APPENDIX F

TFO Environmental and Socio-Economic Overview

ALTALINK

Land Impact Assessment

for the Red Deer Area Transmission Development

Revision 2

Presented to the

Alberta Electric System Operator (AESO)

in Support of the AESO Need Identification Document

Date: April 27, 2011

EXECUTIVE SUMMARY

The intent of this Land Impact Assessment (LIA) is for the transmission facility owner (TFO), AltaLink Management Ltd. (AltaLink), to provide the Alberta Electric System Operator (AESO) with the land impact information it requires for the Need Identification Document developed for the Red Deer Area Transmission Development (RATD). The LIA assessment process is driven by the major aspects of Alberta Utilities Commission (AUC) Rule 007, Section 6, NID 12 (i.e., agricultural impact, residential impact, environmental impact, electrical considerations, visual impact and special constraints), with the exception of cost, which is an aspect dealt with by the AESO. The LIA focuses on those aspects and considerations for which indicators of impact could be developed based on information currently available.

Two alternatives were identified by the AESO for RATD. AltaLink used a qualitative approach for assessing the potential land impacts associated with RATD because this method allows a comparison between alternatives when they are located within the same geographic area. The additional effort and cost to conduct a quantitative comparison will not change or improve the overall conclusions.

Overall, from a potential land impact perspective, both alternatives have potential to traverse a similar landscape, and there are no factors that preclude either alternative.

To evaluate the potential land impacts of Alternative 1 and Alternative 2, the following development was considered:

- Alternative 1 proposes:
    - Rebuild[1] approximately 240 km of existing 138 kV lines and build approximately 20km of new 138 kV line; and
    - construction of one new substation.

[1] Rebuild refers to the replacement of existing lines through the salvage and new build of an existing facility. The AESO does not identify locations of proposed facilities. At the Facility Application stage, the TFO will identify the proposed locations for facilities to be rebuilt, which may be in existing locations or in new locations.

- Alternative 2 proposes:
    - Rebuild[1] approximately 85 km of existing 138 kV lines; and
    - salvage of about 95 km of existing 138 kV lines;
    - three new substations.

Alternative 1 will result in a net increase of about 120 km of transmission line development as a result of the extensive rebuild of existing facilities proposed under this alternative. Alternative 2 would result in a net decrease of about 30 km of transmission line, and includes the salvage of (about 95 km) existing transmission line as a result of substation development proposed under this alternative. In consideration of line length and other aspects, Alternative 2 would result in the lowest overall impact.

In general:

- Both alternatives have the potential to traverse a similar landscape, and there are no factors that preclude either alternative.
- For both alternatives, rebuilds of existing facilities that occupy a diagonal alignment are assumed to be rebuilt on greenfield[2] quarter lines or road allowances to alleviate impacts to specific aspects such as agriculture. Diagonal alignments generally result in higher localized impacts that can be reduced through routing on quarter lines[3] or road allowances.
- In consideration of agricultural land use and land suitability, the potential for agricultural impact is higher for Alternative 1 due to the extent of cropland in the northeast and central portions of the Study Area; and due to higher land suitability at the north end of the Study Area. Due to an overall reduction in line length, Alternative 2 has fewer potential land impacts to agricultural land use and capability.
- Impacts to agriculture increases by using greenfield quarter section lines, however the rebuild of transmission lines that exist on a diagonal alignment to a new alignment on quarter lines or in road allowances will have localized reductions in impacts (from existing facilities), especially where croplands are crossed.

[2] "Greenfield" – new facilities on new rights-of-way (ROW); "brownfield" – alterations to existing facilities.

[3] This assumption allows a longer line length to be considered for a conservative assessment of impacts in the LIA. The assumption is not intended to limit or constrain the use of diagonals segments during route development at the Facility Application stage, as in specific situations a diagonal alignment could result in a lower overall impact location for a new transmission line.

- The potential for residential and visual impacts is lower for Alternative 2 due to the net reduction in transmission line. Additionally, the proposed salvage of lines in Alternate 2 would have a localized positive land impact in terms of residential and visual impact, through the removal (salvage) of transmission lines.

- The potential for environmental impact associated with the proposed developments is higher for Alternative 1 due to the presence of an important bird area and lakes in the north. Alternative 2 proposes a net reduction in transmission line length, thus having fewer potential environmental impacts than Alternative 1. Localized positive effects (i.e., reduction of bird collisions) would be greater for Alternative 2 as there would be an overall reduction in the amount of transmission line in the area.

- The proposed salvage of existing transmission lines (716L and sections of 80L) that are on a diagonal alignment and those not on quarter lines or in road allowances would have localized positive effect in terms of agriculture, residential, visual and native prairie. The salvage of sections of 80L and 716L (under Alternative 2) along the Highway 2 corridor would result in a reduction of existing impacts to residential and country residential areas that occur in this area.

- The salvage of 716L (under Alternative 2) would reduce the potential impact to the existing land use of federal lands presently hosting the facility.

- In terms of the proposed new substations, the majority of potential impacts are agricultural, residential, and environmental.

- In consideration of proposed transmission development in the area and the characteristics of the Study Area, Alternative 2 would result in a lower impact to the Study Area as less overall transmission development would result.

Land Impact Assessments do not provide an analysis of specific routes, but discuss the potential impacts of future routing that may occur in a specific geographic area. The impacts associated with specific routes, and substation locations, are considered at the Facility Application stage.

ACRONYMS

AESO	Alberta Electric System Operator
AUC	Alberta Utilities Commission
CB	Citizen Band
EMF	Electromagnetic Field
ESA	Environmentally Significant Area
kV	Kilovolt
HRO	Historical Resources Overview
HRV	Historic Resource Value
LIA	Land Impact Assessment
NID	Need Identification Document
RATD	Red Deer Area Transmission Development
RDA	Restricted Development Area
RFI	Radio Frequency Interference
ROW	Rights-of-Way
TFO	Transmission Facility Owner

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1. INTRODUCTION

1.1 Background

The AESO is responsible for the safe, reliable, and economic planning and operation of the transmission system within the province of Alberta. AltaLink is responsible for siting, constructing, connecting, and operating new transmission facilities within their operating area as assigned by the AESO. Currently, AltaLink maintains and operates approximately 11,800 km of transmission line and 270 substations in Alberta.

The AESO has requested that AltaLink provide a Land Impact Assessment for the proposed Red Deer Area Transmission Development.

This LIA discusses the potential land impacts of RATD, all of which occur within the AltaLink service territory. This LIA focuses on the potential land impacts of the RATD in the context of AUC Rule 007, Section 6, and the scope of alternatives provided by the AESO, with the exception of cost, an aspect which is dealt with by the AESO. The LIA does not provide an analysis of specific routes, but discusses the comparative potential impacts of future routing that may occur in a specific geographic area. The impacts associated with specific routes are considered at the Facility Application stage.

