



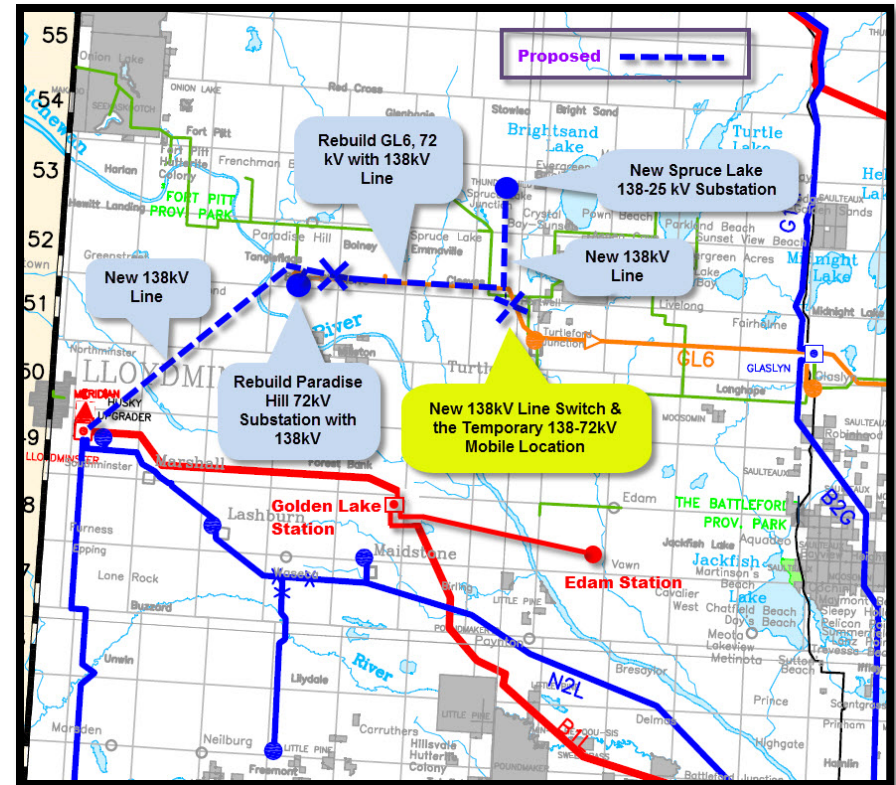
Lloydminster to Spruce Lake 138kV Transmission Line Projects

Preferred Corridor Presentation

June 2017

Project Need

- SaskPower continues to invest in the province's electricity system to ensure we have the infrastructure in place to meet the growing need for power in Saskatchewan.
- As part of this investment, SaskPower is proposing to replace aging infrastructure and construct new facilities in the Lloydminster, Paradise Hill and Spruce Lake areas.
- These projects are designed to improve service reliability, help support oilfield development, and contribute to the overall plan for reinforcing the area.



Project Description

- SaskPower is proposing two new 138-25kV substations.
 - One substation will replace the existing 72-25kV Paradise Hill Substation located approximately 10 km south of the Village of Paradise Hill.
 - The second substation will be located approximately 10 km southeast of the Town of St. Walburg and 6 km northeast of the Hamlet of Spruce Lake.
- A new 138kV transmission line will be constructed.
 - The new line will come from the Lloydminster Switching Station, cross the North Saskatchewan River, and connect to the new Paradise Hill Substation.
 - From the new Paradise Hill Substation, it will head east running parallel to a portion of the existing 72kV GL6 transmission line.
 - The final line segment will connect the new Spruce Lake Substation to the new line proposed to run parallel to the existing GL6 transmission line.
- The existing Paradise Hill and Bolney substations will be salvaged. The existing GL6 line will remain for planned and future distribution use.

Project Description

- The total length of new transmission line for the project is approximately 76 to 79 km depending on the final Spruce Lake Substation Site selected.
- Load served out of the existing Paradise Hill and Bolney Substations will be transferred to the new substation.
- Salvage of the existing Paradise Hill and Bolney Substations will occur following the construction and energization of the new transmission lines and substations.
- Current scheduled in-service date for the projects is start of 2020

138kV Transmission Line Project Schedule

- | | |
|---|-----------------------|
| • Alternative routes selection | Nov 2016 - Feb 2017 |
| • First round of public consultation | March 2017 |
| • Preferred route selection | April – May 2017 |
| • Second round of public consultation | June 2017 |
| • Geotechnical study of river crossing | July - August 2017 |
| • Environmental field studies | July 2017 – Sept 2018 |
| • Submission to Ministry of Environment | October 2018 |
| • Engineering design | July 2017 – Dec 2018 |
| • Easement acquisition | Sept 2018 – Dec 2018 |
| • Construction | Dec 2018 – Dec 2019 |
| • Energization | January 2020 |

Lloydminster Switching Station, Paradise Hill and Spruce Lake Substations Project Schedule

- | | |
|---|---------------------------|
| • Site selection for new substations | Dec 2016 – Ongoing |
| • Site design | Jan 2017 – September 2018 |
| • Lloydminster Switching Station construction | July 2018 – April 2019 |
| • Paradise Hill Substation construction | July 2018 – April 2019 |
| • Spruce Lake Substation construction | Oct 2018 – December 2019 |
| • Energization Paradise Hill Substation | April 2019 |
| • Energization Spruce Lake Substation | January 2020 |

Route Selection Criteria

- Assess impacts to agricultural operations;
- Assess impacts to the natural environment;
- Assess social and other impacts (such as land use);
- Minimize economic costs (construction and materials, maintenance and operating costs, etc.) associated with the project; and
- Construct on favourable topography and foundation conditions.

