

DAY MONTH YEAR
14-Sep-2009Application #
1605450APPLICANT'S FILE NUMBER
Dover 888S PSTSUBMISSION STATUS Registered SUBMISSION ID 195831 CREATION DATE 14-Sep-2009**1. APPLICANT INFORMATION**

Primary Applicant

COMPANY NAME	<u>ATCO Electric Ltd.</u>	BA CODE	<u>0A5Z</u>
CONTACT NAME	<u>George Duffy</u>		
TELEPHONE	<u>(780) 420-5592</u>	FAX	<u>(780) 420-8017</u>
E-MAIL	<u>facilityapp@atcoelectric.com</u>		
MAILING ADDRESS	<u>10035-105st Edmonton, Alberta T5J 2V6</u>		

2. PROJECT OVERVIEW

1. Application Description:

<u>Dover Substation 888S Phase 6 shifting Transformer Addition and 9L57 Alteration</u>

2. Are there other AUC applications directly related to this application? Yes No

Application Category	Application Type	Application Number (If Known)
<u>Electric</u>	<u>Need Assessment</u>	<u>1584342</u>

3. APPLICATION TYPES

1. Identify what this application is for:

<u>Electric Substations</u>
<u>Electric Transmission Lines</u>

SUBMISSION STATUS Registered SUBMISSION ID 195831 CREATION DATE 14-Sep-2009

4. SUBSTATION

1. Provide the name(s) of all other companies having ownership in the project, details of their incorporation, and the share in the project that each would have.

Company Name: _____ Percentage: _____

Details:

Total other ownership (%)

2. Have you conducted a participant involvement program?

Yes No

If No, explain:

3. Are there outstanding public or industry objection and/or concerns? Yes No

4. Provide Electric Facility ID Number(s):

5. Provide legal description, latitude and longitude of the substation. (Provide latitude and longitude coordinates in decimal degrees.)

Lsd	Sec	Twp	Rge	Mer	Lat (NAD 83)	Long (NAD 83)
<u>15</u>	<u>31</u>	<u>92</u>	<u>12</u>	<u>4</u>	<u>57.0298</u>	<u>-111.9204</u>

If you have any questions or comments, please contact the EAS Administrator.

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4. TRANSMISSION LINE

1. Provide the name(s) of all other companies having ownership in the project, details of their incorporation, and the share in the project that each would have.

Company Name: _____ Percentage: _____

Details:

Total other ownership (%)

2. Have you conducted a participant involvement program?

Yes No

If No, explain:

3. Are there outstanding public or industry objection and/or concerns? Yes No

4. Provide Electric Facility ID Number(s):

5. Provide the legal descriptions, including latitudes and longitudes of start and end points of the transmission line.(Provide latitude and longitude coordinate in decimal degrees.)

Start Point of Transmission Line

Lsd	Sec	Twp	Rge	Mer	Lat (NAD 83)	Long (NAD 83)
10	36	82	23	4	56.1536	-113.4628

End Point of Transmission Line

Lsd	Sec	Twp	Rge	Mer	Lat (NAD 83)	Long (NAD 83)
15	31	92	12	4	57.0298	-111.9204

If you have any questions or comments, please contact the EAS Administrator.



September 14, 2009

Don Popowich, Director, Facilities
Alberta Utilities Commission
Fifth Avenue Place
4th Floor, 425 - 1 Street SW
Calgary, Alberta, T2P 3L8

Dear Sir;

**RE: Application for Alteration of Dover Substation 888S
Addition of Phase Shifting Transformer**

1.0 INTRODUCTION

ATCO Electric Ltd. operates the Dover substation 888S, located approximately 60 kilometres northwest of Fort McMurray, Alberta. As directed by the Alberta Electric System Operator (AESO), ATCO Electric proposes to add a phase shifting transformer (PST) and associated equipment connected to 240 kV transmission line 9L57 at the existing Dover substation. The equipment additions require the expansion of the existing substation fence and the re-termination of existing line 9L57 at a new bay at the substation. Construction is planned to start by September 2010 for completion by June 2011.

1.1 Proposal

ATCO Electric hereby applies to the Alberta Utilities Commission pursuant to Section 14 and 15 of the *Hydro and Electric Energy Act* (Chapter H-16, RSA 2000, as amended), for Permit, Licence, Approval and Order to alter and operate:

- a. The existing **Dover substation 888S** (*Permit and Licence No. U2006-147*); and
- b. The existing Brintnell to Dover 240 kV transmission line **9L57** (*Permit and Licence No. U2003-123 and amended under Enquiry No. E2003-054*).

1.2 Project Need

The addition of the proposed phase shifting transformer is part of a system reinforcement project to relieve constraints on the existing transmission system. The need for the project was identified by AESO and approved by the Alberta Utilities Commission as part of the Edmonton Region 240 kV Line Upgrades Plan. Pursuant to the applicable processes under the *Electric Utilities Act*, the need for the project has been addressed by the AESO as project RP-05-786, and is the subject of a needs identification document (NID) filed by AESO as **Application No. 1584342** (Need Assessment Approval No. U2009-62).

In accordance with Section 35 of the *Electric Utilities Act*, the AESO has directed ATCO Electric to submit this application. A copy of the direction correspondence is attached (Attachment 8).

