Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Red River of the North (09020311-560)	s-160n50w5-a	801.8	Red River	208.5	100	0.41	0.0069	14.5	4.5	0.85	0.15	7.3	3	41.7	35	Section 10, 303(d), Canoe Route, Infested Water (zebra mussel), Public Water	Mercury in fish; Mercury in water column; Turbidity	HDD	The Red River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. In order to entirely avoid the wetland at the southern exit point of the Red River, the HDD would need to be redesigned to add an additional 700 feet to the HDD drill. By shifting and extending the HDD drill path, the corresponding pull-string, or the workspace to the south where the pipe is staged to pull-back through the exit hole, would also be extended 700 feet into a forested wetland to the south. Currently, the HDD entry and exit ATWS have been sited to prevent physical alteration of forested wetlands. A realignment would also move further away from Enbridge's co-located easement on parcel(s) where Enbridge does not have easement agreement(s) in place. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Red River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Ditch	s-160n50w10-a	802.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-160n50w15-a	803.6	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-160n50w15-b	803.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
County Ditch 27 (09020311-509) [c]	s-160n50w23-a	805.4	South	93.7	65	Assume 0.0069	0.0069	15.1	4.5	0.89	0.15	Assume 3.0	3	6.7	35	Public Water	N/A	Dry Crossing	County Ditch 27 is a small, somewhat sinuous stream with a herbaceous wetland riparian zone surrounded by agricultural land. Potential net increases in loading will be reduced by placing ATWS outside of adjacent riparian habitat, and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-160n50w25-a	805.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-160n50w25-b	807.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-160n49w32-a	808.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-160n49w32-b	808.6	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-159n49w4-a	809.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-159n49w4-b	810.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-159n49w9-a	810.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-159n49w9-b	811.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-159n49w15-a	811.5	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-159n49w15-b	812.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
County Ditch No. 7	s-159n49w23-b	812.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-159n49w23-a	814.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-159n49w26-a	814.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Judicial Ditch 10 (09020311-521) [c]	s-159n49w36-a	815.6	South	5.1	65	Assume 0.0069	0.0069	15.1	4.5	0.83	0.15	Assume 3.0	3	10.4	35	Public Water	N/A	Dry Crossing	Judicial Ditch 10 is a channelized ditch with a marginal riparian zone along the slopes of the ditch surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS back from adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Judicial Ditch 3	s-158n48w6-a	816.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Ditch	s-158n48w22-a	821.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-158n48w22-b	821.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-158n48w35-a	823.5	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-157n47w6-a	825.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-157n47w6-b	825.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Tamarac River (09020311-503)	s-157n47w16-aa	828.6	South	17.6	65	Assume 0.0069	0.0069	13.4	4.5	0.22	0.15	Assume 3.0	3	12.2	35	Public Water, 303d Impaired	Aquatic macroinvertebrate bioassessments; Fishes bioassessments	HDD	The Tamarac River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to minimize physical alteration of forested wetland and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Tamarac River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	s-157n47w26-c	831.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-157n47w26-d	831.2 831.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-157n47w26-b	831.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-157n47w36-b	832.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-157n47w36-a	833.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-156n47w1-a	833.6	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-156n47w1-b	834.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-156n47w12-a	835.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-156n46w7-a	835.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-156n46w7-b	835.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Middle River (09020309-540)	s-156n46w7-c	836.0	South	77.5	65	Assume 0.0069	0.0069	15.6	4.5	0.64	0.15	20.4	3	Assume 35	35	NRI, Public Water, 303d Impaired	Aquatic macroinvertebrate bioassessments; Dissolved oxygen; Turbidity	HDD	The Middle River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of forested wetland and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Middle River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Ditch	s-156n46w17-a	837.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	This small, unnamed ditch is has an herbaceous wetland riparian zone and is generally surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS back from adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-156n46w21-a	838.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-156n46w21-b	838.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-156n46w28-a	839.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	This small unnamed stream has a marginal riparian zone along the slopes of the ditch surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS back from adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-155n46w1-a	842.5	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Snake River (09020309-543)	s-155n46w12-a	843.2	South	40.7	65	Assume 0.0069	0.0069	15.5	4.5	0.53	0.15	Assume 3.0	3	11.1	35	Public Water, 303d Impaired	Dissolved oxygen; E. coli; Aquatic macroinvertebrate bioassessments; Fishes bioassessments	HDD	The Snake River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of forested wetland and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Snake River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Ditch	s-155n45w21-b	846.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
