



This information is for environmental review purposes only.

— Proposed Project Route

- - Alternative Route

0 250 500 750 Feet



Figure 2.2.4-2
Alberta Clipper and Southern Lights Diluent Projects
 Middle River Alternative



The project route would deviate from the northern Enbridge pipeline right-of-way to route directly adjacent to the south of the LSr Project's south side at MP 835.6 and proceed southeast to present a perpendicular waterbody crossing. The project route would continue to parallel the LSr Project and turn southeast for 1,800 feet, cross the river, turn south for 200 feet, and then cross under Marshall County Road 4 before turning east for 800 feet and rejoining the south side of the northern Enbridge pipeline right-of-way. Table 2.2.4-2 provides a comparison of environmental features for the two routes.

Environmental Features	Unit	Proposed Project Route	Middle River Alternative
Length	miles	0.5	0.5
Adjacent to Existing Right-of-Way	feet	2,800	2,640
Greenfield Route	feet	0	0
NWI-mapped Wetlands Crossed	feet	0	0
Highly Wind Erodible Soils ^b	miles	0.3	0.2
Shallow Bedrock	feet	0	0
Hydric Soils	miles	0.2	<0.1
Prime Farmland Soils	miles	0.1	0.2
Forest Land Affected	miles	<0.1	<0.1
Agricultural Land Affected	miles	0.4	0.5
Herbaceous Land Affected	miles	0	0
Open Water Crossed	feet	50	50
Intermittent Waterbodies Crossed	no.	0	0
Perennial Waterbodies Crossed	no.	1	1
Railroad Crossings	no.	0	0
Interstate and Highway Crossings	no.	1	1

^a Route characteristics that were not significantly different were not included in this comparison.
^b Indicates length of route that would cross soils with a wind erodible index of a potential for a loss of 134 to 310 tons per acre per year.

The project route would deviate from northern Enbridge pipeline right-of-way for a total of 2,800 feet compared to the 2,640-foot-long Middle River Alternative. No NWI-mapped wetlands would be crossed by either route. Both routes would traverse similar flat river basin terrain before reconnecting with the northern pipeline right-of-way. The Middle River Alternative would cross more forested and agricultural land adjacent to the river compared to the project route. Neither of the routes would cross any shallow bedrock. The project route would cross 370 feet more highly wind erodible soils, 528 feet more of hydric soils, 422 feet less of prime farmland soils, less forest land, and less prime farmland when compared to the Middle River Alternative.

In summary, the project route would require widening the LSr Project right-of-way located approximately 400 feet south of the northern Enbridge right-of-way; however, this would decrease disturbance to a highly erodible steep bank, forest land, and agricultural land when compared to the alternative route to the north.

Snake River Alternative

The Snake River Alternative would parallel the south side of the northern Enbridge pipeline right-of-way between MPs 842.9 and 843.4, and would cross the river adjacent to the existing five pipelines (see figure 2.2.4-3). The Snake River Alternative would be 2,429 feet long and be parallel to the river in two locations within the right-of-way. The alternative alignment would present significant construction and restoration issues due to a meandering channel on both sides of the alignment. In addition, steep banks on the east side would further complicate this crossing and threaten maintaining a stable right-of-way due to potential undercutting during high water flow periods.

The project route would be 2,481 feet long and route south, directly adjacent to the LSr Project. It would depart the northern Enbridge pipeline right-of-way to remain parallel with the LSr Project just east of Marshall County Road 14 and proceed southeast for approximately 1,400 feet beginning west of the high bank of the river, allowing for a perpendicular waterbody crossing. The project route would then turn east-southeast to rejoin the northern Enbridge pipeline right-of-way with the LSr Project. The project route would alleviate potential construction and future operational issues and also preserve the river’s natural channel configuration across Enbridge’s northern right-of-way. A widened LSr Project right-of-way would result along the route’s corridor. Table 2.2.4-3 provides a comparison of environmental features for the two routes.