2.0 PROJECT DESCRIPTION

2.1 Dover Substation 888S

ATCO Electric proposes to install a 600 MVA, 240 kV phase shifting transformer, two 240 kV circuit breakers and associated equipment at the Dover substation, as shown on the electrical single line diagram, drawing A-06. To facilitate these additions, the substation fence will be expanded with an approximately 81 to 131 by 102-metre (m) addition to the west as shown on the site plan drawing A-04.

Location and Site

The Dover substation is located in NE 31-92-12-W4M (Lat/Long N57.0298°, E-111.9204°). ATCO Electric holds a lease from the Crown for the 400 by 400-m site. The existing fenced area is approximately 175 by 107 m. A 102 m portion of the west fence will be expanded 81 m west to accommodate the alteration. The fence expansion will be within the existing site. No additional property will be required.

Proposed Addition of Major/Listed Equipment

One	600 MVA, 240 kV phase shifting transformer
Two	240 kV circuit breakers

Final Design Specification for Listed Equipment

- (a) One 600 MVA, 240 kV phase shifting transformer
- (b) One 40 MVAR, 240 kV reactor
- (c) Thirteen 240 kV circuit breakers
- (d) An enclosure surrounded by a chain link fence, and other substation equipment as described in the Application.

Engineering Outline

The general substation equipment layout is indicated on the site plan drawing A-04 (Attachment 4). Engineering information, including switching and protection features, is shown on the proposed single line diagram, drawing A-06 (Attachment 6).

The scope of work for this project is described in section 5.6.1 of the AESO functional specification for Edmonton Region 240 kV Line Upgrades, RP-05-786 (Rev.1, April 9, 2009). The revised functional specification identifies two circuit breakers, whereas the approved NID indicated three. One circuit breaker was to serve as a by-pass device, but is no longer necessary. Since the PST for 9L57 will be located at the Dover substation, the by-pass will be accomplished with switches and the 240 kV bus arrangement.

2.2 Alteration of 240 kV Transmission Line 9L57

To accommodate the addition of the PST and associated equipment and the expansion of the substation fenced area, a portion of the existing 240 kV transmission line 9L57 will be relocated and re-terminated in a new bay in the substation. Lines 9L57 and 9L58 are currently double circuited on steel lattice tower in the vicinity of Dover substation. Line 9L57 terminates at the approximate centre of the south side of the existing substation fenced area. The new termination of 9L57 will be approximately 110 m to the west of the present location, in the southwest corner of the expanded fenced area. ATCO Electric will be removing approximately 250 m of existing line from Tower 1238 to Tower 1239 to the existing Dover substation termination point, as shown on the mosaic (drawing A-05, Attachment 5), and constructing approximately 100 m of new line from Tower 1238 to the new termination point in Dover substation. The overall length of line 9L57 will be decreased by approximately 150 m and upon completion the line length between Brintnell 876S and Dover 888S will be approximately 146.9 km. For the 200-m span from Tower 1238 to 1239, only the north circuit conductors and insulators of 9L57 will be removed; the towers and the south circuit (9L58) will remain in place as part of 9L58, as a double circuit design with one side strung.

The proposed transmission line alignment is a minor change to the existing configuration. All of the right-of-way requirements for the rerouted portion of 9L57 are located on ATCO Electric's substation property. No new right-of-way is required, and the impact on surrounding stakeholders will be minimal.

The proposed line alterations are shown on the site plan drawing A-04 (Attachment 4) and route mosaic drawing A-05 (Attachment 5). Table 1 provides terminus locations of transmission line 9L57 upon completion.

TABLE 1 – 240 kV Line Termination Coordinates

	Facility	Land (Legal)	Lat. (N)	Long. (E)
(1)	240 kV Line 9L57 - Start (Brintnell Substation 876S) - End (Dover Substation 888S)	LSD 10, NE 36-82-23-W4M LSD 15, NE 31-92-12-W4M	56.1536 57.0298	-113.4628 -111.9204

Transmission Line Specifications

The proposed 240 kV line segment will be a standard three-phase design with a circuit of three conductor wires strung from an existing "QQ" tower to a new "G" tower (see Attachment 7) located immediately south of the expanded substation fence. Conductors for the new line segment will be 954 MCM (Cardinal), matching the existing conductor type for 9L57. Thermal ratings for the line are shown in Table 2. The line will meet or exceed the requirements of applicable safety regulations.

TABLE 2 – 240 kV Line Thermal Ratings

Conductor	Thermal Rating, Normal		Thermal Rating, Emergency	
	Summer	Winter	Summer	Winter
954 MCM (Cardinal)	415 MVA	534 MVA	478 MVA	579 MVA

2.3 Schedule

Construction is scheduled to start by September 10, 2010, with a projected in-service date of June 1, 2011.

2.4 Project Costs

The cost estimate for the proposed alterations is provided in Table 3. The costs are based on the scope of work as detailed in ATCO Electric's proposal to provide service as submitted to the AESO. The estimate includes all work within ATCO Electric's scope as described in the functional specification, with an estimated cost of \$26,680,491.

As a result of locating the PST within the expanded facility at Dover, three cost benefits will be realized.

1. The expansion plan is within an existing ATCO Electric site therefore no additional land is required.
2. All-weather access is already established.
3. There will be a general reduction in protection, metering, communication apparatus and equipment requirements, including a reduction of 240 kV circuit breakers from three to two.