South Branch Snake River (09020309-546) c	s-155n45w28-a	847.2	South	40.7	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	Public Water, 303d Impaired	Fishes bioassessments	Dry Crossing	The South Branch Snake River is moderately sinuous with a marginal riparian zone surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS back from adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-155n45w28-c	848.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-155n45w33-a	848.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Stream	s-155n45w34-b	848.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-155n45w34-c	849.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-155n45w34-d	849.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-154n45w2-a	851.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-154n45w11-b	851.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-154n45w11-a	851.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-154n44w18-a	852.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Black River (09020303-557)	s-154n44w20-a_DESKTOP	855.0	South	56.3	65	Assume 0.0069	0.0069	24.5	4.5	0.36	0.15	19.4	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-153n44w3-a	858.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-153n44w11-a	860.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-153n44w13-a	861.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-153n43w18-a	862.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-153n43w19-a	862.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-153n43w19-b	863.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-153n43w20-a	863.3 863.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Red Lake River (09020303-513)	s-153n43w29-a	864.3	South	12.3	65	0.005	0.0069	14.6	4.5	0.16	0.15	7.3	3	20.7	35	Section 10, NRI, Public Water, 303d Impaired, Canoe Route	Mercury in fish	HDD	The Red Lake River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to minimize physical alteration of forested wetland and riparian habitat. The proximity of Highway 32, existing pipeline infrastructure, and the river sinuosity make locating the northern drill workspace completely outside wetland areas unavoidable. Furthermore, moving the mainline valve would require permanent access through an agricultural field and would reduce its effectiveness as a sectionalizing valve, as it would be further from the waterbody and at an increased elevation. However, the southern drill workspace is sited outside of wetland forested riparian habitat in its entirety. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Red Lake River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
County Ditch 21 (09020303-541)	s-153n43w32-a	864.7	South	8.6	65	Assume 0.0069	0.0069	19.1	4.5	3.5	0.15	2.1	3	Assume 35	35	N/A	N/A	HDD	County Ditch 21 is included within the overall Red Lake River HDD, which will prevent an increase in loading of County Ditch 21 during installation. See justification for Red Lake River (MP 864.3).
Unnamed Ditch	s-153n43w33-a	865.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n43w4-a	867.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n43w14-a	869.5	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n43w14-b	869.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	Public Water	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Ditch	s-152n43w14-c	869.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Stream	s-152n43w23-a	870.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n43w24-b	871.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n43w24-c	871.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n42w30-a	872.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n42w30-b	872.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n42w31-a	873.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n42w32-b	873.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-152n42w32-a	873.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Clearwater River (09020305-648)	s-151n42w4-a	875.4	South	29.9	65	Assume 0.0069	0.0069	15.6	4.5	0.4	0.15	4.3	3	Assume 35	35	Public Water, 303d Impaired	Mercury in fish; Turbidity	HDD	The Clearwater River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of forested wetland and riparian habitat; however, physical alteration of wetlands are unavoidable along the pullback section on the eastern side of the river. No trench excavation will occur in the pullback ATWS, only clearing, grading, and installation of construction mats (as necessary) will occur to accommodate construction equipment and the ATWS required to string the pipe. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Clearwater River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Ditch	s-151n41w28-c	882.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-151n41w28-b	882.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-151n41w28-a	882.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-151n41w33-b	882.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-151n41w33-a	883.5	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-151n41w35-a	884.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-150n41w1-a	885.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Lost River (09020305-646)	s-150n41w1-b	885.8	South	14.8	65	0.2	0.0069	16.4	4.5	0.34	0.15	Assume 3.0	3	Assume 35	35	Section 408, Public Water	N/A	Dry Crossing	The Lost River is a moderately sized river with a well-defined channel at the crossing. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). A crossing using the HDD method is not prudent and feasible, due to the configuration of the river on the east side and Highway 222 on the west side, which would likely require closure of this road to weld, test, and install the pipeline. Based on this assessment of the Lost River, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-150n41w1-c	886.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w7-a	888.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w8-a	888.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w9-a	889.6	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
State Ditch No. 61 (09020305-590) [c]	s-150n40w16-a	889.7	South	7.0	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w15-a	890.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w15-b	890.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w15-c	890.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n40w14-a	891.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]												Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Ditch	s-150n40w23-a	892.4	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural and somewhat sparse forest land . The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Ditch	s-150n39w19-a	893.3	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n39w19-c	893.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n39w19-d	893.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
County Ditch No. 89	s-150n39w30-a	894.2	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	ORVW (within Gully 30 Fen)	N/A	Dry Crossing	County Ditch No. 89 is a small, channelized ditch north of the Gully 30 Ditch Fen crossing. Refer to Enbridge's Fen Management Plan developed in coordination with the MDNR for more information on the least degrading prudent and feasible installation method.