Environmental Considerations

SaskPower's goal is to minimize its impact on the biophysical and human environment. This is achieved by:

- Compliance with all regulatory requirements (Municipal, Provincial and Federal);
- Consultation with elected officials, Aboriginal groups, landowners, and other potentially affected groups and individuals as applicable;
- Avoiding or mitigating impacts to rare and endangered species and their habitats and sensitive landscape features (*i.e.*, sand hills, wetlands, native prairie, heritage resources);
- Use of existing rights-of-way and previously disturbed areas; and
- Accommodating local land uses and infrastructure.

Photographs of Corridor Options



Big Gully Creek Valley crossing in the vicinity of the North B Corridor



Numerous water bodies in the study area



Extensive oil and gas development in the study area



Example of terrain on the GL6 to Spruce Lake segment

138kV Single-Circuit H-Frame Tangent Structure



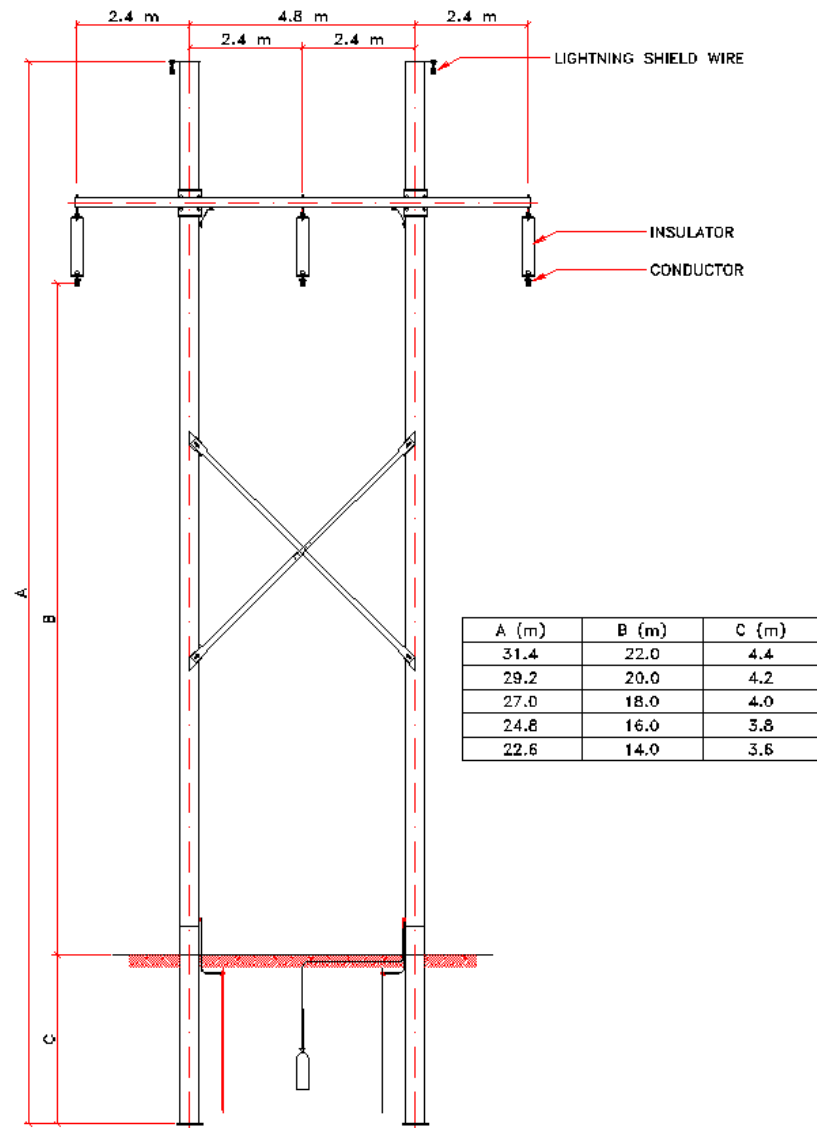
138kV Single-Circuit Tubular Steel H-Frame Tangent Structure (T61/001)

Pole Spacing: 4.8m (16ft)

Structure Height: 19 - 27m (62 - 89ft)

Average Span: ~300m (985ft)

