetland and surrounding buffer is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state and fully vegetated (SF3 and SF4). The buffer zone surrounding the wetland provides high quality wildlife habitat and water quality function.

This wetland is important in maintaining stream flow of the unnamed stream that flows along the west side of the Project area (SF14). The hydrologic condition of this wetland is considered natural despite the presence of historic mine tailings within the southeastern end as this was determined to have little to no impact on wetland hydrology. The wetland was also determined to improve water quality (SF16) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with high species diversity and little to no influence of invasive/non-native species. One plant species of conservation concern, Variegated Horsetail (*Equisetum variegatum* – ACCDC rank; S3) was recorded in WL2. Although this wetland is comprised of only one wetland type it is considered to have a moderate diversity of high quality vegetation communities.

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows from this wetland (SF7, SF26 and SF27) and this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. This wetland may provide open aesthetic functions as well as berry picking and plant gathering opportunities however since this wetland is not readily accessible by the public, community use functions are assessed as low (SF29).

Red rated functions provided by this wetland include maintaining stream flow (SF14), supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel and Variegated Horsetail) (SF7).

4.2.2.3 Wetland 3 (WL3)

WL3 is characterized as a wetland complex comprised of a mix of bog, fen and swamp types. The integrity of this wetland and surrounding buffer is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state and fully vegetated (SF3 and SF4). The buffer zone surrounding the wetland provides high quality wildlife habitat and water quality functions.

This wetland is important in maintaining stream flow of the unnamed stream that flows along the west side of the Project area (SF14). The hydrologic condition of this wetland is considered natural despite the presence of historic mine tailings within the southeastern end as this was

determined to have little to no impact on wetland hydrology. The wetland also showed little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with high species diversity and little to no influence of invasive/non-native species. One plant species of conservation concern, Variegated Horsetail (*Equisetum variegatum* – ACCDC rank; S3) was recorded in WL3. This complex consists of a number of different wetland types and as such it is considered to have a high diversity of high quality vegetation communities (SF23 and SF24).

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows from this wetland (SF7, SF26 and SF27) and this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. This wetland may provide open aesthetic functions as well as berry picking and plant gathering opportunities however since this wetland is not readily accessible by the public, community use functions are assessed as low (SF29).

Red rated functions provided by this wetland include maintaining stream flow (SF14), supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel and Variegated Horsetail) (SF7).

4.2.2.4 Wetland 4 (WL4)

WL4 is characterized as a sloped throughflow fen wetland. Highway 316 borders the south side of this wetland and forestry activity has occurred in the buffer surrounding the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland may be slightly modified by the presence of Highway 316 along the southern side which may have aided in wetland development in this area. The wetland was also determined to improve water quality (SF16) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows through this wetland (SF7, SF26 and SF27) and this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. This wetland may also provide open aesthetic functions as well as berry picking and plant gathering opportunities as it is accessible to the public via Highway 316 (SF29).

Red rated functions provided by this wetland include supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel) (SF7).

4.2.2.5 Wetland 5 (WL5)

WL5 is characterized as a sloped throughflow fen wetland. Highway 316 borders the south side of this wetland and forestry activity has occurred within the buffer surrounding the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland may be slightly modified by the presence of Highway 316 along the southern side which may have aided in wetland development in this area. The wetland was also determined to improve water quality (SF16) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to amphibians, reptiles, and mammals. This wetland may also provide open aesthetic functions as well as berry picking and plant gathering opportunities as it is accessible to the public via Highway 316 (SF29).

No red rated functions were assessed for this wetland.

4.2.2.6 Wetland 6 (WL6)

WL6 is characterized as an isolated tree/shrub fen wetland. Forestry activity has occurred in the buffer surrounding the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland is considered natural (SF13) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is

considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to amphibians, reptiles and mammals (SF28). This wetland may provide plant gathering opportunities but is not readily available to the public and thus the community use function is assessed as low (SF29).

No red rated functions were assessed for this wetland.

4.2.2.7 Wetland 7 (WL7)

WL7 is characterized as a throughflow bog fen wetland. Forestry activity has occurred in the buffer surrounding the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland is considered natural (SF13) with little evidence of excess nutrient loading or contamination (SF17). The wetland was also determined to improve water quality (SF16).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to amphibians, reptiles and mammals (SF28). This wetland may provide plant gathering and berry picking opportunities but is not readily accessible to the public and thus the community use function is assessed as low (SF29).

No red rated functions were assessed for this wetland.

4.2.2.8 Wetland 8 (WL8)

WL8 is characterized as a sloped throughflow fen/swamp complex. Forestry activity has occurred in the buffer surrounding the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland is considered natural and with little evidence of excess nutrient loading or contamination (SF17). The wetland was also determined to improve water quality (SF16) and have a moderate ability to stabilize shorelines (SF21).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals (SF28). This wetland may also provide berry picking and plant gathering opportunities but is not readily accessible to the public and thus the community use function is assessed as low (SF29).

No red rated functions were assessed for this wetland.

4.2.2.9 Wetland 9 (WL9)

WL9 is characterized as a coastal saline pond wetland type. The integrity of this wetland is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state (SF3 and SF4). The majority of buffer around this wetland consists of a boulder/cobble barrier beach with little to no vegetation however the northwest side consists of fully vegetated coastal shrub community with stunted spruce trees. The buffer zone surrounding the wetland provides wildlife habitat and water quality function.

The hydrologic condition of this wetland is considered natural (SF13) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively have little to no influence of invasive/non-native species although species diversity is low (majority of wetland is unvegetated).

This wetland does support fish habitat (SF27) as well as moderate habitat for waterfowl and waterbirds (SF28). This wetland may provide open aesthetic functions but is not readily accessible to the public and thus the community use function is assessed as low (SF29)

No red rated functions were assessed for this wetland.

4.2.2.10 Wetland 10 (WL10)

WL10 is located outside of the Project area but is hydrologically connected via the unnamed stream that flows along the west side of the property and is characterized as a riparian shrub swamp. The integrity of this wetland and surrounding buffer (SF3 and SF4) is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state and fully vegetated. The buffer zone surrounding the wetland provides wildlife habitat and water quality function.

The hydrologic condition of this wetland is considered natural (SF13). The wetland was also determined to improve water quality (SF16) with little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a low diversity of moderate quality vegetation communities (SF25).

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows from this wetland (SF7, SF26 and SF27) and this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. Community use function of this wetland is low (SF29).

Red rated functions provided by this wetland include supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel) (SF7).

4.2.2.11 Wetland 11 (WL11)

WL11 is characterized as an isolated bog wetland. Forestry activity has occurred in the buffer surrounding the wetland as well as within the wetland and as such the integrity of this wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland is considered natural (SF13) with little evidence of excess nutrient loading or contamination (SF17). The wetland may also serve as a groundwater recharge source since there was no outflow evident and given the type and position of the wetland (SF19).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. This wetland is considered to have a moderate diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to reptiles and mammals (SF28). This wetland may provide plant gathering and berry picking opportunities but is not readily accessible to the public and thus the community use function is assessed as low (SF29).

Rated functions for this wetland include potentially a ground water recharge source (SF19).

4.2.2.12 Wetland 12 (WL12)

WL12 is characterized as a throughflow swamp / fen wetland. Forestry activity has occurred in the buffer surrounding the wetland as well as within the wetland and as such the integrity of this

wetland and surrounding buffer is considered to be moderate (SF3 and SF4). Despite these stressors, impacts to this wetland appear to be relatively minimal and the adjacent buffer area is fully vegetated (although altered from the natural forested community). The buffer zone surrounding the wetland supports wildlife habitat and water quality.

The hydrologic condition of this wetland is considered natural (SF13) with little evidence of excess nutrient loading or contamination (SF17). The wetland was also determined to have a moderate ability to detain surface water (SF16).

The plant community in this wetland was determined to be relatively intact with low species diversity but little to no influence of invasive/non-native species. This wetland is considered to have a low diversity of moderate quality vegetation communities (SF23 and SF24).

The wetland may provide moderate habitat to reptiles and mammals (SF28) and given the location of this wetland community use function is assessed as low (SF29).

No red rated functions were assessed for this wetland.

4.2.2.13 Wetland 13 (WL13)

WL13 is characterized as a throughflow bog. The integrity of this wetland and surrounding buffer is considered to be high where impacts to this wetland are minimal and the adjacent buffer area is considered to be in a natural state and fully vegetated (SF3 and SF4). The buffer zone surrounding the wetland provides high quality wildlife habitat and water quality function.

This wetland is important in maintaining stream flow of the unnamed stream that flows along the west side of the Project area (SF14). The hydrologic condition of this wetland is considered natural despite the presence of historic mine activities in the area as this was determined to have little to no impact on wetland hydrology. The wetland showed little evidence of excess nutrient loading or contamination (SF17).

The plant community in this wetland was determined to be relatively intact with moderate species diversity and little to no influence of invasive/non-native species. Although this wetland is comprised of only one wetland type it is considered to have a moderate diversity of high quality vegetation communities.

American Eel (COSEWIC – Threatened) was recorded within the unnamed stream that flows through this wetland (SF7, SF26 and SF27) and this wetland may provide moderate nursery habitat for this species (SF28). The wetland may provide moderate habitat to amphibians, reptiles, fish and mammals. Since this wetland is not readily accessible by the public, community use functions are assessed as low (SF29).

Red rated functions provided by this wetland include maintaining stream flow (SF14), supporting commercial/recreation fish species (SF6) as well as the presence of species of concern (American Eel) (SF7).

5.0 CONCLUSION

A total of 11 wetlands were encountered within the Project area and two wetlands outside the Project boundary but determined to be hydrologically connected downstream. Habitat and functional assessments were conducted for all wetlands and field delineations were conducted for the 11 wetlands encountered within the Project boundary (WL9 and WL10 was not delineated in the field since they were previously mapped for the Keltic EA).

The functional assessment indicate that seven of the 13 wetlands perform red rated functions which elevate the relative importance of these wetlands in terms of the functions they provide to the surrounding watershed. All but one of the wetlands assessed with red rated functions occur along the unnamed stream that flows along the west end of the property and are associated with providing habitat for American Eel as well as maintaining stream flow. The one wetland (WL11) not associated with the unnamed stream may be a source of ground water recharge.

6.0 REFERENCES

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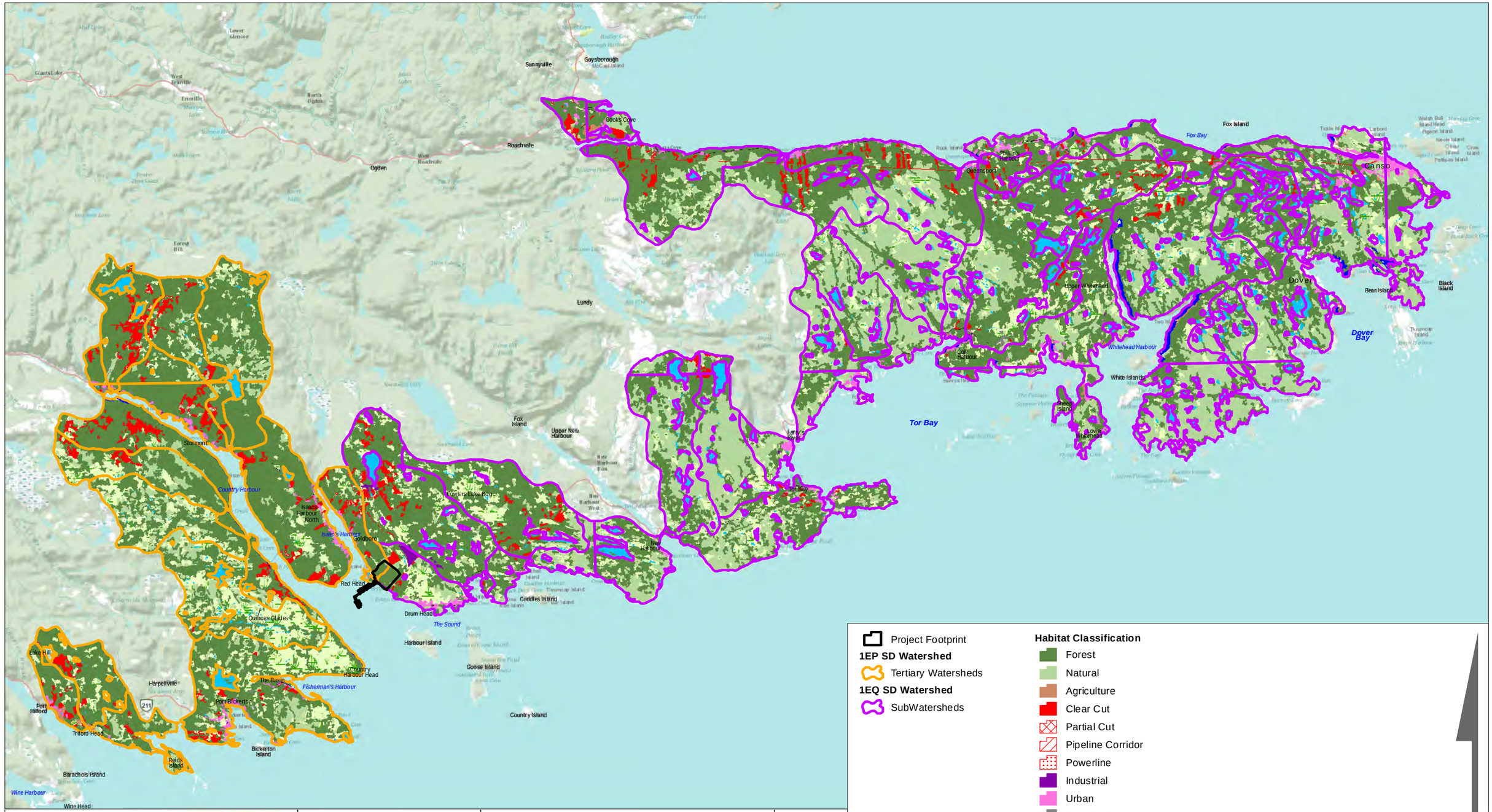
FIGURES



CLIENT: **Pieridae Energy Canada Ltd**	PROJECT No: TV121039.3000	PROJECT: **GOLDBORO LNG WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**	DWN BY: TM
	DATUM: NAD 83		CHK'D BY: SB
	PROJECTION: UTM 20 North		DATE: May 2, 2013
	SCALE: 2,500 1,250 0 2,500 5,000 Metres 1:180,000	TITLE: **PROJECT SITE LOCATION AND WATERSHED LAND COVER**	REV NO:
			FIGURE: 1

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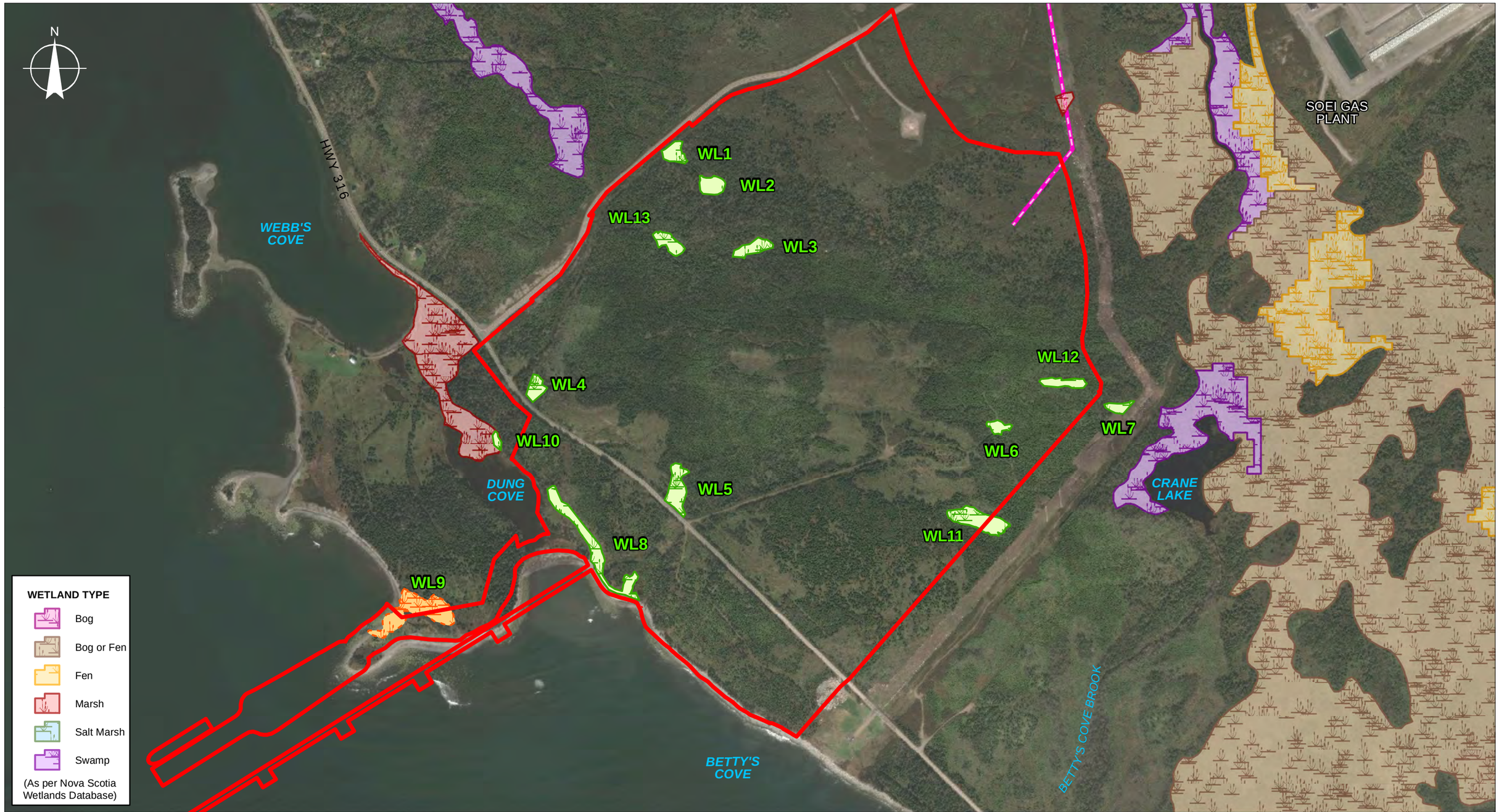
Path: F:\TV121039_Phase3000\MXD\20130506_SBurley_WetlandLocationMap_Fig1.mxd User: tanya.morehouse, Date: 07/05/2013

SOURCE: NSDNR Habitat Classification Data / ESRI Map Service Basemap - Topographic



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DATUM: NAD 83
PROJECTION: UTM 20 North
SCALE: 150 75 0 150 Metres 1:8,000

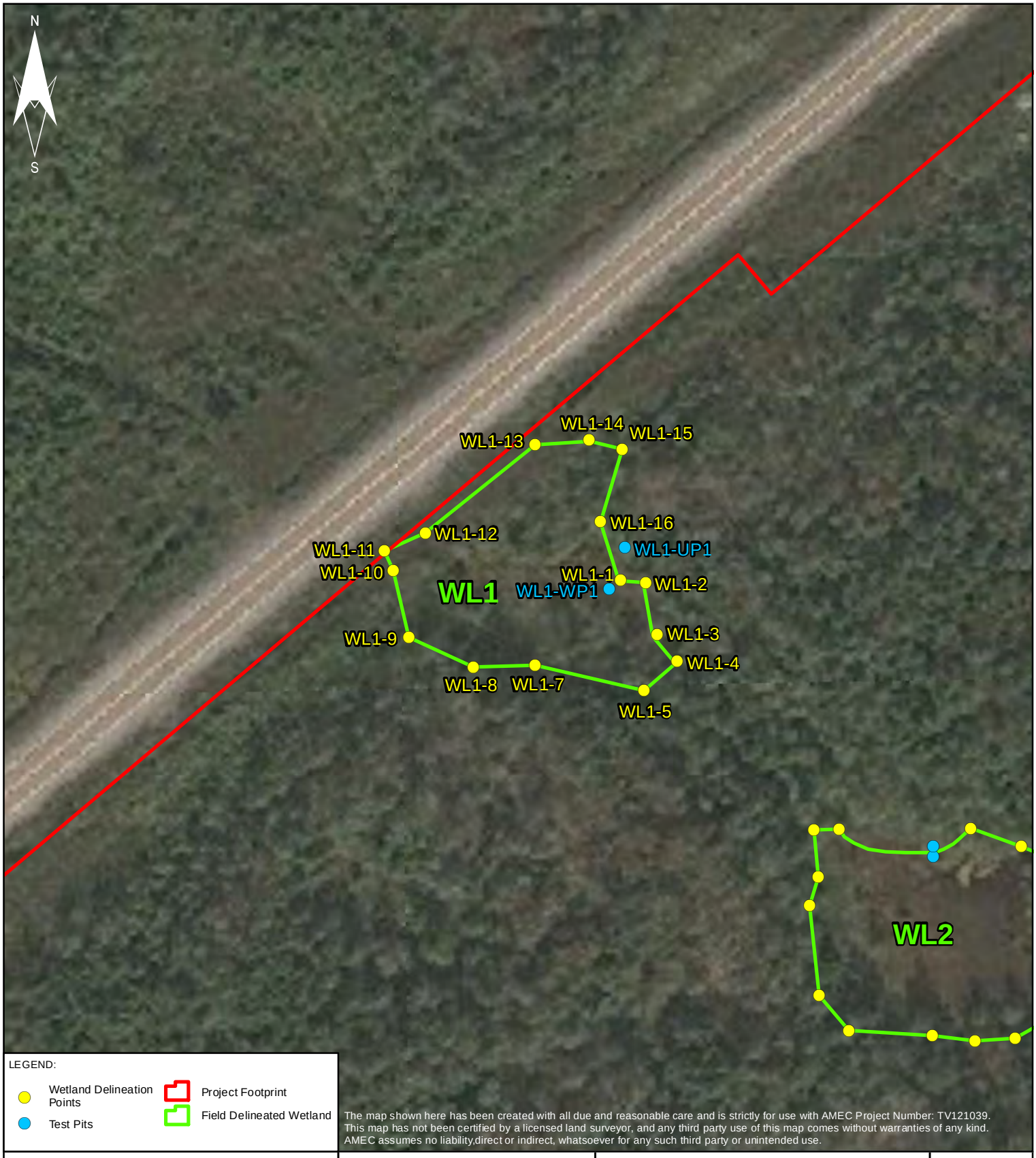
PROJECT: **GOLDBORO LNG**
WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