Table 3 – Cost Estimate, +20 / -10 % (2011 Dollars)

	System Portion	Customer Portion	TOTAL
Transmission Line Costs			
Total-Transmission line	\$ 332,456	\$ -	\$ 332,456
Substation Facilities Cost			
Material	\$ 14,656,384	\$ -	\$ 14,656,384
Labour	\$ 4,461,443	\$ -	\$ 4,461,443
Total-Substations	\$ 19,117,827	\$ -	\$ 19,117,827
Telecommunication Cost			
Material	\$ 191,528	\$ -	\$ 191,528
Labour	\$ 218,430	\$ -	\$ 218,430
Total-Telecommunication	\$ 409,958	\$ -	\$ 409,958
Owner Costs			
Proposal to Provide Service	\$ 175,000	\$ -	\$ 175,000
Facility Applications	\$ 18,000	\$ -	\$ 18,000
Land Rights - Easements	\$ -	\$ -	\$ -
Land - Damage Claims	\$ -	\$ -	\$ -
Land - Acquisitions	\$ -	\$ -	\$ -
Total - Owner's Cost	\$ 193,000	\$ -	\$ 193,000
Distributed Costs			
Procurement	\$ -	\$ -	\$ -
Project Management	\$ 200,000	\$ -	\$ 200,000
Construction Management	\$ -	\$ -	\$ -
Contingency	\$ 2,000,525	\$ -	\$ 2,000,525
Total - Distributed Costs	\$ 2,200,525	\$ -	\$ 2,200,525
Total Direct Costs	\$22,253,766	\$ -	\$22,253,766
Salvage			
Transmission Line Labour	\$ -	\$ -	\$ -
Substation Labour	\$ -	\$ -	\$ -
Land Remediation and Reclamation	\$ -	\$ -	\$ -
Total-Salvage	\$ -	\$ -	\$ -
Other Costs			
INFLATION	\$ 1,508,842	\$ -	\$ 1,508,842
ES&G	\$ 1,667,749	\$ -	\$ 1,667,749
AFUDC	\$ 1,250,134	\$ -	\$ 1,250,134
Total - Other Costs	\$ 4,426,725	\$ -	\$ 4,426,725
Total In-Direct Costs	\$ 4,426,725	\$ -	\$ 4,426,725
TOTAL PROJECT COSTS	\$26,680,491	\$ -	\$26,680,491

3.0 LAND AND ENVIRONMENTAL CONSIDERATIONS

The Dover substation is located within the Regional Municipality of Wood Buffalo, approximately 60 kilometres northwest of Fort McMurray. The adjacent area surrounding the site is forested land within the provincial Green Area. The surrounding stakeholders include industrial leaseholders, government agencies and one trapper. The nearest dwelling units are at a mobile industrial camp located approximately 280 m east of the existing substation fence.

The proposed alterations will occur within the existing site and no significant impacts are expected on the adjacent landholders or the environment. ATCO Electric will undertake the alterations adhering to Alberta Environment's C&R/IL/95-2, *Environmental Protection Guidelines for Electric Transmission Lines*. Environmental considerations are discussed further in a conservation and reclamation document (Attachment 2).

4.0 LANDHOLDER AND AGENCY REFERRAL

ATCO Electric conducted a participant involvement program in accordance with the requirements of AUC Rule 007. ATCO Electric notified all landholders within 800 m of the substation property and pertinent agencies, to notify them of the project, to provide them with project-specific details and to facilitate the identification of any questions or concerns. ATCO Electric mailed project information to a list of seven industrial landholders (oilsands, pipeline and forestry interests), one trapper, two agencies with registered land interests (Alberta Sustainable Resource Development and Energy Resource Conservation Board), and three additional agencies (Regional Municipality of Wood Buffalo, Alberta Environment and TELUS). A copy of the information package is included as Attachment 10 of this application. The notification package included information on both the phase shifting transformer addition and a future project involving the addition of a capacitor bank at Dover substation. The capacitor bank project was a joint notification with AESO, therefore the package included AESO's description of the need for the capacitor bank at Dover.

ATCO Electric followed up with personal consultation with all directly affected or directly adjacent landholders and pertinent agencies to identify any potential concerns. There were no objections and no outstanding concerns identified for the proposed alterations.

5.0 CONCLUSION

The alterations will be designed, built and operated in accordance with the requirements of the *Safety Codes Act* and applicable regulations and industry standards. The proposed facilities will be inspected and declared safe prior to being energized.

ATCO Electric is confident that the alterations described herein are both warranted and cost effective, and respectfully requests the Commission's favourable consideration.

Correspondence or questions concerning this project can be directed to George Duffy (phone 780-420-5592), or to the project manager Craig Shutt (phone 780-420-3676).

Yours truly,

ATCO Electric Ltd.