Deflection Structures: Guy-anchored



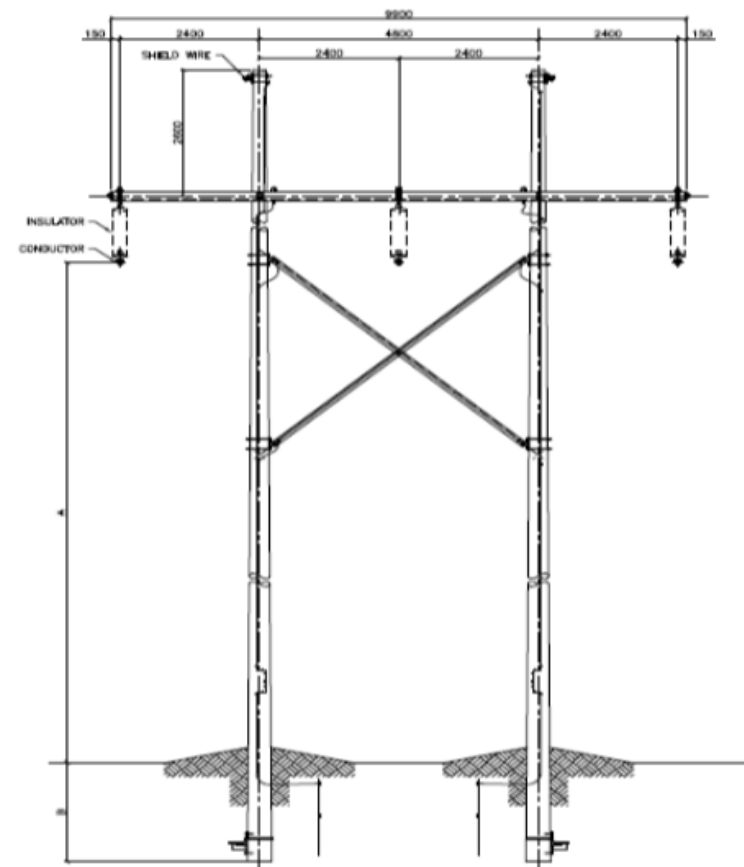
138kV Single-Circuit Wood H-Frame Tangent Structure Steel Crossarm & Crossbraces (D14/902)

Pole Spacing: 4.8m (16ft)

Structure Height: 19.8 – 25.9m (65 - 85ft)

Average Span: ~225m (740ft)

Deflection Structures: Guy-anchored



POLE LENGTHS	DIMENSIONS	
	A (3/8 IN)	B
50' = 50'	29'-11"	7'-0"
15240 = 15240	9130	2134
55' = 55'	34'-5"	7'-0"
16780 = 16780	10502	2288
60' = 60'	38'-11"	8'-0"
18290 = 18290	11874	2438
65' = 65'	43'-5"	9'-0"
19810 = 19810	13245	2591
70' = 70'	47'-11"	9'-0"
21340 = 21340	14617	2743
75' = 75'	52'-5"	9'-0"
22860 = 22860	15988	2898
80' = 80'	56'-11"	10'-0"
24380 = 24380	17360	3048
85' = 85'	61'-5"	10'-0"
25910 = 25910	18732	3200

Pole Spacing: 4.8m

Structure height : 19.8m-25.9m

Structure Type: Wood

Average span: 225m (740ft)

SaskPower Standard Single Circuit H-Frame Tangent Wood Structure D14-902 (With steel crossarm & Crossbraces)

138kV Double-Circuit
Steel Lattice Tower Structure

Structure Height: 50 -120m (164 - 394ft)

Span: 1150 - 1450m (3,773 – 4,757ft)



138kV Single-Circuit
Tubular Steel Single-Pole
Tangent Structure
(T67/001)



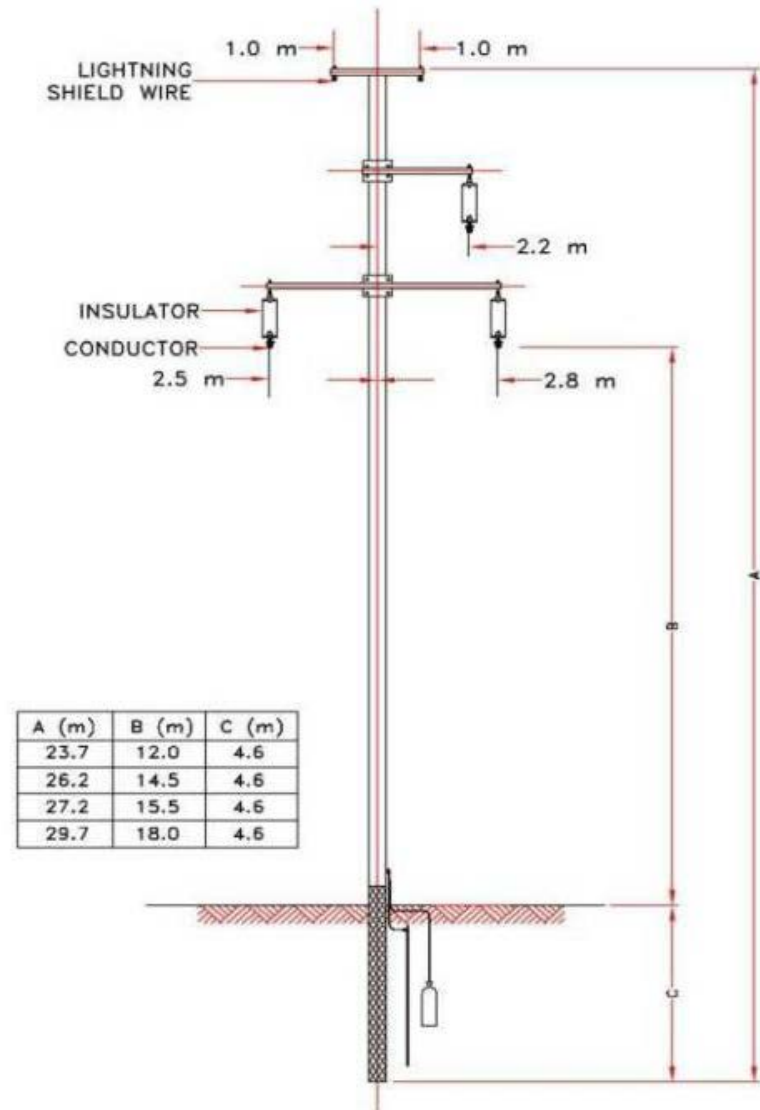
138kV Single-Circuit Tubular Steel Single-Pole Tangent Structure (T67/001)