TITLE: **WETLAND DELINEATION OVERVIEW**

DWN BY: JT
CHK'D BY: SB
DATE: July 2013
REV NO:
FIGURE: 2

Path: G:\GIS\PROJECTS\TV121039_Phase3000\MXD\20130703_SBurley_WetlandOverviewMap_Fig2.mxd User: jonathan.thornton, Date: 03/07/2013

SOURCE: NSDNR Aerial Photography; NSDNR Wetlands Vegetation and Classification Inventory, 2000



LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters
1:1,000

PROJECT:
WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

DWN BY: TM
CHK'D BY: SB
DATE: May 2, 2013
REV. NO:
FIGURE NO: 3

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DATUM: NAD 83
PROJECTION: UTM Zone 20 North
PROJECT NO: TV121039.3000

TITLE:
WETAND 1 (WL1)

Path: F:\TV121039_Phase3000\MXD\20130429_SBurley_WetlandMaps_WL1_Fig3.mxd User: tanya.morehouse Date: 10/05/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

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PROJECT:
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REV. NO:

FIGURE NO: 4

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PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE:
WETAND 2 (WL2)

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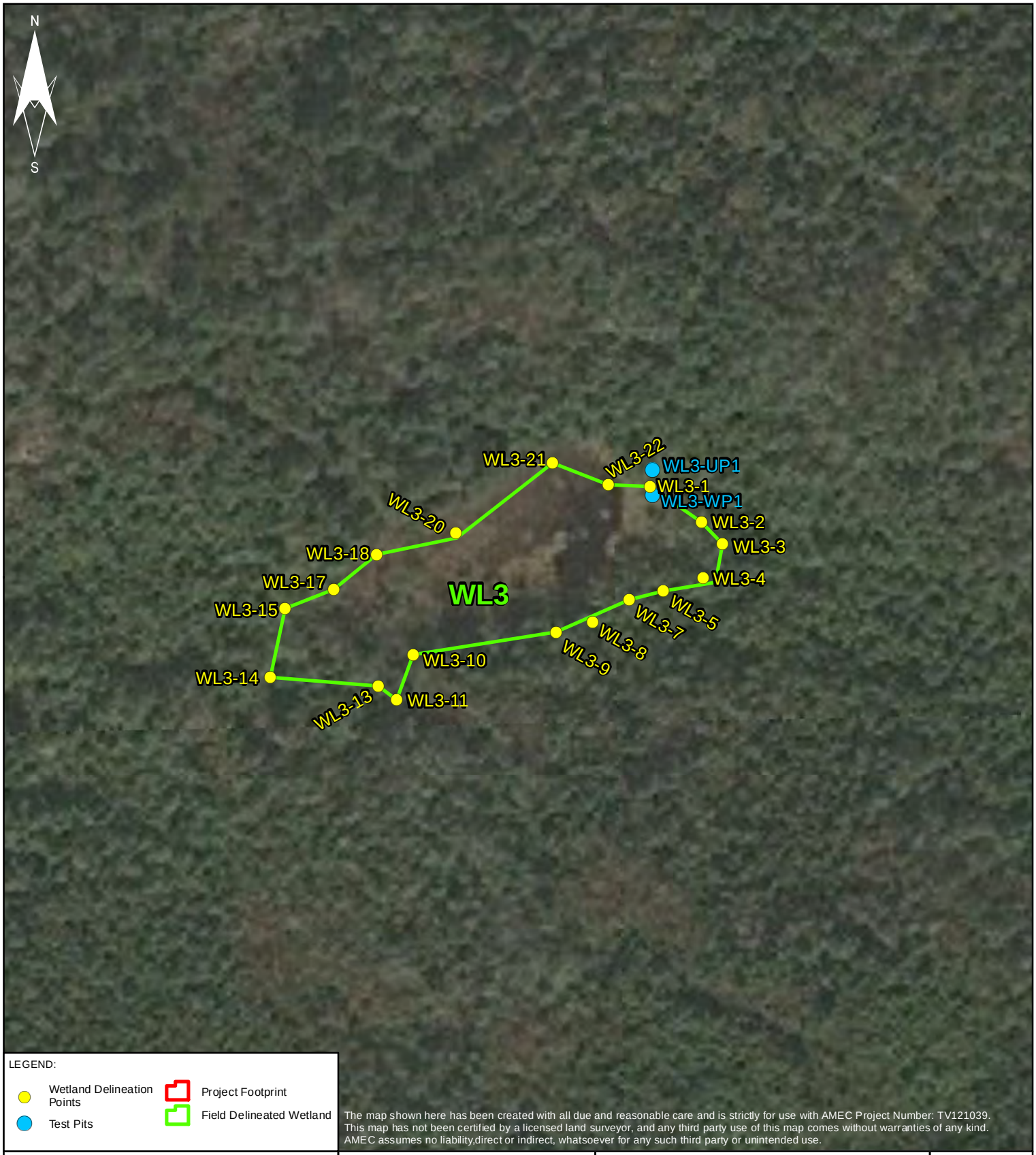

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters
1:1,000

PROJECT:
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DWN BY: TM
CHK'D BY: SB
DATE: May 2, 2013
REV. NO:
FIGURE NO: 5

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DATUM: NAD 83
PROJECTION: UTM Zone 20 North
PROJECT NO: TV121039.3000

TITLE:
WETAND 3 (WL3)

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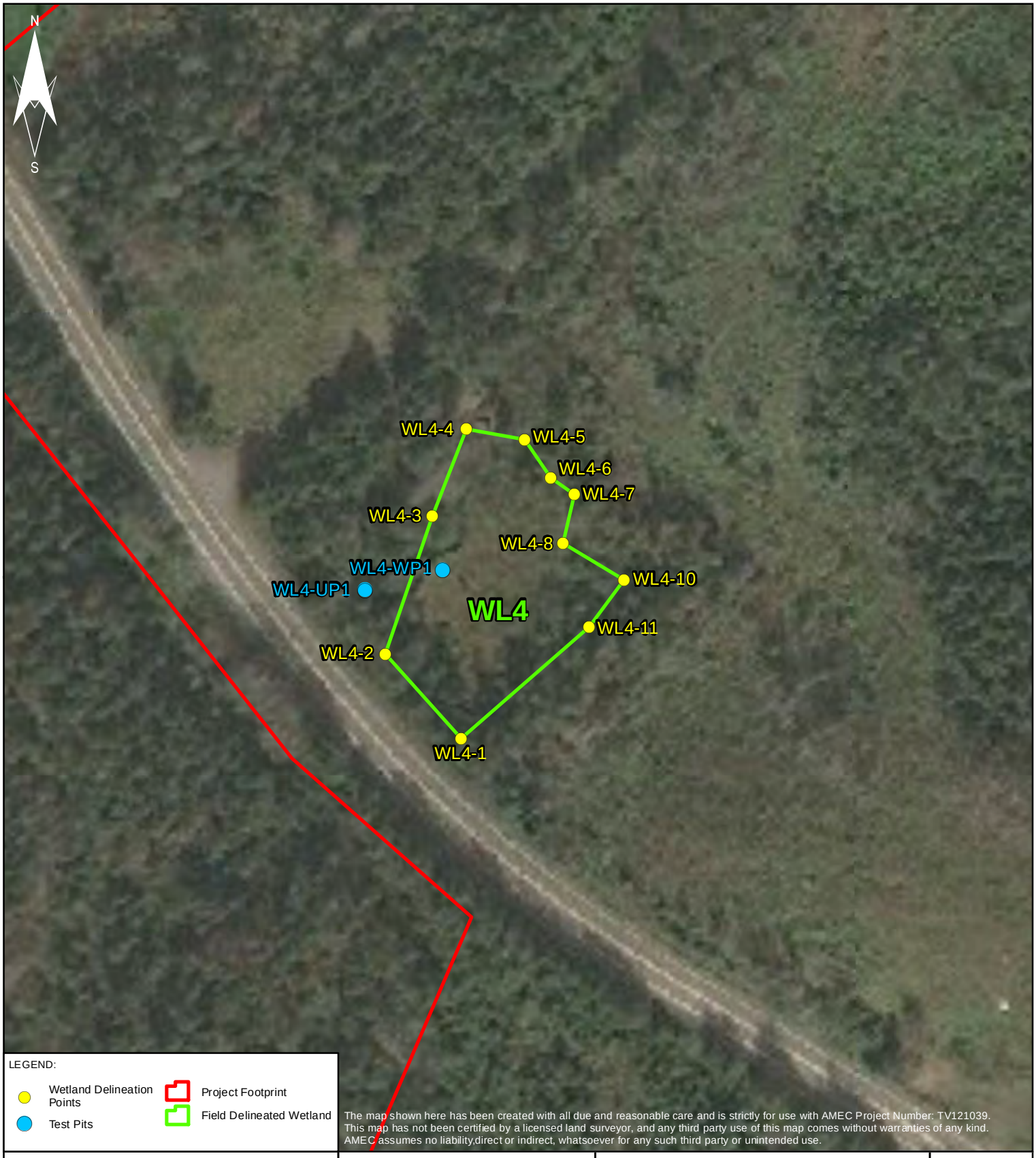

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters

1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: TM

CHK'D BY: SB

DATE: May 2, 2013

REV. NO:

FIGURE NO: 6

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DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 4 (WL4)**

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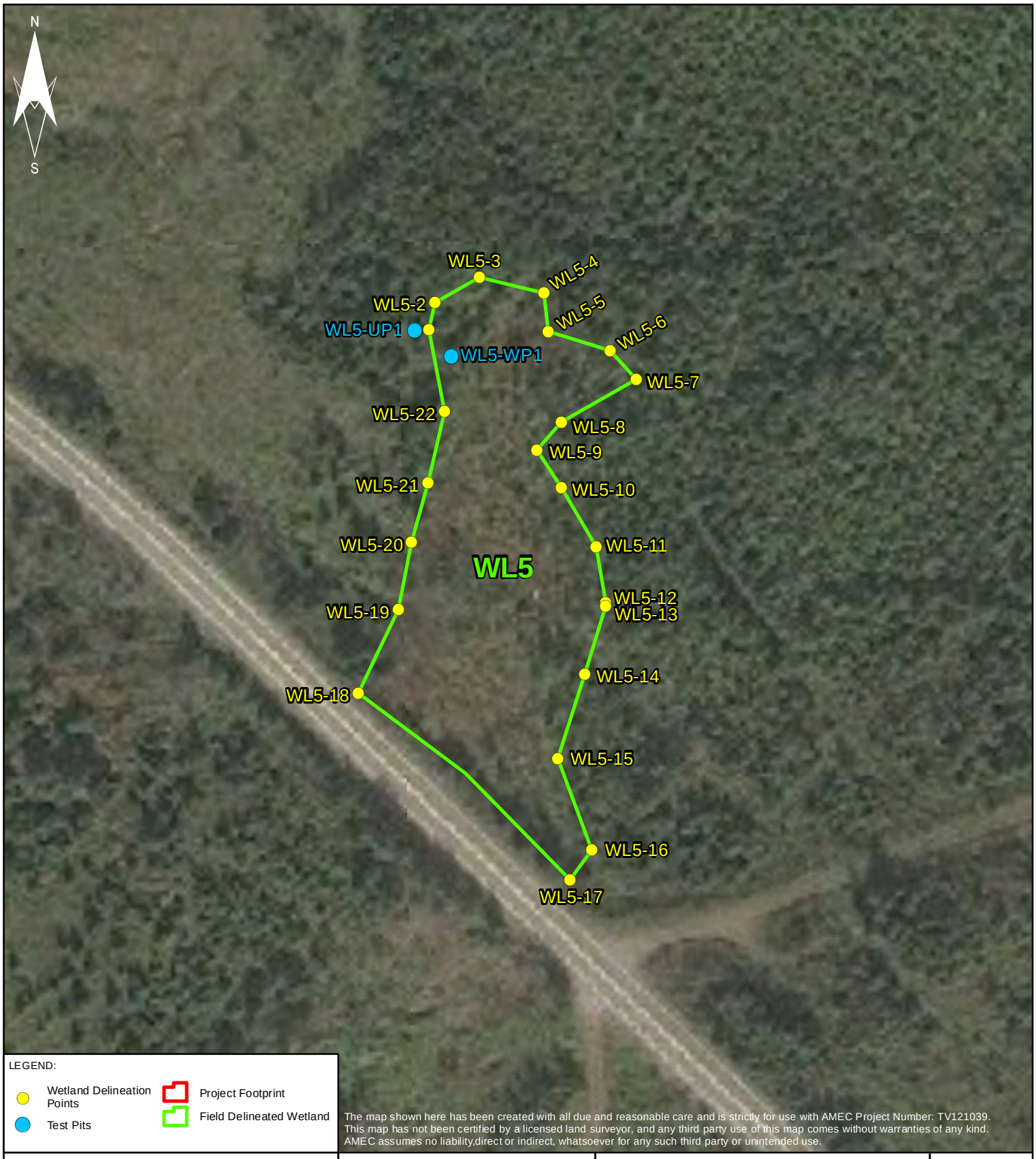

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

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CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters
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PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 5 (WL5)**

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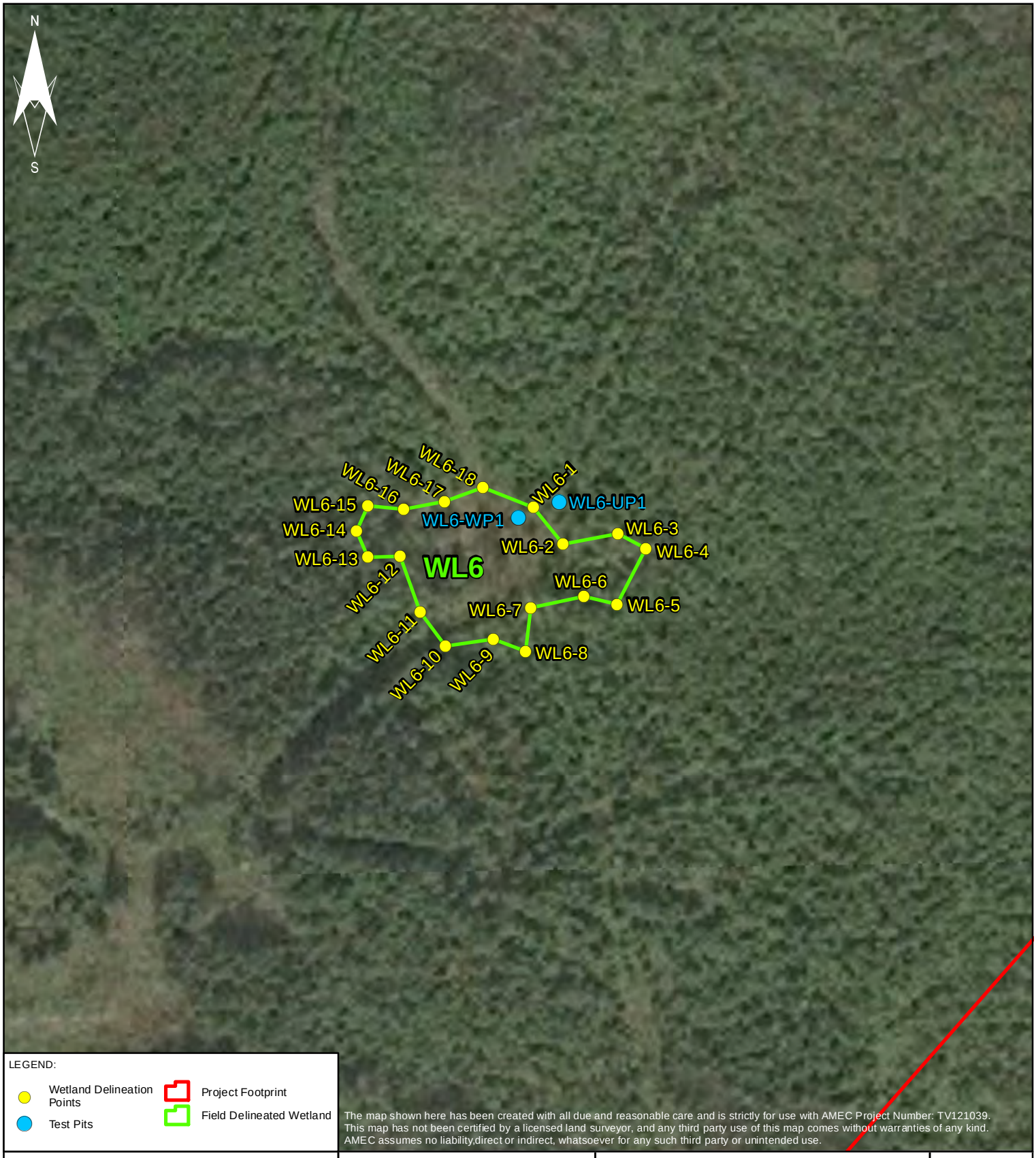

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters
1:1,000

PROJECT:
WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

DWN BY: TM
CHK'D BY: SB
DATE: May 2, 2013
REV. NO:
FIGURE NO: 8

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DATUM: NAD 83
PROJECTION: UTM Zone 20 North
PROJECT NO: TV121039.3000

TITLE:
WETAND 6 (WL6)

Path: F:\TV121039_Phase3000\MXD\20130507_SBurley_WetlandMaps_WL6_Fig8.mxd User: tanya.morehouse Date: 10/05/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 Meters

1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: TM

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DATE: May 2, 2013

REV. NO:

FIGURE NO: 9

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DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 7 (WL7)**

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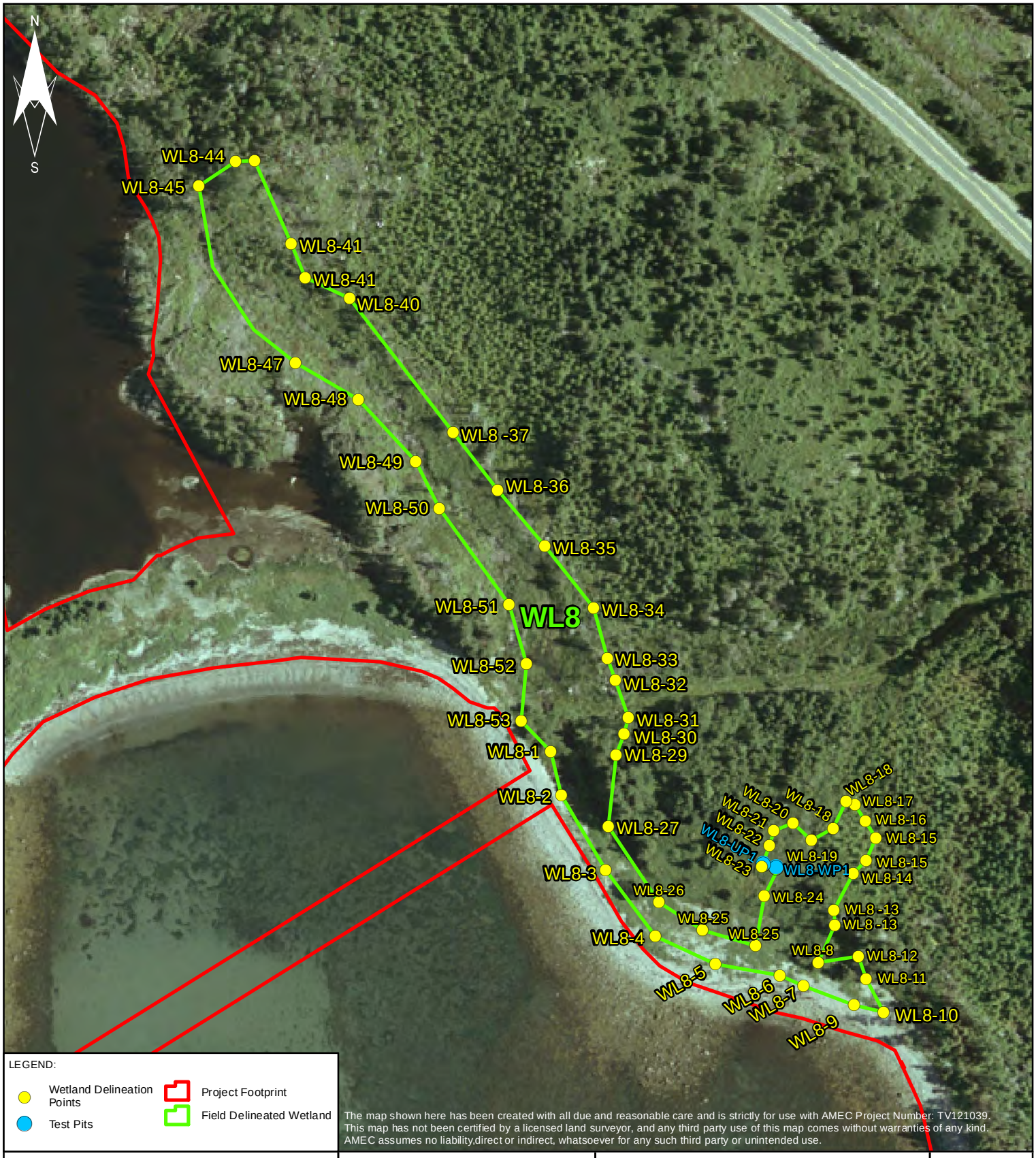

LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters — 1:1,500

PROJECT: WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

DWN BY: TM

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DATE: May 2, 2013

REV. NO:

FIGURE NO: 10

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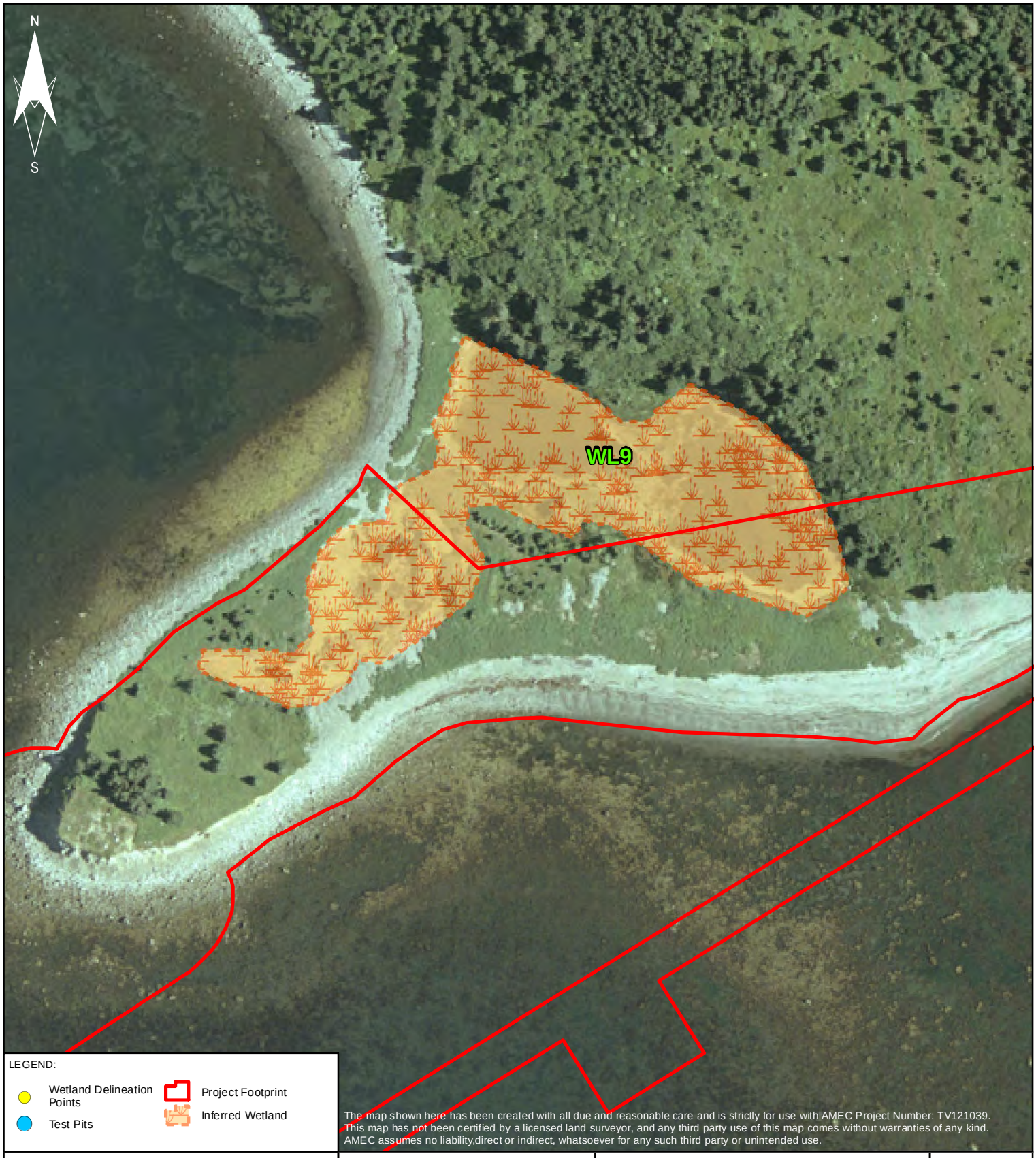
PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: WETAND 8 (WL8)

Path: F:\TV121039_Phase3000\MXD\20130507_SBurley_WetlandMaps_WL8_Fig10.mxd User: tanya.morehouse Date: 07/05/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data



LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Inferred Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters
1:1,500

PROJECT:
WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT

DWN BY: TM

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FIGURE NO: 11

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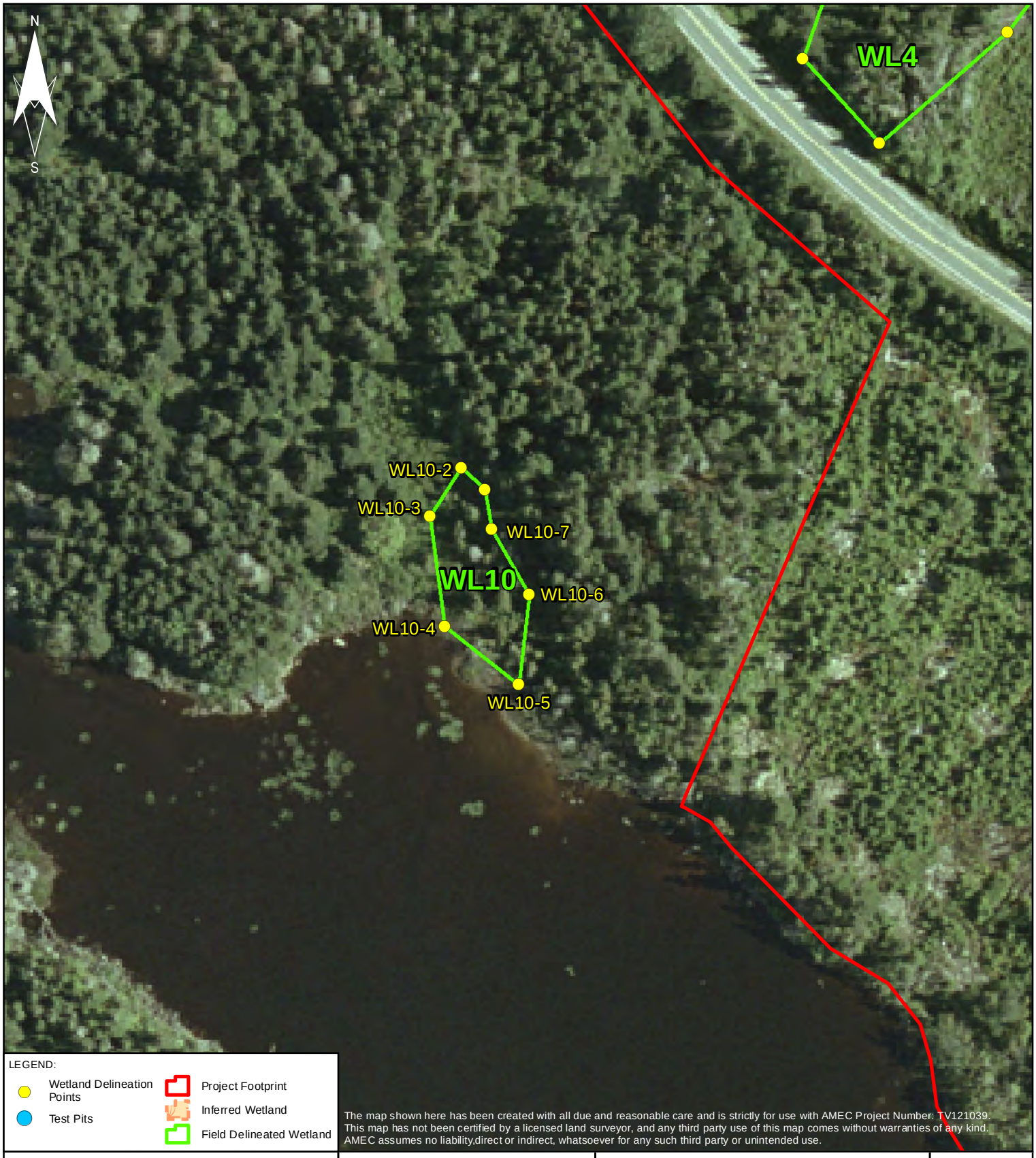
PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE:
WETAND 9 (WL9)

Path: F:\TV121039_Phase3000\MXD\20130507_SBurley_WetlandMaps_WL9_Fig11.mxd User: tanya.morehouse Date: 07/05/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data



LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Inferred Wetland
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters — 1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: TM

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DATE: May 2, 2013

REV. NO:

FIGURE NO: 12

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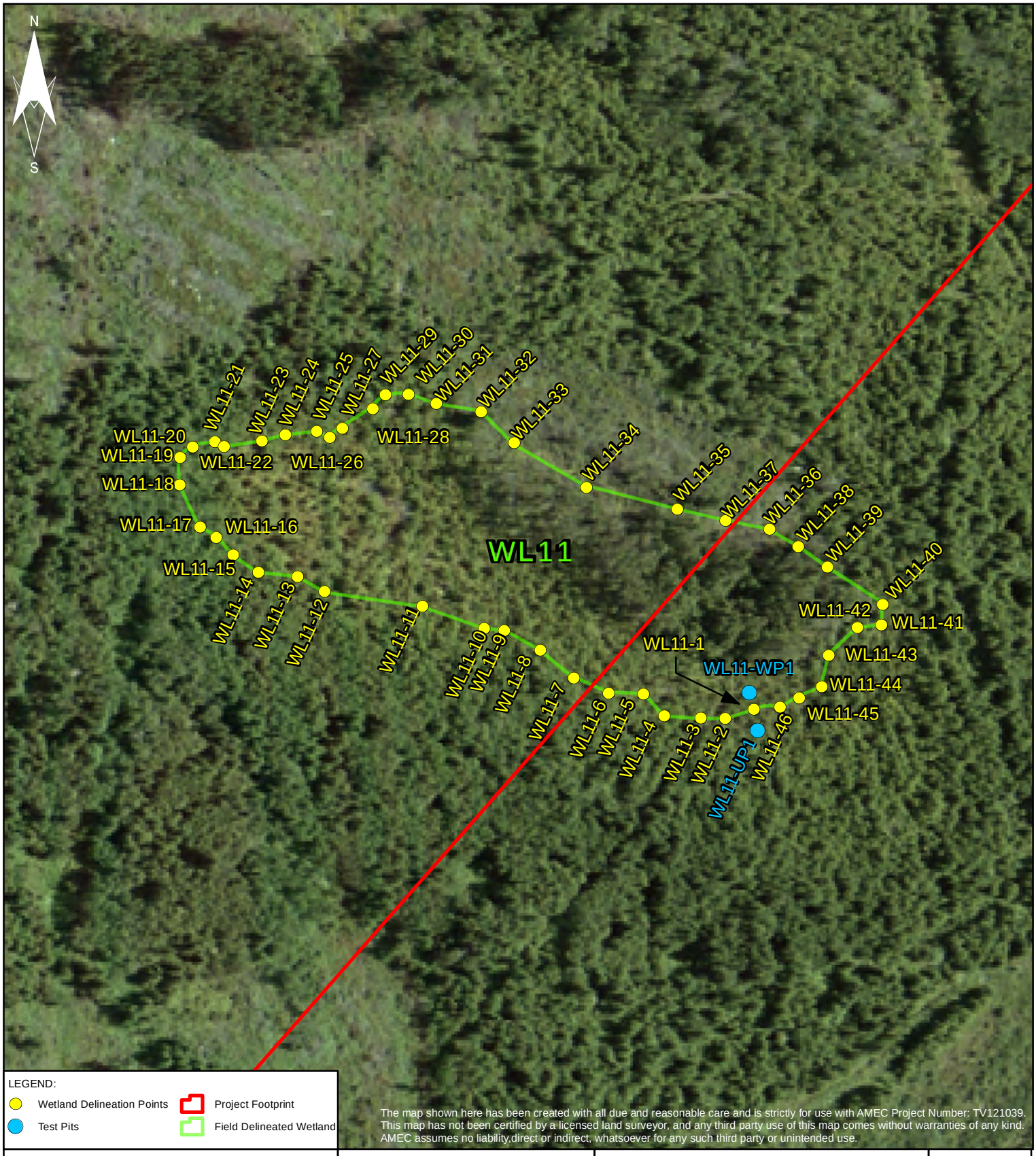
DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 10 (WL10)**

Path: F:\TV121039_Phase3000\MXD\20130507_SBurley_WetlandMaps_WL10_Fig12.mxd User: tanya.morehouse Date: 10/05/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data



LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters — 1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: JT

CHK'D BY: SB

DATE: July 2013

REV. NO:

FIGURE NO: 13

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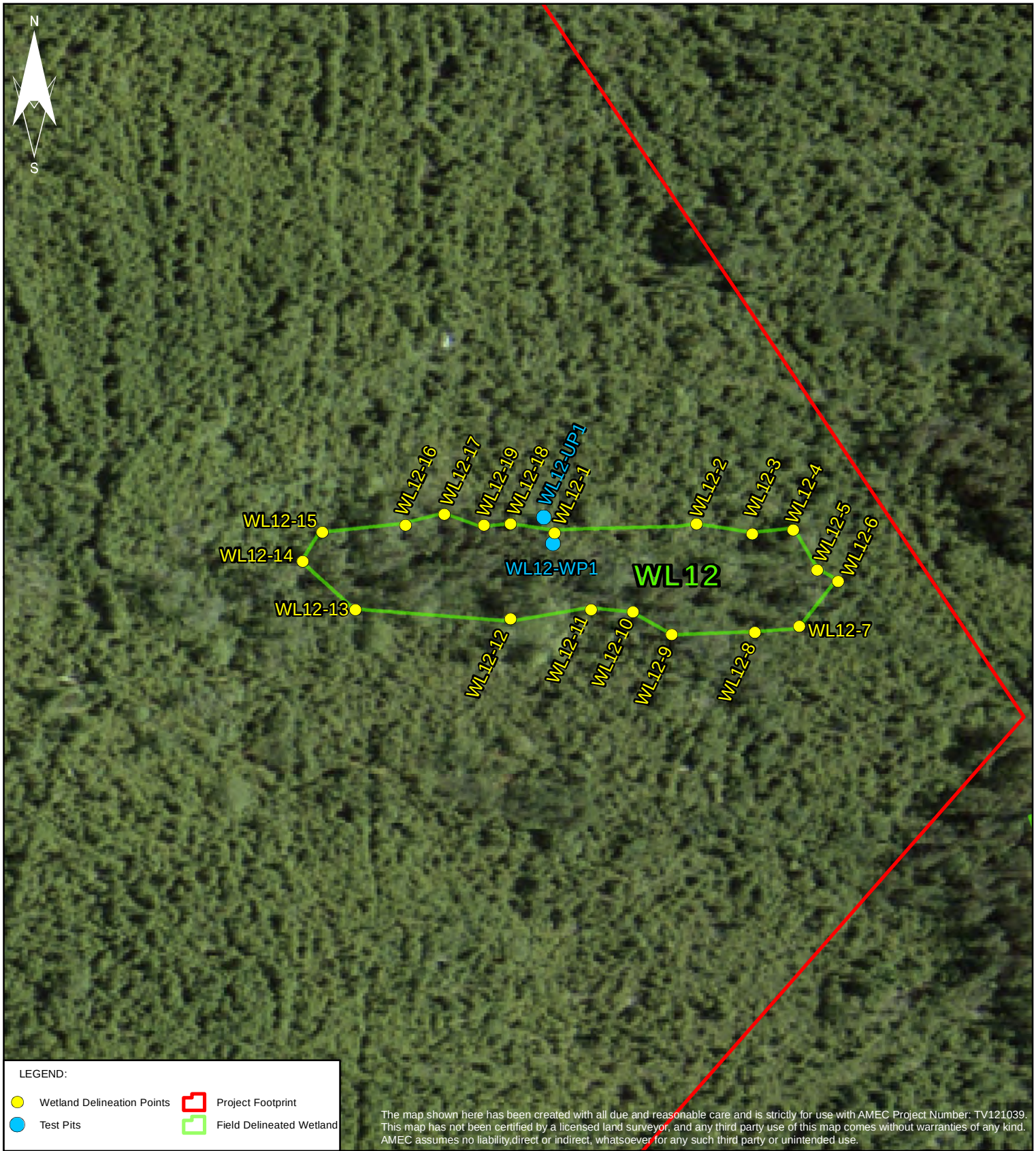
DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 11 (WL11)**

Path: G:\GIS\PROJECTS\TV121039_Phase3000\MXD\20130705_WL11_Fig13.mxd User: jonathan.thornton Date: 05/07/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data



LEGEND:

- Wetland Delineation Points
- Test Pits
- Project Footprint
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters — 1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: JT

CHK'D BY: SB

DATE: July 2013

REV. NO:

FIGURE NO: 14

AMEC Environment and Infrastructure
A Division of AMEC Americas Ltd.
Suite 1 - 495 Prospect Street
Fredericton, NB E3B 9M4
Tel. 506-458-1000 Fax 506-450-0829
www.amec.com

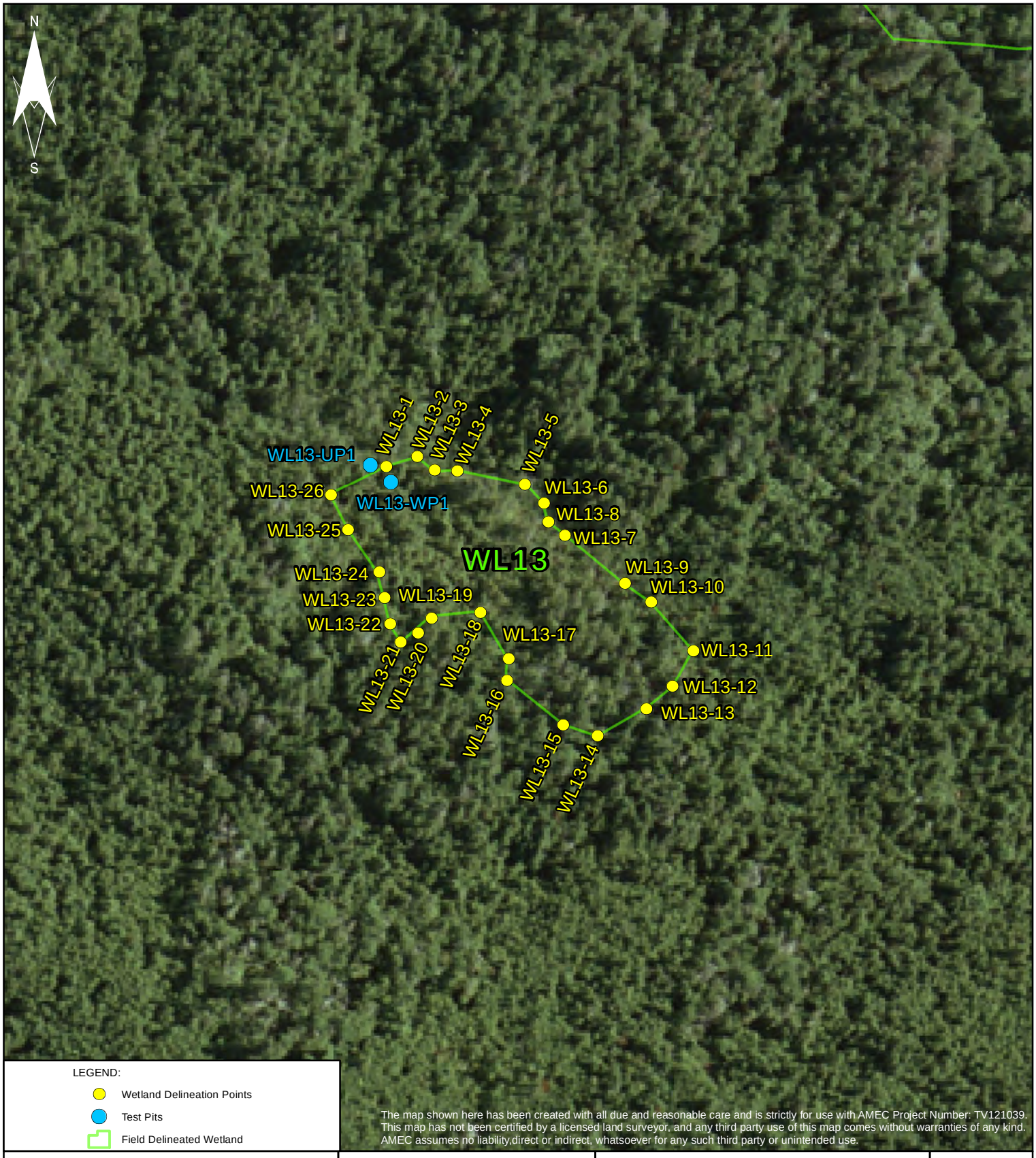
DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 12 (WL12)**