< Original signed by >

Paul Goguen, P. Eng., MBA

Vice President, Transmission

Attachments:

1. Application Cover Letter/Text (this document)
2. Conservation and Reclamation document
3. Reference Note re: Required Attachments for EAS/DDS Registration
4. Regional Map, Drawing RS-888S-A-02, and Site Plan, Drawing RS-9L57-A-04
5. Proposed Route Mosaic, Drawing RS-9L57-A05
6. Proposed Single Line Diagram, Drawing RS-888S-A-06
7. Typical Structure Diagram, RS-GTower-240SC
8. AESO Direction Correspondence to ATCO Electric
9. AESO Functional Specification for Edmonton Region 240 kV Line Upgrades, RP-05-786 (Rev.1, April 9, 2009)
10. Project Information Package to Stakeholders (June 24, 2009)

CC: A. Xu / F. Ritter, AESO, Calgary

ATTACHMENT 2

CONSERVATION AND RECLAMATION

ATCO Electric Ltd. proposes to expand the fenced area of Dover substation 888S, install a 240 kilovolt (kV) phase shifting transformer and associated equipment, and reroute a portion of 240 kV transmission line 9L57, all on the existing substation property. The locations are shown on the route mosaic (drawing A-05), and described in the application text (Attachment 1 of this application to the Alberta Utilities Commission). The work is scheduled to occur starting in September 2010 for completion by June 1, 2011. This document describes conservation and reclamation measures for the project. The facilities are not an activity requiring Conservation and Reclamation Approval or an Environmental Impact Assessment report under the *Environmental Protection and Enhancement Act (EPEA)*.

Project Setting

The project area is located within the Regional Municipality of Wood Buffalo, about 60 km northwest of Fort McMurray. The surrounding area is forested lands with heavy industrial use, primarily in-situ oil sands development.

Project Details

The fenced area of the existing substation will be expanded to the west by an area of approximately 81 to 131 by 102 metres (m) for the installation of a new phase shifting transformer (PST) and associated equipment in the substation. To accommodate the PST, a portion of the existing 240 kV transmission line 9L57 will be relocated and re-terminated in the substation. Line 9L57 currently terminates at the south-central side of the substation; the new termination will be on the southwest side. ATCO will remove approximately 50 m of existing line on the south side of the substation, remove the north-circuit conductors and insulators from a 200 m span of existing line (with towers left in place for the existing south-circuit line 9L58), and construct approximately 100 m of new line with one additional structure on the southwest side of the substation. Overall line length for 9L57 will decrease by approximately 150 m.

All proposed alterations to the Dover substation 888S and transmission line 9L57 will occur on ATCO Electric's existing property, and no additional right-of-way will be required. The scope of activity does not require brushing or vegetation removal, and does not cross any watercourses. Overall, there should be no significant impacts on the environment or adjacent landholders.

General Conservation and Reclamation Measures

ATCO Electric will undertake the alterations adhering to:

- Alberta Environment's *C&R/IL/95-2, Environmental Protection Guidelines for Electric Transmission Lines*.
- ATCO Electric's general construction and maintenance environmental protection standards.
- Terms and conditions of the applicable right-of-way agreements and easements.

All construction activity will be confined to ATCO Electric's property.

ATCO Electric will follow standard good practices to minimize potential erosion, soil compaction, spills and fires, and to implement post-construction clean-up and reclamation. The area is accessible year round, and soil and ground conditions for the new construction do not require seasonal timing considerations. Activities will be delayed if required by weather and soil conditions.

Construction of the substation expansion will require surface disturbance for an area of about 85 to 135 m by 110 m (1.2 hectares). Topsoil will be removed from the disturbed area and stockpiled at the periphery of the site for future site reclamation if and when decommissioning of the substation is required.

Operation and Maintenance

Continued operation and maintenance of the line will require access to the structures and conductors. Access for work on the line will be from the ATCO Electric's property, using existing access where available.

Reclamation

ATCO will ensure that following construction any bare areas will be seeded with a seed mix approved by the local forest officer. Salvaged structures and materials that are not reused will be removed from the site.

Water Crossings

There are no watercourses, watercourse banks or steep slopes present in the construction area.

Wildlife

The construction is located in an intensive industrial area, and the proposed alterations are relatively minor in nature. Consultation with Alberta Sustainable Resource Development and the surrounding landholders have not identified any wildlife concerns for the site or any specific mitigation requirements.

Aesthetic Effects

No aesthetic impacts are anticipated from the proposed alterations.

Sensitive Areas

There are no environmentally sensitive areas in the construction area.

Electrical Effects

Where necessary, metal fences, buildings, and structures will be grounded by ATCO Electric to minimize induced voltages. Minimum clearance required between all transmission facilities and buildings will be in accordance with the *Safety Codes Act* and regulations.

Noise and Traffic

There would be no appreciable traffic impacts as a result of the construction activities since the site is located along a well-used industrial road. There are no private dwellings within several kilometres. The nearest occupied units are a mobile work camp located about 280 m east of the existing substation fence. A noise impact study will be completed and the results forward to the AUC upon completion.

Socio-economic Considerations

The proposed alterations will not have a significant socio-economic impact relative to the various industrial facilities in the area. There are good roads in the area and there would be no significant impacts on transportation and infrastructure. The project is within one hour of Fort McMurray which has services, amenities and health facilities equipped to deal with construction activities of this magnitude.

