



BLUE HILL WIND GENERATION FACILITY TRANSMISSION LINE PROJECT



June 2019

PROJECT NEED

- **Build a transmission line** to connect the new 176 MW Blue Hill wind generation facility to the grid.
- **Increase total power generation installed capacity** in Saskatchewan by approximately 3.9% to meet growing energy consumption.
- **Increase renewable power generation installed capacity** in Saskatchewan by 16% and further reduce carbon emission.



PROJECT DESCRIPTION

- Build a new 230 kV switching station near the existing Herbert tap;
- Construct approximately 23 km new 230 kV single circuit transmission line to connect the Blue Hill Wind Farm to the new switching station using steel H-Frame structures; and
- The new service line and the new 230 kV Pasqua to Swift Current transmission line will go in and out of the new switching station.

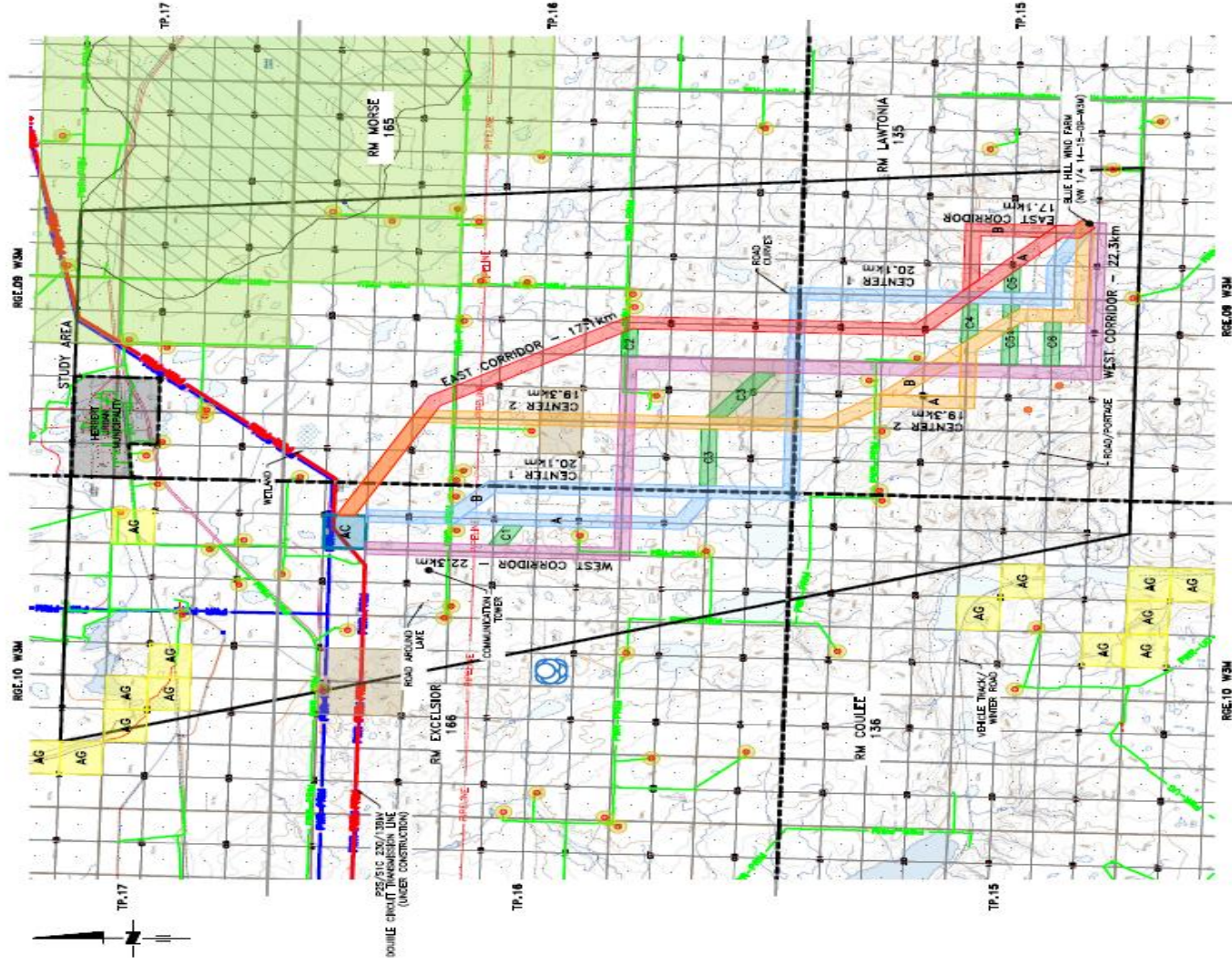


ENVIRONMENTAL ASSESSMENT & APPROVALS

Throughout the planning and construction of the proposed transmission line we will be in on-going communication with the Ministry of Environment (ENV). This will ensure that all regulatory process and procedures are met as required.