1.2 Study Area

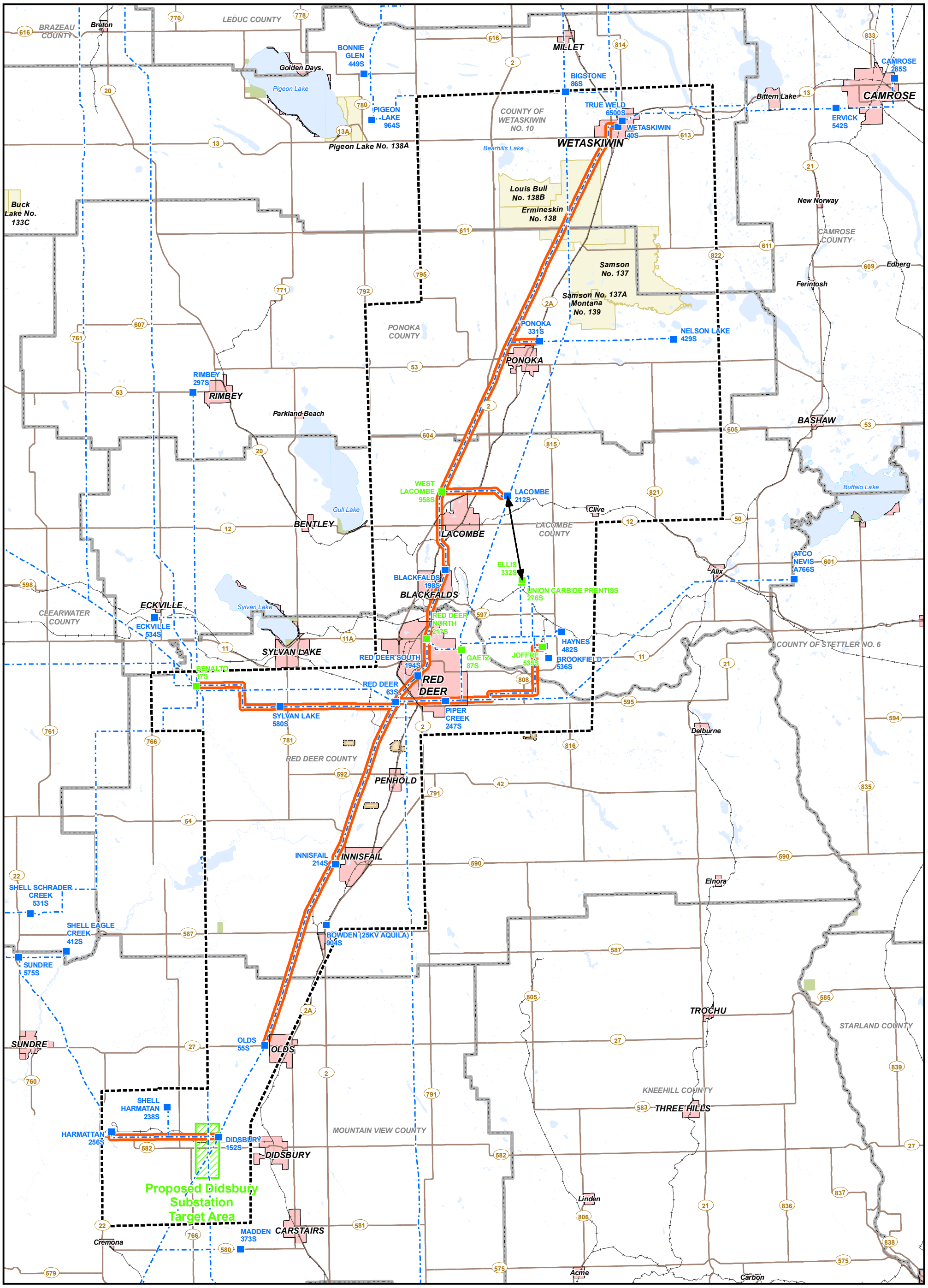
The Study Area is located in central Alberta, extending north and south of the City of Red Deer, encompassing portions of the following counties: Westaskiwin, Ponoka, Lacombe, Red Deer, and Mountain View. Figures LIA1-A1 and LIA1-A2 provide a general representation of the existing facilities affected by the developments under Alternative 1 and Alternative 2, respectively. The Study Area is representative of the area in which the developments under both alternatives will likely occur. The Study Area serves as a spatial basis for the qualitative assessment of the land impacts associated with RATD developments.

1.3 RATD Developments

The AESO provided two alternatives for RATD (see tables 1 and 2, and figures LIA1-A2 and LIA1-A2). Those developments which do not have the potential to have a land impact are noted and not carried forward for assessment. The approximated line length is a conservative estimate, considering the longest expected potential route[4]; Tables 1 and 2 display existing line lengths

[4] Route lengths were calculated as described under 1.4.1.1.

and potential new line lengths that may result from each alternative. The system alternatives will be assessed for system reliability by the AESO.



LEGEND

- Proposed Substation Upgrade
- Transmission Line Connects These Two Substations
- Proposed Transmission Line Requiring Rebuild
- Proposed Substation Target Area
- Study Area
- Existing Substation
- Existing Transmission Line
- Railway
- Road
- First Nations Reserve
- Military Base
- Municipal or County Boundary
- Park
- Urban Area
- Water Body

