

PACIFIC NORTHWEST LNG - ADDENDUM TO THE ENVIRONMENTAL IMPACT STATEMENT

Archaeology and Heritage Resources
December 12, 2014

20.0 ARCHAEOLOGY AND HERITAGE RESOURCES

The assessment of potential effects of the Project on archaeological and heritage resources was provided in Section 20 of the EIS. This section of the EIS Addendum provides:

- An update to the potential project and cumulative effects on the Archaeological and Heritage Resources VC as a result of the project changes
- Responses to requests for additional information from the federal government (August 14, 2014)
- An updated list of mitigation measures for the Archaeological and Heritage Resources VC
- Updated conclusions on the assessment of effects on the Archaeological and Heritage Resources VC, taking into account project changes and the requested additional information.

Table 20-1 lists the documents applicable to Archaeological and Heritage Resources submitted by PNW LNG as part of the environmental assessment process to date and identifies if information is either *updated by EIS Addendum*, *superseded*, *not relevant*, or *not affected* by information in the EIS Addendum. The following sections of the EIS Addendum contain information that updates the documents classified as *updated by EIS Addendum* in Table 20-1. Figure 20-1 has been updated from that provided in the EIS to reflect the project changes and any other applicable updates.

Table 20-1 Status of Previously Submitted Documents

Document Name	Status
Section 20 and Appendix R and S of the EIS (February 2014)	Updated by EIS Addendum
Technical Memorandum: Standards and Chance Find Protocol (June 2014)	Not affected
Technical Memorandum: Incorporating Indigenous Perspective into the Assessment (June 2014)	Not affected
Responses to the Working Group (June 2014)	Not affected

20.1 PROJECT EFFECTS ASSESSMENT UPDATE

20.1.1 Baseline Conditions

The baseline conditions described in Section 20 of the EIS for Archaeology and Heritage Resources apply to the marine terminal design mitigation. The design mitigation results in the relocation of the marine terminal berth by about 510 m from the location described in the EIS; however, the Archaeology and Heritage Resources baseline conditions at the new location are similar to those originally presented in the EIS. No archaeological or heritage sites, in addition to those detailed in the EIS, are recorded within or near the marine terminal. The potential for unrecorded archaeological and or heritage sites also remains as assessed in the EIS with the most likely unrecorded resource being shipwrecks. The marine terminal design mitigation does not affect the potential interactions with terrestrial archaeological and heritage resources.

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20.1.2 Effects Assessment

The archaeological potential of the marine terminal is similar to that of the original plan detailed in the EIS. No archaeological and/or heritage resources additional to those described in the EIS are recorded within or near the marine terminal. Therefore, the marine terminal design mitigation does not result in a material change to the potential effects, mitigation measures, residual effects identified, or the characterization of the residual effects (i.e., context, magnitude, extent, duration, frequency, reversibility) described in Section 20 of the EIS. The characterization of these effects is presented in Table 20-2. Changes to the information presented in Table 20-2 (compared to Table 20-4 of the EIS) are identified with underlined text.

As mitigation for previously undetected resources, construction of the marine terminal will employ a chance-find protocol for archaeological and heritage resources (see Section 24 and Appendix J.15). The determination of significance presented in the EIS with respect to archaeological and heritage resources does not change as a result of the marine terminal design mitigation (i.e., remains not significant).

20.2 CUMULATIVE EFFECTS ASSESSMENT UPDATE

The cumulative effects assessment provided in the EIS was reviewed with respect to the marine terminal design change, the potential cumulative effects from the change in location of the accommodation camp, and additional information requests related specifically to cumulative effects assessment.

The marine terminal design mitigation and the change in location of the accommodation camp do not result in any change to the cumulative effects assessment presented in Section 20 of the EIS.

Changes in the construction schedule for the Project have not affected the outcomes of the cumulative effects assessment for archaeological and heritage resources. Conclusions on significance of cumulative effects are based primarily on spatial overlaps, rather than temporal overlaps; therefore, changes in the construction schedule do not affect these conclusions.

