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File:	123220406	Date:	December 22, 2016

Reference: Wyndwood Expansion Project – Project Development Area Amendment

1 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was contracted by Westcoast Energy Inc., doing business as Spectra Energy Transmission (Westcoast), to prepare the environmental and socio-economic assessment (ESA) for the proposed Wyndwood Expansion Project (the Project; NEB filing A80172) that meets the requirements of the National Energy Board (NEB) Filing Manual, 2016-01 (NEB Filing Manual; NEB 2016). The Project is located in the Peace River Regional District (PRRD) approximately 15 kilometres (km) west of Chetwynd, British Columbia (BC). The Project originally consisted of the construction and operation of an approximately 28 km pipeline loop segment consisting of 914 mm (Nominal Pipe Size [NPS] 36) outside diameter (OD) natural gas buried pipeline looping the existing 762 mm (NPS 30) Fort St. John Mainline.

Since submission of the ESA to the NEB on October 21, 2016, the Project Development Area (PDA) and pipeline route have been modified (amended PDA). The pipeline route has decreased in total length from 28 km to 27 km, with the change being near the east end of the pipeline route. This memorandum has been prepared to support the existing ESA application and Westcoast's amendment application to the NEB. Specifically, this memorandum reports on results of previous baseline field programs applicable to the amended PDA, and describes potential changes to the ESA as a result of the amended PDA. Appendix A shows the Project overview (Figure 1-1) and the amended PDA in relation to the original PDA (Figure 1-2). The Environmental Protection Plan (EPP; Appendix A of the ESA) and Caribou Habitat Restoration Plan (CHRP) already encompass the works proposed within this memorandum.

The amended PDA is the physical footprint of the Project is 167.5 ha. The PDA is the physical footprint of the Project and includes:

- 20 to 35 m wide permanent Right of Way (ROW)
- 20 to 60 m wide intermittent Temporary Work Space (TWS)

Baseline field programs for wildlife, vegetation, fisheries, air quality, noise, soils, and archaeology were conducted in 2015 and 2016 to support the ESA for the Project. During the preparation of the ESA, Westcoast designed the proposed Project route around three residents' properties in an effort to mitigate concerns raised with Westcoast's original route. Since filing the ESA, Westcoast has now entered into agreements to purchase two of the properties and acquire a statutory ROW in respect of the third property. As a result, Westcoast has reverted to its original plan to construct the Project contiguous to the existing Fort St. John Mainline in the location in question. These amendment areas will decrease the overall length of the loop by approximately one km, but increase the clearing requirements by 2.4 ha, as part of the original PDA had historically been cleared.

Reference: Wyndwood Expansion Project – Project Development Area Amendment

2 STUDY AREA AND OVERVIEW

The study area overlaps cultivated land, industrial developments, various settlements, and forested, riparian, and wetland habitats within Crown and private lands. The Project footprint will be reduced from 170.9 ha to 167.5 ha, consisting of 100.1 ha of Crown land and 67.4 ha of private land. The dominant land use that overlaps the proposed pipeline is agriculture; 12.2 km occurs within the Agricultural Land Reserve (ALR) and 11.8 km occurs within private land, which includes industrial and various residential settlements. Baseline data that includes the proposed amendment areas is provided in Appendix B of the ESA submitted to the NEB under NEB filing A80172. No new fieldwork was required in support of the amendment as the area was included in field programs carried out for the ESA. The local assessment areas (LAA) and regional assessment areas (RAA) used for the biophysical and socio-economic elements in the ESA include the proposed amendment areas.

Table 2-1 identifies the new approximate land clearing requirements for the Project. The existing cleared land is mainly associated with forestry and industrial activity.

Table 2-1 Approximate Land Clearing Requirements for the Project

Project Feature	Land Requirements (ha)		Total Footprint ² (ha)
	New Clearing ¹	Existing Clearing	
Pipeline Permanent ROW	41.2	21.2	62.4
Pipeline Temporary Workspace and Log Decks	52.2	42.7	94.9
Access Roads	0.0	10.2	10.2
Total²	93.5	74.1	167.5
NOTES:			
¹ New clearing includes greenfield areas with limited existing vegetation removal and includes all merchantable and non-merchantable timber.			
² May not sum due to rounding.			