Path: G:\GIS\PROJECTS\TV121039_Phase3000\MXD\20130705_WL12_Fig14.mxd User: jonathan.thornton Date: 05/07/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data



LEGEND:

- Wetland Delineation Points
- Test Pits
- Field Delineated Wetland

CLIENT: GOLDBORO LNG

SCALE: 10 5 0 10 20 30 Meters — 1:1,000

PROJECT: **WETLAND FIELD SURVEY, DELINEATION AND FUNCTIONAL ASSESSMENT REPORT**

DWN BY: JT

CHK'D BY: SB

DATE: July 2013

REV. NO:

FIGURE NO: 15

AMEC Environment and Infrastructure
A Division of AMEC Americas Ltd.
Suite 1 - 495 Prospect Street
Fredericton, NB E3B 9M4
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www.amec.com

DATUM: NAD 83

PROJECTION: UTM Zone 20 North

PROJECT NO: TV121039.3000

TITLE: **WETAND 13 (WL13)**

Path: G:\GIS\PROJECTS\TV121039_Phase3000\MXD\20130407_WL13_Fig15.mxd User: jonathan.thornton Date: 04/07/2013 SOURCE: ESRI Map Service - Aerial / SNSMR - Topographic Data

APPENDIX A
Wetland Delineation Data Sheets and Habitat Assessment Forms

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL1-UP

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 7% Lat: 607444 ~~Long:~~ N 5012603 Datum: NAD83

Soil Map Unit Name/Type: Aspotogan (A-4) Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	10	✓	FAC
2. Acer rubrum	2		FAC
3. Betula cordifolia	2		FACW
4. Picea glauca	2		FAC
5.			
	16	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5m)			
1. Abies balsamea	15	✓	FAC
2. Kalmia angustifolia	1		FAC
3. Sorbus americana	2		FAC
4. Aronia prunifolia	5	✓	FAC
5.			
	23	= Total Cover	

Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	30	✓	FAC
2. Aralia nudicaulis	2		FAC
3. Linnea borealis	10	✓	FAC
4. Coptis trifolia	5		FAC
5. Trientalis borealis	5		FAC
6.			
7.			
8.			
9.			
10.			
	52	= Total Cover	

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	—	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	89	x 3 =	267
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	91 (A)		275 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

All species are FAC or FACW

SOIL

Sampling Point: WL1-UP1

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	Remarks
0-15							Duff	-Moss duff over Rock

[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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 15cm

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept.26/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL1-UP1

Investigator(s): S. Burley / M. Jensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Hummocky

Slope (%): 1 ~~Lat~~ E 607441 ~~Long~~ N 5002595 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (AS A-4) Wetland Type: Bog/Marsh/Swamp

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	If yes, optional Wetland Site ID: WL1

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	5	✓	FACW
2. Larix laricina	1		FAC
3.			
4.			
5.			
	6	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5 m)			
1. Alnus incana	15	✓	FACW
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: 1 m)			
1. Rosa nitida	5		OBL
2. Juncus effusus	30	✓	FACW
3. Carex sp	20		~~OBL~~
4. Thelypteris palustris	2		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	57	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	—	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	7	x 1 = 7
FACW species	50	x 2 = 100
FAC species	1	x 3 = 3
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	58 (A)	110 (B)

Prevalence Index = B/A = 1.9

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Carex sp removed from prevalence/dominance test as species unknown (likely OBL or FACW)

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

SOIL

Sampling Point: WL1-UP1

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	Remarks
0 0-40							Organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0 cm

Water Table Present? Yes ✓ No ___ Depth (inches): 0 cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0 cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL2-UP1
Investigator(s): S. Burley / M. Sensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky
Slope (%): 7% Lat: E 607504 Long: N 5002545 Datum: NAD 83
Soil Map Unit Name/Type: Aspotogan (A4) Wetland Type: Upland
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	30	✓	FAC
2. Picea glauca	10	✓	FAC
3.			
4.			
5.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5m)			
1. Viburnum nudum	2		FAC
2. Abies balsamea	5	✓	FAC
3. Rhododendron groenlandicum	2		FAC
4.			
5.			
	9	= Total Cover	

Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	35	✓	FAC
2. Maianthemum canadense	2		FAC
3. Linnaea borealis	5		FAC
4. Vaccinium angustifolium	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	47	= Total Cover	

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	—	= Total Cover	

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	96	x 3 =	288
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	96 (A)		288 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:
___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)
All FAC species

SOIL

Sampling Point: WL2-UP1

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	Remarks
0 0-30							organic	Very Dark 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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 30 cm

Hydric Soil Present? Yes ____ No ✓

Remarks:

Substrate consist of a mossy dark layer over Rock

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL2-WP1
Investigator(s): S. Burley / M. Sensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Hummocky
Slope (%): 1 % ~~Lat:~~ N 60° 7 50.1 ~~Long:~~ W 52° 52 54.3 Datum: NAD 83
Soil Map Unit Name/Type: Aspotogan (CA-4) Wetland Type: Herb Fen
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____
Is the Sampled Area within a Wetland? Yes ✓ No ____
If yes, optional Wetland Site ID: WL 2

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	5	✓	FAC
2. Abies balsamea	2		FAC
3. Acer rubrum	2		FAC
4.			
5.			
	9 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Alnus incana	5	✓	FACW
2. Viburnum nudum	1		FAC
3. Picea mariana	5	✓	FACW
4.			
5.			
	11 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Rhododendron groenlandicum	20	✓	FACW
2. Thelypteris palustris	2		OBL
3. Rubus flagellaris	5		FAC
4. Rubus hispidus	1		OBL
5. Icerlonia angustifolia	10	✓	FAC
6.			
7.			
8.			
9.			
10.			
	38 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 03	x 1 =	03
FACW species 30	x 2 =	60
FAC species 26	x 3 =	75
FACU species —	x 4 =	0
UPL species —	x 5 =	0
Column Totals: 58 (A)		138 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:
___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL2-UP1

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	Remarks
0-40							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 10cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL3-UP1

Investigator(s): S. Burley / M. Jensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 10-20 ~~Lat:~~ E 607627 ~~Long:~~ N 5002413 Datum: NAD83

Soil Map Unit Name/Type: Aspotogan (A-4) Wetland Type: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	5	✓	FAC
2. Picea rubra	20	✓	FAC
3. Picea mariana	2	____	FAC
4. ____	____	____	____
5. ____	____	____	____
	27	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5m)			
1. Hamamelis virginiana	15	✓	FAC
2. Kalmia angustifolia	10	✓	FAC
3. Abies balsamea	5	____	FAC
4. Picea mariana	2	____	FAC
5. ____	____	____	____
	32	= Total Cover	

Herb Stratum (Plot size: 1m)			
1. Vaccinium myrtilloides	10	____	FAC
2. Cornus canadensis	10	____	FAC
3. Maianthemum canadense	2	____	FAC
4. ____	____	____	____
5. ____	____	____	____
6. ____	____	____	____
7. ____	____	____	____
8. ____	____	____	____
9. ____	____	____	____
10. ____	____	____	____
	22	= Total Cover	

Woody Vine Stratum (Plot size: ____)			
1. ____	____	____	____
2. ____	____	____	____
	____	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	0
FACW species	4	x 2 =	8
FAC species	77	x 3 =	231
FACU species	____	x 4 =	____
UPL species	____	x 5 =	____
Column Totals:	81 (A)		239 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL 3-UP1

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	Remarks
0--5cm							organic	leaf litter

[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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 5cm

Remarks:

Hydric Soil Present? Yes ___ No ✓

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL3-WP1
Investigator(s): S. Burley / M. Jensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): Concave
Slope (%): 1 % ~~Lat:~~ E 0607627 ~~Long:~~ N 5002408 Datum: NAD 83
Soil Map Unit Name/Type: Aspotogan (A-4) Wetland Type: Fen/Bog
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: WL3
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	20	✓	FACW
2. Abies balsamea	5	✓	FAC
3.			
4.			
5.			
	25 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Alnus incana	15	✓	FACW
2. Betula cordifolia	2		FACU
3. Viburnum nudum	5		FAC
4. Rhododendron maximum	5		FAC
5. Kalmia angustifolia	5		FAC
	32 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Rhododendron groenlandicum	15	✓	FACW
2. Cornus canadensis	5		FAC
3. Carex trisperma	5		OBL
4. Maianthemum trifolia	2		OBL
5. Chamaedaphne calyculata	2		FAC
6.			
7.			
8.			
9.			
10.			
	29 = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	~ = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	27	x 1 =	27
FACW species	250	x 2 =	100
FAC species	27	x 3 =	81
FACU species	2	x 4 =	8
UPL species		x 5 =	
Column Totals:	80	(A)	196 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:
___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL3-UP1

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	Remarks
0-40+							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 12 cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): Ucm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 27/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL4-UPL

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 10% ~~Lat:~~ E607093 ~~Long:~~ N5002085 Datum: NAD 83

Soil Map Unit Name/Type: Halifax (C-4) Wetland Type: ~~Riparian Fen~~ Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. ~~Betula~~ Abies balsamea	5	✓	FAC
2. Picea rubens	15	✓	FAC
3.			
4.			
5.			
	20	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5 m)			
1. Sorbus americana	2		FAC
2. Alnus viridis	2		FACW
3. Prunus serotina	2		FAC
4.			
5.			
	6	= Total Cover	

Herb Stratum (Plot size: 1 m)			
1. Vaccinium angustifolium	10	✓	FAC
2. Maianthemum canadense	5		FAC
3. Carex disperma	5		OBL
4. Kalmia angustifolium	2		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	22	= Total Cover	

Woody Vine Stratum (Plot size: ~)			
1.			
2.			
	~	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	~	x 2 =	0
FAC species	41	x 3 =	123
FACU species	2	x 4 =	8
UPL species	~	x 5 =	0
Column Totals:	48 (A)		136 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

Majority of species are FAC

SOIL

Sampling Point: WL4-UP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (cm) (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
O 0-5								
Ap 5-20	7.5YR 4/2						organic	Duff
Ae 20-30	7.5YR 6/3						Silt Loam	
B 30+	7.5YR 4/4						Sandy loam	
							Silt Sandy loam	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 27/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL4-WP1
Investigator(s): S. Burley / M. Jensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave
Slope (%): 1 ~~Lat:~~ E 60 7114 ~~Long:~~ N 5002099 Datum: NAD 83
Soil Map Unit Name/Type: Hal. Fox (LC-4) Wetland Type: Riparian Fen
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____
If yes, optional Wetland Site ID: WL4

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea glauca	2		FAC
2. ~~Abies balsamea~~			
3.			
4.			
5.			
	2 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5m)			
1. Alnus incana	20%	✓	~~OBL~~ FACW
2. Doellingeria umbellata	15%	✓	FAC
3.			
4.			
5.			
	35 = Total Cover		
Herb Stratum (Plot size: 1m)			
1. Typha latifolia	2		OBL
2. Juncus effusus	10	✓	FACW
3. Eleocharis ~~Hageltonii~~ palustris	15%	✓	FACW
4. Carex trisperma	10	✓	OBL
5. Solidago rugosa	2		FAC
6.			
7.			
8.			
9.			
10.			
	37 = Total Cover		
Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	12	x 1 =	12
FACW species	45	x 2 =	90
FAC species	19	x 3 =	57
FACU species	—	x 4 =	0
UPL species	—	x 5 =	0
Column Totals:	54	(A)	159 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:
__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL4-SP1

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	Remarks
0 0-40+							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0cm

Water Table Present? Yes ✓ No ___ Depth (inches): 5cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Sept. 27/12

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: ~~Oct. 5~~ UP1

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL5-UP1

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 5 Lat: E 607415 Long: N 5001913 Datum: NAD 83

Soil Map Unit Name/Type: Halifax (C-4) Wetland Type: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	60	✓	FAC
2. Picea mariana	5		FACW
3.			
4.			
5.			
	65 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Viburnum nudum	2		FAC
2. Alnus spicata	2		~~FACW~~ FAC
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	20	✓	FAC
2. Pteridium aquilinum	5		FACU
3. Maianthemum canadense	2		FAC
4. Vaccinium myrtilloides	2		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	29 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	—	x 1 = 0
FACW species	7	x 2 = 14
FAC species	86	x 3 = 258
FACU species	5	x 4 = 20
UPL species		x 5 =
Column Totals:	98 (A)	292 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL5-UP1

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	Remarks
O 0-5								
Ae 5-7	5YR 5/1						Organic	Dirt
B 7-30	5YR 4/4						Silt Sand	
							Coarse 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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 27/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL5-UP1
Investigator(s): S. Burley / M. Jensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Hill slope Local relief (concave, convex, none): Hummocky
Slope (%): 2 ~~Lat:~~ E 607422 ~~Long:~~ N 5001908 Datum:
Soil Map Unit Name/Type: Halifax (C-4) Wetland Type: Sloped Fen / Bog
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: WL5
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	15	✓	FACW
2. Abies balsamea	2		FAC
3.			
4.			
5.			
	17 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Alnus incana	2		FACW
2. Betula cord. foliacea	2		FACW
3. Viburnum nudum	2		FAC
4.			
5.			
	6 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Oncolea sensibilis	5		FACW
2. Carex trisperma	40	✓	OBL
3. Solidago rugosa	2		FAC
4. Rubus hispidus	2		FACW
5. Osmunda cinnamomea	5		FAC
6.			
7.			
8.			
9.			
10.			
	54 = Total Cover		

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	24	x 2 =	48
FAC species	11	x 3 =	33
FACU species	2	x 4 =	8
UPL species		x 5 =	
Column Totals:	77 (A)		129 (B)

Prevalence Index = B/A = 1.7

Hydrophytic Vegetation Indicators:
___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WLS-4P1

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	Remarks
0-40+							Organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0 cm

Water Table Present? Yes ✓ No ___ Depth (inches): 5cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Adapted from U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (2011)

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 27/17

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL6-UP1

Investigator(s): S. Burley / M. Jensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): Hummocky

Slope (%): 2% Lat: E 608143 Long: N 5002014 Datum: NAD83

Soil Map Unit Name/Type: Aspotogan (AA) Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharum	45	✓	FAC
2. Picea mariana	10		FACW
3.			
4.			
5.			
	55 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Betula cordifolia	2		FACU
2. Viburnum nudum	5	✓	FAC
3.			
4.			
5.			
	7 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	60	✓	FAC
2. Rubus flagellaris	5		FAC
3. Trientalis borealis	2		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	67 = Total Cover		

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	—	x 1 =	0
FACW species	10	x 2 =	20
FAC species	57	x 3 =	171
FACU species	2	x 4 =	8
UPL species		x 5 =	
Column Totals:	69 (A)		199 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

Majority of Species are FAC

SOIL

Sampling Point: WL6-UP1

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	Remarks
0-16							organic	Duff

[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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 16 cm

Hydric Soil Present? Yes ____ No ✓

Remarks:

Substrate consists of dry moss duff over Rock.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 27/12
Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL6-WP1
Investigator(s): S. Burley / M. Jensen Affiliation: AMEC
Landform (hillslope, terrace, etc.): Surface depression Local relief (concave, convex, none): ~~concave~~ Hummocky
Slope (%): 0 Lat: E 60 8135 Long: N 5002011 Datum: NAD 83
Soil Map Unit Name/Type: Aspotogan (CA-4) Wetland Type: Open/Treed Fen
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____
If yes, optional Wetland Site ID: WL6

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	5	✓	FACW
2. Abies balsamea	2		FAC
3.			
4.			
5.			
	7 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Viburnum nudum	2		FAC
2. Alnus incana	2		FACW
3. Rubus canadensis	2		FACW
4.			
5.			
	6 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Rubus hispidus	2	✓	FACW
2. Kalmia angustifolia	2		FAC
3. Carex canescens	2		FAC
4. Oclemena nemoralis	2		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	11 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of 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	12	x 2 =	24
FAC species	8	x 3 =	24
FACU species	2	x 4 =	8
UPL species	—	x 5 =	0
Column Totals:	24 (A)		58 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:
___ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL6-WP1

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	Remarks
0-30 cm							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 30cm

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 3cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL7-UP1

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 5% Lat: E 608384 Long: N 5002071 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (CA4) Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	5	✓	FAC
2. Betula cordifolia	2		FACW
3. Picea rubens	10	✓	FAC
4.			
5.			
	17	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5m)			
1. Viburnum nudum	2		FAC
2. Kalmia angustifolia	15	✓	FAC
3. Myrica pensylvanica	5	✓	FAC
4. Alnus incana	2		OBL
5.			
	24	= Total Cover	

Herb Stratum (Plot size: 1m)			
1. Kalmia angustifolia	5	✓	FAC
2. Cornus canadensis	10	✓	FAC
3. Gaultheria hispidula	2		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	17	= Total Cover	

Woody Vine Stratum (Plot size: ~)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

Percent of 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	–	x 2 =	0
FAC species	54	x 3 =	162
FACU species	2	x 4 =	8
UPL species		x 5 =	
Column Totals:	58 (A)		172 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

Majority of species are FAC or FACW

SOIL

Sampling Point: WL7-SP1

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	Remarks
O 0-8								
Ae 8-20	5YR 7/1						organic duff	
B 20+	10YR 4/3						Sandy Si. lt	
							Sand/Si. lt clay	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 26/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL7-WP1

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Hummocky

Slope (%): 1% ~~Lat:~~ E 608389 ~~Long:~~ N 5002048 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (A-4) Wetland Type: Shrub Bog

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	If yes, optional Wetland Site ID: WL18

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	2		FACW
2. Betula cordifolia	2		FACU
3. Abies balsamea	2		FAC
4.			
5.			
	6 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5m)			
1. Viburnum nudum	2		FAC
2. Alnus incana	10	✓	~~OBL~~ FACW
3. Nemopanthes mucronata	10	✓	FAC
4. Picea mariana	10	✓	FACW
5.			
	32 = Total Cover		
Herb Stratum (Plot size: 1m)			
1. Myrica gale	40	✓	OBL
2. Carex trisperma	10		OBL
3. Rubus hispidus	5		FACW
4. Typha latifolia	2		OBL
5. Sarracenia purpurea	1		OBL
6.			
7.			
8.			
9.			
10.			
	58 = Total Cover		
Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	53	x 1 = 53
FACW species	27	x 2 = 54
FAC species	14	x 3 = 42
FACU species	2	x 4 = 8
UPL species	—	x 5 = 0
Column Totals:	96 (A)	157 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL7-UP1

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	Remarks
0-Hot							Organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0cm

Water Table Present? Yes ✓ No ___ Depth (inches): 25cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 25/12

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: GLG-UP1

Investigator(s): S. Burley / M. Sensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Hummocky

Slope (%): 5% ~~Lat:~~ 7314 ~~Long:~~ 5001669 Datum: NAD83

Soil Map Unit Name/Type: Halifax CC-4 Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea glauca	60	✓	FAC
2. Abies balsamea	10		FAC
3.			
4.			
5.			
	70 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5m)			
1. Betula populifolia	2		FACU
2. Prunus pensylvanica	2		FAC
3.			
4.			
5.			
	4 = Total Cover		

Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	40	✓	FAC
2. Maianthemum canadense	15	✓	FAC
3. Trientalis borealis	5		FAC
4. Carex trisperma	1		OBL
5. Aster acuminata	1		FACU
6.			
7.			
8.			
9.			
10.			
	62 = Total Cover		

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of 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	0	x 2 =	0
FAC species	132	x 3 =	396
FACU species	3	x 4 =	12
UPL species	—	x 5 =	
Column Totals:	136 (A)		409 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

~~✓~~ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

All but one species are FAC or FACU.