Structure Height: 19 - 27m (62 - 89ft)

Average Span: ~150m (490ft)

Deflection Structures: Guy-anchored

Structures located 0.6m (2ft) inside
boundary of road allowance where
practical



Tap Structure



Switch Structure



Switch structure next to H-frame structure

Anchored Structures

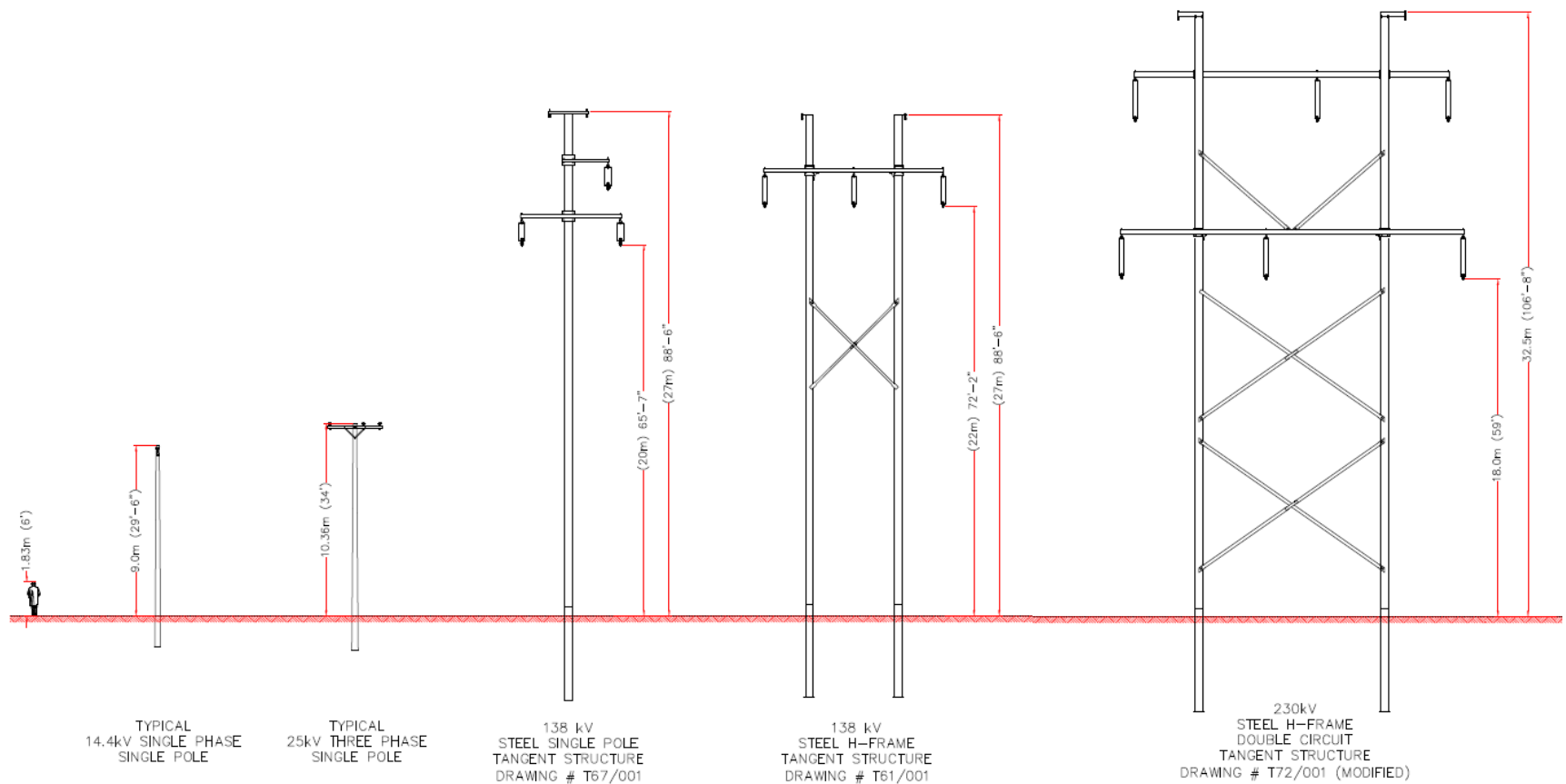


Medium Angle Deflection Structure



Heavy Angle Deflection Structure

Size Comparison of Distribution & Transmission Lines



138kV Minimum Clearance of Conductor

Over Farmland	7.5 metres (24.6 feet)
Over Highways	7.8 metres (25.6 feet)
Over High Load Corridors	10.65 metres (34.9 feet)
Over Railways	8.7 metres (28.5 feet)

Typical 138kV Right-of-Way Width

Single-Pole Standard Width	20 metres (66 feet)
H-Frame Standard Width	30 metres (98 feet)

Right-of-Way Preparation



Drum-style mulcher used for tree clearing



Hydro-axe equipment used for tree clearing

Right-of-Way Preparation (cont.)