NO.:
DRAWN:AS/RN/MD - ST
FILE NO.: 123510290-001
REVISION: 3
DATE: 2011-04-27
AL FOLDER: Red Deer

N

0 5 10 15 Kilometres
0 5 10 Miles

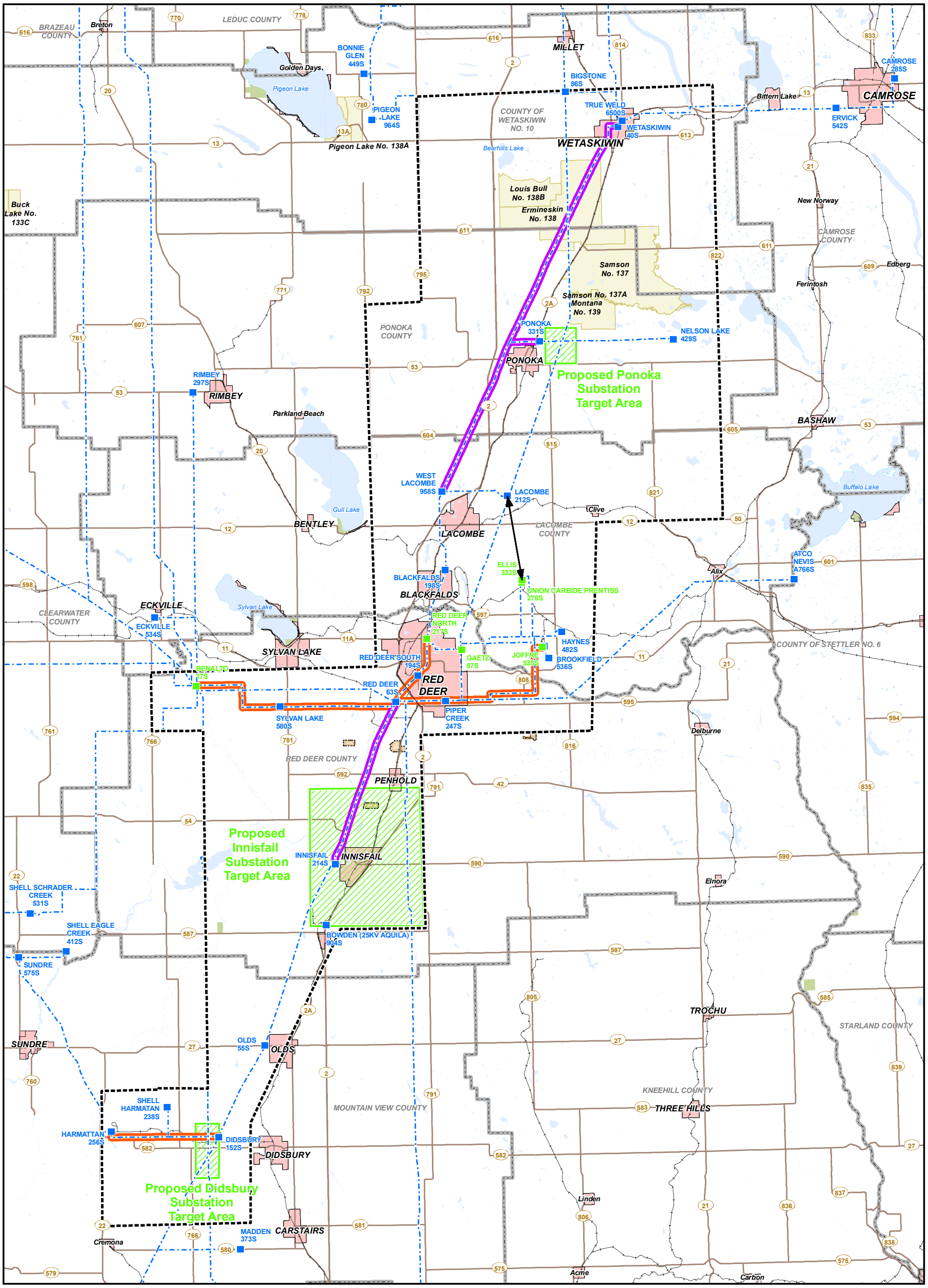
Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

LAND IMPACT ASSESSMENT

ALTALINK LIA1-A1

Red Deer Transmission Development

Alternative #1



LEGEND

- Proposed Substation Upgrade
- Transmission Line Connects These Two Substations
- Proposed Transmission Line Requiring Rebuild
- Proposed Transmission Line Salvage
- Proposed Substation Target Area
- Study Area
- Existing Substation
- Existing Transmission Line
- Railway
- Road
- First Nations Reserve
- Military Base
- Municipal or County Boundary
- Park
- Urban Area
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NO.:
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0 5 10 15 Kilometres
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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.

LAND IMPACT ASSESSMENT

ALTALINK **LIA1-A2**

Red Deer Transmission Development

Alternative #2

Table 1: Summary of Red Deer Area Transmission Development Alternative #1

Development	Existing Line Length to be Removed	New Line Length	Net Change in Line Length
Development at Existing Substations[5]			
Split existing 138 kV 768L and 778L transmission lines; modifications to Red Deer North 217S and Gaetz 87S[6]	N/A	N/A	N/A
New autotransformer at Benalto 17S[6]	N/A	N/A	N/A
New 50MVAR 138 kV cap bank at Joffre 535S[6]	N/A	N/A	N/A
New 50MVAR 138 kV cap bank at Prentiss 276S[6]	N/A	N/A	N/A
New 25MVAR 138 kV cap bank at Ellis 332S[6]	N/A	N/A	N/A
Upgrading West Lacombe 958S	N/A	N/A	N/A
138 kV Transmission Line Developments			
Rebuild 716L between Ponoka 331S and Wetaskiwin 40S	40 km	60 km	20 km
Rebuild 80L between Blackfalds 198S and West Lacombe 958S	12 km	20 km	8 km
Rebuild 80AL between Lacombe 212S and West Lacombe 958S	10 km	15 km	5 km
Rebuild 80L between Blackfalds 198S and Red Deer North 217S	10 km	15 km	5 km
Rebuild 80L between Red Deer South 194S and Red Deer North 217S[6, 7]	6 km	6 km	0 km
Rebuild 80L between Red Deer South 194S and Red Deer 63S[6,7]	6 km	6 km	0 km
Rebuild 755L between Red Deer 63S, Piper Creek 247S and Joffre 535S[6]	28 km	50 km	22 km
Rebuild 80L between Ponoka 331S and West Lacombe 958S	28 km	50 km	22 km
Rebuild 80L between Red Deer 63S and Olds 55S	53 km	70 km	17 km

[5] Indicates brownfield development that is not expected to result in land impacts; these developments are not considered further in this assessment.

[6] Common to Alternative 2.

[7] For the purpose of this LIA, rebuilds in urban areas are assumed to occur within proximity of their existing ROW; and are not further assessed. The final alignment will be determined at the Facility Application stage.

Rebuild 637L/648L from Red Deer 63S to Sylvan Lake to Benalto 17S[6]	30 km	30 km	0 km
Rebuild 166L between Didsbury 152S and Harmattan 256S[6]	16 km	20 km	4 km
Build a new line from Lacombe 212S to Ellis 332S[6]	0 km	20 km	20 km
Salvage of Existing 138 kV Transmission Lines			
N/A	0	0	0
New 240/138 kV Substations			
New substation in the Didsbury (Johnson 281S) area[6]	N/A	N/A	N/A
Total km of existing line length to be removed	***240 km**		
Total km of new transmission line length		***360 km**	
Total km of transmission line length change			***120 km**
Total km of transmission line salvage	***0 km**		