ALTERNATIVE CORRIDORS



LEGEND

- | | |
|--|--|
| | EXISTING 230kV TRANSMISSION LINE |
| | EXISTING 138kV TRANSMISSION LINE |
| | EXISTING 72kV TRANSMISSION LINE |
| | EXISTING OVERHEAD DISTRIBUTION LINE |
| | EXISTING UNDERGROUND DISTRIBUTION LINE |
| | EXISTING FIBRE OPTIC CABLE |
| | EXISTING RM/TOWN BOUNDARY LINES |
| | PROPOSED ROUTE CORRIDOR WEST |
| | PROPOSED ROUTE CORRIDOR CENTER 1 |
| | PROPOSED ROUTE CORRIDOR CENTER 2 |
| | PROPOSED ROUTE CORRIDOR EAST |
| | PROPOSED ROUTE CROSSINGS |
| | PREFERRED STATION LOCATION |
| | KNOWN AREA OF RARE SPECIES |
| | MAGNETARY BIRD |
| | POTENTIAL GRASSLAND EXP |

NOT FOR CONSTRUCTION

[illegible]

DISCLAIMER

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UPPER RURAL RESIDENCE
O DENOTES 80m MINIMUM AVOIDANCE BUFFER)
LOW DENOTES 160m AVOIDANCE BUFFER)

POTENTIAL ROUTE ALTERNATIVE COMPARISONS

	WEST	CENTER 1A	CENTER 1B	CENTER 2A	CENTER 2B	EAST A	EAST B
ECONOMIC IMPACTS / ROUTE LENGTH							
Length of transmission line required (km)	22.3	20.1		19.3		17.1	
Cost Estimated from Q4 2018 (T73 structure series = \$529,000/km)	\$11,796,700	\$10,632,900		\$10,209,700		\$9,045,900	
ENVIRONMENTAL IMPACTS							
Permanent Waterbody Crossing	6	8	4	4	4	3	3
Flood Plain, Creek or Coulee Crossing (all spanable)	11	6	6	9	9	3	5
Sensitive Terrain Features (rolling hills)	YES	YES	YES	YES	YES	YES	YES
Archaeological/Heritage Assessment required	YES	YES	YES	YES	YES	YES	YES
Impact on Migratory Birds or Important Bird Areas	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL
Impact on Rare Species	POTENTIAL	POTENTIAL	POTENTIAL	YES	YES	POTENTIAL	POTENTIAL
Impact on Native Grasslands, Undisturbed Lands	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL	POTENTIAL
Impact on Designated Lands, Protected Areas, Conservation Easements	NO	NO	NO	NO	NO	NO	NO
Vegetation Clearing Required	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL
AGRICULTURAL IMPACTS							
Land cover / Land use Type	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland	Agricultural/Modified and Native Grassland
Percent of Route on Cultivated Farmlands (km)	71%	88%	88%	88%	88%	86%	86%
Percent of Route on Modified Grassland (hay/alfalfa) (km)	18%	8%	8%	4%	4%	9%	9%
Percent of Route on Native Grassland (km)	11%	4%	4%	8%	8%	5%	5%
Percent of Route on quarter section or section boundary lines (km)	100%	91%	91%	56%	40%	37%	55%
Percent of Route through quarter sections (not on boundary lines) (km)	0%	9%	9%	44%	60%	63%	45%
Percent of route through hilly terrain (km)	40%	40%	40%	35%	35%	44%	44%
SOCIAL RESIDENTIAL IMPACTS							
Within 2.5km clearance to urban municipality boundaries	NO	NO	NO	NO	NO	NO	NO
Within 800m clearance to residences / outbuildings	5	4	4	4	5	2	2
Within 60-160m clearance prudent avoidance residential buffer	0	0	0	0	0	0	0
Within 60m minimum clearance buffer	0	0	0	0	0	0	0