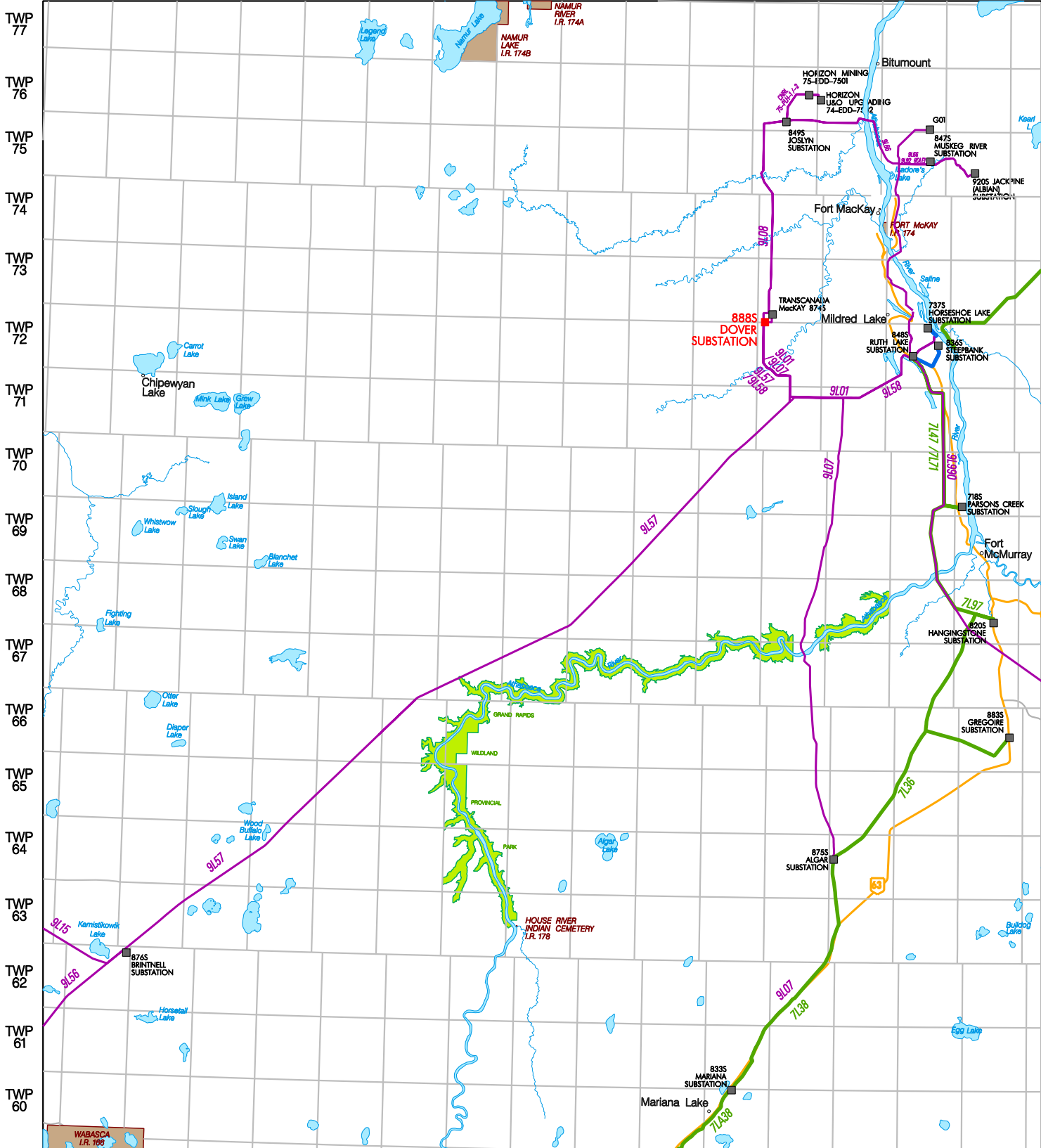
ATTACHMENT 3

Reference Note – Required Attachments for IAR/DDS Registration

This attachment provides information requirements in accordance with the Alberta Utilities Commission's Integrated Application Registry/Digital Data Submission (IAR/DDS) system. To avoid duplicate submission in the IAR/DDS system of an attachment that is otherwise deemed by the IAR/DDS system as a required attachment, this reference note is provided to indicate where the required attachment or information may be found and to substitute for the required or duplicate attachment. Attachments cited are considered to be submitted for the applicable facilities as referenced below.