* Total km have been rounded to nearest 5 km

Table 2: Summary of Red Deer Area Transmission Development Alternative #2

Development	Existing Line Length to be Removed	New Line Length	Net Change in Line Length
Development at Existing Substations[8]			
Split existing 138 kV 768L and 778L transmission lines; modifications to Red Deer North 217S and Gaetz 87S[9]	N/A	N/A	N/A
New Autotransformer at Benalto 17S[9]	N/A	N/A	N/A
New 50MVAR 138 kV cap bank at Joffre 535S[9]	N/A	N/A	N/A
New 50MVAR 138 kV cap bank at Prentiss 276S[9]	N/A	N/A	N/A
New 25MVAR 138 kV cap bank at Ellis 332S[9]	N/A	N/A	N/A
138 kV Transmission Line Developments			
Rebuild 80L between Red Deer South 194S and Red Deer North 217S[9, 10]	6 km	6 km	0 km
Rebuild 80L between Red Deer South 194S and Red Deer 63S[9, 10]	6 km	6 km	0 km
Rebuild 755L between Red Deer 63S, Piper Creek 247S and Joffre 535S[9]	28 km	50 km	22 km
Rebuild 637L/648L from Red Deer 63S to Sylvan Lake to Benalto 17S[9]	30 km	30 km	0 km
Rebuild 166L between Didsbury 152S and Harmattan 256S[9]	16 km	20 km	4 km
Build a new line from Lacombe 212S to Ellis 332S[9]	0 km	20 km	20 km
Salvage of Existing 138 kV Transmission Lines			
Salvage 80L from Ponoka 331S to West Lacombe 958S	30 km	0 km	(30) km
Salvage 80L from Red Deer 63S to Innisfail 214S	25 km	0 km	(25) km
Salvage 716L from Wetaskiwin 40S to Ponoka 331S	40 km	0 km	(40) km
New 240/138 kV Substations			
New substation in the Didsbury (Johnson 281S) area[9]	N/A	N/A	N/A

[8] Indicates brownfield development that is not expected to result in land impacts; these developments are not considered further in this assessment.

[9] Common to Alternative 1.

[10] For the purpose of this LIA, rebuilds in urban areas are assumed to occur within proximity of their existing ROW; and are not further assessed. The final alignment will be determined at the Facility Application stage.

New substation in the Ponoka (Wolf Creek 288S) area	N/A	N/A	N/A
New substation in the Innisfail (Hazelwood 287S) area[11]	0 km	20	20 km
Total km of existing line length to be removed	***180 km**		
Total km of new transmission line length	***150 km**		
Total km of transmission line length change	***(30) km**		
Total km of transmission line salvage	***95 km**		

* Total km have been rounded to nearest 5 km

[11] New line development is required to connect the new Innisfail substation.

1.4 Scope of the LIA

The scope of the LIA assesses the relative potential land impacts of the proposed RATD alternatives. A qualitative approach is used for assessing the potential impacts associated with each alternative. The relative comparison is primarily based on total line lengths of the transmission development and the nature of the landscape being crossed. The assessment assumes that transmission line developments will be sited on greenfield quarter section lines or road allowances. The rationale for this approach is described below in the context of each transmission facility scenario. The LIA makes the assumption that one of the two alternatives will be implemented. Existing transmission lines and selected base features (see figures LIA1-A1 and LIA1-A2) provide geographic context for RATD.

1.4.1 RATD Developments

1.4.1.1 138 kV transmission line developments and use of existing ROWs

The City of Red Deer and surrounding areas have high densities of both urban and country residential settlement patterns. It is possible that the majority of 138 kV developments associated with RATD will be replaced/placed on greenfield quarter section lines to reduce potential residential and visual impacts in areas of higher residential density.[12] It is also possible that 138 kV developments would use road allowances in areas of lower residential density to reduce potential agricultural impacts (ie., the areas between Wetaskiwin and Lacombe, and Penhold and Olds) that may result from quarter line development. For the purpose of this LIA, rebuilds in urban areas (common to both alternatives) are assumed to occur within proximity of their existing ROW; and are not further assessed. The final alignment will be determined at the Facility Application stage.

- For Alternative 1, the new 138 kV transmission lines proposed total about 360 km.
- For Alternative 2, the new 138 kV transmission lines proposed total about 150 km.

Rebuilds are assumed to be developed through the replacement of existing lines through the removal and new build of an existing facility. For RATD, where existing facilities occur on a diagonal alignment, it is assumed that these facilities will be rebuilt on new quarter lines or road allowances. Diagonal alignments generally result in higher localized impacts that can be

[12] In general, 138 kV transmission line development is not considered in LIAs because their relative impacts, when compared to larger 240 kV or 500 kV transmission lines, are low-level and common (i.e., 138 kV lines are typically sited in road allowances, have little associated land impact in a rural setting and, therefore, have negligible effect on the variation in land impact among the components). 138 kV line developments are considered for RATD as the lowest impact location for 138 kV developments may be on quarter lines due to residential settlement patterns in the Study Area.

reduced through routing on quarter lines or road allowances. In order to provide a conservative assessment, it is assumed that rebuild developments will be built on new ROWs that are likely be placed on quarter section lines or road allowances.[13]

The locations of the proposed transmission lines are unknown. Potential land impacts within the Study Area will be assessed based on the major aspects of Rule 007 that are applicable to RATD (i.e., agricultural impact, residential impact, environmental impact, electrical considerations, visual impact and special constraints).

1.4.1.2 Removal and salvage of existing 138 kV transmission lines

Both Alternative 1 and Alternative 2 involve the removal of existing transmission lines that are to be rebuilt (existing facilities will be replaced). Alternative 2 proposes the salvage of existing transmission lines, in addition to the replacement of existing facilities. Where salvage of an existing transmission line is proposed, a potential reduction to the existing land impact is presented through the removal of existing transmission lines. The proposed salvage of existing transmission lines that are on a diagonal alignment would have an increased localized reduction in land impacts to aspects such as agriculture. The total removal is approximately 240 km for Alternative 1, and 180 km (of which 95 km is salvage) for Alternative 2.

1.4.1.3 New 240/138 kV substations

New substations are part of both Alternatives. In Alternative 1, one new 240/138 kV substation in the Didsbury area, with associated 240 kV and 138 kV connections, is proposed. A specific location for this substation will be determined at the Facility Application stage. A substation target area is displayed on Figure LIA1-A2. The substation and associated 240 kV and 138 kV connection lines are assessed within that area.

In Alternative 2, three new 240/138 kV substations, Didsbury, Ponoka and Innisfail, with associated new 240 kV and 138 kV transmission connections, are proposed. Specific locations for these substations will be determined at the Facility Application stage. Substation target areas are displayed on Figure LIA1-A2.

The Didsbury and Ponoka substations, and associated 240 kV and 138 kV in-and-out connection lines are assessed within the substation target areas. The Innisfail substation 240 kV connections are assessed within the substation target area. Due to the length of new transmission line expected to connect the new substation, the 138 kV connections are assessed under new transmission lines in Section 1.4.1.1.

[13] This assumption allows a longer line length to be considered for a conservative assessment of impacts in the LIA. The assumption is not intended to limit or constrain the use of diagonals segments during route development at the Facility Application stage, as in specific situations a diagonal alignment could result in a lower overall impact location for a new transmission line.

2. LAND IMPACT ASSESSMENT PROCESS

2.1 LIA Methodology

The LIA process allows the AESO to consider the potential land impacts associated with RATD developments. The assessment process is driven by the major aspects of AUC Rule 007, Section 6, NID12. Agricultural impact, residential impact, environmental impact, electrical considerations, visual impact and special constraints are examined. Cost is an aspect addressed by the AESO. Associated with each major aspect are several specific considerations that are assessed in the LIA as per AUC Rule 007. However, these considerations in many cases (e.g., psychological impact, noise and TV interference, visual impact of tree removal, etc.) cannot be assessed in great detail until the Facility Application stage, when route and structure location and detailed design are undertaken by the TFO. The LIA focuses on those aspects and considerations that can be described using information currently available.