20.3 RESPONSES TO THE OUTSTANDING INFORMATION REQUESTS

20.3.1 Archaeology Information Request #1

20.3.1.1 Government of Canada - Outstanding Information

***Parks Canada:** The proponent's response indicates that the BC Archaeology Branch database was consulted providing background information regarding known resources. Moreover, local archaeological professionals (2) with experience in the region were consulted. It does not appear other knowledgeable individuals were contacted for further use information of the Island. In its response, the proponent indicated that "where Traditional Use Study information has been provided to PNW LNG, and it is relevant to archaeological and heritage resources found on Lelu Island, this information will be incorporated as appropriate into the assessment and further Project refinement." This information, which can not only help in assessment of value and impact but also in site*

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identification, was therefore not incorporated into the present archaeological inventory and impact assessment. Refer also to the deficiencies identified in Aboriginal Issues IR #2.

20.3.1.2 Response

In response to the Information Request, several steps have been taken to address the issues raised. Since the EIS was filed, five Traditional Use Studies (TUS) of Lelu Island and the surrounding area have been completed by First Nations. Three of these are final documents; the Kitselas and Gitga'ata reports are available in draft or preliminary form only:

- Metlakatla First Nation Traditional Land Use and Ecological Knowledge of the Proposed Pacific NorthWest LNG Project Final Report May 13, 2014, DM Cultural Services Ltd.
- Gitxaala Use Study, Port Edward Area LNG Projects July 2014, Calliou Group
- Kitselas First Nation Traditional Use Study Analysis: The North Coast Territories-Lelu Island, July 28, 2014, Dr. Siommon Pulla
- Kitsumkalum Traditional Use Study Interim Report for Pacific NorthWest LNG/Petronas, July 30, 2014, Crossroads Cultural Resource Management
- Gitga'ata First Nation Traditional Use and Occupancy Study Prince Rupert Region: Preliminary Results Report, July 7, 2014, Inglis Consulting Services.

These documents were reviewed for any information which would have changed the approach or methodology undertaken during the various archaeological work completed. In summary, the TU studies identified the terrestrial and intertidal portions of Lelu Island as a location for harvesting coastal resources such as shellfish, crabs, and seaweed; for hunting of deer and other land mammals as well as birds; and for the gathering of medicinal, material, and edible plant resources. None of the studies identified any prehistoric permanent or temporary habitation sites on Lelu Island, nor any placename(s) associated with it. The Gitxaala study identified the general area of Stapledon Island and the east coast of Lelu Island as a 'sacred place,' but did not provide further details due to the sensitive nature of this information. The information contained within these studies is consistent with the findings of the archaeological work completed so far; namely that Lelu Island was primarily a location for the gathering of resources rather than for habitation or other purposes. The activities emphasized in the TU studies such as hunting and berry picking would leave minimal material evidence on the landscape; isolated lost or dropped items such as lithic artifacts would be expected but at such low densities that pedestrian survey or shovel testing would be unlikely to detect their presence (although two artifacts were identified through survey during the most recent Data Gap Inventory study).

Two knowledgeable individuals were also contacted for further information: David Archer, one of the leading researchers in the archaeology of the Prince Rupert region, and Susan Marsden of the Museum of Northern British Columbia and expert on Coast Tsimshian oral histories. No response was received from Susan Marsden; David Archer responded and could provide no further information on the potential archaeology or uses of Lelu Island.

The assessment of project effects on Heritage can identify locations of traditional use, or areas held as having heritage value from an indigenous perspective, however traditional use information does not necessarily inform archaeological potential or indicate the presence of an archaeological site. For example, information in the

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Provincial database and knowledge held by local First Nations informed the archaeology program of a cabin located within the northern portion of the project development area (PDA). Based on the cabin's presence, as well as the surrounding terrain attributes, this location was subject to shovel testing which yielded negative results for archaeological materials.

20.3.2 Archaeology Information Request #4

20.3.2.1 Government of Canada - Outstanding Information

Parks Canada: *The proponent should support its rationale for justifying why not all archaeological shovel tests were excavated to sterile deposits by providing the following information: 1. Justify that the depths of the shovel testing program that was actually conducted were adequate based on other known sites in the area and the depositional history of the area 2. Indicate if there are any other archaeological methods for testing wet sites and, if there are, why they were not used 3. If a test was halted at a shallow depth because of roots or other impediments, indicate if more tests were opened to compensate.*