SOIL

Sampling Point: Wet-1

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	Remarks
O 0-10							organic	
Ae 10-15"	7.5YR 7/1	100					Sandy Silt	
B 15-30"	5YR 5/4	100					Silt Clay loam	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: Sept. 25/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WLS-WP1

Investigator(s): S. Burley / M. Jensen Affiliation: AMEC

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Concave

Slope (%): 5 ~~Lat:~~ 607318 ~~Long:~~ 5001668 Datum: NAD 83

Soil Map Unit Name/Type: Halifax (CC-4) Wetland Type: Shrub Swamp / Fen

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: WLS
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

~~fen~~

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	2		FAC
2. Picea glauca	2		FAC
3. Betula cord. lutea	<1		FACU
4.			
5.			
	45 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5 m)			
1. Alnus incana	25	✓	FACW
2. Rosa nitida	2		OBL
3. Rubus flagellaris	2		FAC
4.			
5.			
	29 = Total Cover		

Herb Stratum (Plot size: 1 m)			
1. Lysimachia terrestris	2		FACW
2. Calamagrostis canadensis	5		FACW
3. Rubus flagellaris	5		FAC
4. Alnus incana	<1		FACW
5. Comarum palustre	1		OBL
6. Carex trisperma	50	✓	OBL
7. Aster novi-belgii	2		
8. Abies balsamea	1		FAC
9.			
10.			
	55 = Total Cover		

Woody Vine Stratum (Plot size: —)			
1.			
2.			
	— = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	52	x 1 =	52
FACW species	33	x 2 =	66
FAC species	12	x 3 =	36
FACU species	1	x 4 =	4
UPL species	—	x 5 =	0
Column Totals:	98 (A)		158 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Lab 8 - UP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (~~inches~~) cm	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 35	Black						Fine Muck	Black organic

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (~~inches~~): 35 cm

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 0 cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0 cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: June 19/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL11-UP1

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): Hummocky

Slope (%): 1% ~~Lat.~~ E 6088129 ~~Long.~~ N 5001772 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (As A-11) Wetland Type: Treed Bog

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	If yes, optional Wetland Site ID: WL11

Remarks: (Explain alternative procedures here or in a separate report.)
a lot of Rain in last Month / Rained Today

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	5%	FACW	FACW
2. Larix laricina	1%		FAC
3.			
4.			
5.			
	6% = Total Cover		
Sapling/Shrub Stratum (Plot size: 5m)			
1. Picea mariana	65%	✓	FACW
2. Nemopanthus mucronata	2%		FAC
3. Betula cordifolia	2%		FACU
4. Kalmia angustifolia	30%	✓	FAC
5.			
	97 = Total Cover		
Herb Stratum (Plot size: 1m)			
1. Cornus canadensis	2		FAC
2. Maianthemum canadense	2		FAC
3. Carex trisperma	60%	✓	OBL
4. Vaccinium angustifolium	2%		FAC
5. Vaccinium macrocarpon	2%		FACU
6. Rhynchospora alba	2%		FAC
7.			
8.			
9.			
10.			
	16% = Total Cover		
Woody Vine Stratum (Plot size: —)			
1.			
2.			
	____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 4 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60%	x 1 =	60%
FACW species	70	x 2 =	140
FAC species	40	x 3 =	120
FACU species	3	x 4 =	12
UPL species	—	x 5 =	—
Column Totals:	173 (A)		332 (B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL11-wp1

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	Remarks
0-40cm							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 40cm

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 10cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Goldboro Guysborough County Sampling Date: June 19/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL11-UPI

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Hummocky

Slope (%): 30 ~~Lat:~~ 60E131 ~~Long:~~ 5202765 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (Orthic) (AS-A4) Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Previously logged

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	23%		FACW
2.			
3.			
4.			
5.			
	23% = Total Cover		

Sapling/Shrub Stratum (Plot size: 5 m)			
1. Balsam fir	30%	✓	FAC
2. Picea mariana	5%		FACW
3. Betula populifolia	2%		FACU
4.			
5.			
	37% = Total Cover		

Herb Stratum (Plot size: 1 m)			
1. ~~Rubus idaeus~~			
2. Cornus canadensis	5%	✓	FAC
3. Vaccinium angustifolium	2%		FAC
4. Maianthemum canadense	2%		FAC
5.			
6.			
7.			
8.			
9.			
10.			
	9 = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	—	x 1 =	—
FACW species	7	x 2 =	14
FAC species	39	x 3 =	117
FACU species	2	x 4 =	8
UPL species	—	x 5 =	—
Column Totals:	48 (A)		139 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL11-UP1

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	Remarks
0-15							organic	Duff

[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:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 15cm

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: June 19/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL12-WP1

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): Basin (treed swamp) Local relief (concave, convex, none): hummock

Slope (%): 1% E Lat: 6082268 N Long: 5002104 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan CAS A-4 Wetland Type: Treed Swamp

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No ✓	If yes, optional Wetland Site ID: WL12
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red maple	5	✓	FAC
2. Black Spruce (Picea mariana)	5	✓	FACW
3.			
4.			
5.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5m)			
1. Nemopanthus	5	✓	FAC
2. Black Spruce	10	✓	FACW
3. Lab. Tea	5	✓	FACW
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: 1m)			
1. Carex trisperma	80	✓	OBL
2. Bunchberry	5		FAC
3. Kalmia	>1		FAC
4. Mountain Cranberry	>1		FAC
5. Creeping snowberry (Gaultheria hispidula)	>1		FAC
6. Twin Flower	>1		FAC
7.			
8.			
9.			
10.			
	~~90~~ 99 Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 6 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 20	x 1 = 20
FACW species 20	x 2 = 40
FAC species 19	x 3 = 57
FACU species —	x 4 =
UPL species —	x 5 =
Column Totals: 59 (A)	117 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL12-WP1

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	Remarks
O	0-30cm							organic	Peat
B	30-40cm	7.5YR4/2						silt loam	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ✓ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 35 cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: June 19/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL12-UP1

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): hummock

Slope (%): 40 ~~Lat:~~ E 608267 ~~Long:~~ N 5002109 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (As A-4) Wetland Type: upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red maple (Acer rubrum)	2		FAC
2. Balsam fir (Abies balsamea)	2		FAC
3. Black spruce (Picea mariana)	10	✓	FACW
4.			
5.			
	14	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5 m)			
1. Black Spruce	10	✓	FACW
2. White birch (Betula papyrifera)	2		FACU
3. Balsam fir	10	✓	FAC
4. Nemopanthes	2		FAC
5. Kalmia	25	✓	FAC
Red maple → 2 FAC	51	= Total Cover	

Herb Stratum (Plot size: 1 m)			
1. Bunch berry (Cornus canadensis)	20	✓	FAC
2. Starflower (Trientalis borealis)	5		FAC
3. Blueberry	5		FAC
4. Mtn. Cranberry	>21		FAC
5. Mayflower	>21		FAC
6.			
7.			
8.			
9.			
10.			
	32	= Total Cover	

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 5 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 = ____	
FACW species 20	x 2 = 40	
FAC species 75	x 3 = 225	
FACU species 2	x 4 = 8	
UPL species ____	x 5 = ____	
Column Totals: 97	(A) 273	(B)

Prevalence Index = B/A = 2.81

Hydrophytic Vegetation Indicators:

- ____ Rapid Test for Hydrophytic Vegetation
- ____ Dominance Test is >50%
- ____ Prevalence Index is ≤3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL12-UP1

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	Remarks
O 0-15							Organic	
Ae 15-25	7.5YR6/2	100					Silt Loam	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 25 cm

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ✓ No ____ Depth (inches): 25 cm

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: June 20/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL13-WP1

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): Riparian bog (treed) Local relief (concave, convex, none): hummock

Slope (%): 1 ~~Lat:~~ E 607390 ~~Long:~~ N 5002423 Datum: Nad 83

Soil Map Unit Name/Type: Aspotogan (As A-4) Wetland Type: Treed bog

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes _____	No _____	If yes, optional Wetland Site ID: WL13
Wetland Hydrology Present?	Yes _____	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Black Spruce	10	✓	FACW
2. Balsam fir	2		FAC
3.			
4.			
5.			
	12	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5m)			
1. Speckled Alder	5	✓	FACW
2. Wild Raisin	2		FAC
3. Nemopanthus	2		FAC
4. Balsam fir	2		FAC
5.			
	11	= Total Cover	
Herb Stratum (Plot size: 1m)			
1. Rubus hispidus	2		FACW
2. Golden Rod Species	2		
3. Carex tri	2		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	6	= Total Cover	
Woody Vine Stratum (Plot size: —)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 2 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	17	x 2 =	34
FAC species	8	x 3 =	24
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	27 (A)		60 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WL13-WP1

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	Remarks
40cm							organic	Peat

[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:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): (close by)

Water Table Present? Yes ✓ No ___ Depth (inches): 35cm

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10cm

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DELINEATION DATA FORM – NOVA SCOTIA

Project/Site: Goldboro LNG Municipality/County: Guysborough Sampling Date: June 20/13

Applicant/Owner: Pieridae Energy (Canada) Ltd. Sampling Point: WL13-UP1

Investigator(s): Scott Burley Affiliation: AMEC

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): hummock

Slope (%): 2 ~~Lat:~~ E 6073E6 ~~Long:~~ N 5002426 Datum: NAD 83

Soil Map Unit Name/Type: Aspotogan (As A.4) Wetland Type: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: *(WL13 border)

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Balsam fir	25	✓	FAC
2. Black Spruce	30	✓	FACW
3.			
4.			
5.			
	55	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5m)			
1. Nemopanthus	5	✓	FAC
2. Black Spruce	5	✓	FACW
3. Balsam-fir	~~15~~ 5	✓	FAC
4. Lambkill	2		FAC
5.			
	~~17~~ 17	= Total Cover	

Herb Stratum (Plot size: 1m)			
1. Creeping snowberry	~~>2~~ 1		FAC
2. Sarsaparilla	~~>2~~ 1		FAC
3. Velvet Leaf Blueberry	~~5~~ 4	✓	FAC
4. Twin flower	~~>2~~ 1		FAC
5. Starflower	~~>2~~ 1		FAC
6. Mayflower	~~>2~~ 1		FAC
7.			
8.			
9.			
10.			
	~~15~~ 10	= Total Cover	

Woody Vine Stratum (Plot size: ←)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 6 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	—	x 1 =	—
FACW species	35	x 2 =	70
FAC species	47	x 3 =	141
FACU species	—	x 4 =	—
UPL species	—	x 5 =	—
Column Totals:	82 (A)		211 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WC13-UP1

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	Remarks
O 0-20cm							organic	duff
A_e 20-25cm	7.5YR 6/1						silt loam	
B 25+cm	10YR 4/3						silt loam	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WL1
~~WL15~~

Freshwater Wetland Data Sheet:

Date: Sept. 26 (Wed.)
Investigator(s): Scott Burley/ [illegible]
Weather: Sunny
Topographic Sheet: 011 F/14
Aerial Photo Number: ~~A~~ 20028310-141

Wetland Atlas Number: NA
GIS Map / Stand No.: NA
Wetland Form[1]:: ~~[illegible]~~ Bog/Fen/Swamp
Wetland size: 0.17 ha
Associated Watercourse: Yes - unnamed

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ✓
3.Fen (FE) ____
4.Emergent wetland (EW) ✓
5.Shrub wetland (SB) ✓
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh ✓
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp ✓
7.Wooded swamp ____
8.Bog ✓

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM ____
17.Narrow leaved SM ✓ juncus
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ✓
29.Compact SS ____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog ____
34.Shrubby B ✓
35.Open B ✓

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated ✓
3.Seasonally flooded ____

Water Depth:
1.0-5 cm ✓
2.5-20 cm ✓ (Stream)
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Stream 5-10 (30cm near outlet)

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine _____
3.Palustrine ✓
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):

1.Deciduous trees	<2
2.Coniferous trees	<5
3.Dead trees	<1
4.Tall shrubs	30
5.Low shrubs	15
6.Dead shrubs	<1
7.Herbs	10
8.Mosses	90
9.Narrow-leaved emergents	20-30
10.Broad-leaved emergents	0
11.Robust emergents	0
12.Free-floating plants	0
13.Floating plants (rooted)	0
14.Submerged plants	<1 in stream
15. Other	

Interspersion: 1.Minimal ___ 2.Low _____ 3.Medium ___ 4.High ✓

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ✓
2.Ground water depression _____
3.Surface water slope _____
4.Ground water slope ____

Inlets/Outlets/water bodies: yes: small stream; in + out

Wildlife: (Observation/Signs/Reports)
dragonflies
bird (sound)

Adjacent Wildlife habitat (%):
forest (95% coniferous) 3 sides; 4th side near road.

1.Salt marsh ____
2.Forest Both sides
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____ road near NW side

Description:

Surrounding Land Use %:
1 Agriculture ____
2.Forestry Forest
3 Recreation ____
4.Industrial ____
5.Urban development ___
6.Transportation ✓
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:
1.Private road adjacent Stubb Road
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

Existing Uses of Wetlands:
1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ✓
4.Education & public awareness ✓
5. None evident ✓

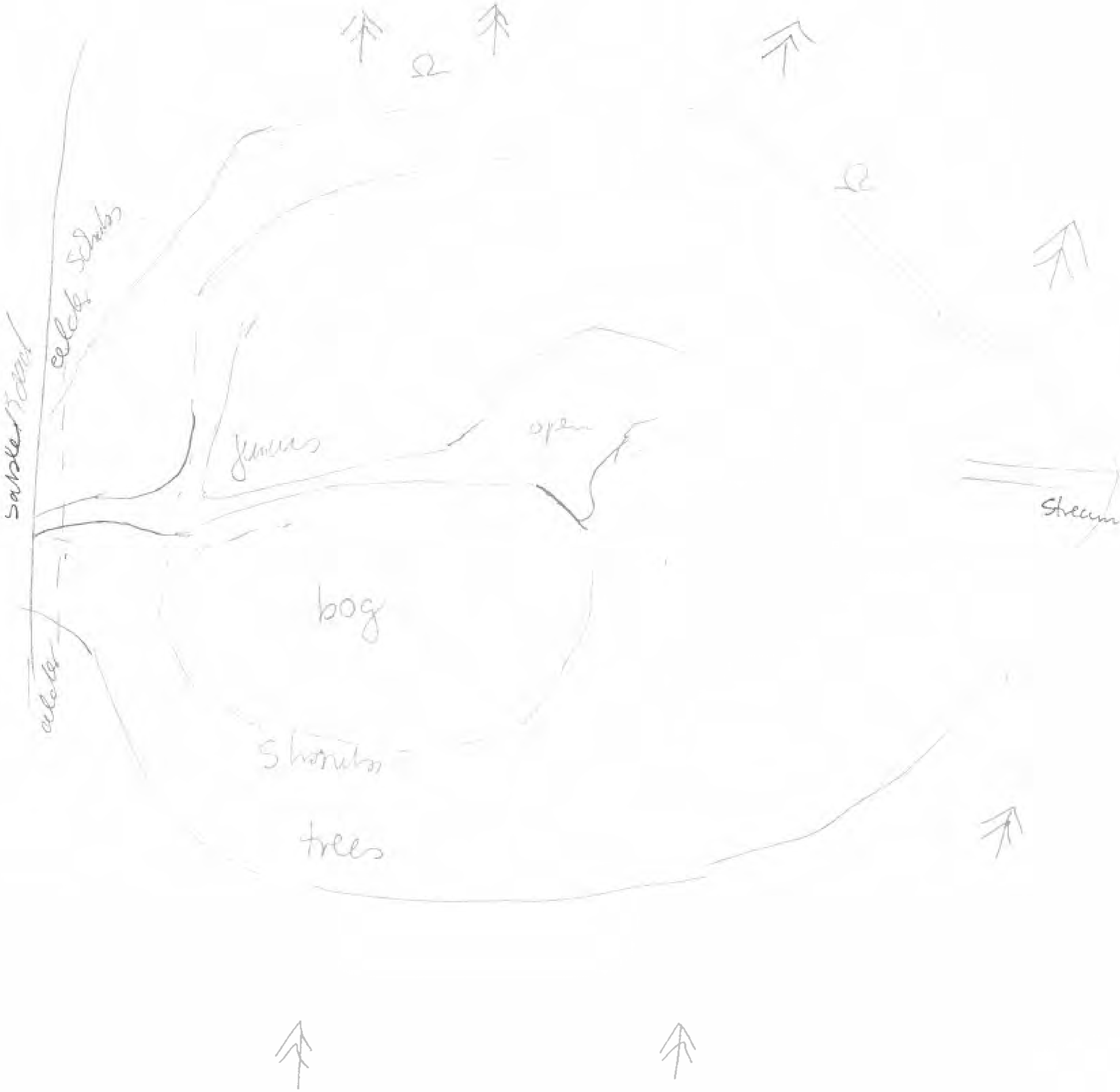
Potential Threats: development

Special Features:
1.Rare wetland type ____
2.Rare animal or plant species possible
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:

Grey Jay


sable Road
cedar shrubs
cedar
juncus
open
bog
stream
shrubs
trees

WL15

WL 2

Freshwater Wetland Data Sheet: ~~WL 16~~

Date: WL Sep 26
Investigator(s): Scott Burley/ M Severn
Weather: sunny i20°
Topographic Sheet: 11 E/14
Aerial Photo Number: 20080310-141

Wetland Atlas Number : NA
GIS Map / Stand No. : NA
Wetland Form[1]:: Hed Fen
Wetland size: 0.20 ha
Associated Watercourse: yes unnamed stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ____
3.Fen (FE) ✓
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ____
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp ✓
7.Wooded swamp ____
8.Bog small bog on edge

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW __
3.Floating leaved OW __
4.Rooted floating leaved OW __
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ✓
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ✓
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog ____
34.Shrubby B ✓ (small)
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated ✓
3.Seasonally flooded _____

Water Depth:
1.0-5 cm ✓
2.5-20 cm _____
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Channels deeper (heavy rain 2 days ago → difficult estimate)

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____ ?
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ✓
3.Palustrine ____
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):

1.Deciduous trees	2
2.Coniferous trees	10
3.Dead trees	2
4.Tall shrubs	5-10
5.Low shrubs	5
6.Dead shrubs	<1
7.Herbs	10
8.Mosses	95
9.Narrow-leaved emergents	20-30 Juncus/Carex
10.Broad-leaved emergents	0
11.Robust emergents	0
12.Free-floating plants	0
13.Floating plants (rooted)	0
14.Submerged plants	0
15. Other	

Interspersion: 1.Minimal ___ 2.Low _____ 3.Medium ✓ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ✓
2.Ground water depression _____
3.Surface water slope _____
4.Ground water slope ____

Inlets/Outlets/water bodies: yes; out

Wildlife: (Observation/Signs/Reports)
chickadee
dragonflies

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest 100%
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description: coniferous forest (BF, BS)

Surrounding Land Use %:

1 Agriculture ____
2.Forestry ✓ (not evident)
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:

1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ____
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

Potential Threats: development

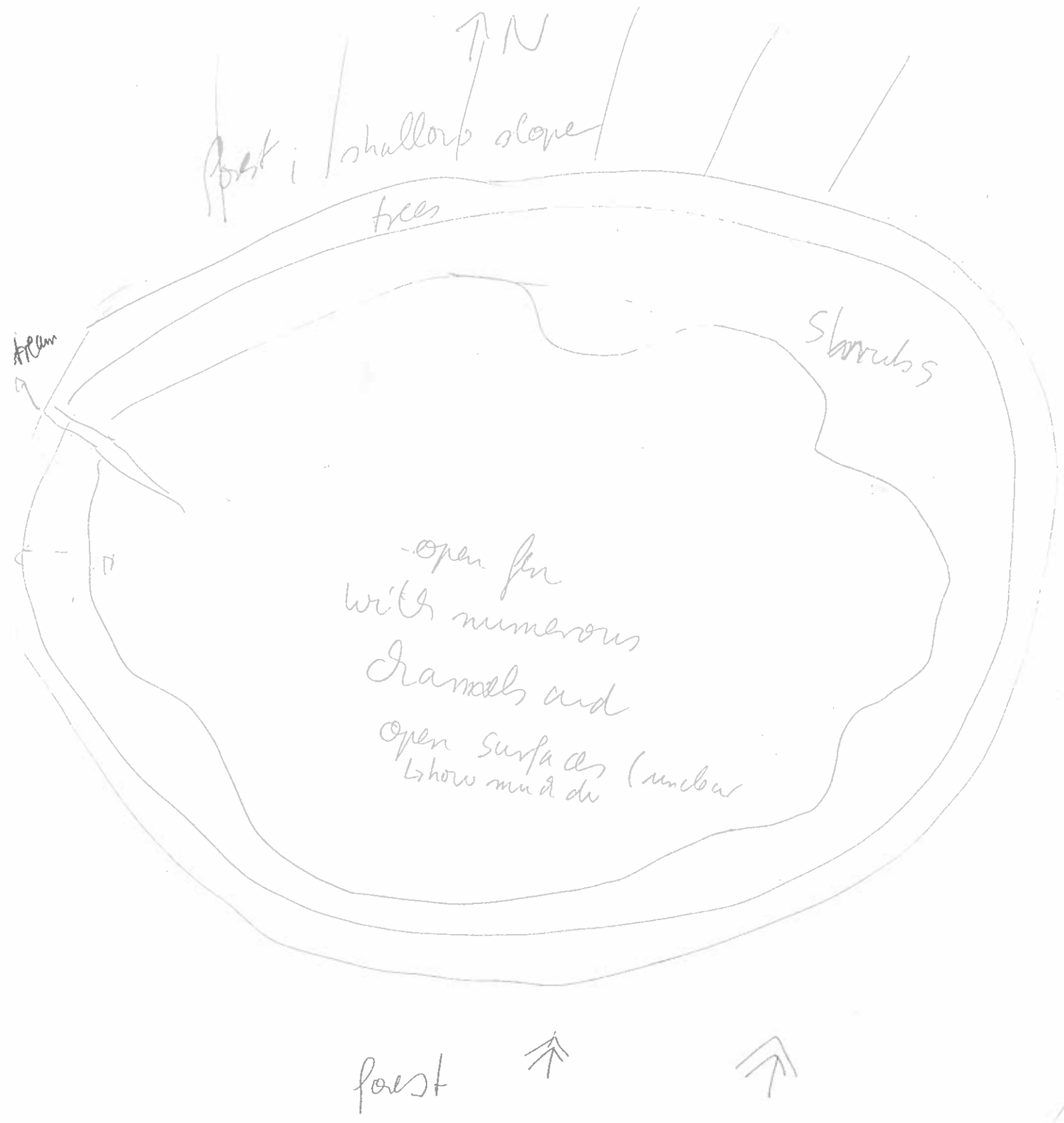
Special Features:

1.Rare wetland type ____
2.Rare animal or plant species possible
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:

- high watertable due to heavy rain 2 days ago
- suspected tailings at south end.