Environmental Features	Unit	Proposed Project Route	Snake River Alternative
Length	Miles	0.5	0.5
Adjacent to Existing Right-of-Way	Feet	2,481	2,429
Greenfield Route	Feet	0	0
NWI-mapped Wetlands Crossed	Feet	0	129
Highly Wind Erodible Soils ^b	feet	0.4	0.3
Shallow Bedrock	Feet	0	0
Hydric Soils	Miles	<0.1	0.1
Prime Farmland Soils	Miles	<0.1	0.0
Forest Land Affected	Miles	0.1	0.1
Agricultural Land Affected	Miles	0.4	0.3
Herbaceous Land Affected	Miles	0	0
Open Water Crossed	Feet	13	13
Intermittent Waterbodies Crossed	no.	0	0
Perennial Waterbodies Crossed	no.	1	1
Railroad Crossings	no.	0	0
Interstate and Highway Crossings	no.	0	0

^{a/} Route characteristics that were not significantly different were not included in this comparison.
^{b/} Indicates route length that would cross soils with a wind erodible index of a potential for a loss of 134 to 310 tons /acre/year.



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Figure 2.2.4-3
Alberta Clipper and Southern Lights Diluent Projects
Snake River Alternative



The Snake River Alternative would cross 129 feet of NWI-mapped wetland, compared to no wetlands crossed by the proposed route. Wetlands crossed by the Snake River Alternative include one wetland primarily associated with the river's riparian area. Both routes would cross similar flat river basin terrain before reconnecting with the northern Enbridge corridor's alignment. Neither the project route nor the alternative route would cross any shallow bedrock. The project route would cross 211 feet more of highly wind erodible soils, 106 feet less of hydric soils, and 60 feet more of prime farmland soils than the Snake River Alternative.

In summary, the project route would ensure a perpendicular approach and crossing of the Snake River to alleviate construction and restoration issues. The project route would decrease disturbance to a highly erodible, steep eastern bank on the south side of the northern Enbridge pipeline right-of-way. Construction of the project route would allow for a manageable waterbody crossing.

Clearbrook East Alternative

The Clearbrook East Alternative is approximately 6.3 miles long and would exit the Clearbrook tank facility at MP 909.5 and parallel the southern-most Enbridge corridor's south side eastward until the corridor converges with the northern Enbridge corridor prior to crossing Minnesota State Highway 223 at MP 916.4 (see figure 2.2.4-4). The Clearbrook East Alternative would present a route in proximity of residences, an adjacent crossing of a pond and two archaeological sites at MP 912.2, and a combined wetland and potential parallel stream crossing of Ruffy Brook at MP D914.4.

The project route is approximately 6.4 miles long and would exit the Clearbrook tank facility at MP 909.5 and route parallel to the northern Enbridge corridor's north side eastward until the corridor converges with the southern Enbridge corridor prior to crossing Minnesota State Highway 223 at MP 916.4. The project route would avoid residential encroachment, two archaeological sites at MP 912.2, and would present perpendicular crossings of Ruffy Brook at MPs 913.1, 913.2, and D914.4. The project route would include approximately 2,112 feet of greenfield route to avoid these archaeological sites and present the perpendicular stream crossing at MP 913.2. Table 2.2.4-4 provides a comparison of environmental features for the two routes.

The Clearbrook East Alternative would cross 61 percent more NWI-mapped wetlands, 72 percent more hydric soils, and 60 percent more highly wind erodible soils when compared to the project route. The project route would cross 1,584 additional feet of prime farmland soils and 4,752 feet of additional total agricultural land when compared to the Clearbrook East Alternative.

In summary, the project route would present improved stream crossing construction, contain the least amount of residential congestion, present less total impacts to wetlands, archaeological sites, and wind erodible soils.



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- - Alternative Route

0 1,750 3,500 5,250
 Feet



Figure 2.2.4-4
Alberta Clipper and Southern Lights Diluent Projects
 Clearbrook East Alternative