20.3.2.2 Response

1. Tests in some locations which had been assessed as having archaeological potential revealed very poorly-drained deposits and, on occasion, standing water in tests. Although this was not described in the methodology or results sections, in these cases the field director attempted auger testing but was unable to retrieve examinable deposits in the auger due to saturation.
Given that highly saturated deposits were identified in subsurface tests, the potential for archaeological material to be present in these areas is reduced. Archaeological sites in the region have been identified beneath one to several metres of overburden, often humic (for example, Lucy Island and areas peripheral to the Boardwalk site). However in these cases, overall potential was significantly higher, and the deeply buried cultural deposits are associated with extensive midden deposits at surface or at shallower depth. No such surface deposits have been identified on Lelu Island. Given these factors, the depth of testing conducted on Lelu was adequate.
2. As part of further archaeological survey work (*Proposed Lelu Island Pacific NorthWest LNG Plant: Archaeological Gap Inventory Report, July 22, 2014*) dendritic channels through the intertidal mudflats were inspected. These are the areas assessed as having the highest potential for fish traps or other vegetal artifacts (wet sites).
3. Additional tests were not opened to compensate for those which were halted at a shallow depth due to impediments encountered. However, none of the areas selected for testing during the Stantec inventory and AIA program were identified as having archaeological potential during the initial phase of the archaeological inventory. Adherence to the Chance Find Protocol (see Section 24: Archaeological and Heritage Management Plan of the EIS and Appendix J.15) during clearing and construction phases will allow appropriate opportunity for any unidentified archaeological deposits to be identified, if present.

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20.4 MITIGATION

20.4.1 Changes to Mitigation Measures Presented in the EIS

There are no changes to mitigation measures as a result of project changes.

20.4.2 Complete List of Current Mitigation Measures

All of the technically and economically-feasible mitigation measures currently being presented by PNW LNG to address potential effects to Archeological and Heritage Resources are listed below. By implementing this full set of mitigation measures, PNW LNG is confident that the Project will not result in significant adverse effects to Archeological and Heritage Resources.

- Systematic Data Recovery (SDR) studies for culturally modified tree (CMT) related sites will be conducted by systematically recording a representative sample of CMT features, consisting of:
 - Detailed recording as outlined in the CMT Handbook (Archaeology Branch 2001)
 - Stem round collection
 - Monitoring of CMT removal by a crew comprised of a professional archaeologist and a local First Nations representative
 - Direct dating by stem-round sampling
 - Production of a comprehensive report
- SDR studies will be conducted on affected heritage sites, consisting of:
 - Scientific excavation and/or surface collection studies
 - Collection and analysis of artifacts, faunal remains, botanical remains, and other archaeological remains
 - Collection and processing of carbon samples for dating
 - Completion of other appropriate specialized analytical processes (e.g., geochemical analysis of stone tools, blood residue analysis)
 - Analysis and interpretation of all recovered data
 - Cataloguing of all collected artifacts and their subsequent curation in an approved facility
 - Production of a comprehensive report
- Work affecting archaeological or heritage sites will cease until the site can be properly assessed by a professional archaeologist
- Archaeological or heritage resources of low significance may also be mitigated through a program of archaeological monitoring carried out during construction
- A Chance Find Protocol document will be used during project construction in the event that unrecorded CMTs are encountered (see Section 24 and Appendix J.15).

20.5 CONCLUSION

Project changes were assessed for potential effects, including cumulative effects, on archaeological and heritage resources. Based on this assessment, there are no changes to the potential adverse effects, the mitigation measures, and the residual adverse effects identified in the EIS. The characterization of the residual adverse effects

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(i.e., context, magnitude, extent, duration, frequency, reversibility) and the determination of significance of those effects remain the same as identified the EIS (i.e., remain not significant) (see Table 20-2).

By following site avoidance and/or site mitigation measures, the residual effects to archaeological and heritage resources will not be significant.

The outstanding information provided in response to the information requests does not change the results of the assessment.

The conclusions of the assessment of effects on archaeological and heritage resources do not change from those presented in the EIS (i.e., remain significant).