The following information was available for the Study Area and was used in the qualitative assessment of potential land impacts associated with RATD: general residential development (i.e., urban, rural, and country residential development); agricultural land use; agricultural land capability; surface water and wetlands; native grassland; parks, protected areas and Environmentally Significant Areas (ESAs); important bird areas; existing transmission lines and substations; and historical resources. Additionally, aerial photographs (2007 and 2008) were used in the assessment to confirm and supplement the aforementioned data where data was not available (see Table 3).

Table 3: Data Sets

Data Set	Source
Agriculture land use	Prairie Farm Rehabilitation Administration (PFRA) 2001, Western Grains Transition Payment Program (WGTPP) Generalized Landcover, Agriculture and Agri - Food Canada
Agricultural land capability	AGRASID 3.0 2007; Alberta Agriculture and Food, Agriculture Stewardship Division, Information and Program Management Branch 2008
Surface water and important bird areas	AltaLIS Ltd. 2001. 1:20,000 Base Features, Geographic Information System (GIS) Spatial Database, Scale 1:20,000. Calgary, Alberta Bird Studies Canada and The Canadian Nature Federation. 2004. Important Bird Areas of Canada Database. Port Rowan, Ontario: Bird Studies Canada
Data Set	**Source**

Native grassland	PFRA 2001, Western Grains Transition Payment Program (WGTPP) Generalized Landcover, Agriculture and Agri - Food Canada
Existing transmission lines	AltaLink Management Ltd.
Parks, protected areas, and ESAs	Alberta Tourism Parks and Recreation (ATPRC) 2008; Alberta Tourism Parks and Recreation (ATPRC) 2007 Fiera Biological Consulting, Environmentally Significant Areas Provincial Update 2009. Report prepared for: Resource Data Division, Alberta Environmental Protection. Edmonton, Alberta
Historical Resources	Alberta Culture and Community Spirit. 2009. Listing of Historic Resources March 2010 edition. Historic Resources Management Branch, Alberta Culture and Community Spirit. Edmonton, Alberta
Aerial photographs	Black & White; 2.5 m Spot Imagery 2007/2008

A description of each major aspect of AUC Rule 007 and associated considerations is presented in Section 2.2. An assessment of the proposed alternatives is provided in Section 2.3.

2.2 Major Aspects of AUC Rule 007

This section provides a description of the concerns related to the major aspects identified in AUC Rule 007, and how these can be used to provide land impact information and guide the overall land impact assessment of RATD. As well, recommendations can be made on how land impacts can be mitigated. The major aspects identified in AUC Rule 007, with the exception of cost, were considered.

Each aspect in AUC Rule 007 contains a list of potential impacts which are discussed in the following sections. A discussion has been provided below on each of the specific concerns and how they relate to RATD.

2.2.1 Agricultural Impact

Agricultural impact refers to the potential effects on farming activities carried out on rural lands which include raising livestock, cultivation of crops, and other commercial operations.

2.2.1.1 Specific Agricultural Concerns

AltaLink has considered the specific agricultural considerations outlined in AUC Rule 007 and how they relate to RATD:

a) Loss of crops: This includes short-term loss caused by construction; longer-term losses possible from soil erosion, rutting, drainage, disturbance, and soil mixing; and permanent loss of crop under or adjacent to the structure base

Short-term crop loss during construction is reduced or avoided with appropriate mitigation and construction practices. Such short-term losses are compensated through damage payments to landowners. Permanent loss of crop under or adjacent to the structure base is mitigated through working with specific landowners during the Facility Application consultation and compensated for by annual structure payments. Potential impacts will be further reduced by landowner input on structure placement.

Any use of existing linear disturbances would reduce impacts to agriculture. The majority of a ROW on private land can be used by the landowner for crop production if desired.

b) Short-term disruption of farming and livestock grazing resulting from construction

These potential impacts are mitigated through appropriate construction practices and working with specific landowners to reduce or avoid any disruption.

c) Reduced efficiency of field operations

This potential impact is mitigated by determining structure placement that reduces or avoids impact. Long-term impacts are considered when determining annual structure payments.

d) Restrictions on use of aircraft and high-pressure irrigation systems

The presence of a transmission line can potentially impact use of aircraft for agricultural operations, such as crop spraying. This is landowner and route specific, and aerial spraying is being used less often as high-wheel crop sprayers become more common. The impact on the operation of irrigation equipment can usually be reduced or avoided through consultation with affected landowners around the placement of structures and centrelines. Any unavoidable impacts (e.g., changes to irrigation systems) are considered when determining compensation payments for mitigations or impacts. A desktop level assessment using spatial data and aerial imagery revealed that irrigation is unlikely to be an issue in the Study Area.

e) Risk of collision with structure; damage to equipment, lost time, liability for damage to structure and secondary liabilities

A landowner will not be held liable for structure damage unless it was deliberately caused by the landowner or their agents. If any transmission line is taken out of service by the damage, it is typically restored to service within 24 to 48 hours, so any disruption to farming activities due to repairs of the line and structure is short in duration. The potential of collision with a transmission structure is considered low.

f) Reduction in yield adjacent to structures due to overlapping farming operations and added soil compaction

Permanent loss of crops and reduced yield adjacent to the structure on private land is mitigated through working with specific stakeholders during the Facility Application consultation. The total area adjacent to structures where the overlapping farming operations occur is relatively small and is addressed and compensated for through annual structure payments. Potential impacts are further reduced by landowner input to structure placements.

g) Added cost and inconvenience of weed control under structures

The added cost and inconvenience of weed control is compensated as part of the annual structure payments to landowners.

h) Impact of height restrictions on equipment during field operations

All transmission lines in Alberta are required to provide clearance for agricultural equipment 4.3 metres high. New power lines must provide a minimum clearance for equipment 4.88 metres high on agricultural land.

i) Psychological impact of line

This is a subjective impact involving factors such as visual impact, electromagnetic fields (EMF), land values, and other issues. Provision of unbiased information around EMF research from national and international health and scientific agencies is available to the public, and may help to address the concerns.

j) Loss of shelter belts

Impacts to shelter belts can be mitigated through routing offsets relative to legal boundaries such as quarter-section lines along which shelter belts will exist. In some cases only trimming may be required. Compensation for re-establishment of a shelter belt is also a possibility. All of these are site specific and determined in consultation with the potentially affected landowner at the Facility Application stage.

k) Shared use with other utilities and transmission lines

Utilizing existing linear disturbances is a factor in the final determination of routing during the Facility Application stage, as per the Alberta Environment's *Guide for Transmission Lines*, and Alberta's *Transmission Regulation*. There is the potential to parallel existing transmission lines within the Study Area.

l) Interference with citizen band radios

This is becoming less of an issue as Citizen Band (CB) radios are being replaced with newer technologies. However, CB radios operate at frequencies close to that of AM radios, neither of which are designed to be immune to transmission line interference. The interference produced by power lines diminishes with distance from the power lines, making interference highly localized. All facilities will comply with federal guidelines related to radio interference.