STAKEHOLDER FEEDBACK

We received feedback from the majority of impacted landowners. We were asked to:

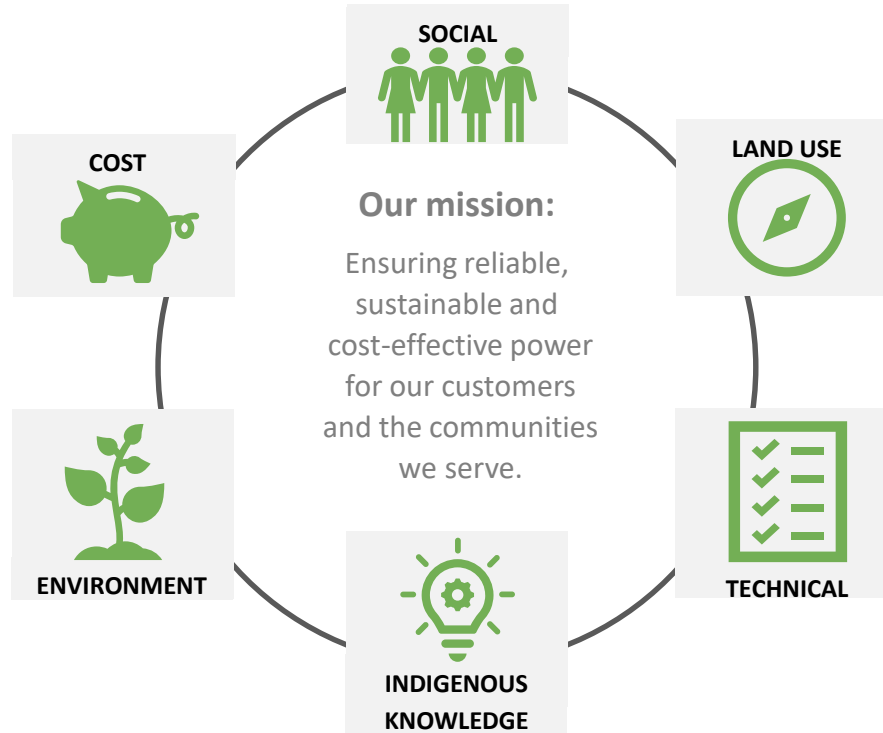
- Minimize disturbance to the environment and wildlife including leks and raptor stick nests.
- Preserve archaeological resources including teepee rings.
- Build along fence/quarter section line to avoid placing structures diagonally across agricultural land.

We will be doing additional consultation and collecting feedback on the preferred route.