Cross-Reference of Common Attachments

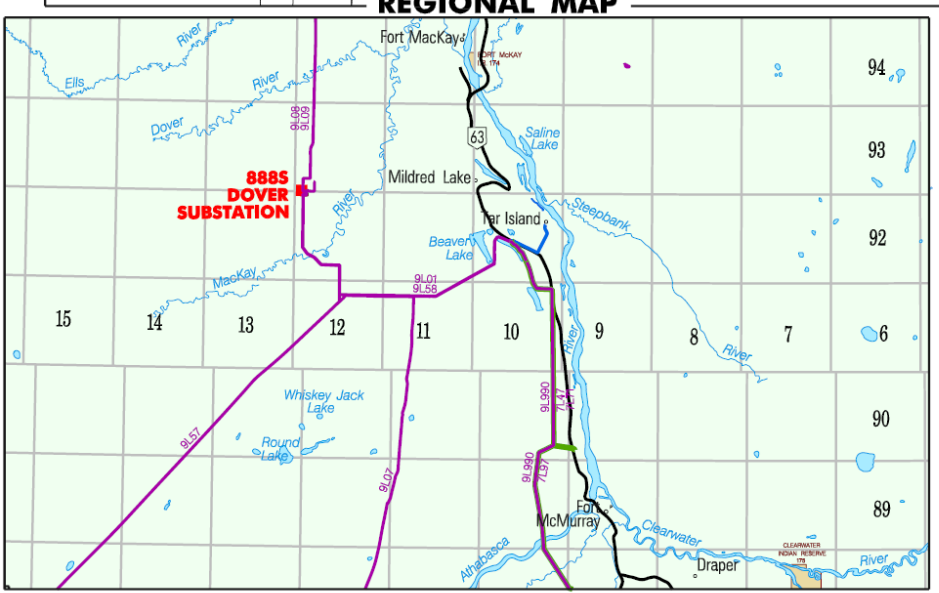
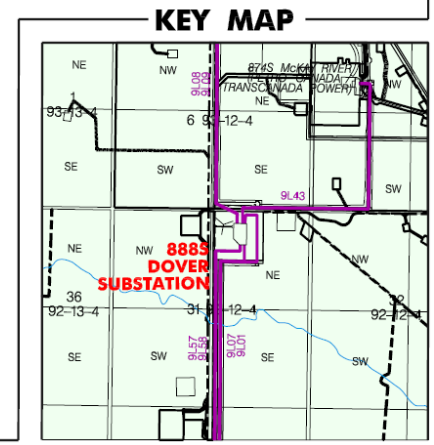
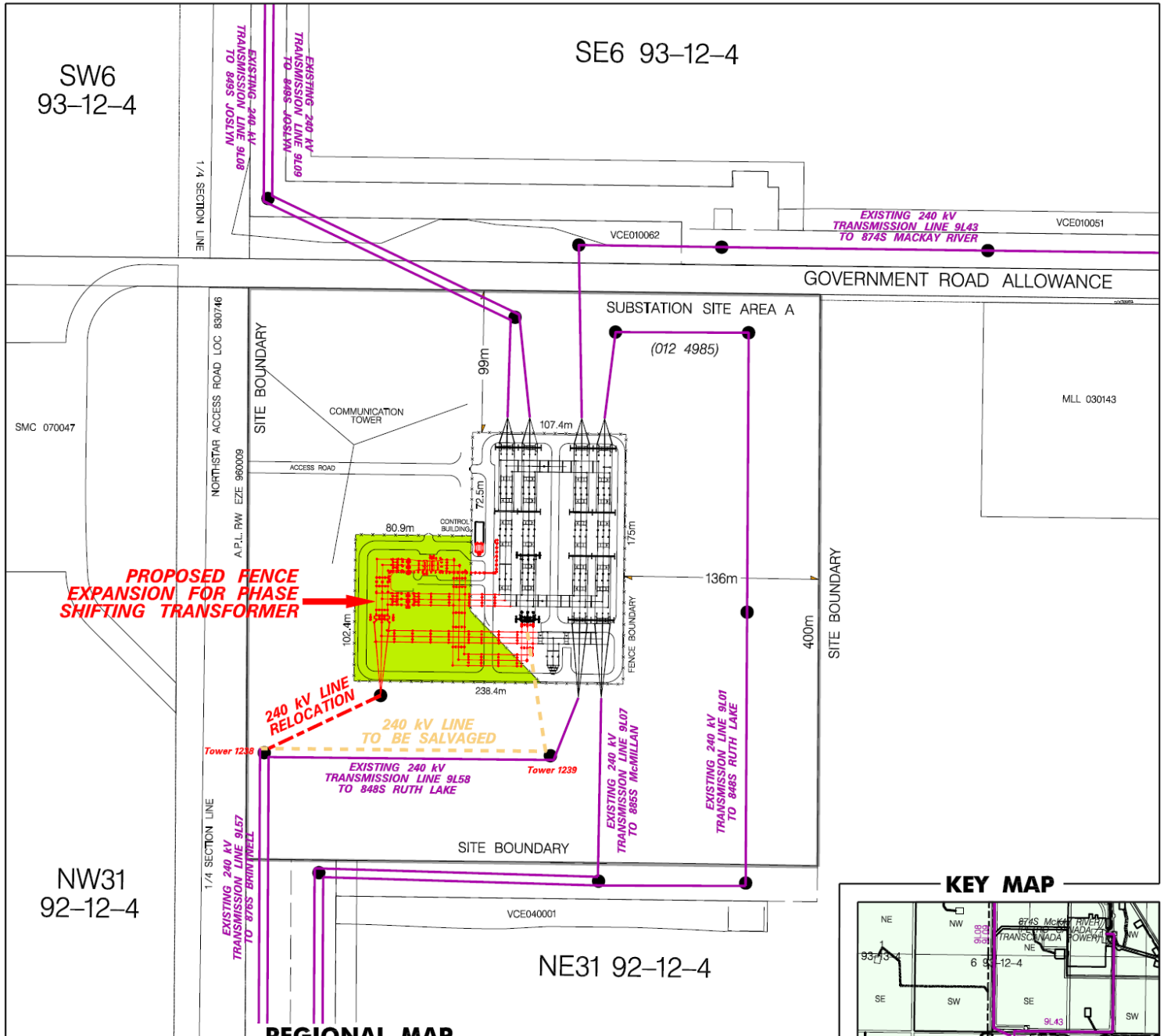
Attachment Description:	Applicable Facilities:	Submission:
AESO Direct Assignment Letter	(1) Dover Substation 888S and (2) Transmission Line 9L57.	Attachment 8 , submitted under (1) Dover Substation 888S.
Application (text)	(1) Dover Substation 888S and (2) Transmission Line 9L57.	Attachment 1 , submitted under (1) Dover Substation 888S.
Project Area Map	(1) Dover Substation 888S and (2) Transmission Line 9L57.	Attachment 4 (pt.1), Dwg.A-02 , (regional map), submitted under (1) Dover Substation 888S.
Substation Single-line Diagram (electrical)	(1) Dover Substation 888S.	Attachment 6, Dwg.A-06 (SLD drawing), submitted under (1) Dover Substation 888S.
Substation Single-line Diagram (site plan)	(1) Dover Substation 888S.	Included in Attachment 4-2, Dwg.A-04 , (site plan), submitted under (2) Transmission Line 9L57.
Air Photo Mosaics	(2) Transmission Line 9L57.	Attachment 5, Dwg.A-05 (route mosaic), submitted under (2) Transmission Line 9L57.
Conservation & Reclamation Plan	(2) Transmission Line 9L57.	Attachment 2 , submitted under (2) Transmission Line 9L57.
Route Maps	(2) Transmission Line 9L57.	Attachment 4 (pt.2), Dwg.A-04 , (site plan), submitted under (2) Transmission Line 9L57.
Transmission Line Maps	(2) Transmission Line 9L57.	Attachment 7, Dwg. RS-GTower-240SC (typical structure), submitted under (2) Transmission Line 9L57.
Functional Specifications	(1) Dover Substation 888S and (2) Transmission Line 9L57.	Attachment 9 , AESO's Functional Specification for Edmonton Region 240 kV Upgrades (Rev.1, April 9, 2009), submitted under (1) Dover Substation 888S.
Participant Involvement Program (Per AUC Rule 007)	(1) Dover Substation 888S and (2) Transmission Line 9L57.	Attachment 10 , public notification package, submitted under (1) Dover Substation 888S.