2.2.2 Residential Impact

The potential for reducing residential impact is an important consideration in the routing of transmission lines. The proximity of urban areas is used as an indication of the potential residential impact associated with the proposed alternatives.

2.2.2.1 Specific Residential Concerns

AltaLink has considered the concerns outlined in AUC Rule 007 which are listed below and are associated with residential impacts.

a) Decrease of property values

This is a site-specific impact. Potential impacts are related to property type, size and location of structures. This can be considered at the Facility Application stage.

b) Loss of developable lands and constraints on development

Development tends to happen in proximity to existing developed (urban) areas (i.e., residential density is a measure of potential impact). Therefore, reducing routing in areas of existing residential density will help avoid areas with the highest development potential. Given the high densities of both urban and country residential settlement patterns there is potential for constraints on developable lands within the Study Area.

c) Relocation or removal of residences

It is not possible to assess the specific impact at this preliminary stage, as specific routes are not determined until the future Facility Application stage.

d) Psychological impact of the line

This is a subjective impact involving factors such as visual impact, EMF, land values and other issues. Provision of unbiased information around EMF research from national and international health and scientific agencies is available to the public, and may help to address the concerns.

e) Noise and TV interference

TV reception problems related to high-voltage transmission lines are unlikely. If interference does occur, it can often be resolved by relocating the TV or changing the antennae. The transmission lines are designed to meet allowable audible noise and TV interference. Where individual landowners may be impacted, measurements will be taken before and after construction so signal interference beyond allowable levels can be identified and mitigated.

f) Windbreak and other vegetation removal

This is an issue where the removal or trimming of trees or other vegetation may be required when establishing a new ROW. It is also important to note that the overall impact is considered in making compensation payments for structures and land rights. This is site-specific and determined in consultation with the potentially affected landowner at the more detailed Facility Application stage.

g) Conflict with recreational use of land holdings

Assuming areas such as ESAs, parks, protected areas, river valleys and lakes are used for recreational purposes, there is a potential for conflict with recreational land use if routes are within close proximity to these features.

h) Public versus private land

The use of public land is generally viewed by landowners as a preferable development to using private lands. The majority of the Study Area is private land.

2.2.3 Environmental Impacts

Existing environmental information was used to provide a general indication of environmental issues and relative impacts having potential to occur within the Study Area. These impacts will be considered during siting of the facilities and as additional information becomes available.

2.2.3.1 Specific Environmental Concerns

Major surface water bodies, wetlands, ESAs, and native vegetation were considered as potential indicators of environmental impact. AltaLink has considered the potential environmental impacts that are outlined in AUC Rule 007, as well as the additional criteria of “Impact to Waterfowl and Other Birds”. Effects on these features can be avoided or reduced at the Facility Application stage.

a) Increased public accessibility to wildlife areas

This is typically an issue for treed or forested areas where there is currently little access. Much of the Study Area has been cleared for agricultural purposes and is already accessible. There is

potential to increase access to treed or forested areas if new ROWs are used, however treed or forested areas characterize a small portion of the Study Area and it is expected that small shrubs or trees can be spanned by the proposed alternatives and would not increase public access through transmission line right-of-ways.

Access along the ROW on private land is managed in consultation with the landowner to determine the appropriate access mitigation; one method of controlling access involves using locked gates. This consideration will be further discussed at the Facility Application stage when routing is developed and the potential to alter access is better known.

b) Alteration of natural areas and interference with outdoor educational opportunities

The location of protected or designated areas within the Study Area can be determined using existing data sources. Further consideration of potential impacts will be discussed at the Facility Application stage when routing is developed and potential impacts can be more accurately addressed.

***c)* Use of Restricted Development Area**

There are no Restricted Development Areas (RDAs) within the Study Area.

d) Effect on erosion

There is potential to cause erosion when topsoil is disturbed, which can have related effects if surface water is present. AltaLink will attempt to avoid areas that pose potential erosion problems. If they cannot be avoided, then the intent is to work with associated regulatory agencies and landowners to develop appropriate mitigations and construction practices to reduce potential impacts.

e) Unique ecological areas

The identification of areas of potential ecological value, such as wetlands and ESAs, can be used to determine if unique ecological areas occur in the Study Area. This consideration may be further discussed at the Facility Application stage when routing is developed and the potential to impact areas of potential ecological value is better known.

f) Impact to Waterfowl and Other Birds

Bird collisions with overhead transmission lines crossing over or adjacent to wetlands and water bodies are a concern. Visual warning devices can be placed on the shield wires adjacent to water bodies used by waterfowl, in the construction/maintenance phases of the RATD. This potential impact is relevant to RATD as a result of the surface water and important wetlands, as well as the important bird areas within the Study Area.

2.2.4 Cost

The information and findings in an LIA do not consider cost.

2.2.5 Electrical Considerations

Electrical considerations play an important role when assessing potential impacts associated with the proposed alternatives. While the technical considerations, such as transfer capability, system flexibility, system reliability and losses are considered by the AESO separately, some land impacts related to electrical considerations can be identified. Technical requirements and the other electrical considerations associated with the alternatives can affect the presence or level of impacts on the land.

2.2.5.1 Specific Electrical Considerations

AltaLink has considered the specific electrical considerations outlined in AUC Rule 007 and how they relate to RATD:

a) Ease of connections to future load areas

This relates to the electrical capacity, location of the facilities, and the type of technology used (e.g., rebuild or replace). This specific impact does not have any direct land impact and will be considered by the AESO separately.

b) Reliability and reparability of the line

The reliability and reparability of a line as it relates to the specific technology being considered does not have any impact from a land perspective. However, wet soil conditions can present difficulties for future maintenance and repair activities. The identification of wet areas can be determined during the more detailed Facility Application processes that will occur in the future.

c) Access for construction and maintenance of the line

Wet soil conditions can present difficulties in accessing transmission lines for future maintenance and repair. Existing soil classification data can be used to provide a general indication of the presence of wet soils. Paralleling major roads or existing transmission lines can also reduce some of the potential access impacts associated with new facilities. RATD occurs in an area with consistent access.

2.2.6 Visual Impact

Visual impacts depend on stakeholder views, and these impacts will continue to be assessed as the RATD moves forward and additional information becomes available.