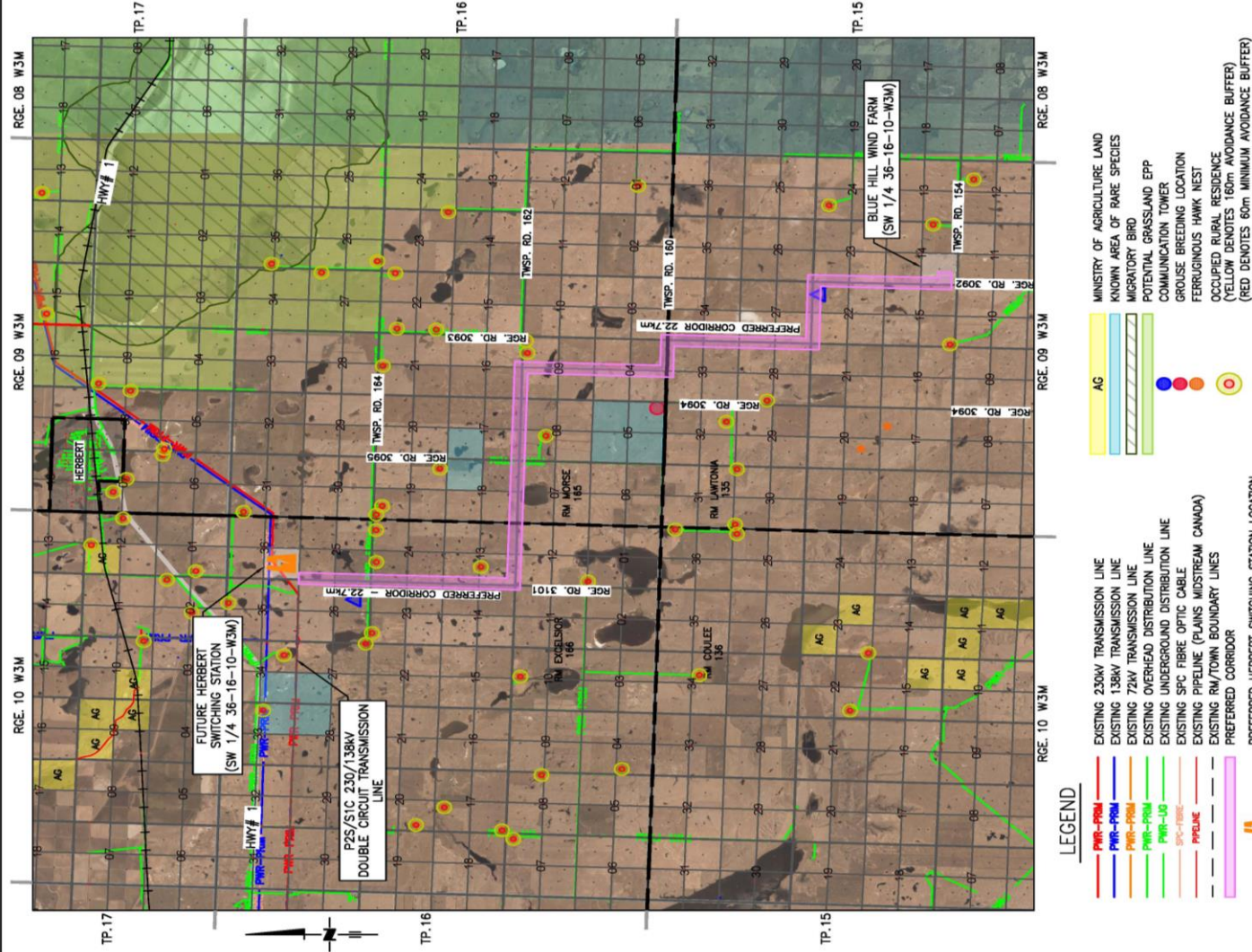


ROUTING CONSIDERATIONS

Selecting a preferred route requires a balanced look at many factors. SaskPower has six considerations that inform the decision-making process for all routing projects:



PREFERRED ROUTE



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PREFERRED
230kV ROUTE CORRIDOR AND
STATION LOCATION
BLUE HILL WIND GENERATION

POTENTIAL ROUTE ALTERNATIVE COMPARISONS

	PREFERRED ROUTE	WEST	CENTER 1A	CENTER 1B	CENTER 2A	CENTER 2B	EAST A	EAST B	AVERAGE
Length of transmission line required (km)	22.7	22.7	21.1		20.3		18.2		20.6
Cost Estimated from Q1 2019 (T73 structure series = \$550,000/km)	\$12,485	\$12,485	\$11,605		\$11,165		\$10,010		\$11,316
Estimated number of heavy angle/deadend structures (one at each station location is included)	8	5	8	8	9	6	5	6	7
Percentage cost premium	20%	20%	14%		10%		LEAST COST OPTION		15%
Permanent Waterbody Crossing	5	6	8	4	4	4	3	3	5
Flood Plain, Creek or Coulee Crossing (all spanable)	3	11	6	6	9	9	3	5	7
Percent of Route on Cultivated Farmlands (km)	78%	71%	88%	88%	88%	88%	86%	86%	85%
Percent of Route on Modified Grassland (hay/alfalfa) (km)	15%	18%	8%	8%	4%	4%	9%	9%	9%
Percent of Route on Native Grassland (km)	7%	11%	4%	4%	8%	8%	5%	5%	6%
Percent of Route on quarter section or section boundary lines (km)	100%	100%	91%	91%	56%	40%	37%	55%	67%
Percent of Route through quarter sections (not boundary lines) (km)	0%	0%	9%	9%	44%	60%	63%	45%	33%
Percent of route through hilly terrain (km)	38%	40%	40%	40%	35%	35%	44%	44%	40%
Within 800m clearance to residences / outbuildings	4	5	4	4	4	5	2	2	4
Total Number of Constraints	6	9	6	5	6	6	4	4	6