3 RESULTS

The baseline conditions for each biophysical and socio-economic element identified through previous field programs and through desktop analysis are summarized in Table 3-1. Figure 1-2, Appendix A, identifies field survey locations within the vicinity of the amended PDA.

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 3-1 Biophysical or Socio Economic Existing Conditions

Biophysical or Socio-economic Element	Description of Existing Conditions
Air Quality	The air quality in the region surrounding the amended PDA is typical of a rural area. Refer to the baseline discussion in the ESA for further information.
Greenhouse Gas (GHG) Emissions	GHG emissions disperse well in the atmosphere and therefore are not limited to a regional or local assessment area. Refer to the baseline discussion in the ESA for further information.
Acoustic Environment	The acoustic environment in the region surrounding the amended PDA is typical of a rural area. Refer to the baseline discussion in the ESA for further information.
Soil and Soil Productivity	The amended PDA is located in an area of moderately well to well drained soils. The soils in the study area are loamy clay, with areas of steep to extreme slopes and shallow bedrock. The amended PDA is largely located in areas where the water erosion risk is severe low to moderate, and the wind erosion risk is moderate. The compaction and rutting risk is low to moderate.
Fish and Fish Habitat	The amended PDA will cross two new watercourse crossings, P-43 and P-45. Both watercourses are non-fish bearing and classified as no watercourse evident (NWE). Construction activities also have the potential to interact with watercourses A-9, P-40, P-42, and P-47.
Vegetation and Wetlands	The terrain is largely in the lowlands of the Rocky Mountain Foothills and within the incised valleys near the Pine River. The entire Project footprint lies within the Moist Warm Boreal White and Black Spruce (BWBSmw) biogeoclimatic subzone. Forests in the BWBSmw are often dominated by trembling aspen (<i>Populus tremuloides</i>) and lodgepole pine (<i>Pinus contorta</i>), with white spruce (<i>Picea glauca</i>) as the dominant climax species. Wetter upland sites with rich soils are generally dominated by balsam poplar (<i>Populus balsamifera</i>) or white spruce, with black spruce (<i>Picea mariana</i>) the dominant tree species at lowland sites on poorer soils with a thick organic layer. Several Terrestrial Ecosystem Mapping and rare plant plots were completed in the adjacent native forest area (Appendix A, Figure 1-2). No wetlands were observed. No rare plants were observed. There were several mapped weed locations near or within the amended PDA (Appendix A, Figure 1-2).
Wildlife and Wildlife Habitat	The amended PDA is located within forested and disturbed habitats potentially suitable for the following focus species: grizzly bear, black bear, moose, American marten, fisher, short-eared owl, common nighthawk, and Canada warbler. The amended PDA is located within the Burnt Pine caribou herd range, and the Moberly and Hart Grizzly Bear Population Units (GBPU). There are no wildlife features identified within the amended PDA.
Heritage Resources	An archaeological study was not completed on the amended PDA.
Land and Resource Use	The amended PDA is located within the Dawson Creek Land and Resource Management Plan planning area, the Peace Northern Caribou Plan area, and the Dawson Creek Timber Supply Area of the Peace River Forest District. It overlaps with Crown land tenure and ALR. The amended PDA does not overlap with any mineral or range tenures, parks or protected areas.

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 3-1 Biophysical or Socio Economic Existing Conditions

Biophysical or Socio-economic Element	Description of Existing Conditions
Navigable Waters	The Project intersects 59 mapped watercourses, of which 39 have been determined unnavigable based on their classification (i.e., non-classified drainage, NWE, wetland or existing access). The two additional watercourses that the amended PDA crosses are unnavigable based on their classification.
Employment and Economy, Infrastructure and Services	The amended PDA is located within the PRRD Electoral Area C and E, which is closest in proximity to the District of Chetwynd, approximately 15 km away. The pipeline loop runs parallel to the Pine River and Highway 97. The total population of PRRD C in 2011 was 6,390 and in PRRD E in 2011 was 2,764.