Unnamed Ditch	s-150n39w29-a	894.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n39w29-b	894.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-150n39w29-c	894.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	s-149n38w7-d_DESKTOP	900.8	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	This small, unnamed stream has an herbaceous wetland riparian zone surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	s-149n38w7-c	901.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-149n38w8-a	902.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	Public Water	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-149n38w8-b	902.0	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-149n38w8-c	902.1	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Ditch	s-149n38w9-a	902.7	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural land. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.
Unnamed Stream	s-149n38w16-a	902.9	South	Assume 65	65	Assume 0.0069	0.0069	Assume 4.5	4.5	Assume 0.15	0.15	Assume 3.0	3	Assume 35	35	N/A	N/A	Dry Crossing	This small, unnamed stream has an herbaceous riparian zone surrounded generally by agricultural land with adjacent forested tracts. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Lost River (09020305-512)	s-149n38w15-a	904.0	South	20.3	65	Assume 0.0069	0.0069	15	4.5	0.64	0.15	2.4	3	Assume 35	35	Public Water; 303d Impaired	E. Coli	Dry Crossing	The Lost River has an herbaceous riparian zone surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on this assessment of the Lost River, the least degrading prudent and feasible installation method is a dry crossing.
Silver Creek (09020305-527)	CL018bWB	907.1	Central	13.0	30	Assume 0.0069	0.0069	16.6	3.5	0.65	0.1	7.1	2	Assume 18	18	Public Water, 303d Impaired	Aquatic macroinvertebrate bioassessments	Dry Crossing	Silver Creek has a marginal herbaceous riparian zone and is surrounded by agricultural and pasture lands. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. The HDD crossing method is not prudent and feasible as it would have to include all three crossings of Silver Creek (MPs 907.1, 907.4, and 907.7) which would require a drill length of over one mile. Finally, an HDD in this location would cross under existing pipelines two times, which would present potential safety and operational reliability concerns. Based on this assessment of the Silver Creek, the least degrading prudent and feasible installation method is a dry crossing.
Silver Creek (09020305-527)	CL019bWB	907.4	Central	13.0	30	Assume 0.0069	0.0069	16.6	3.5	0.65	0.1	7.1	2	Assume 18	18	Public Water, 303d Impaired	Aquatic macroinvertebrate bioassessments	Dry Crossing	Silver Creek has a marginal herbaceous riparian zone and is surrounded by agricultural and pasture lands. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). The HDD crossing method is not prudent and feasible as it would have to include all three crossings of Silver Creek (MPs 907.1, 907.4, and 907.7) which would require a drill length of over one mile. Finally, an HDD in this location would cross under existing pipelines two times, which would present potential safety and operational reliability concerns. Based on this assessment of the Silver Creek, the least degrading prudent and feasible installation method is a dry crossing.