PROJECT SCHEDULE

- Consultation Round 1: Q1, 2019
- Consultation Round 2: Q2, 2019
- Engineering / Design Complete: Q3, 2020
- Easement / Permitting Complete: Q3, 2020
- Construction Start: Q4, 2020
- Construction Complete / ISD: Q2, 2021

STRUCTURE TYPE

230kV Single-Circuit
Tubular Steel H-Frame
Tangent Structure
(T70/001)



STRUCTURE TYPE

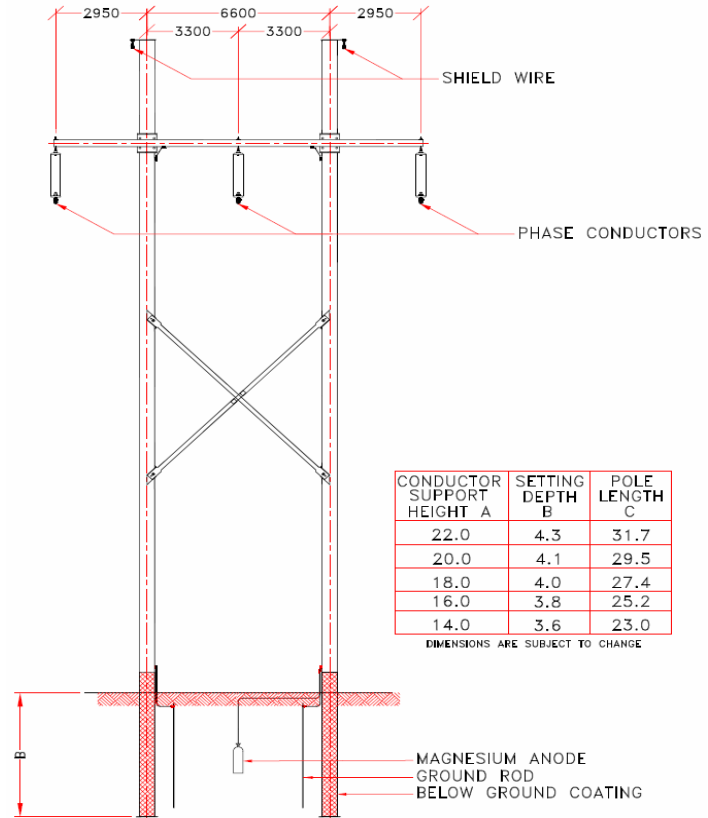
230kV Single-Circuit Tubular Steel H-Frame Tangent Structure (T70/001)

Pole Spacing: 6.6m (22ft)

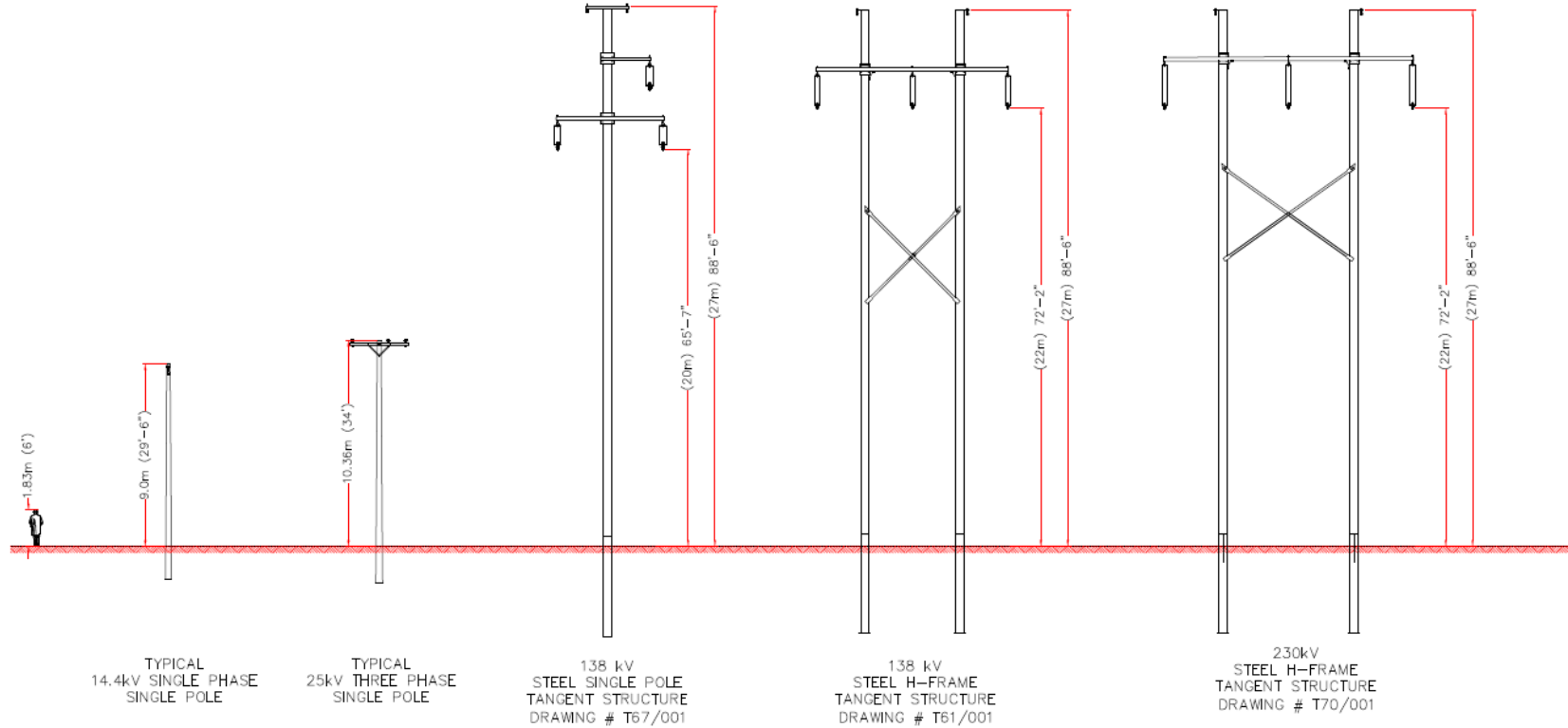
Structure Height: 19-27m (62-89ft)