A total of 167.5 ha of land in the PDA will have soil stripped, graded, or excavated for the permanent ROW, access road, log deck, and intermittent TWS areas. This includes 63.7 ha within previously disturbed areas (pipelines, railways, existing oil and gas facilities or access roads). Total disturbance in ALR is 69.3 ha, with 41.3 ha of new soil disturbance. Table 3-2 presents a summary of the soil disturbance in the PDA.

Table 3-2 Areas of Soil Disturbance in the Project Development Area

Project Feature	New Soil Disturbance Area			Existing Soil Disturbance Area¹			Total Disturbance		
	Non-ALR (ha)	ALR (ha)	Total (ha)	Non-ALR (ha)	ALR (ha)	Total (ha)	Non-ALR (ha)	ALR (ha)	Total (ha)
Permanent ROW	13.2	8.3	21.5	23.7	17.2	40.9	36.9	25.5	62.4
Log Deck	3.1	2.0	5.1	0.1	0.5	0.6	3.2	2.5	5.7
TWS ²	46.2	31.0	77.2	11.9	10.3	22.2	58.1	41.3	99.4
Grand Total ³	62.5	41.3	103.8	35.7	28.0	63.7	98.2	69.3	167.5

NOTES:

- ¹ Existing soil disturbance area includes disturbance from oil and gas facilities and buildings, active and abandoned pipeline ROWs, primary and secondary roads, and railways. It does not include areas cleared for cutlines, cutblocks or trails, where limited soil disturbance is assumed.
- ² Includes soil storage areas and additional workspaces, TWS intermittent along proposed pipeline.
- ³ Values in column may not appear to sum to this total due to rounding.

Two new watercourse crossings were identified in the amended PDA; P-43 and P-45. Table 3-3 presents a summary of these two watercourses. These watercourses fall within the LAA for the ESA and were identified and assessed during the 2015-2016 field programs.

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 3-3 Watercourse Crossing Location and Stream Class

Crossing No.	Watercourse Name	Fish-bearing	Stream Class	Mean Channel Width ¹ (m)	Pipeline Crossing Coordinates	
					Latitude	Longitude
P-43	Tributary to Pine River	No	NWE ¹	-	55.61785	-121.86198
P-45	Tributary to Pine River	No	NWE ¹	-	55.618208	-121.85514
NOTE: ¹ These drainages are not considered watercourses, do not provide fish habitat, and are not further assessed.						

P-102, P-101 and P-100, all non-fish bearing watercourses, no longer fall within the PDA and therefore will not interact with the Project.

4 ASSESSMENT

Table 4-1 provides a list of each element in the ESA and indicates which ones have interactions with the proposed amendment areas, as well as whether its inclusion would have any change to the original overall assessment.

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 4-1 Interactions of Biophysical and Socio-economic Elements with the Proposed Amendment

Biophysical or Socio-economic Element	Amendment Interacts with Element (Y/N)	Summary of Assessment Finding	Change to Original Assessment (Y/N)
Physical and Meteorological Environment	Y	The amended PDA will not substantially alter the physical or meteorological environment. No change is expected to the original assessment findings.	N
Air Emissions	Y	The area of the amended PDA will reduce the overall pipeline length and is negligible in comparison to the Project, so construction of the amended PDA is not expected to substantially change Criteria Air Contaminants emissions associated with construction equipment operation and land clearing as presented in the ESA.	N
GHG Emissions	Y	As the overall length of the pipeline is decreasing, no change is expected to occur with the GHG emissions presented in the ESA due to construction equipment operation and land clearing.	N
Acoustic Environment	Y	Due to the small size of the amended PDA, the overall decrease of the pipeline length, and with the implementation of mitigations previously identified in the EPP, no change is expected to the original assessment on the acoustic environment.	N
Soil and Soil Productivity	Y	There will be a decreased soil disturbance area where residual effects (decreased soil productivity due to wind and water erosion, compaction or rutting) may occur within the Soil Assessment Area, for a revised total new disturbance of 103.8 ha for the Project. Under the original PDA, total new disturbance was 104.3 ha. With the implementation of the mitigation measures described in Table 7-4 of the ESA, and the mitigation measures in the EPP, there are no residual effects predicted on soil productivity as a result of the amended PDA.	N
Water Quality and Quantity	Y	With implementation of standard mitigation measures and Best Management Practices, construction of the amended PDA is not expected to cause changes to water quality or quantity in the two additional watercourse crossings identified along the pipeline route.	N