Silver Creek (09020305-527)	s-149n37w30-a	907.7	Central	13.0	30	Assume 0.0069	0.0069	16.6	3.5	0.65	0.1	7.1	2	Assume 18	18	Public Water, 303d Impaired	Aquatic macroinvertebrate bioassessments	Dry Crossing	Silver Creek has a marginal herbaceous riparian zone and is surrounded by agricultural and pasture lands. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). The HDD crossing method is not prudent and feasible as it would have to include all three crossings of Silver Creek (MPs 907.1, 907.4, and 907.7) which would require a drill length of over one mile. Finally, an HDD in this location would cross under existing pipelines two times, which would present potential safety and operational reliability concerns. Based on this assessment of the Silver Creek, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	CL020aWB	908.4	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural land and the town of Clearbrook. The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian habitat to limit potential net increases in loading.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Creek	s-149n37w29-a_DESKTOP	908.8 910.1	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	Public Water	N/A	Dry Crossing	This unnamed stream has a riparian zone of mixed scrub-shrub and herbaceous wetland and generally surrounded by agricultural land. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. The HDD method is not prudent and feasible at this location due to the close proximity to the Clearbrook Terminal and the Town of Clearbrook, as well as the inability to configure a drill path in the somewhat congested area. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream (09020305-572)	CL022_200aWB	909.2 909.8	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This unnamed stream has a marginal mainly herbaceous wetland riparian zone. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. The HDD method is not prudent and feasible at this location due to the inability to configure a drill path adjacent to the Clearbrook Terminal. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-149n37w32-b	910.9	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	Public Water	N/A	Dry Crossing	This small, unnamed stream has an herbaceous wetland riparian zone surrounded by agricultural and pasture land. Potential net increases in loading will be reduced by placing the ATWS outside of adjacent riparian habitat and by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-149n37w32-e_DESKTOP	910.9	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream (09020305-572)	CLC5020_300aWB	911.5	Central	Assume 30	30	Assume 0.0069	0.0069	14.8	3.5	0.23	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This small, unnamed stream has a forested wetland riparian zone. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. A crossing using the HDD method is not prudent and feasible, due to 179th Avenue and the existing MinnCan Pipeline corridor to the east. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-148n37w20-a	915.3	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This small unnamed stream is surrounded by forested upland and wetland habitats. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CLC5018aWB	917.1	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This small unnamed stream has a mixed forested/herbaceous wetland riparian area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Use of the HDD method would increase ATWS in wetlands for drill pits and clearing of forested wetland. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Clearwater River (09020305-517)	CLC5037aWB	922.2	North	5.8	15	Assume 0.0069	0.0069	15.4	3	0.5	0.05	6.1	1.5	37.1	7	NRI, Public Water, 303d Impaired	Dissolved Oxygen; Mercury in fish	HDD	The Clearwater River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to reduce physical alteration of forested wetland and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Clearwater River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Tributary of Clearwater River	CLC5038aWB	922.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	HDD	The Tributary of Clearwater River is included within the overall Clearwater River HDD, which will prevent an increase in loading of the feature during installation. See justification for Clearwater River (MP 922.2).
Walker Brook (09020305-509)	CLC5048aWB	924.2	North	Assume 15	15	Assume 0.0069	0.0069	13.3	3	0.18	0.05	Assume 1.5	1.5	Assume 7	7	Public Water, 303d Impaired	Dissolved Oxygen	Modified Dry Crossing	Walker Brook is a small stream that occurs within a wetland complex. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. A true dry crossing at this location is not prudent and feasible due to the surrounding saturated wetland area and associated high water table. An HDD is also not prudent and feasible as the HDD would be approximately 1 mile long, where the risk of inadvertent returns increase due to the length of the crossing and the longer duration of the pilot hole and reaming operations. Furthermore, the pullback section would need to be set up on the north side of 350th Street, encroaching on the Bagley Municipal Airport runway operations. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CLC5051aWB	925.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This small unnamed stream has a mixed scrub-shrub and herbaceous wetland riparian area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-146n36w8-c	928.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is associated with a small wetland area and occurs within a forested area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Tributary to Walker Brook	s-146n36w8-a	928.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Modified Dry Crossing	The Unnamed Tributary to Walker Brook is a small stream that occurs within a wetland complex. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. A true dry crossing at this location is not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-146n36w15-b	931.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream is located within a forest/scrub-shrub wetland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Stream (07010101-738)	s-146n36w15-a	931.7	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This unnamed stream is located within a forest/scrub-shrub wetland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream (07010101-738)	s-146n36w23-b	932.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Bore	This feature is adjacent to a road and generally surrounded by agricultural and somewhat sparse forest land . The feature, along with the adjacent road, will be crossed using a conventional bore. A conventional bore is the least degrading prudent and feasible crossing method for this feature, which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Table 4.0-1 in Appendix A of Attachment H). Furthermore, the ATWS required for the crossing has been set back from adjacent riparian and wetland habitat to limit potential net increases in loading.