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Table 20-2 Characterization of Residual Effects for Archaeological and Heritage Resources

Project Phase	Mitigation Measures	Residual Effects Characterization						Likelihood	Significance	Confidence	Follow-up and Monitoring
		Context	Magnitude	Extent	Duration	Reversibility	Frequency				
Destruction or Disturbance of CMTs											
Construction	<ul style="list-style-type: none"> SDR studies for CMT sites will be conducted by systematically recording a representative sample of CMT features Use of a Chance Find Protocol during project construction (see Section 24 and Appendix J.15). 	U	L/M	PDA	P	I	S	L	N	H	Follow-up: None Monitoring: <u>During clearing</u>
Operations		No effects anticipated									
Decommissioning		No effects anticipated									
Residual effects for all phases		U	L/M	PDA	P	I	S				
Destruction or Disturbance of other Archaeological or Heritage Sites											
Construction	<ul style="list-style-type: none"> Work affecting archaeological or heritage sites will cease until the site can be properly assessed by a professional archaeologist SDR studies on affected heritage sites (if found) Archaeological or heritage resources of low significance may also be mitigated Use of a Chance Find Protocol during project construction (see Section 24 and Appendix J.15). 	U	L/H	PDA	P	I	S	L	N	H	Follow-up: None Monitoring: <u>During site preparation</u>
Operations		No effects anticipated									
Decommissioning		No effects anticipated									
Residual effects for all phases		U	L/H	PDA	P	I	S				

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Project Phase	Mitigation Measures	Residual Effects Characterization						Likelihood	Significance	Confidence	Follow-up and Monitoring
		Context	Magnitude	Extent	Duration	Reversibility	Frequency				
<p>KEY</p> <p>CONTEXT:</p> <p>U = Undisturbed: These are no existing disturbances within the PDA</p> <p>D = Disturbed: There are existing disturbances within the PDA</p>	<p>MAGNITUDE:</p> <p>L = Low: Effect is detectable but is limited to small portions of CMTs and/or other archaeological or heritage sites of low significance or to portions of archaeological or heritage sites already substantially disturbed by previous developments</p> <p>M = Moderate: Affects small but intact portions of archaeological or heritage sites of moderate or high significance, or substantial, intact portions of archaeological or heritage sites of low significance</p> <p>H = High: Affects substantial, intact portions of one or more sites of moderate or high significance</p> <p>EXTENT:</p> <p>PDA = Limited to the PDA</p> <p>LAA = Limited to Lelu Island and private property on the mainland</p> <p>RAA = Extending beyond Lelu Island and the private property on the mainland</p>	<p>DURATION:</p> <p>ST Short term: Measureable for less than one month</p> <p>MT Residual effects are measurable for 4 to 30 years.</p> <p>LT Long term: Measurable for life of the Project</p> <p>P Permanent: Measurable parameter unlikely to recover to baseline</p> <p>FREQUENCY:</p> <p>S = Single event: Effect occurs once</p> <p>MI = Multiple irregular event (not set schedule): Effect occurs sporadically at irregular intervals</p> <p>MR = Multiple regular event: Effect occurs daily</p> <p>C = Continuous: Effect occurs continuously</p> <p>REVERSIBILITY:</p> <p>R = Reversible: Effects will cease during or after the Project is complete</p> <p>I = Irreversible: Effects will persist after the life of the Project</p>	<p>LIKELIHOOD OF RESIDUAL EFFECT:</p> <p><i>Based on professional judgment.</i></p> <p>L = Low probability of occurrence</p> <p>M = Medium probability of occurrence</p> <p>H = High probability of occurrence</p> <p>SIGNIFICANCE:</p> <p>S = Significant: Residual effects are unavoidable, and, even after mitigation measures are employed, cannot be adequately compensated for</p> <p>N = Not Significant: Where Residual effects occur, they can be effectively mitigated through appropriate data collection</p> <p>CONFIDENCE AND RISK</p> <p><i>Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation, and assumptions made.</i></p> <p>L = Low level of confidence</p> <p>M = Moderate level of confidence</p> <p>H = High level of confidence</p>								

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20.6 FIGURES

Please see following pages.



- Local Assessment Area and Regional Assessment Area
- Project Component
- Railway
- Road
- Watercourse

Pacific NorthWest LNG
Archaeological and Heritage Resources Local Assessment Area and Regional Assessment Area
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Sources: Government of British Columbia; Government of Canada, Natural Resources Canada, Centre for Topographic Information; Progress Energy Canada Ltd.; Millennia; WorldView-2 Imagery, Imagery date: 2011.

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

DATE: 12-NOV-14
 FIGURE ID: 123110537-454
 DRAWN BY: K. POLL

PROJECTION: UTM - ZONE 9
 DATUM: NAD 83
 CHECKED BY: A. GALLACHER

PREPARED BY:

PREPARED FOR:

FIGURE NO:
20-1