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 4-1 Interactions of Biophysical and Socio-economic Elements with the Proposed Amendment

Biophysical or Socio-economic Element	Amendment Interacts with Element (Y/N)	Summary of Assessment Finding	Change to Original Assessment (Y/N)
Fish and Fish Habitat	Y	Two watercourses not identified in the ESA will be crossed by the amended PDA (Appendix A, Figure 1-2); P-43 and P-45. No additional overall clearing is required within the Riparian Management Area of the two additional watercourse crossings identified within the amended PDA. Both such watercourses were identified as NWE and will not require an Approval Application for Changes In and About a Stream under section 11 of BC's <i>Water Sustainability Act</i> . Effects on riparian vegetation will be limited with implementation of standard mitigation measures and Best Management Practices. Disturbance will be limited to the amended PDA.	N
Vegetation and Wetlands	Y	The amended PDA route intersects with a small amount of mature mixed forest, but does not intersect with plant species of interest or ecological communities of concern. As a result, no residual effects are predicted to occur for change in abundance of plant species of interest. There is a negligible residual effect of change in abundance of ecological communities of interest resulting from a temporary, reversible loss of old forest. There are no wetlands located in the study area for the amended PDA and therefore no residual effects are predicted to occur for changes in wetland function. Therefore, there is no change to the findings of the ESA.	N
Wildlife and Wildlife Habitat	Y	Due to the small change in area and overlap with disturbed habitats and similar habitat types to the original PDA, the amended PDA is not expected to result in a change in habitat availability, change in movement patterns, or change in mortality risk that is not already captured in the ESA. With implementation of mitigation measures committed to in the ESA, EPP, and CHRP, the amended PDA will not change the findings of the original assessment on wildlife and wildlife habitat.	N
Species at Risk or Species of Special Status and Related Habitat	Y	Due to the small size of the amended PDA, and with the implementation of mitigation measures identified in the ESA, EPP, and CHRP, no changes to the findings of the original assessment for Species at Risk is expected.	N

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 4-1 Interactions of Biophysical and Socio-economic Elements with the Proposed Amendment

Biophysical or Socio-economic Element	Amendment Interacts with Element (Y/N)	Summary of Assessment Finding	Change to Original Assessment (Y/N)
Human Occupancy and Resource Use	Y	The area proposed for the amended PDA construction was included within the LAA used to assess effects of the Project on land and resource use, so it has already been assessed. Therefore, no change is expected to the original assessment.	N
Heritage Resources	Y	An archaeological study was not completed for the amended PDA. Landsong Heritage Consulting Ltd. will complete a desktop study in January 2017, and, if required, field surveys will be conducted in spring 2017.	N
Traditional Land and Resource Use	Y	Due to the small size of the amended area, and overall decrease in the pipeline length, no change is expected to the original assessment findings for traditional land and resource use.	N
Social and Cultural Well-being	N	Not Applicable.	N
Human Health and Aesthetics	Y	Due to the small size of the amended area, and overall decrease in the pipeline length, no change is expected to the original assessment findings for human health and aesthetics.	N
Infrastructure and Services	Y	The amendment to the PDA will not change the peak workforce (400 workers) used to assess effects on community infrastructure and services. Therefore, no change is expected to the original assessment findings for infrastructure and services.	N
Navigation and Navigation Safety	N	Not Applicable.	N
Employment and Economy	Y	Construction expenditures for the amended PDA will be minor compared to overall construction costs (estimated at \$170 million), and will therefore not result in a change to the findings of the original assessment of employment and economy.	N