Visual impacts are closely related to residential impacts as they are typically influenced by similar factors. However, additional impacts will be experienced by other groups, such as recreational users (e.g., hikers, fishermen, hunters, etc.), and users of recreational installations, and nearby roads. There are some general assumptions that can be made for all overhead transmission lines:

- The closer the line is to a residence, the more likely a visual impact will be perceived.
- The higher the residential density, the more likely a visual impact will be perceived.
- Paralleling similar, existing transmission facilities has a lower visual impact than a greenfield route where there is no existing line.
- Close proximity to parks, natural areas and other recreational areas can be viewed as creating a higher degree of visual impact than in other areas.
- Extensive clearing of mature-treed areas increases the potential level of visual impact by removing what is generally considered an aesthetically pleasing feature on the landscape and potential visual screening of the transmission line.

2.2.6.1 Specific Visual Concerns

AltaLink has considered the specific visual considerations in AUC Rule 007 and how they relate to RATD:

a) Visual impact of tree removal as seen from roads and recreational installations

Many stakeholders view the removal of trees as a visual impact. The Study Area consists of primarily cleared land used for agriculture. Potential impacts on shelter belts will be considered during the TFO route evaluations leading to the Facility Application.

b) Visual impact on dispersed recreational users such as hikers, fishermen, hunters, scenic viewers, and cross-country skiers

Areas commonly used by recreational users can be identified using existing data sources and considered during route selection. There are lakes, parks, protected areas, and ESAs within the Study Area.

c) Visual impact of structures and lines as seen from residences, farms, roads, and recreational installations

The type of residences and landowners can provide an indication of potential visual impact. The type of structure being proposed can also impact the potential level of visual impact.

2.2.7 Special Constraints

Special constraints are issues or factors unique to the specific Study Area being assessed. Using existing sources of available data, there are special constraints that have been identified in the Study Area and incorporated into the assessment of the alternatives.

2.2.7.1 Specific Special Constraints

AltaLink has considered specific impacts in AUC Rule 007 that can be associated with special constraints (item "a" below), as well as identified additional special constraints that may relate to RATD.

a) Electrical interference with radio transmitting stations, and other telecommunication equipment

There is the potential for transmission facilities to impact radio and other telecommunication equipment, as several telecommunications facilities are within the Study Area. The intent is to work with affected facility owners to ensure appropriate routing and mitigation methods are employed to reduce or avoid any potential impact. Following the construction of the proposed facilities, radio frequency interference (RFI) measurements will be taken to ensure that federal guidelines are not exceeded. Interference problems caused by the new facilities will be mitigated by AltaLink.

b) Major River Crossings

Major river crossings can present potential constraints related to technical design, environmental implications, timing restrictions and associated cost implications. Several potential impacts on major river crossings can be avoided by crossing overhead and complying with setbacks to the normal high-water marks for the crossing structures. Riparian vegetation can be selectively removed to reduce impacts. Rivers and streams are common throughout portions of the Study Area; however the only major watercourse is the Red Deer River. An accurate assessment of major river crossings will occur at the Facility Application stage, at which time site-specific routing occurs.

c) Proximity to Historical Resources

Historical resources are specific sites that have been identified within the province that hold particular archaeological significance. The province maintains a registry of known locations and, depending on the significance of a particular site, there will be constraints placed on nearby planned development or disturbance. Historical resources are present in the Study Area, and this aspect will be further addressed at the Facility Application stage when detailed routing is known.

d) Oil and gas

Well sites are common throughout the Study Area. These sites pose a challenge to routing, but can typically be mitigated through shifts in the transmission line at the Facility Application stage.

2.3 Assessment of Alternatives

This section assesses the 138 kV transmission line developments, removal and salvage of existing transmission lines, and new substations for each of the two alternatives proposed under RATD, relative to the aspects of Rule 007.

As assessment of agricultural, residential, visual, environmental, specific electrical considerations and special constraints indicators was used to assess and characterize potential land impacts associated with the two alternatives as listed in Tables 1 and 2 and based on the Study Area (see figures LIA1-A1 and LIA1-A2).

2.3.1 Agricultural Impact

Agricultural land use and agricultural land suitability were evaluated as potential indicators. Agricultural land use is represented by cropland and forage.[14] The agricultural land suitability classification system categorizes lands into seven classes, with Class 1 being most suitable for agriculture. The higher the class, the less suitable the lands are for agricultural operations.

In terms of agricultural land, within the Study Area there is both cropland and forage. Forage is concentrated in the western portion, particularly in the north within the counties of Wetaskiwin and Ponoka, although there are areas of forage scattered throughout the Study Area. Cropland occurs extensively over the rest of the Study Area. Land suitability ranges from Class 2 to 7, with most lands being Class 3. Within the northern portion of the Study Area, outside of Wetaskiwin there is a concentration of Class 2 land. There are small amounts of Class 5 to 7 lands throughout the Study Area. The potential for agricultural impacts are lower in the central and south portion of the Study Area due to lower land capability.

If all proposed transmission line developments were relocated to, or sited on greenfield quarter section lines, the potential land impacts would be greatest in terms of short-term disruption of farming and livestock grazing resulting from construction, and the reduced efficiency of field operations. Siting of lines in road allowances and maximizing the use of existing right-of-ways, where possible, would reduce this potential impact.

Any use of existing utilities and transmission lines through paralleling existing ROWs can have variable impacts. For example, paralleling a road in an open road allowance would decrease

[14] The forage land class includes pasture.

agricultural impacts; however, paralleling an existing transmission line that forces routing further into an agricultural field would increase the level of impact. The relative levels of this impact will be addressed at the Facility Application stage once detailed routing is known.

The proposed salvage of transmission lines would provide a potential benefit to agriculture, allowing use of previously disturbed areas. The proposed transmission line salvages occur in areas of mixed cropland and forage. The majority of the land is Class 3.

Alternative 1

For transmission lines, Alternative 1 proposes approximately 360 km of transmission line development and removal of about 240 km of existing lines, with a net result of about 120 km of new transmission line.

For substations, Alternative 1 proposes a new Didsbury substation. Within the proposed Didsbury substation target area the land is classified as Class 3 and includes cropland and some forage. Should the substation be sited to the east of the target area there is the potential to minimize impact to cropland. Alternative 1 has fewer potential agricultural impacts than Alternative 2 related to development of new substations as a result of fewer proposed new substations.

The rebuild of transmission lines that exist on a diagonal alignment to a new alignment on quarter lines or in road allowances will have localized reductions in impacts, especially where croplands are crossed.

Alternative 2

For transmission lines, Alternative 2 proposes approximately 150 km of transmission line development and removal of about 180 km of existing lines (of which 95 km is salvage), with a net result of a reduction of about 30 km of transmission line.

For substations, three new substations at Didsbury, Ponoka, and Innisfail are proposed. The potential impacts of the proposed Didsbury substation are the same as described above for Alternative 1. The development of a new Ponoka substation has a range of potential impacts to agriculture, as both cropland and forage exist within the target area. The development of a new Innisfail substation would have a potential impact to cropland, as the majority of the proposed target area is Class 3 and cropland.

As with Alternative 1, the proposed removal of existing transmission lines that are on a diagonal alignment will have localized reductions in impacts. Due to an overall reduction in line length, Alternative 2 has fewer potential land impacts to agricultural land use and capability.