N
forest
shallow slope
trees
shrubs
open fen
with numerous
channels and
open surfaces (under
forest

WL16

WL 3

Freshwater Wetland Data Sheet: ~~WL 17~~

Date: Sept 26 Weds.
Investigator(s): Scott Burley/ M. Sexton
Weather: Overcast 20°
Topographic Sheet: 11 F/14
Aerial Photo Number: 2008310-141

Wetland Atlas Number : NA
GIS Map / Stand No. : N/A
Wetland Form[1]:: Fen/Bog
Wetland size: 0.19 ha
Associated Watercourse: Unnamed Stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ✓
3.Fen (FE) ✓
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ✓
6.Forested wetland (FW) ✓

Wetland Class:
1.Open water ✓
2.Deep marsh ____
3.Shallow marsh ✓
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp ✓
7.Wooded swamp ✓
8.Bog ✓

Wetland Subclass:
1.Vegetated open water ?
2.Non-vegetated OW ?
3.Floating leaved OW ____
4.Rooted floating leaved OW ____
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM ____
17.Narrow leaved SM ✓
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ✓
29.Compact SS ____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ✓
33.Wooded bog ____
34.Shrubby B ____
35.Open B ✓
fen

Water Regime Indicator:
1.Permanently flooded ____
2.Saturated ✓
3.Seasonally flooded ____

Water Depth:
1.0-5 cm ✓
2.5-20 cm ____
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____
pond: >40 cm

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% _____
2.76-95% in peripheral band ✓
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine _____
3.Palustrine ____
4.Isolated _____
5.Deltaic ___ ?

Vegetation Types (%):

1.Deciduous trees	2
2.Coniferous trees	15-20
3.Dead trees	<1
4.Tall shrubs	10
5.Low shrubs	15
6.Dead shrubs	<1
7.Herbs	5
8.Mosses	95
9.Narrow-leaved emergents	20+30 Juncus, Carex
10.Broad-leaved emergents	0
11.Robust emergents	0
12.Free-floating plants	0
13.Floating plants (rooted)	0
14.Submerged plants	1
15. Other	

Interspersion: 1.Minimal ___ 2.Low _____ 3.Medium ✓ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ✓
2.Ground water depression _____
3.Surface water slope _____
4.Ground water slope ____

Inlets/Outlets/water bodies:
outlet likely

Wildlife: (Observation/Signs/Reports)
dragonflies

Adjacent Wildlife habitat (%):

1.Salt marsh ✓
2.Forest ✓
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description:

Surrounding Land Use %:
1 Agriculture ____
2.Forestry possible
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:
1.Private road adjacent X
2.DOT road adjacent X
3.Private road within X
4.DOT road within X
5.Vehicle tracks X
6.Other X

Description:

Existing Uses of Wetlands:
1.Economic use (e.g. farming) ____
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

Potential Threats: development

Special Features:
1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:

- high water table due to heavy rain 2+ days ago
- possible Equisetum variegatum
- northern leopard frog
- dragonfly
- grasshopper


N ↑
trees
Old Rd
Marsh
Shrubs
fen
stream
fen
Marsh?
Juncus + no Sphagn.
with pillows of Sph.
Shrub-fen
open with islands
bog
Marsh?
tailings
not to scale
WL 17

WL4
~~WL19~~

Freshwater Wetland Data Sheet:

Goldboro LNG

Date: Th. Sept 27

Investigator(s): Scott Burley/ M. Clark

Weather: cloudy, rainy

Topographic Sheet: 011 F/40

Aerial Photo Number: 2006310-141

Wetland Atlas Number : N/A

GIS Map / Stand No. : N/A

Wetland Form[1]:: Riparian Fen

Wetland size: 0.15 ha

Associated Watercourse: unnamed stream

Wetland Type:

1.Aquatic bed/unconsolidated bottom (AB) ____

2.Bog(BO) ____

3.Fen (FE) √

4.Emergent wetland (EW) ____

5.Shrub wetland (SB) √

6.Forested wetland (FW) ____

Wetland Class:

1.Open water __

2.Deep marsh ____

3.Shallow marsh _____

4.Seasonally flooded flats ____

5.Meadow ____

6.Shrub swamp √

7.Wooded swamp ____

8.Bog ____

Wetland Subclass:

1.Vegetated open water ___

2.Non-vegetated OW __

3.Floating leaved OW ___

4.Rooted floating leaved OW ___

5.Dead woody OW ____

6.Vegetated deep marsh ____

7.Non-vegetated DM ____

8.Dead woody DM ____

9.Sub-shrub DM ____

10.Floating leaved DM ____

11.Rooted floating leaved DM ____

12.Robust DM ____

13.Narrow-leaved DM ____

14.Broad-leaved DM ____

15.Dead woody shallow marsh ____

16.Robust SM _____

17.Narrow leaved SM _____

18.Broad leaved SM ____

19.Floating leaved SM ____

20.Rooted floating leaved SM ____

21.Non-vegetated SM ____

22.Emergent seasonally flooded flats ____

23.Shrubby SFF ____

24.Grazed meadow ____

25.Ungrazed M ____

26.Sedge M ____

27.Sapling shrub swamp ____

28.Bushy SS √

29.Compact SS _____

30.Low sparse SS √

31.Deciduous wooded swamp ____

32.Evergreen WS ____

33.Wooded bog ____

34.Shrubby B ____

35.Open B _____

Water Regime Indicator:

1.Permanently flooded ___

2.Saturated √

3.Seasonally flooded _____

Water Depth:

1.0-5 cm √

2.5-20 cm ______

3.20-50 cm ____

4.50-100 cm ____

5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

2 streams one 40 cm today rain + heavy rain 3 days ago

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ✓
3.Palustrine ____
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees <1
2.Coniferous trees 15
3.Dead trees <1
4.Tall shrubs 20-30
5.Low shrubs 30-40
6.Dead shrubs <1
7.Herbs 5-10
8.Mosses 95
9.Narrow-leaved emergents 20-50 Juncus, Carex Iris
10.Broad-leaved emergents 5-10
11.Robust emergents 0
12.Free-floating plants 0
13.Floating plants (rooted) in stream <5
14.Submerged plants 0
15. Other 0

Interspersion: 1.Minimal ___ 2.Low ___ 3.Medium ✓ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression _____
2.Ground water depression _____
3.Surface water slope ✓
4.Ground water slope ____

Inlets/Outlets/water bodies:

2 Streams near edges

Wildlife: (Observation/Signs/Reports)

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest ✓
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description:

Surrounding Land Use %:
1 Agriculture ____
2.Forestry ✓ possible
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation ✓
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description: Road, Hw 316

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:
1.Private road adjacent ____
2.DOT road adjacent ✓
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description: Hw 316

Existing Uses of Wetlands:
1.Economic use (e.g. farming) ____
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

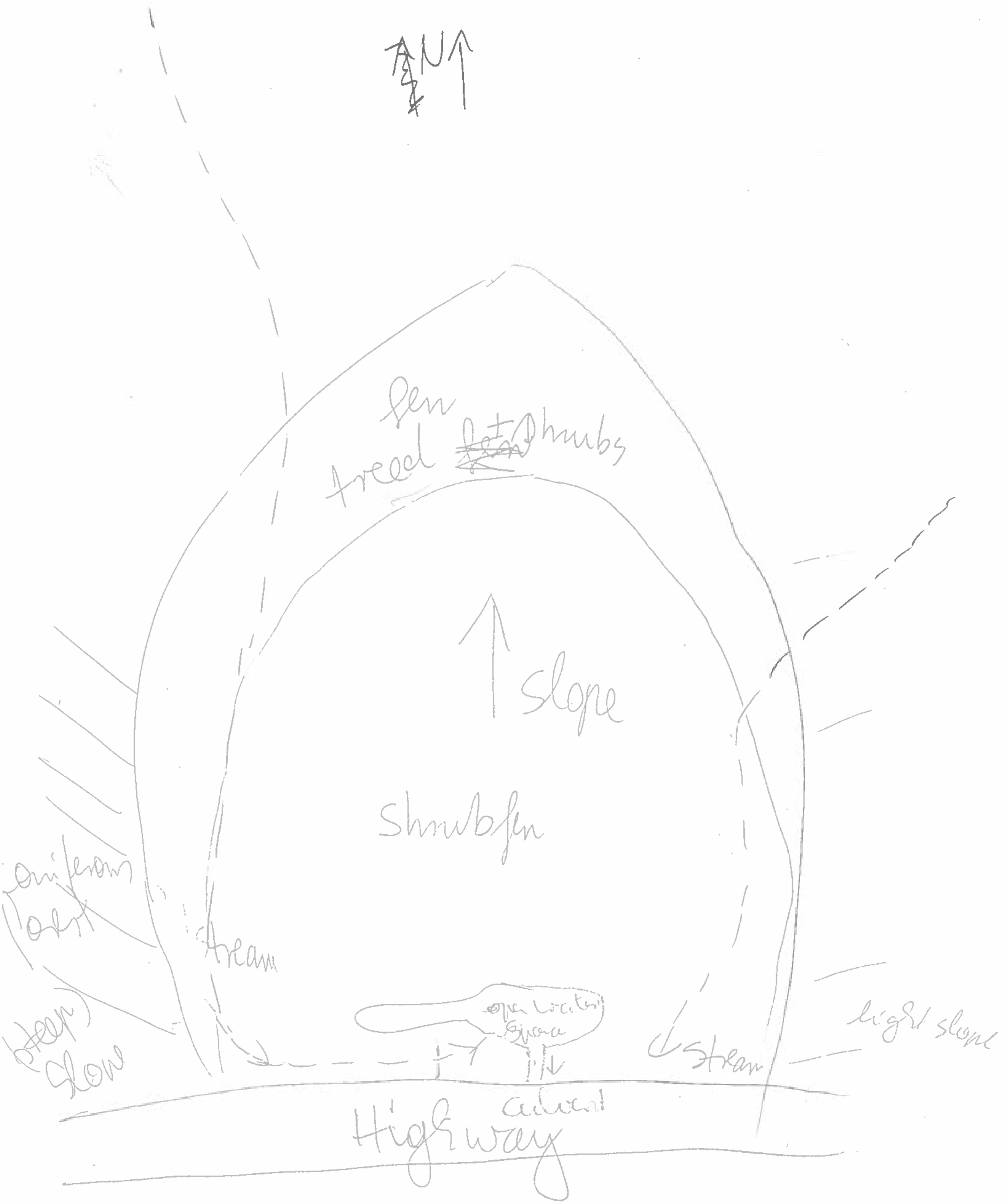
Potential Threats: development

Special Features:
1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species possible
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes: high water levels due to heavy rain 3 days ago, and intermittent rain since ca 3 am

- several addition draining channels (narrow) at bottom near road


N
fen
treed shrubs
slope
Shrub fen
coniferous forest
stream
open water space
steep slope
stream
light slope
culvert
Highway

WL19

WL 5

Freshwater Wetland Data Sheet: ~~WL 20~~

Date: Fr 28 Sept 2012
Investigator(s): Scott Burley/ Monica Sussa
Weather: sunny
Topographic Sheet: 011F/4
Aerial Photo Number: 2cx&310-141

Wetland Atlas Number : NA
GIS Map / Stand No. : NA
Wetland Form[1]:: Sloped Fen ~~Bog~~
Wetland size: ca. 32 ha
Associated Watercourse: unnamed stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ___
2.Bog(BO) ~~NA~~
3.Fen (FE) ✓
4.Emergent wetland (EW) ___
5.Shrub wetland (SB) ___
6.Forested wetland (FW) ___

Wetland Class:
1.Open water ___
2.Deep marsh ___
3.Shallow marsh ___
4.Seasonally flooded flats ___
5.Meadow ___
6.Shrub swamp ✓
7.Wooded swamp ___
8.Bog ___

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW puddles
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ___
6.Vegetated deep marsh ___
7.Non-vegetated DM ___
8.Dead woody DM ___
9.Sub-shrub DM ___
10.Floating leaved DM ___
11.Rooted floating leaved DM ___
12.Robust DM ___
13.Narrow-leaved DM ___
14.Broad-leaved DM ___
15.Dead woody shallow marsh ___
16.Robust SM ___
17.Narrow leaved SM ___
18.Broad leaved SM ___
19.Floating leaved SM ___
20.Rooted floating leaved SM ___
21.Non-vegetated SM ___
22.Emergent seasonally flooded flats ___
23.Shrubby SFF ___
24.Grazed meadow ___
25.Ungrazed M ___
26.Sedge M ___
27.Sapling shrub swamp ___
28.Bushy SS ✓
29.Compact SS ___
30.Low sparse SS ___
31.Deciduous wooded swamp ___
32.Evergreen WS ___
33.Wooded bog ___
34.Shrubby B ___
35.Open B ___

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated ✓
3.Seasonally flooded ___

Water Depth:
1.0-5 cm ✓
2.5-20 cm ___
3.20-50 cm ___
4.50-100 cm ___
5.>100 cm ___
puddles today (after rain) 10-20cm

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

WL 20

1.Beaver Pond ____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ____
3.76-96% in patches ____
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ____
3.Palustrine ✓
4.Isolated ____
5.Deltaic ____

Vegetation Types (%):
1.Deciduous trees 0
2.Coniferous trees 15
3.Dead trees 2
4.Tall shrubs 30
5.Low shrubs ~~10~~ 15
6.Dead shrubs 5-10 (with tall shrubs)
7.Herbs ~~5~~ 5
8.Mosses 95
9.Narrow-leaved emergents 50 = 60 Juncus, Carex
10.Broad-leaved emergents 2 — 0 Iris
11.Robust emergents 0
12.Free-floating plants 0
13.Floating plants (rooted) 0
14.Submerged plants
15. Other

Interspersion: 1.Minimal ____ 2.Low ____ 3.Medium ✓ 4.High ✓

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ____
2.Ground water depression ____
3.Surface water slope ✓
4.Ground water slope ____

Inlets/Outlets/water bodies:
inlet; plus outlet of sorts: water collects at bottom near road and flows out through culvert

Wildlife: (Observation/Signs/Reports)
birds
deer tracks
~~deer~~ grasshoppers

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest ✓
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description:

Surrounding Land Use %:

1 Agriculture ____
2.Forestry 75
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation ✓ 25
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description: DOT Road Itw 316 at south side

Disturbance: 1.Low ✓ 2.Moderate ✓ 3.High ____

Description: abandoned tracks, overgrown shrubs

Roads and/or tracks:

1.Private road adjacent ____
2.DOT road adjacent ✓
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks possible, overgrown
6.Other ____

Description: Itw 316

Existing Uses of Wetlands:

1.Economic use (e.g. farming) forestry
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

Potential Threats: development

Special Features:

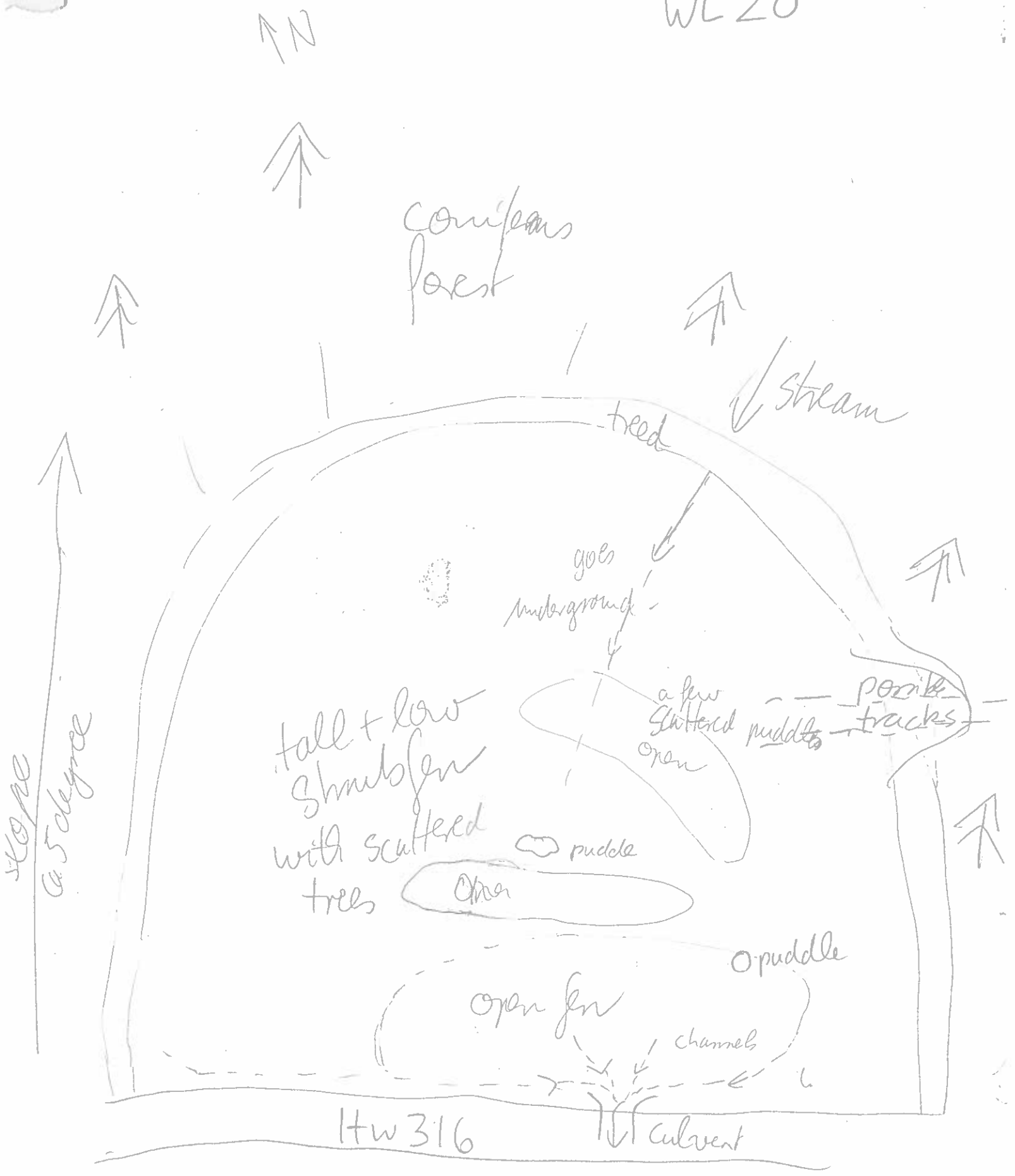
1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:

grasshopper

WL20



wetland on slope ~5 degree

not to scale

WL 6

Freshwater Wetland Data Sheet: ~~WL21~~

Date: Fri, Sept 27, 2012
Investigator(s): Scott Burley/ Maria Sksh
Weather: sunny, warm
Topographic Sheet: 11 E/4
Aerial Photo Number: 2008310-141

Wetland Atlas Number : N/A
GIS Map / Stand No. : N/A
Wetland Form[1]:: Open/Treed Fen
Wetland size: 0.10 ha
Associated Watercourse: none

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ✓
3.Fen (FE) ✓
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ____
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp (✓)
7.Wooded swamp (✓)
8.Bog ____

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW __
3.Floating leaved OW __
4.Rooted floating leaved OW __
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ✓
28.Bushy SS ____
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ✓
33.Wooded bog ____
34.Shrubby B ____
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated ✓
3.Seasonally flooded _____

Water Depth: ✓
1.0-5 cm ✓
2.5-20 cm ______
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ____
3.Palustrine ✓
4.Isolated ____
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees <1
2.Coniferous trees 10-20
3.Dead trees 5
4.Tall shrubs 10
5.Low shrubs 15
6.Dead shrubs <2
7.Herbs 2 (-5)
8.Mosses 95
9.Narrow-leaved emergents 50 ~~60~~ Juncus, Carex, grass
10.Broad-leaved emergents 0
11.Robust emergents 0
12.Free-floating plants 0
13.Floating plants (rooted) 0
14.Submerged plants 0
15. Other

Interspersion: 1.Minimal ___ 2.Low ✓ 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ✓
2.Ground water depression ____
3.Surface water slope ____
4.Ground water slope ____

Inlets/Outlets/water bodies:

no

Wildlife: (Observation/Signs/Reports)

bird call

Adjacent Wildlife habitat (%):

1.Salt marsh ___
2.Forest ✓ 100 %
3.Dykelands ___
4.Mudflats ___
5.Beach ___
6.River ___
7. Other ___

Description:

Surrounding Land Use %:

1 Agriculture ___
2.Forestry formerly 100%
3 Recreation ___
4.Industrial ___
5.Urban development ___
6.Transportation (V)
7.Residential ___
8.Waste Disposal ___
9.Scientific Research ___
10.Trapping ___
11.Education ___
12.Seasonal resident ___

Description: regenerating clearcuts (several decades)

Disturbance: 1.Low ___ 2.Moderate ✓ 3.High ___

Description:

Roads and/or tracks:

1.Private road adjacent ___
2.DOT road adjacent ___
3.Private road within ___
4.DOT road within ___
5.Vehicle tracks ✓
6.Other ___

Description: old skidder trails (2 sets)

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ___
4.Education & public awareness ___
5. None evident ✓

Potential Threats: development, forestry

Special Features:

1.Rare wetland type ___
2.Rare animal or plant species ___
3.Habitat of rare species ___
4.Nesting site for colonial water birds ___
5.Migration stop-over site ___
6. None evident ✓