Reference: Wyndwood Expansion Project – Project Development Area Amendment

Table 4-1 Interactions of Biophysical and Socio-economic Elements with the Proposed Amendment

Biophysical or Socio-economic Element	Amendment Interacts with Element (Y/N)	Summary of Assessment Finding	Change to Original Assessment (Y/N)
Accidents and Malfunctions	Y	Construction and use will not change the original assessment findings with the proposed mitigation measures and implementation of Best Management Practices identified in the EPP.	N
Effects of the Environment on the Project	Y	Due to the small size of and change associated with the amended PDA, no change is expected to the original assessment findings for effects of the environment on the project with the implementation of the mitigation measures identified in the EPP.	N

Reference: Wyndwood Expansion Project – Project Development Area Amendment

5 CONCLUSION

This memorandum has been prepared to support Westcoast's amended application to the NEB, and assessed the potential interactions between the proposed amendment and components of the biophysical and socio-economic environment. This assessment has determined that the adverse environmental and socio-economic effects associated with the Project amendment will not be significant with the standard environmental protection measures originally proposed in the ESA, the EPP and the CHRP. Based on this assessment, the environmental and socio-economic effects of the Project amendment are not expected to change from those presented in the ESA.

Westcoast's Environmental Manual for Construction Projects in Canada (Spectra 2014) outlines environmental policies and procedures for construction and operation of its federally regulated projects in Canada. In addition, implementation of the mitigation measures presented in the ESA, the EPP, the CHRP, and involvement in the design and planning of the Project by environmental specialists (including consultants), as well as periodic inspection of the Project will help to maintain compliance with Westcoast's environmental commitments and limit the potential for adverse environmental effects.

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Attachment: Appendix A Figures

IL/KM/dsc

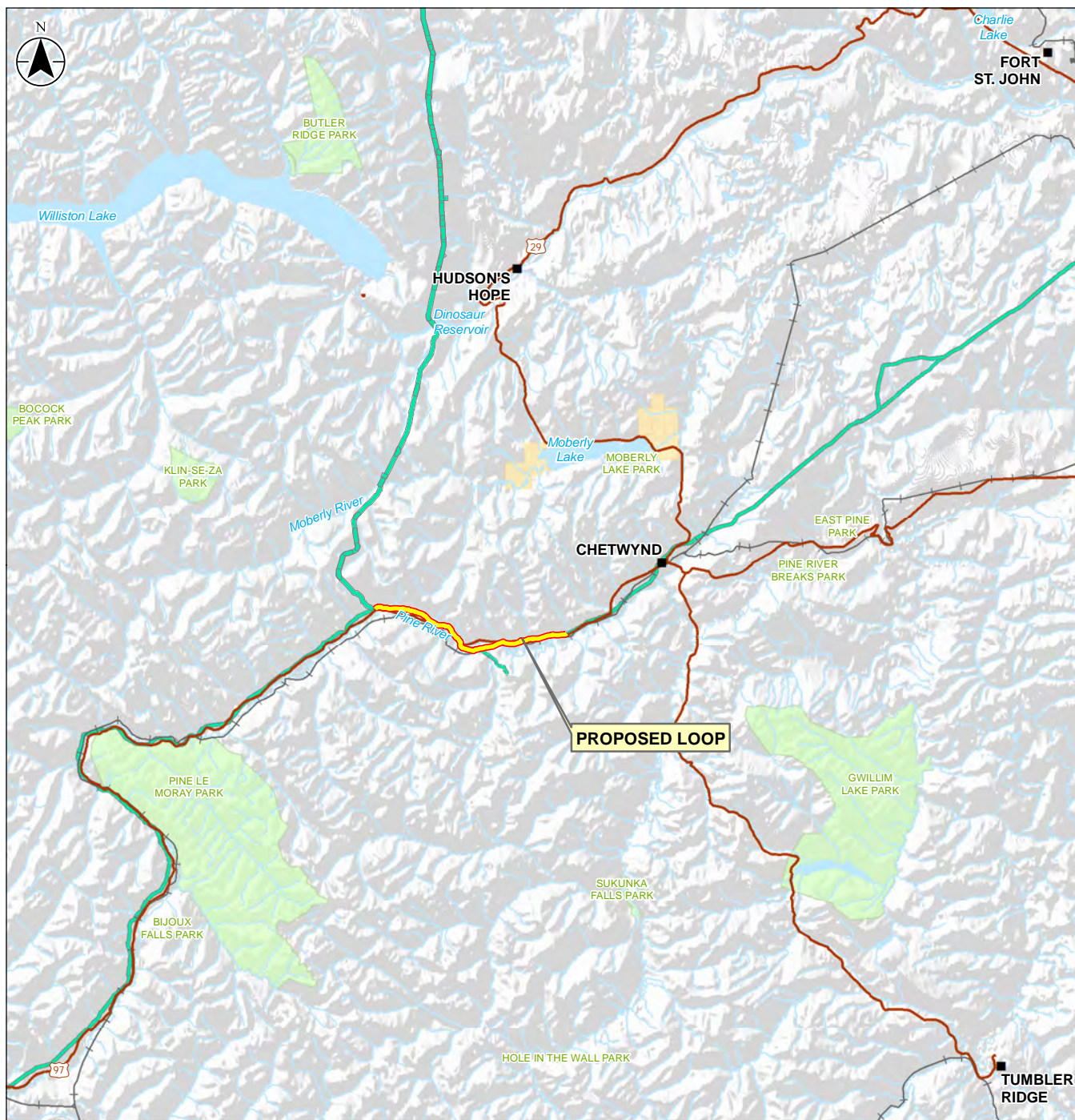
Reference: Wyndwood Expansion Project – Project Development Area Amendment