2.3.2 Residential and Visual Impact

The Study Area has urban, country residential and rural settlement patterns with a relatively high population density. There are numerous urban areas within the Study Area, including the City of Red Deer; the towns of Wetaskiwin, Ponoka, Lacombe, Blackfalds, Penhold, Innisfail, Bowden and Olds; as well as several First Nations Reserves. There are also several ESAs, river valleys, and lakes which are assumed to be used for recreational purposes within the Study Area.

Visual impacts would be generally be uniform throughout the Study Area, with the exception of the north-central portion (where greater recreational opportunities exist), and the central portion where there is a higher density if urban areas. Siting of developments in or near either recreational or urban areas could result in visual impacts on to residences and dispersed recreational users. The potential for visual impact as seen from residences, farms, and roads is high throughout the Study Area as a result of the population density. These potential impacts would be the highest in the central portion of the Study Area, encompassing the greatest number of urban areas.

In terms of loss of developable lands and constraints on development, as well as conflicts with recreational use of land holdings, the siting of proposed transmission line developments on greenfield quarter section lines would result in the greatest impact, when compared to siting developments on road allowances.

Potential residential impacts in terms of loss of developable lands and constraints on development would be the highest in the central portion of the Study Area where most urban areas exist. In terms of impacts to recreational land holdings, the greatest impact would be in the north-central area where the majority of ESAs exist in the Study Area that may be used for recreational purposes. Relative to the use of both greenfield quarter section lines and road allowances, the use of existing ROWs could result in less of an impact to the overall potential residential impact (i.e., a visual disturbance already exists due to an existing line). These aspects will be further addressed at the Facility Application stage when detailed sites and routing is known.

The proposed salvage areas include a rural-residential population base, as well as parks and ESAs which are likely used as recreation areas. Both would benefit from the salvage of these existing lines.

Alternative 1

As discussed, Alternative 1 proposes approximately 360 km of transmission line development and salvage of about 240 km of existing lines, with a net result of about 120 km of new transmission line.

The target area for the proposed Didsbury substation is uniform in terms of potential impact to recreational related visual impact, which is low as a result of no parks, protected areas, or ESAs within the area. In terms of residential impact, the target area is rural residential and therefore potential impacts to residences can be found throughout the area.

Alternative 2

As Alternative 2 proposes a net reduction in transmission line, there are thus fewer potential residential and visual impacts than Alternative 1. Additionally, the proposed salvage of lines in Alternate 2 would have a localized positive land impact in terms of residential and visual impact, through the removal (salvage) of transmission lines.

In Alternative 2 the potential land impacts of the proposed Didsbury substation are the same as noted above for Alternative 1. Development of a new Ponoka substation has the potential to have both a residential and visual impact, as a result of the higher rural-residential density within and to the west of the target area, the First Nations reserves to the north, and the presence of ESAs in the target area. The development of a new Innisfail substation could have a potential impact to residential and visual considerations as well, given the high rural-residential density to the west of the target area. Alternative 2 has greater potential residential and visual impacts than Alternative 1 related to development of new substations.

2.3.3 Environmental Impact

Some developments will have a lower or higher potential level when compared to others, environmental impacts can be mitigated using various planning, routing and construction techniques to either reduce or avoid the potential impact.

Rivers and streams are common throughout all portions of the Study Area; however, the only major watercourse is the Red Deer River. As discussed in 2.2.7.1, an accurate assessment of major river crossings cannot be made until the Facility Application stage, at which time site-specific routing occurs. There are major water bodies within the Study Area that can potentially be considered as constraints when siting lines (i.e., avoidance during siting or routing in order to decrease impact, or, if avoidance is not possible, adhering to appropriate mitigation techniques). The majority of these lakes are found across the northern half of the Study Area. A designated important bird area surrounds Bearhills Lake in the north, making this an area of special consideration for Alternative 1.

There are multiple (i.e., approximately 20) parks, protected areas, natural areas and ESAs throughout the Study Area, with a concentration in the north-central portion of the Study Area. Additionally, native grassland occurs throughout the Study Area, with concentrations west of the towns of Didsbury and Olds, and southeast of Red Deer.

Environmental considerations are widespread throughout the Study Area, as is the potential to alter existing natural areas and interfere with outdoor educational opportunities, unique

ecological areas, and impact waterfowl and other birds. Bird collisions with overhead transmission lines crossing over or adjacent to wetlands and water bodies are a concern. Visual warning devices can be placed on the wires adjacent to water bodies used by waterfowl.

Overall, the potential for environmental impact associated with the proposed developments is comparatively lower in the south-central portion of the Study Area as few environmental features exist, allowing greater potential for avoidance. In the event that siting of developments is on greenfield quarter section lines, this would result in the greatest impact, particularly to native grassland which exists throughout much of the Study Area and is not as easily avoided as localized features such as ESAs and important bird areas.

The potential impact to environmental features such as ESAs will depend on routing, which will be determined at the Facility Application stage.

While the majority of the area impacted by the proposed salvages is agricultural, removal of these existing lines may provide a positive impact to areas of native prairie along the lines by allowing for reclamation of native prairie. Potential for bird collisions would be removed in these areas.

Alternative 1

In terms of environmental considerations, Alternative 1 proposed a greater amount of new line length, indicating a greater potential for environmental impact. The potential for environmental impact associated with the proposed developments is higher for Alternative 1 due to the presence of an important bird area and lakes in the north.

The target area for the proposed Didsbury substation, depending on its final location, has the potential to impact native prairie.

Alternative 2

Alternative 2 proposes a net reduction in transmission line length, thus having fewer potential environmental impacts than Alternative 1.

In Alternative 2 the potential land impacts of the proposed Didsbury to substation are the same as noted above for Alternative 1. Development of a new Ponoka substation has the potential to have an impact both to native prairie in the northwest and south of the target area. The development of a new Innisfail substation has the potential to impact native prairie, as well as a small water body, depending on its final location. Within the area surrounding the proposed substations, Alternative 2 has a greater potential for environmental impacts relative to Alternative 1.

2.3.4 Specific Electrical Considerations

As discussed in 2.2.5.1, the reliability and reparability of a line as it relates to the specific technology being considered does not have any impact from a land perspective.

2.3.5 Special Constraints

Special constraints are issues or factors unique to the specific Study Area being assessed. Using existing sources of available data, there are special constraints (i.e., electrical interference, major river crossings, proximity to historical resources, and oil and gas wells) that have been identified in the Study Area. As discussed in Section 2.2.7.1, it is generally possible to mitigate potential impacts associated with these constraints at the detailed routing stage. As a result of their site specific nature, an accurate assessment cannot be made without site-specific routing, which will be conducted in the Facility Application stage.

3. CONCLUSION

Please refer to the Executive Summary (Section 1) for a summary of conclusions.

4. INFORMATION SOURCES

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