Drum mulcher clearing a right-of-way for a new transmission line



Cleared right-of-way ready for construction

Structure Setting



Auguring pole foundation



Temporary crane pad leveled for structure setting

Structure Setting



Conductor Stringing



Temporary rider poles



Conductor on reels



Stringing equipment

Conductor on dollies during stringing

Other Construction Activities



Installing ground rods



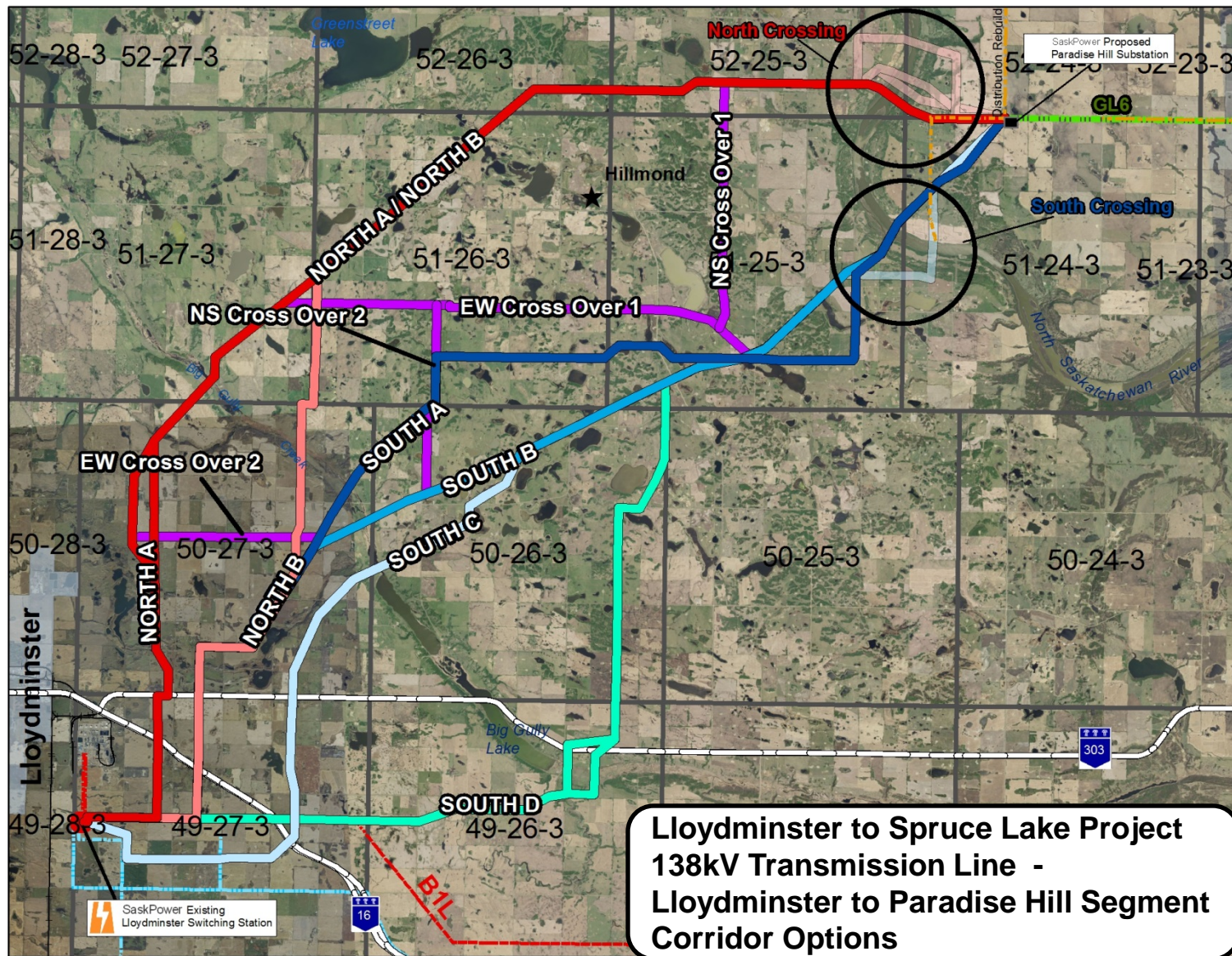
Installing sacrificial anodes



Crushed rock backfill



Tension (proof) testing anchors





Total Length and Land Use

Route Alternative	Total Length (km)	Percentage on cultivated land	Percentage on legal boundaries