6 REFERENCES

Spectra Energy Transmission (Spectra). 2014. Environmental Manual for Construction Projects in Canada (EMCPC), 3rd Edition. Revised March 2015.

APPENDIX A

FIGURES



- City or Town
- Highway
- Railway
- Watercourse
- Existing Right of Way
- Waterbody
- First Nation Reserve
- Park, Protected Area, Ecological Reserve or Conservancy
- Proposed Loop



Stantec **Spectra Energy**

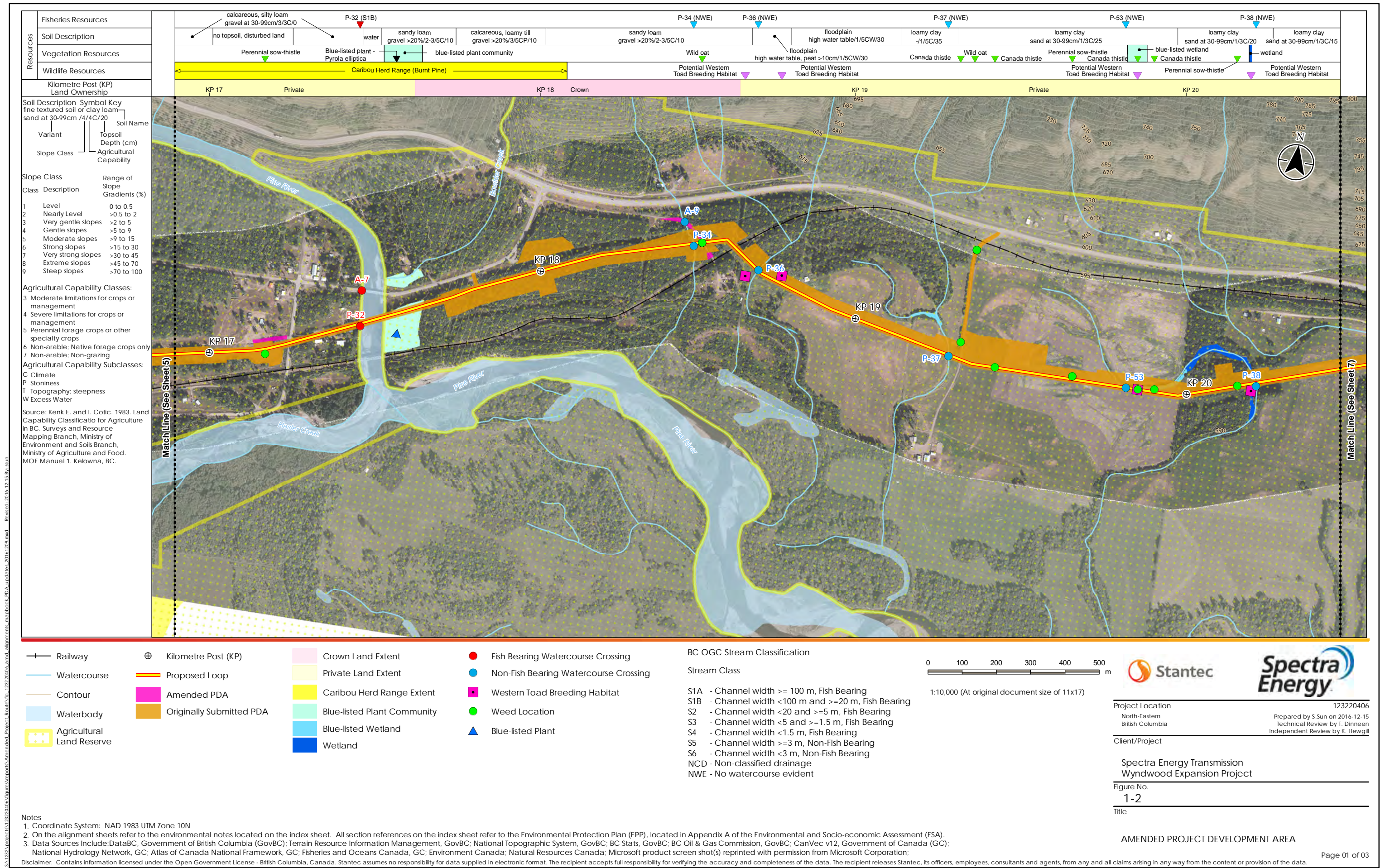
Project Location: North-Eastern British Columbia
 Prepared by: T. Dinneen on 2016-12-14
 Technical Review by: I. Levitt on 2016-12-14
 Independent Review by: K. Hewgill on 2016-12-14