Description:

Notes:


old logging Road
N
conif forest
slope
slope
tree fern or swamp
coniferous tree fern
partially from pool flooding
low shrub fern with trees + juniper + carex
open fen
scattered trees + shrubs
slope conif trees
treed fen
not to scale
WL21

WL 7
~~WL 18~~

Freshwater Wetland Data Sheet: WL 7

Date: W, Sept 26, 2012
Investigator(s): Scott Burley/ M. Jensen
Weather: Sunny
Topographic Sheet: 11 F/14
Aerial Photo Number: 2008316-141

Wetland Atlas Number : NA
GIS Map / Stand No. : NA
Wetland Form[1]:: Shrub Bog
Wetland size: 0.1 ha
Associated Watercourse: unnamed stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ✓
3.Fen (FE) ____
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ✓
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh ____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp ____
7.Wooded swamp ____
8.Bog ✓

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM ____
17.Narrow leaved SM ____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ____
29.Compact SS ____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog ✓
34.Shrubby B ✓
35.Open B ____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated ✓
3.Seasonally flooded ____

Water Depth:
1.0-5 cm ✓
2.5-20 cm ____
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above ✓

Percent Vegetation Cover:
1.> 95% ✓
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ✓
3.Palustrine ____
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):

1.Deciduous trees	<1
2.Coniferous trees	20
3.Dead trees	
4.Tall shrubs	10
5.Low shrubs	70
6.Dead shrubs	<1
7.Herbs	5-10
8.Mosses	95
9.Narrow-leaved emergents	10
10.Broad-leaved emergents	0
11.Robust emergents	<1
12.Free-floating plants	0
13.Floating plants (rooted)	0
14.Submerged plants	0
15. Other	

Interspersion: 1.Minimal ___ 2.Low ✓ 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ✓
2.Ground water depression _____
3.Surface water slope _____
4.Ground water slope ____

Inlets/Outlets/water bodies: In + Out

Wildlife: (Observation/Signs/Reports)
dragonfly

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest 1
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other Pipeline ROW

Description:

Surrounding Land Use %:
1 Agriculture ____
2.Forestry possible
3 Recreation ____
4.Industrial ✓
5.Urban development ___
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description: no forestry evident ; industrial ; pipeline ROW

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:
1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ~~100m~~
4.DOT road within ____
5.Vehicle tracks 100m
6.Other ____

Description:

Existing Uses of Wetlands:
1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

Potential Threats: development

Special Features:
1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:
1 dragonfly;
~~part~~ of wetland may have been submitted to pipeline development
One side)


NT
WL18
coniferous forest
no slope no slope
treed / shrub bog
pink flags
pink flags
slope
pipeline ROW
Compact shrub bog
shrub bog
stream
stream
trees + shrub bog
coniferous forest
not to scale

~~WL14~~

Freshwater Wetland Data Sheet: WL 8

Date: Sept. 25/12
Investigator(s): Scott Burley/ M Sensen
Weather: Sun
Topographic Sheet: 11 F/14
Aerial Photo Number: A28316-141

Wetland Atlas Number : N/A
GIS Map / Stand No. : N/A
Wetland Form[1]:: Shrub Swamp/Fen
Wetland size: 0.62 ha
Associated Watercourse: Unnamed Stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ____
3.Fen (FE) X
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) X
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp _____
7.Wooded swamp X
8.Bog ____

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW __
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF X
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ____
29.Compact SS _____
30.Low sparse SS X
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog ____
34.Shrubby B _____
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated _____
3.Seasonally flooded X

Water Depth:
1.0-5 cm X
2.5-20 cm X
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above X

Percent Vegetation Cover:
1.> 95% X
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ___
2.Riverine X
3.Palustrine ____
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees 20% - Red maple, birch
2.Coniferous trees 55% - Picea glauca, Abies balsamea
3.Dead trees 2%
4.Tall shrubs - Alnus incana 20%
5.Low shrubs - 5% Alnus
6.Dead shrubs -
7.Herbs - 15% - Sol.clago, potentilla, Rubus
8.Mosses - 50% - Sphagnum
9.Narrow-leaved emergents - 10% - Scirpus, Juncus, Calamagrostis
10.Broad-leaved emergents - 10% - Typha, Iris
11.Robust emergents -
12.Free-floating plants -
13.Floating plants (rooted) -
14.Submerged plants -
15. Other -

Interspersion: 1.Minimal ___ 2.Low X 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression _____
2.Ground water depression _____
3.Surface water slope X
4.Ground water slope ____

Inlets/Outlets/water bodies:
Many small streams flowing into east, larger stream flowing through 2 wetland N -> S
Wildlife: (Observation/Signs/Reports)

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest 40%
3.Dykelands ____
4.Mudflats ____
5.Beach 40% Beach
6.River ____
7. Other 20% Pond

Description:

Surrounding Land Use %:
1 Agriculture ____
2.Forestry 20%
3 Recreation ____
4.Industrial _____
5.Urban development ___
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low X 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:
1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

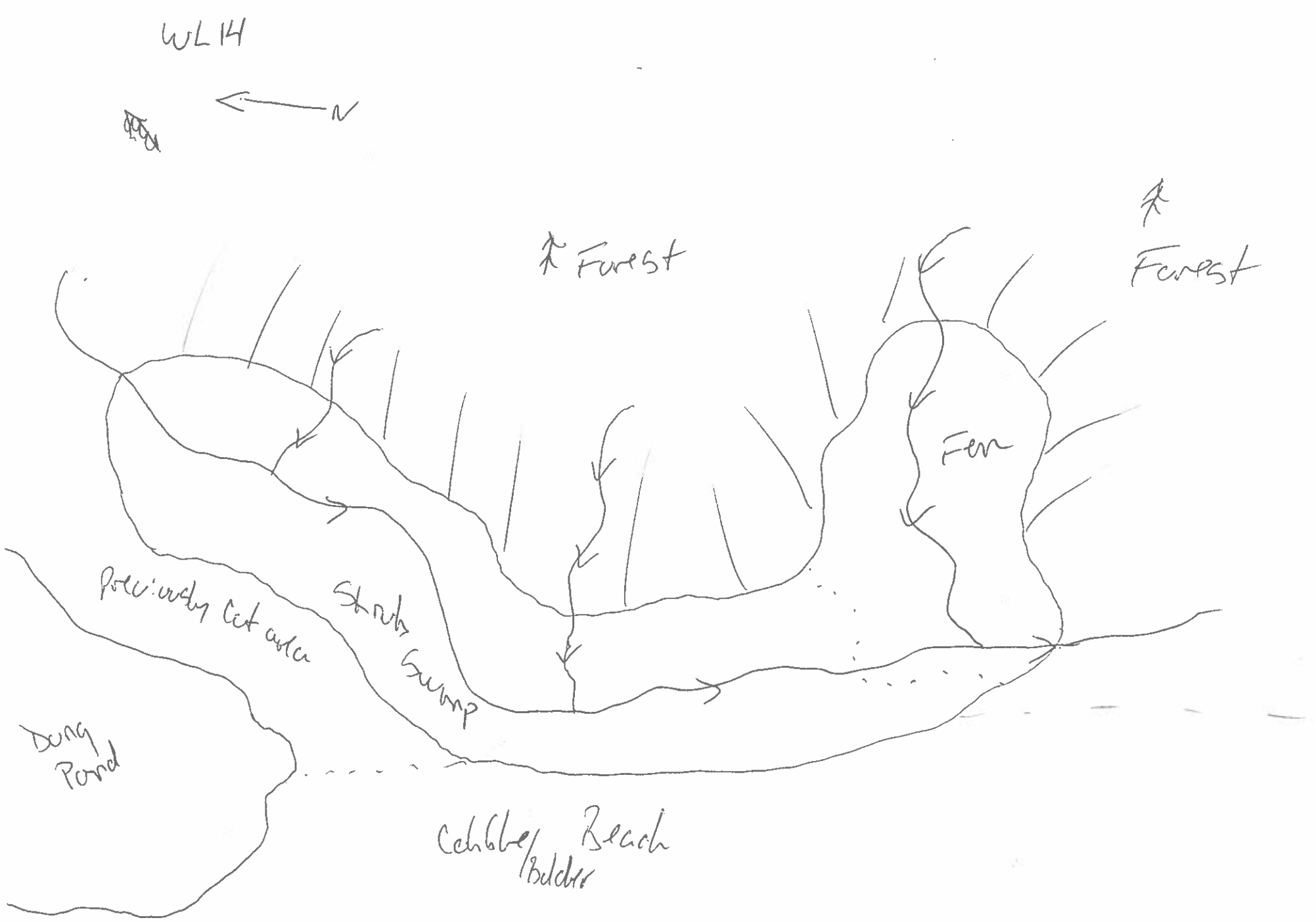
Existing Uses of Wetlands:
1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ____
4.Education & public awareness ____
5. None evident X

Potential Threats:

Special Features:
1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species X
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident _____

Description:

Notes:


WL 14
N
Forest
Forest
Fen
Shrub Swamp
Dung Pond
Cobble/Boulder Beach

Freshwater Wetland Data Sheet: ~~WL-13~~ WL-90

more a flood plain than a Shrub-Swamp

Date: Fr. 27 Sept. 2017
Investigator(s): Scott Burley/ Marion Seitz
Weather: sunny; warm
Topographic Sheet: 011 F/4
Aerial Photo Number: 2008 310-141

Wetland Atlas Number: n/A
GIS Map / Stand No.: n/A
Wetland Form[1]:: Riparian Swamp
Wetland size: 0.05 ha
Associated Watercourse: unnamed stream + Dug Pond

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ____
3.Fen (FE) ____
4.Emergent wetland (EW) ✓
5.Shrub wetland (SB) ✓ – more a flood-plain
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp ✓ maybe
7.Wooded swamp ____
8.Bog ____

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ✓
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog ____
34.Shrubby B _____
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated _____
3.Seasonally flooded ✓

Water Depth:
1.0-5 cm ✓
2.5-20 cm _____
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

stream 5-10 – deeper 20 or 30 possibly

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond ____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above 1

Percent Vegetation Cover:
1.> 95% 1
2.76-95% in peripheral band ____
3.76-96% in patches ____
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ✓
2.Riverine ____
3.Palustrine ____
4.Isolated ____
5.Deltaic ____

Vegetation Types (%):
1.Deciduous trees 0
2.Coniferous trees <1
3.Dead trees <1
4.Tall shrubs 20
5.Low shrubs ~~20~~
6.Dead shrubs 10-20
7.Herbs 80-90
8.Mosses 30-40
9.Narrow-leaved emergents 5-10 Juncus, Carex, grass
10.Broad-leaved emergents <1 Iris
11.Robust emergents 0
12.Free-floating plants 0
13.Floating plants (rooted) 0
14.Submerged plants 0
15. Other [illegible] 5-10

Interspersion: 1.Minimal 1 2.Low ____ 3.Medium ____ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ____
2.Ground water depression ____
3.Surface water slope ✓
4.Ground water slope ____

Inlets/Outlets/water bodies:

~~All~~ flows N~~W~~ to S. into Lake - bidirectional flowthrough.

Wildlife: (Observation/Signs/Reports)

deer trail

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest ✓ 80%
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other shrub 20%

Description:

Surrounding Land Use %:

1 Agriculture ____
2.Forestry ✓ some but not evident 80%
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low ✓ 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:

1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ____
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident ✓

Potential Threats: Development

Special Features:

1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident ✓

Description:

Notes:


N
Stream
Conifers
Soil
slope
Lake
Wetland B
↑ slope
(WL on slope)

Freshwater Wetland Data Sheet: WL11

Date: June 19/13
Investigator(s): Scott Burley
Weather: Sun
Topographic Sheet: 11 E/14
Aerial Photo Number: 20083/102-141

Wetland Atlas Number : N/A
GIS Map / Stand No. : N/A
Wetland Form[1]:: Treed Bog
Wetland size: 0.44 ha
Associated Watercourse: N/A

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) X
3.Fen (FE) ____
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ____
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp _____
7.Wooded swamp ____
8.Bog X

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ____
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog X
34.Shrubby B X
35.Open B X

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated X
3.Seasonally flooded _____

Water Depth:
1.0-5 cm X
2.5-20 cm _____
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:
1.Beaver Pond ____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above X

Percent Vegetation Cover:
1.> 95% X
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine ____
3.Palustrine ____
4.Isolated X
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees 5-30
2.Coniferous trees 35-50
3.Dead trees 10-30
4.Tall shrubs 30-50
5.Low shrubs 20-30
6.Dead shrubs —
7.Herbs 30-50
8.Mosses ~100-30
9.Narrow-leaved emergents 15-30
10.Broad-leaved emergents —
11.Robust emergents -
12.Free-floating plants -
13.Floating plants (rooted) -
14.Submerged plants —
15. Other —

Interspersion: 1.Minimal ___ 2.Low X 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression X
2.Ground water depression ____
3.Surface water slope ____
4.Ground water slope ____

Inlets/Outlets/water bodies:
None

Wildlife: (Observation/Signs/Reports)
Pasturing; Deer tracks, snake (Garter)

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest 100
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description:

Surrounding Land Use %:

1 Agriculture ____
2.Forestry 90
3 Recreation ____
4.Industrial ____
5.Urban development ___
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low X 2.Moderate ____ 3.High ____

Description: Forestry activity w/I + Surrounding wetland

Roads and/or tracks:

1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description: None

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ____
4.Education & public awareness ____
5. None evident X

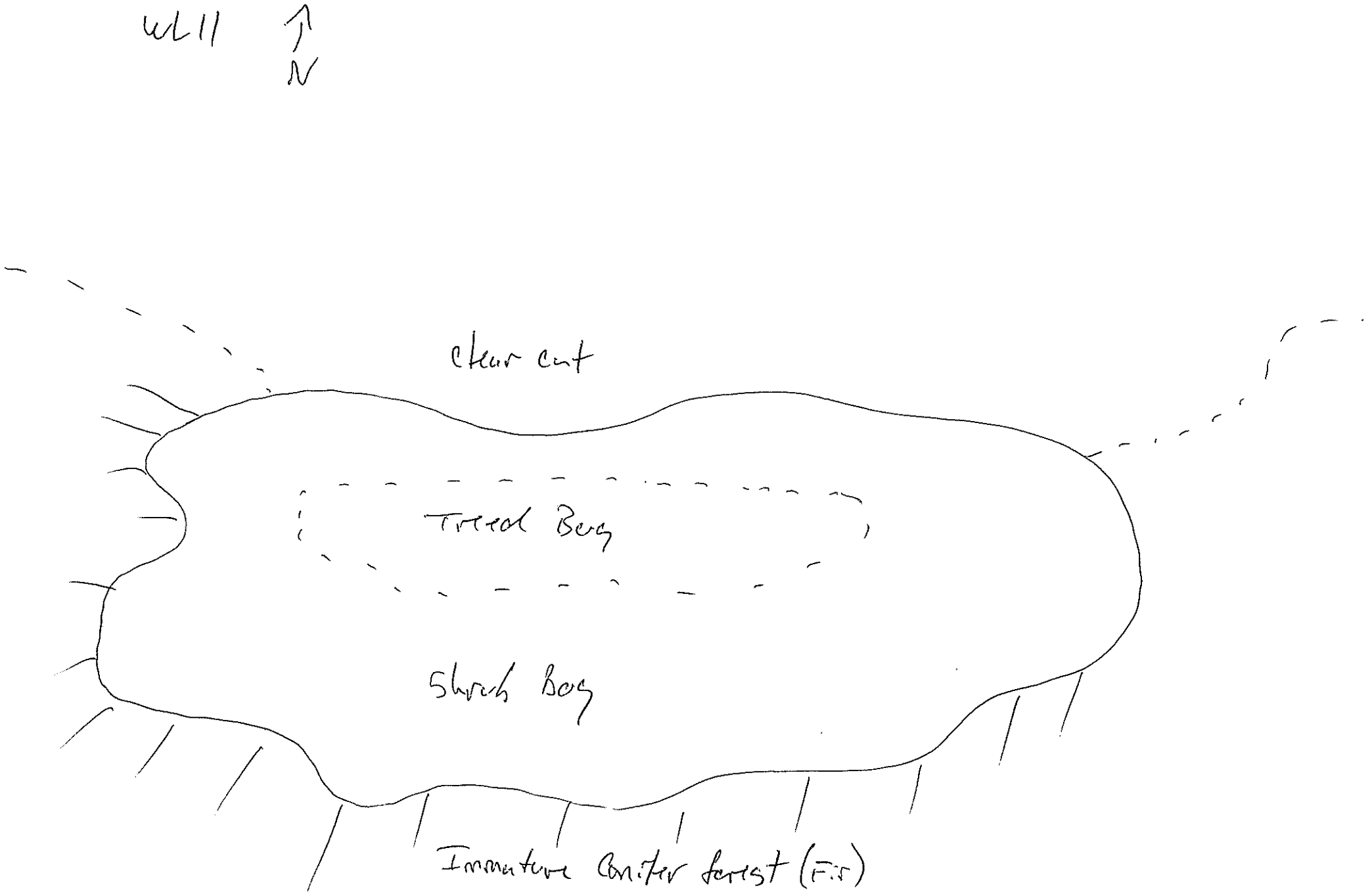
Potential Threats: Industrial development

Special Features:

1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident X

Description:

Notes:


well
N
clear cut
Treed Bog
Shrub Bog
Immature Conifer forest (F.s)

Freshwater Wetland Data Sheet: WL12

Date: June 19/13
Investigator(s): Scott Burley/Leah Deroche
Weather: Sun
Topographic Sheet: 11 F/4
Aerial Photo Number: 30BG 3160-141

Wetland Atlas Number: NA
GIS Map / Stand No.: NA
Wetland Form[1]:: Treed Swamp
Wetland size: 0.17 ha
Associated Watercourse: Unnamed Stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) ____
3.Fen (FE) ____
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) X
6.Forested wetland (FW) X

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp X
7.Wooded swamp X
8.Bog ____

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ____
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS X
33.Wooded bog ____
34.Shrubby B _____
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated X
3.Seasonally flooded _____

Water Depth:
1.0-5 cm X - in wetland
2.5-20 cm X in stream
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:

1.Beaver Pond _____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above X

Percent Vegetation Cover:
1.> 95% X
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine X
3.Palustrine ____
4.Isolated _____
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees Acer rubra 15%
2.Coniferous trees
3.Dead trees
4.Tall shrubs Acer pensylvanicum - 20%
5.Low shrubs
6.Dead shrubs
7.Herbs - Cinnamon Fern 60%
8.Mosses
9.Narrow-leaved emergents Carex trisperma 25%
10.Broad-leaved emergents
11.Robust emergents
12.Free-floating plants
13.Floating plants (rooted)
14.Submerged plants
15. Other

Interspersion: 1.Minimal X 2.Low _____ 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression X
2.Ground water depression _____
3.Surface water slope _____
4.Ground water slope ____

Inlets/Outlets/water bodies:
Stream flowing West -> East

Wildlife: (Observation/Signs/Reports)
Song birds
Deer tracks

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest _____
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other X

Description: 100% regenerating mixed forest

Surrounding Land Use %:

1 Agriculture ____
2.Forestry 100%
3 Recreation ____
4.Industrial _____
5.Urban development ___
6.Transportation ____
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low _____ 2.Moderate X 3.High ____

Description:

Roads and/or tracks:

1.Private road adjacent _____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ___
2.Recreational activities ___
3.Aesthetics ____
4.Education & public awareness ____
5. None evident X

Potential Threats:

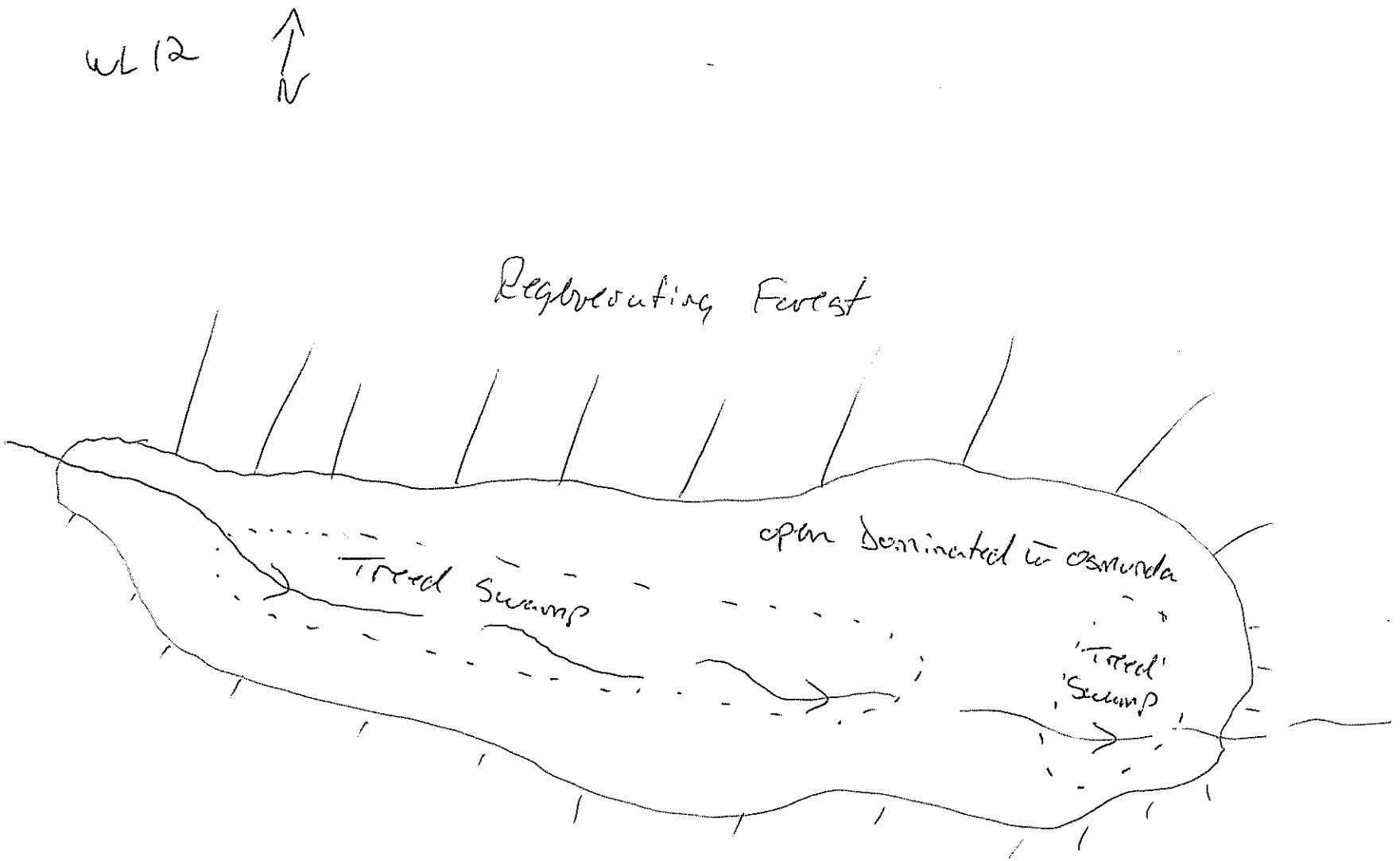
Special Features:

1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident _____

Description:

Notes:

WL 12


N
Regenerating Forest
open dominated by osmunda
Treed Swamp
Treed Swamp

Freshwater Wetland Data Sheet: WL13

Date: June 20/13
Investigator(s): Scott Burley
Weather: Sun
Topographic Sheet: 11 F/14
Aerial Photo Number: 2008310-141

Wetland Atlas Number : NA
GIS Map / Stand No. : NA
Wetland Form[1]:: Riparian Rog
Wetland size: 0.19 ha
Associated Watercourse: unnamed stream

Wetland Type:
1.Aquatic bed/unconsolidated bottom (AB) ____
2.Bog(BO) X
3.Fen (FE) ____
4.Emergent wetland (EW) ____
5.Shrub wetland (SB) ____
6.Forested wetland (FW) ____

Wetland Class:
1.Open water ___
2.Deep marsh ____
3.Shallow marsh _____
4.Seasonally flooded flats ____
5.Meadow ____
6.Shrub swamp _____
7.Wooded swamp ____
8.Bog X

Wetland Subclass:
1.Vegetated open water ___
2.Non-vegetated OW ___
3.Floating leaved OW ___
4.Rooted floating leaved OW ___
5.Dead woody OW ____
6.Vegetated deep marsh ____
7.Non-vegetated DM ____
8.Dead woody DM ____
9.Sub-shrub DM ____
10.Floating leaved DM ____
11.Rooted floating leaved DM ____
12.Robust DM ____
13.Narrow-leaved DM ____
14.Broad-leaved DM ____
15.Dead woody shallow marsh ____
16.Robust SM _____
17.Narrow leaved SM _____
18.Broad leaved SM ____
19.Floating leaved SM ____
20.Rooted floating leaved SM ____
21.Non-vegetated SM ____
22.Emergent seasonally flooded flats ____
23.Shrubby SFF ____
24.Grazed meadow ____
25.Ungrazed M ____
26.Sedge M ____
27.Sapling shrub swamp ____
28.Bushy SS ____
29.Compact SS _____
30.Low sparse SS ____
31.Deciduous wooded swamp ____
32.Evergreen WS ____
33.Wooded bog X
34.Shrubby B X
35.Open B _____

Water Regime Indicator:
1.Permanently flooded ___
2.Saturated X
3.Seasonally flooded _____

Water Depth:
1.0-5 cm X
2.5-20 cm X in stream
3.20-50 cm ____
4.50-100 cm ____
5.>100 cm ____

Note: 1. Canadian Wetland Classification System (2nd Edition)

Impounded Wetland Type:
1.Beaver Pond ____
2.Man-made Impoundment ____
3.Ducks Unlimited Impoundment ____
4. None of the above X

Percent Vegetation Cover:
1.> 95% X
2.76-95% in peripheral band ___
3.76-96% in patches ___
4.26-75% in peripheral band ____
5.26-75% in patches ____
6. 5-25% in peripheral band ____
7. 5-25% in patches ____
8.< 5% ____

Wetland Site:
1.Lacustrine ____
2.Riverine X
3.Palustrine ____
4.Isolated ____
5.Deltaic ___

Vegetation Types (%):
1.Deciduous trees 5%0
2.Coniferous trees 3%0
3.Dead trees 2%0
4.Tall shrubs 30%0
5.Low shrubs 25%0
6.Dead shrubs —
7.Herbs 30%0
8.Mosses rock%0
9.Narrow-leaved emergents 25%0
10.Broad-leaved emergents 2%0 —
11.Robust emergents 2%0
12.Free-floating plants —
13.Floating plants (rooted) —
14.Submerged plants —
15. Other —

Interspersion: 1.Minimal ___ 2.Low X 3.Medium ___ 4.High ____

Conductivity: N/A
Alkalinity: N/A
pH: N/A

Hydrological Classification:
1.Surface water depression ____
2.Ground water depression ____
3.Surface water slope X
4.Ground water slope ____

Inlets/Outlets/water bodies:
Stream flowing through wetland East -> west

Wildlife: (Observation/Signs/Reports)
Passerines, dragon flies,

Adjacent Wildlife habitat (%):

1.Salt marsh ____
2.Forest 100
3.Dykelands ____
4.Mudflats ____
5.Beach ____
6.River ____
7. Other ____

Description:

Surrounding Land Use %:

1 Agriculture ____
2.Forestry 100
3 Recreation ____
4.Industrial ____
5.Urban development ____
6.Transportation 5%
7.Residential ____
8.Waste Disposal ____
9.Scientific Research ____
10.Trapping ____
11.Education ____
12.Seasonal resident ____

Description:

Disturbance: 1.Low X 2.Moderate ____ 3.High ____

Description:

Roads and/or tracks:

1.Private road adjacent ____
2.DOT road adjacent ____
3.Private road within ____
4.DOT road within ____
5.Vehicle tracks ____
6.Other ____

Description:

Existing Uses of Wetlands:

1.Economic use (e.g. farming) ____
2.Recreational activities ____
3.Aesthetics ____
4.Education & public awareness ____
5. None evident X

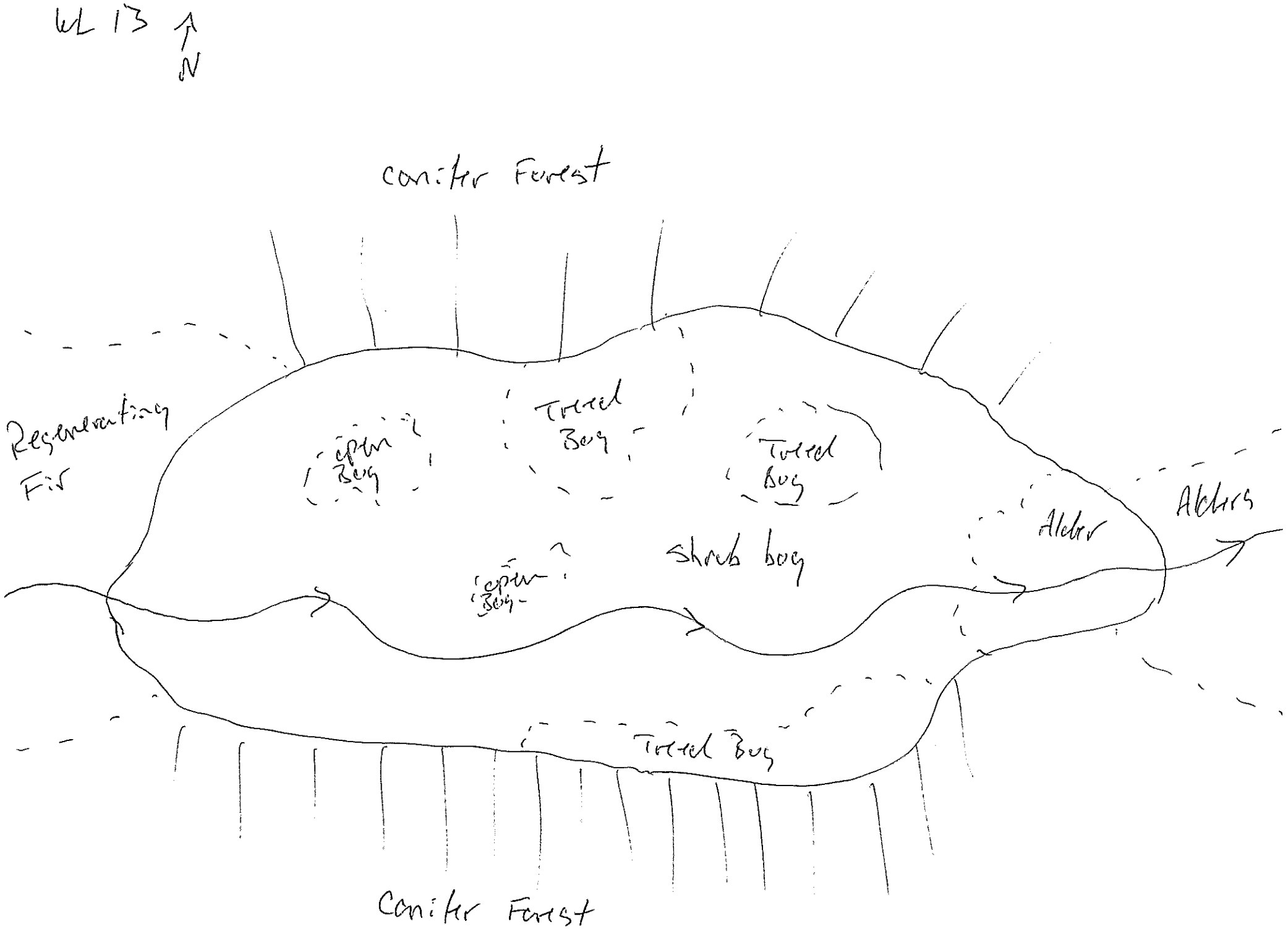
Potential Threats:

Special Features:

1.Rare wetland type ____
2.Rare animal or plant species ____
3.Habitat of rare species ____
4.Nesting site for colonial water birds ____
5.Migration stop-over site ____
6. None evident X

Description:

Notes:


WL 13
N
conifer Forest
Regenerating Fir
open Bog
Treed Bog
Treed Bog
shrub bog
open Bog
Alder
Alders
Treed Bog
Conifer Forest

APPENDIX B
Wetland Delineation GPS Waypoints

Appendix D - Wetland Delineation GPS Points

Wetland #	Delineation Point	Northing	Easting
WL1	WL1-1	5002597	607443
	WL1-2	5002596	607448
	WL1-3	5002586	607450
	WL1-4	5002581	607454
	WL1-5	5002575	607448
	WL1-7	5002580	607427
	WL1-8	5002580	607414
	WL1-9	5002586	607402
	WL1-10	5002599	607399
	WL1-11	5002602	607397
	WL1-12	5002606	607405
	WL1-13	5002623	607427
	WL1-14	5002624	607437
	WL1-15	5002622	607443
	WL1-16	5002608	607439
	WL1-UP1	5002603	607444
	WL1-WP1	5002595	607441
WL2	WL2-1	5002549	607511
	WL2-2	5002545	607521
	WL2-3	5002542	607529
	WL2-4	5002537	607534
	WL2-6	5002532	607536
	WL2-8	5002514	607531
	WL2-9	5002508	607520
	WL2-10	5002507	607512
	WL2-11	5002508	607504
	WL2-12	5002509	607487
	WL2-13	5002516	607482
	WL2-14	5002533	607480
	WL2-15	5002539	607482
	WL2-16	5002548	607481
	WL2-17	5002548	607486
	WL2-UP1	5002545	607504
	WL2-WP1	5002543	607504
WL3	WL3-1	5002410	607626
	WL3-2	5002403	607637
	WL3-3	5002399	607641
	WL3-4	5002392	607637
	WL3-5	5002390	607629
	WL3-7	5002388	607622
	WL3-8	5002383	607615
	WL3-9	5002381	607608
	WL3-10	5002377	607580
	WL3-11	5002368	607577
	WL3-13	5002371	607574
	WL3-14	5002373	607553
	WL3-15	5002386	607556
	WL3-17	5002390	607565
	WL3-18	5002397	607573
	WL3-20	5002401	607589
	WL3-21	5002414	607608

Wetland #	Delineation Point	Northing	Easting
WL3	WL3-22	5002410	607618
	WL3-UP1	5002413	607627
	WL3-WP1	5002408	607627
WL4	WL4-1	5002056	607118
	WL4-2	5002073	607103
	WL4-3	5002100	607112
	WL4-4	5002116	607119
	WL4-5	5002114	607130
	WL4-6	5002107	607135
	WL4-7	5002104	607140
	WL4-8	5002094	607137
	WL4-10	5002087	607149
	WL4-11	5002078	607143
	WL4-UP1	5002085	607099
	WL4-WP1	5002089	607114
WL5	WL5-1	5001913	607418
	WL5-2	5001919	607419
	WL5-3	5001923	607427
	WL5-4	5001920	607440
	WL5-5	5001913	607441
	WL5-6	5001909	607453
	WL5-7	5001904	607458
	WL5-8	5001895	607443
	WL5-9	5001890	607439
	WL5-10	5001883	607443
	WL5-11	5001871	607450
	WL5-12	5001860	607452
	WL5-13	5001860	607452
	WL5-14	5001846	607448
	WL5-15	5001830	607443
	WL5-16	5001812	607449
	WL5-17	5001806	607445
	WL5-18	5001843	607404
	WL5-19	5001859	607412
	WL5-20	5001872	607414
	WL5-21	5001883	607417
	WL5-22	5001897	607421
	WL5-UP1	5001913	607415
	WL5-WP1	5001908	607422
WL6	WL6-1	5002013	608138
	WL6-2	5002006	608144
	WL6-3	5002008	608154
	WL6-4	5002005	608160
	WL6-5	5001994	608154
	WL6-6	5001996	608148
	WL6-7	5001994	608137
	WL6-8	5001985	608136
	WL6-9	5001988	608130
	WL6-10	5001986	608121
	WL6-11	5001993	608116
	WL6-12	5002004	608112
	WL6-13	5002003	608106

Wetland #	Delineation Point	Northing	Easting
WL6	WL6-14	5002009	608103
	WL6-15	5002013	608106
	WL6-16	5002013	608113
	WL6-17	5002014	608121
	WL6-18	5002017	608128
	WL6-UP1	5002014	608143
	WL6-WP1	5002011	608135
WL7	WL7-1	5002053	608390
	WL7-2	5002053	608399
	WL7-3	5002055	608415
	WL7-5	5002059	608418
	WL7-6	5002058	608425
	WL7-8	5002030	608401
	WL7-9	5002033	608384
	WL7-10	5002037	608374
	WL7-11	5002044	608362
	WL7-12	5002051	608360
	WL7-13	5002054	608370
	WL7-UP1	5002071	608384
	WL7-WP1	5002048	608389
WL8	WL8-1	5001702	607252
	WL8-2	5001689	607255
	WL8-3	5001667	607268
	WL8-4	5001648	607283
	WL8-5	5001640	607300
	WL8-6	5001637	607319
	WL8-7	5001634	607326
	WL8-8	5001640	607330
	WL8-9	5001628	607340
	WL8-10	5001626	607349
	WL8-11	5001636	607344
	WL8-12	5001642	607342
	WL8 -13	5001651	607335
	WL8 -13	5001656	607335
	WL8-14	5001666	607340
	WL8-15	5001670	607344
	WL8-15	5001677	607347
	WL8-16	5001681	607344
	WL8-17	5001686	607341
	WL8-18	5001687	607338
	WL8-18	5001680	607335
	WL8-19	5001676	607328
	WL8-20	5001681	607323
	WL8-21	5001679	607317
	WL8-22	5001674	607316
	WL8-23	5001668	607314
	WL8-24	5001660	607314
	WL8-25	5001645	607312
	WL8-25	5001650	607296
	WL8-26	5001658	607284
	WL8-27	5001680	607269
	WL8-29	5001701	607271
	WL8-30	5001707	607273

Wetland #	Delineation Point	Northing	Easting
WL8	WL8-31	5001712	607275
	WL8-32	5001723	607271
	WL8-33	5001729	607269
	WL8-34	5001744	607265
	WL8-35	5001762	607250
	WL8-36	5001778	607237
	WL8 -37	5001795	607224
	WL8-40	5001834	607193
	WL8-41	5001840	607181
	WL8-41	5001850	607176
	WL8-43	5001874	607166
	WL8-44	5001874	607160
	WL8-45	5001867	607149
	WL8-47	5001815	607178
	WL8-48	5001804	607196
	WL8-49	5001786	607213
	WL8-50	5001773	607220
	WL8-51	5001745	607240
	WL8-52	5001728	607245
	WL8-53	5001711	607243
	WL8-UP1	5001669	607314
	WL8-WP1	5001668	607318
WL10	WL10-1	5001989	607041
	WL10-2	5001993	607036
	WL10-3	5001984	607030
	WL10-4	5001963	607033
	WL10-5	5001951	607048
	WL10-6	5001969	607050
	WL10-7	5001981	607042
WL11	WL11-WP1	5001772	608129
	WL11-UP1	5001765	608131
	WL11-1	5001769	608130
	WL11-2	5001767	608125
	WL11-3	5001768	608120
	WL11-4	5001768	608113
	WL11-5	5001772	608109
	WL11-6	5001772	608102
	WL11-7	5001775	608095
	WL11-8	5001781	608089
	WL11-9	5001785	608082
	WL11-10	5001785	608078
	WL11-11	5001789	608066
	WL11-12	5001792	608047
	WL11-13	5001795	608041
	WL11-14	5001796	608034
	WL11-15	5001799	608029
	WL11-16	5001803	608025
	WL11-17	5001805	608022
	WL11-18	5001813	608018
	WL11-19	5001818	608018
	WL11-20	5001820	608021
	WL11-21	5001821	608025
	WL11-22	5001820	608027

Wetland #	Delineation Point	Northing	Easting
WL11	WL11-24	5001823	608039
	WL11-25	5001823	608045
	WL11-26	5001822	608048
	WL11-27	5001824	608050
	WL11-28	5001828	608056
	WL11-29	5001830	608058
	WL11-30	5001831	608063
	WL11-31	5001829	608068
	WL11-32	5001827	608077
	WL11-33	5001821	608084
	WL11-34	5001812	608098
	WL11-35	5001808	608115
	WL11-36	5001806	608125
	WL11-37	5001804	608133
	WL11-38	5001801	608139
	WL11-39	5001797	608144
	WL11-40	5001790	608155
	WL11-41	5001786	608155
	WL11-42	5001785	608150
	WL11-43	5001780	608145
	WL11-44	5001774	608143
	WL11-45	5001771	608139
	WL11-46	5001770	608135
WL12	WL12-WP1	5002104	608268
	WL12-UP1	5002109	608266
	WL12-1	5002106	608268
	WL12-2	5002108	608295
	WL12-3	5002106	608306
	WL12-4	5002107	608314
	WL12-5	5002099	608319
	WL12-6	5002097	608323
	WL12-7	5002088	608315
	WL12-8	5002087	608307
	WL12-9	5002086	608291
	WL12-10	5002091	608283
	WL12-11	5002091	608275
	WL12-12	5002089	608259
	WL12-13	5002091	608229
	WL12-14	5002101	608219
	WL12-15	5002106	608223
	WL12-16	5002108	608239
	WL12-17	5002110	608246
	WL12-18	5002108	608254
	WL12-19	5002108	608259
WL13	WL13-WP1	5002423	607390
	WL13-UP1	5002426	607386
	WL13-1	5002426	607389
	WL13-2	5002428	607395
	WL13-3	5002425	607398
	WL13-4	5002425	607403
	WL13-5	5002423	607416
	WL13-6	5002419	607420
	WL13-7	5002415	607421

Wetland #	Delineation Point	Northing	Easting
WL13	WL13-8	5002413	607424
	WL13-9	5002403	607435
	WL13-10	5002400	607441
	WL13-11	5002390	607449
	WL13-12	5002383	607445
	WL13-13	5002379	607440
	WL13-14	5002374	607430
	WL13-15	5002376	607423
	WL13-16	5002384	607413
	WL13-17	5002389	607413
	WL13-18	5002398	607407
	WL13-19	5002397	607398
	WL13-20	5002394	607395
	WL13-21	5002392	607392
	WL13-22	5002395	607390
	WL13-23	5002401	607389
	WL13-24	5002406	607388
	WL13-25	5002414	607382
	WL13-26	5002421	607378