Average Span: ~240m (787ft)

Deflection Structures: Guy-anchored



SIZE COMPARISON OF DISTRIBUTION & TRANSMISSION LINES



230 KV MINIMUM CLEARANCE OF CONDUCTOR

Over Farmland	8.1 meters (26.6 feet)
Over Highways	8.4 meters (27.5 feet)
Over High Load Corridors	11.25 meters (36.9 feet)
Over Railways	9.3 meters (30.5 feet)

TYPICAL 230 KV RIGHT-OF-WAY

H-Frame Standard Width..... 40 meters (131 feet)

ANCHORED STRUCTURES



Heavy Angle Deflection Structure



Medium Angle Deflection Structure

RIGHT-OF-WAY PREPARATION



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



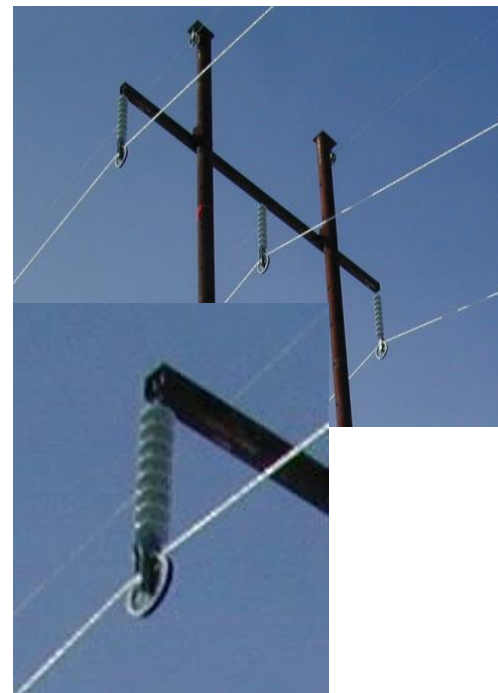
Temporary rider poles



Helicopter Conductor Stringing



Stringing equipment



Conductor on dollies during stringing

OTHER CONSTRUCTION ACTIVITIES



Installing ground rods



Installing sacrificial anodes



Crushed rock backfill



Tension (proof) testing anchors

COMMENTS, QUESTIONS AND SUGGESTIONS

EMAIL: PublicConsultation@saskpower.com

BY PHONE: 1-833-223-3370 (toll free)

IN PERSON: Attend our open house at
the Morse Community Hall, Morse SK to discuss the preferred route
on June 20, 2019
Anytime between: 12 p.m. and 7 p.m. (come-and-go format)

Everyone is welcome to attend.