Client/Project: Spectra Energy Transmission Wyndwood Expansion Project

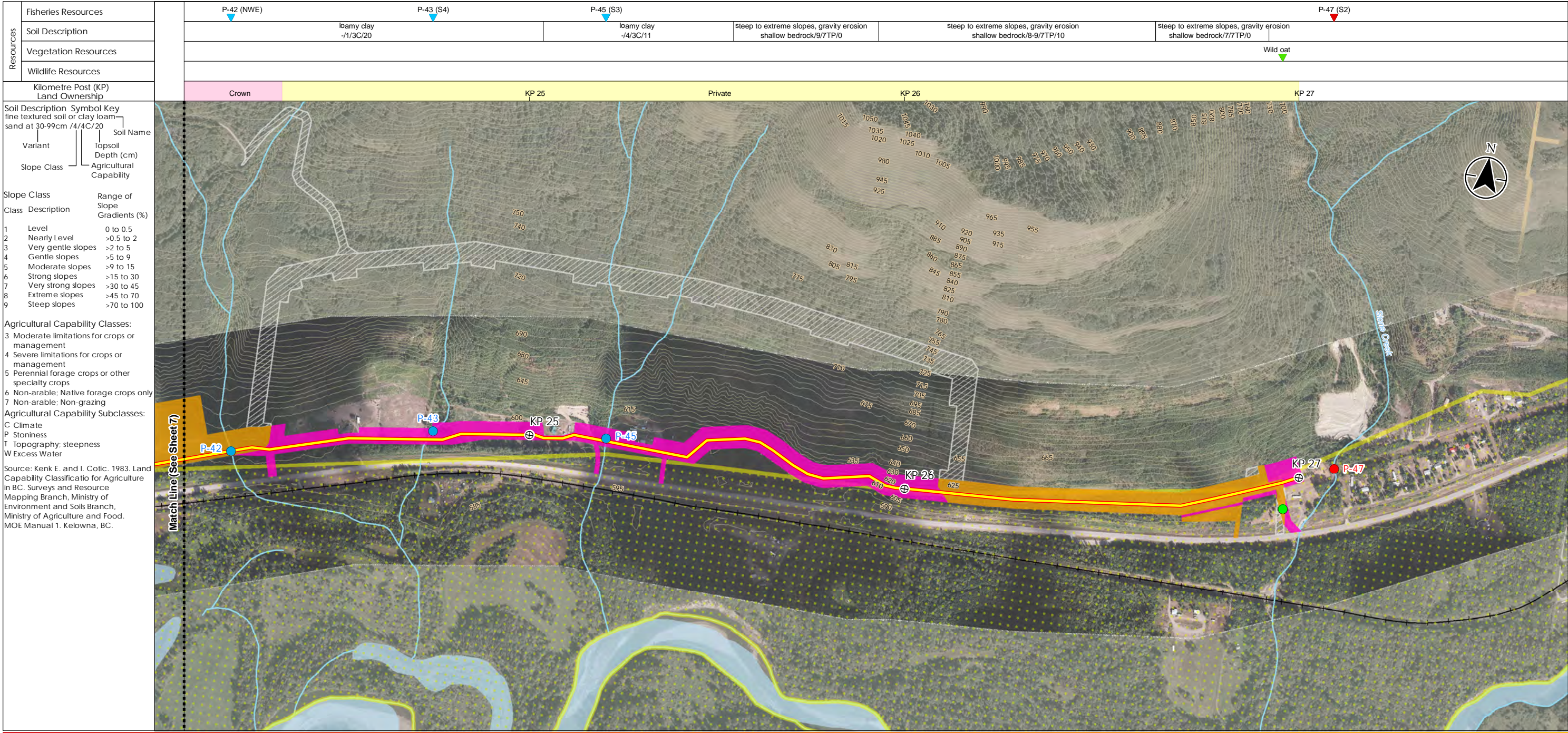
Figure No.
1-1
 Title

Wyndwood Expansion Project
 Overview Map

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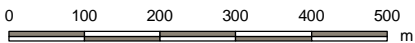
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BC OGC Stream Classification

Stream Class

- S1A - Channel width ≥ 100 m, Fish Bearing
S1B - Channel width < 100 m and ≥ 20 m, Fish Bearing
S2 - Channel width < 20 and ≥ 5 m, Fish Bearing
S3 - Channel width < 5 and ≥ 1.5 m, Fish Bearing
S4 - Channel width < 1.5 m, Fish Bearing
S5 - Channel width ≥ 3 m, Non-Fish Bearing
S6 - Channel width < 3 m, Non-Fish Bearing
NCD - Non-classified drainage
NWE - No watercourse evident



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Project Location	North-Eastern British Columbia	123220406
Client/Project	Spectra Energy Transmission Wyndwood Expansion Project	
Figure No.	1-2	
Title	AMENDED PROJECT DEVELOPMENT AREA	

Notes

- Coordinate System: NAD 1983 UTM Zone 10N
- On the alignment sheets refer to the environmental notes located on the index sheet. All section references on the index sheet refer to the Environmental Protection Plan (EPP), located in Appendix A of the Environmental and Socio-economic Assessment (ESA).
- Data Sources Include: DataBC, Government of British Columbia (GovBC); Terrain Resource Information Management, GovBC; National Topographic System, GovBC; BC Stats, GovBC; BC Oil & Gas Commission, GovBC; CanVec v12, Government of Canada (GC); National Hydrology Network, GC; Atlas of Canada National Framework, GC; Fisheries and Oceans Canada, GC; Environment Canada; Natural Resources Canada; Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation;

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