NORTH A	49.2	81	18
NORTH B	50.2	79	33
SOUTH A	47.5	68	29
SOUTH B	43.0	63	17
SOUTH C	44.8	64	2
SOUTH D	50.2	70	0
PREFERRED CORRIDOR (MODIFIED SOUTH C)	42.6	65	2

Residences

Route Alternative	Residences within 45m	Residences within 45 – 160m	Residences within 160m – ½ mile
NORTH A	0	1	61
NORTH B	0	2	48
SOUTH A	0	2	46
SOUTH B	0	1	44
SOUTH C	0	0	24
SOUTH D	0	1	34
PREFERRED CORRIDOR (MODIFIED SOUTH C)	0	0	32

Oil and Gas Infrastructure

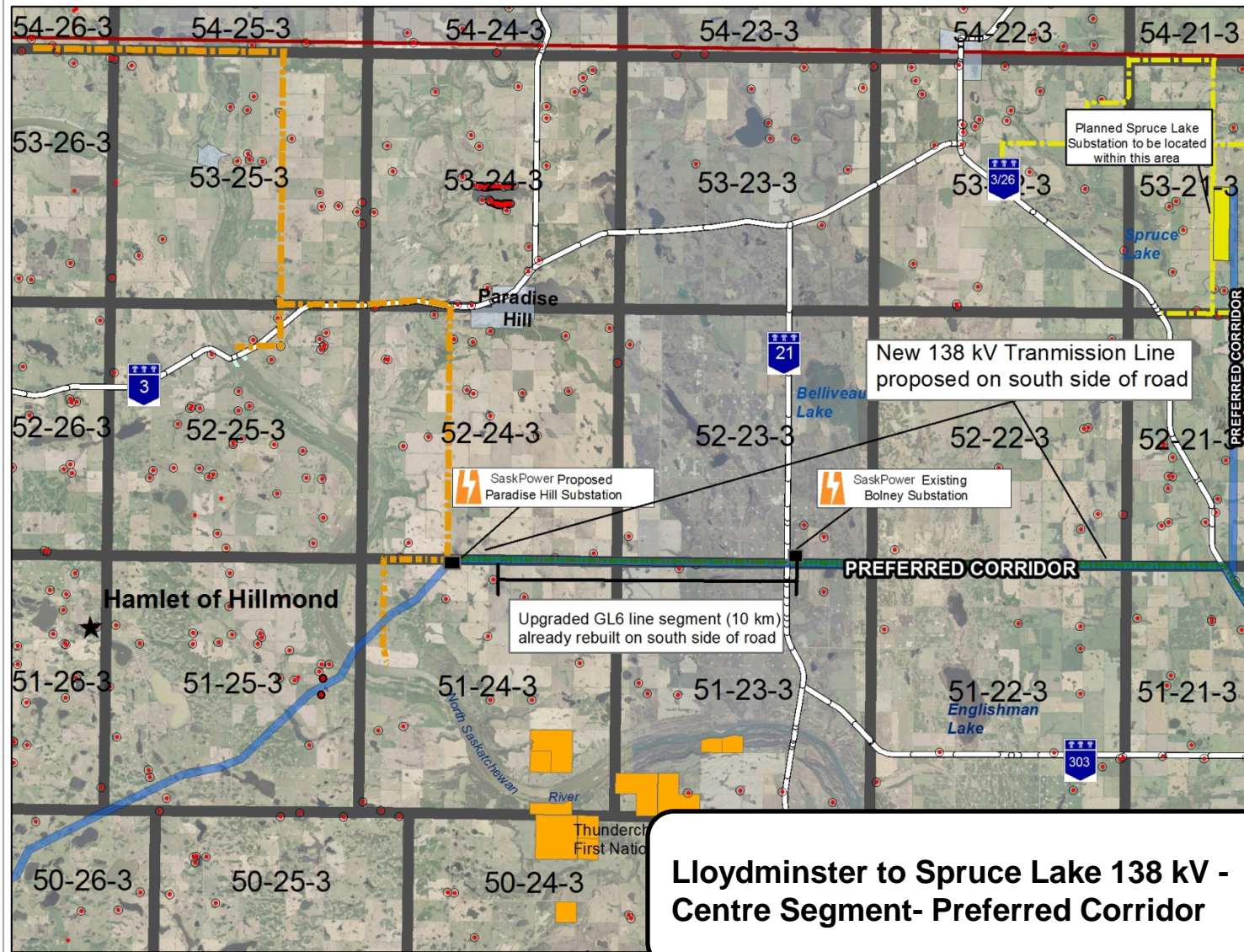
Route Alternative	Licenced Wells Within 100m	Number of underground pipeline crossings
NORTH A	8	25
NORTH B	14	29
SOUTH A	23	32
SOUTH B	24	30
SOUTH C	37	39
SOUTH D	33	69
PREFERRED CORRIDOR (MODIFIED SOUTH C)	27	39