ATCO Electric

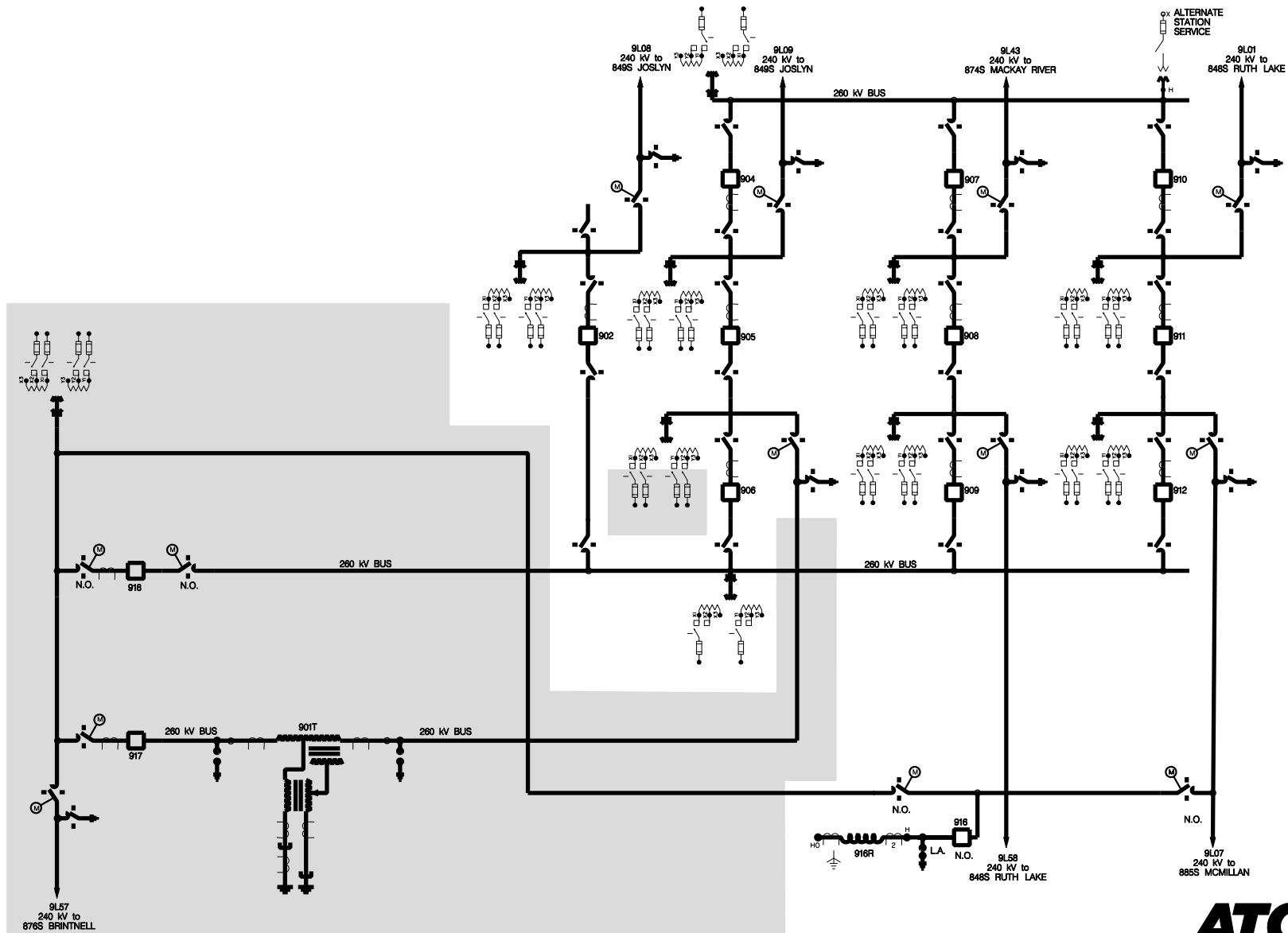
Dover Substation
Alteration Project

REGIONAL MAP
ATTACHMENT 4



Dover Substation
Alteration Project

DOVER SUBSTATION 888S
SITE PLAN

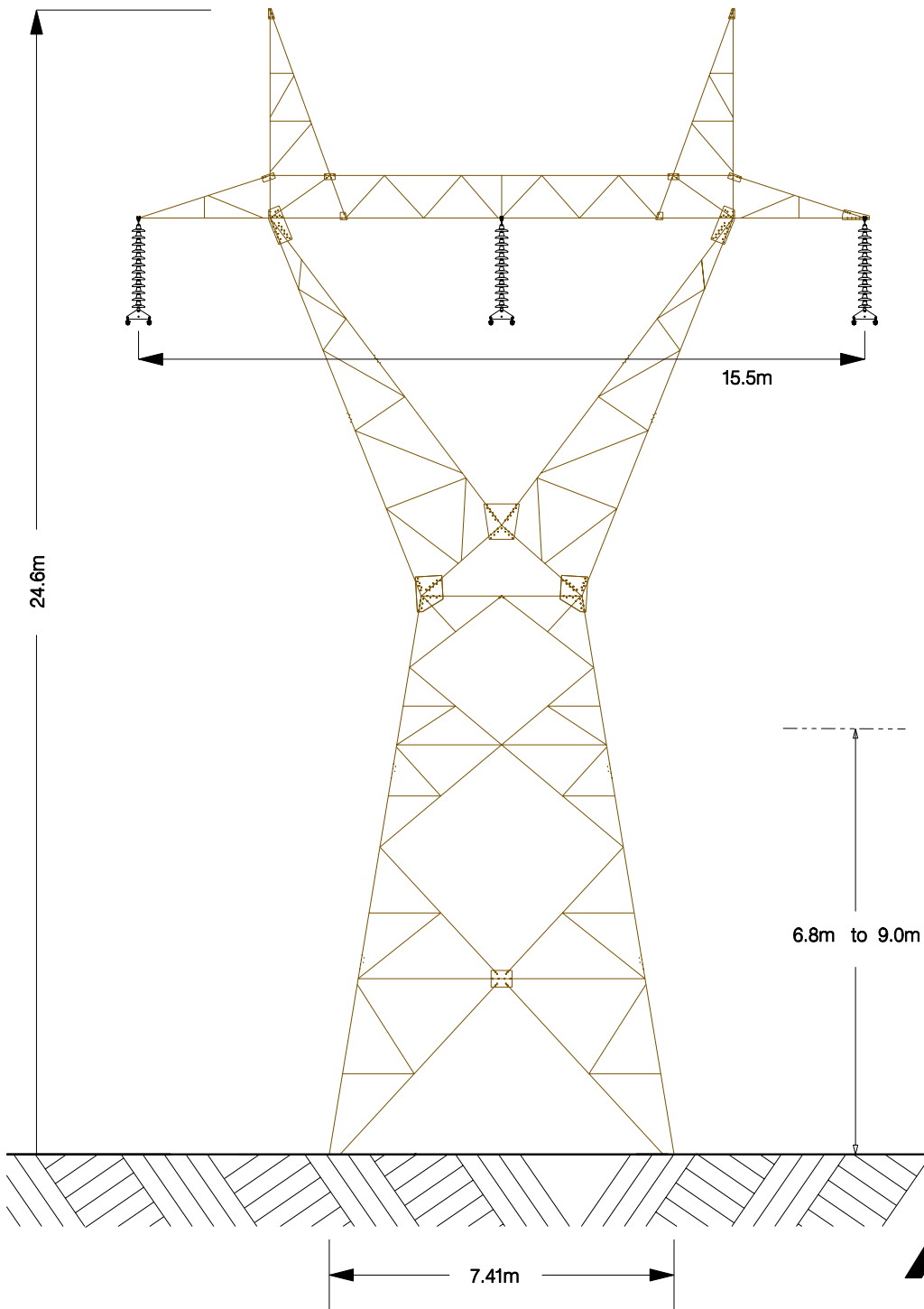


Dover Substation
Alteration Project

DOVER SUBSTATION 888S
PROPOSED SINGLE LINE DIAGRAM

PROPOSED ADDITIONS /
ALTERATIONS

Typical Steel Single Circuit 240 kV "G - Tower" Structure



Approximate Dimensions	
Height.....	24.6m
Max.Width.....	16m
Distance Between Structures.....	250-300m



240 kV Transmission Project

TYPICAL STRUCTURE
"G" TOWER