Estimated Cost

Route Alternative	Percentage cost (over lowest cost option)
NORTH A	+19%
NORTH B	+22%
SOUTH A	+13%
SOUTH B	+2%
SOUTH C	+6%
SOUTH D	+21%
PREFERRED CORRIDOR (MODIFIED SOUTH C)	LOWEST COST

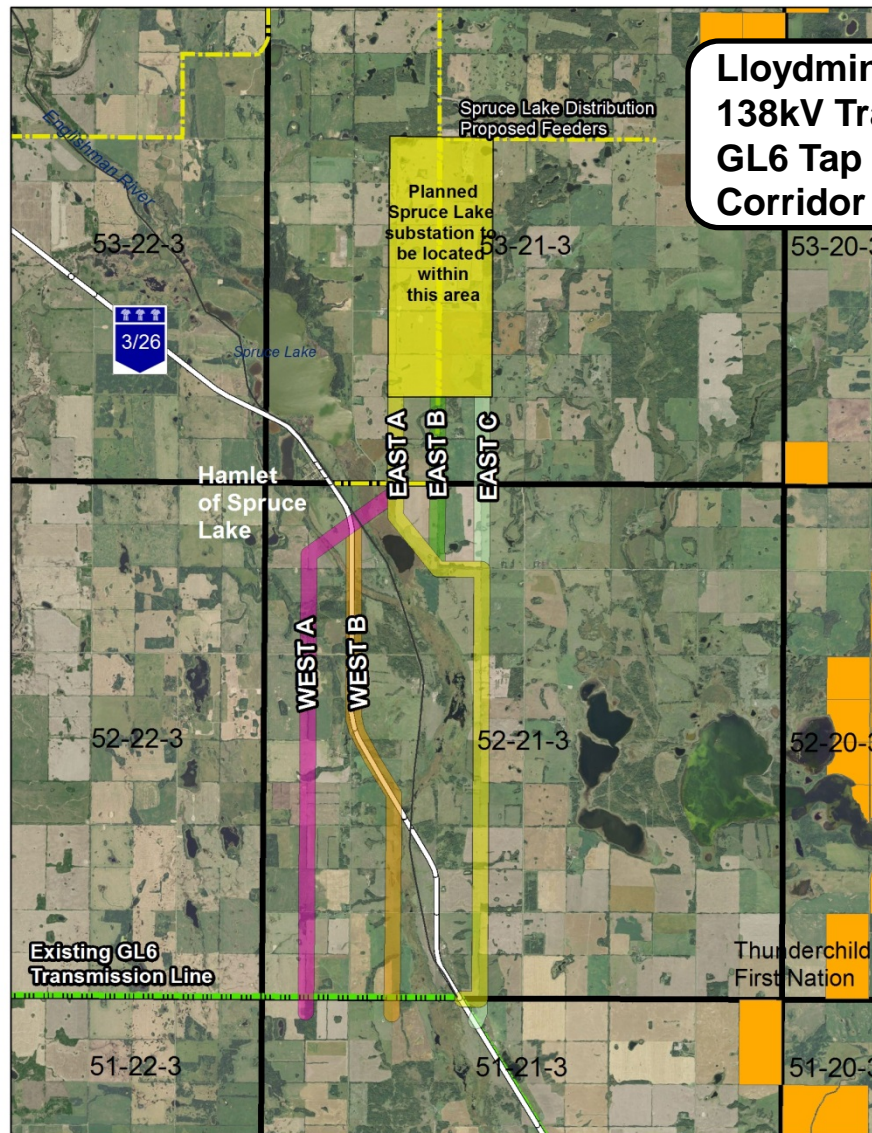
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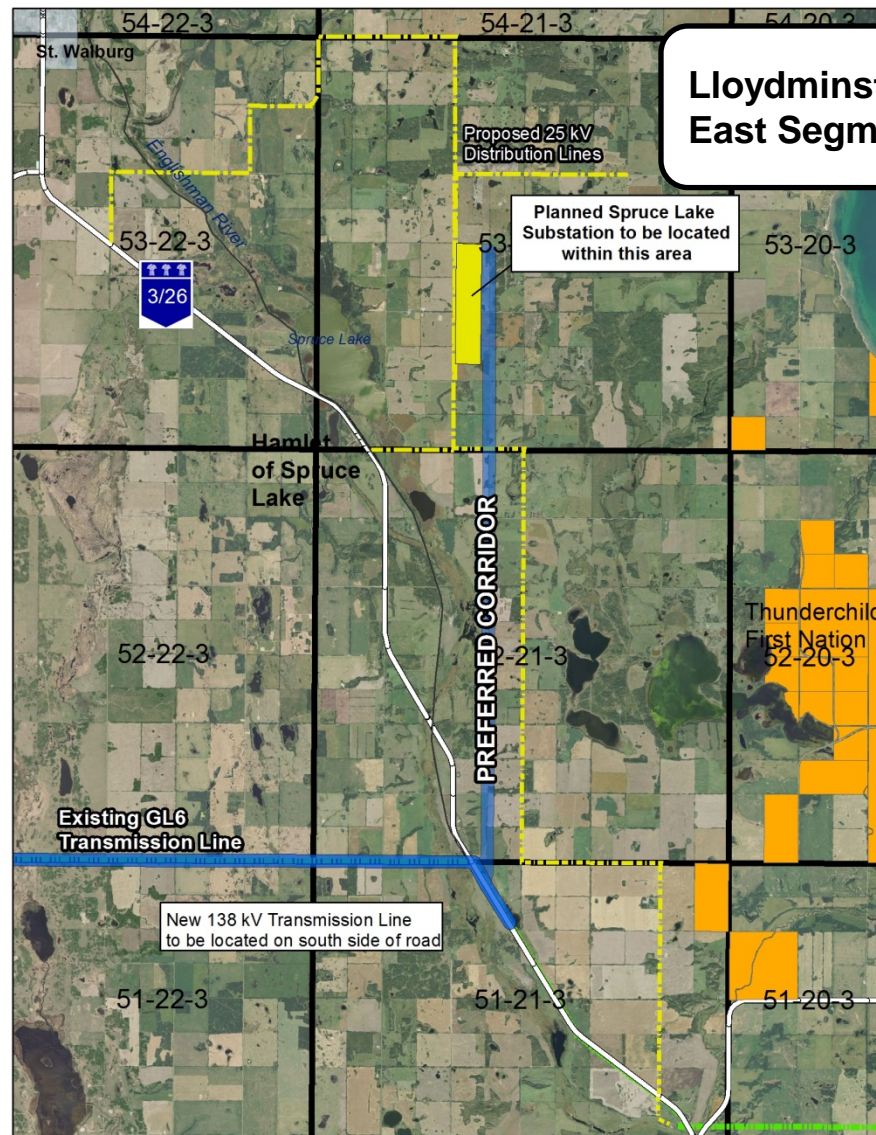
- Cost estimates presented for comparison purposes are based on 2016 rates and subject to change.
- Cost estimates provide routing cost comparison and do not factor in total project costs such as landowner compensation, environmental mitigation, specialized structures or specialized construction.



Lloydminster to Spruce Lake 138 kV - Centre Segment- Preferred Corridor

Lloydminster to Spruce Lake Project 138kV Transmission Line - GL6 Tap to Spruce Lake Segment Corridor Options





Lloydminster to Spruce Lake 138 kV – East Segment – Preferred Corridor

Total Length and Land Use

Route Alternative	Total Length (km)*	Percentage on cultivated land	Percentage on legal boundaries
WEST A	13.6-16.0	83	85
WEST B	13.7-16.1	61	37
EAST A	14.2-16.6	85	87
EAST B	13.2-15.9	84	52
EAST C - PREFERRED	13.1-15.8	80	95

*Total line length dependent on final site selected for the Spruce Lake Substation

Residences

Route Alternative	Residences within 45m	Residences within 45 – 160m	Residences within 160m – ½ mile
WEST A	0	0	11
WEST B	0	0	11
EAST A	0	0	11
EAST B	0	1	10
EAST C - PREFERRED	0	0	11

Oil and Gas Infrastructure

Route Alternative	Licenced Wells Within 100m	Number of underground pipeline crossings
WEST A	3	2
WEST B	3	1
EAST A	4	1
EAST B	2	1
EAST C - PREFERRED	2	1

Estimated Cost

Route Alternative	Percentage cost (over lowest cost option)
WEST A	+3%
WEST B	+14%
EAST A	+9%
EAST B	+1%
EAST C - PREFERRED	LOWEST COST

Note:

- Cost estimates presented for comparison purposes are based on 2016 rates and subject to change.
- Cost estimates provide routing cost comparison and do not factor in total project costs such as landowner compensation, environmental mitigation, specialized structures or specialized construction.

OPEN HOUSE

Lloydminster to Spruce Lake 138kV Projects

SaskPower invites anyone interested in these projects to attend one of the following open house information sessions and offer comments to the project team.

Location: Centennial Civic Centre Auditorium
5405 49th Ave, Lloydminster
Date: Tuesday, June 27, 2017
Time: Noon - 7:00 p.m.

Location: Paradise Hill Community Centre
Date: Wednesday, June 28, 2017
Time: Noon - 7:00 p.m.

An aerial photograph of a vast landscape. In the foreground, there is a dense forest of bare, light-colored trees. Beyond the forest, a wide river flows horizontally across the middle of the frame. The far bank of the river is a flat, open landscape with patches of brown and green. The sky is filled with soft, white clouds. The entire image is framed by a thick orange border.

THANK YOU