Unnamed Stream	s-146n36w23-c_DESKTOP	933.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Modified Dry Crossing	This unnamed creek, shown on the public waters inventory maps as a water basin, was delineated in the field as a wetland (not a stream) as there was no discernible bed or banks. Enbridge subsequently developed a desktop waterbody in the event that flow is present during construction. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. The crossing is not co-located with an existing right-of-way, as it was sited in this location and outside of an existing right-of-way to follow a MPUC route segment alternative (RSA-05) which avoids the Wild Rice River Watershed. A true dry crossing at this location is not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Based on the evaluation of this desktop waterbody, the least degrading prudent and feasible installation method is a modified dry crossing.
Bear Creek (07010101-631) [c]	CLC5095aWB	940.1	North	7.7	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	Bear Creek is located within a scrub-shrub and herbaceous wetland complex. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetland for the ATWS required for the drill. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Mississippi River (07010101-753)	CLC5098aWB	941.0	North	8.2	15	1.5	0.0069	15.5	3	0.27	0.05	3.9	1.5	12	7	Public Water, 303d Impaired, Canoe Route, Restricted ORVW	Mercury in fish	HDD	The Mississippi River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. Physical alteration of wetlands at HDD entry and exit ATWS is unavoidable, but has been minimized as much as is prudent and feasible. In order to avoid the wetlands at the entry and exit points of the Mississippi River, the HDD would need to be redesigned to add an additional 1,500 feet to the HDD drill. Furthermore, by shifting and extending the HDD drill path, the corresponding pull-string, or the workspace to the south where the pipe is staged to pull-back through the exit hole, would also be extended 1,500 feet outside of the environmental survey corridor. The pull-string area would need to be surveyed to determine if there are wetlands or other environmental features in this area and would require additional greenfield clearing. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Mississippi River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
La Salle Creek	HUC5002aWB	946.0	North	Assume 10	10	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water, Trout Stream, Aquatic Management Area	N/A	Dry Crossing	The LaSalle Creek is a designated trout stream and within an Aquatic Management Area (AMA), which is located within a large wetland complex. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. The results of a geotechnical evaluation at LaSalle Creek indicate that installation of the pipeline using the HDD crossing method is not prudent and feasible. A reroute would be required to parallel the waterbody for a substantial distance due to the existing pipeline infrastructure to the west of the proposed route and a false right-of-way for the pullback section would require additional physical alteration of forested wetlands to the east. Consultation with the Minnesota Department of Natural Resources suggests a dry crossing is preferable to protect this resource from a potential inadvertent release associated with an HDD. Based on the evaluation of LaSalle Creek, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	HUC5070aWB	961.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream is located within a mixed herbaceous and forested wetland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetland for the ATWS required for the drill. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	HUC5074aWB	962.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This unnamed stream is located within a mixed herbaceous and forested wetland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetland for the ATWS required for the drill. Additionally the road infrastructure in the area would create entry and exit design challenges. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Hay Creek (07010106-619) [c]	HUC5081aWB	963.7	North	4.6	15	Assume 0.0069	0.0069	15.6	3	1.8	0.05	2.2	1.5	Assume 7	7	Public Water	N/A	HDD	The Hay Creek is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at Hay Creek is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Ditch	s-141n35w20-a_DESKTOP	965.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream is located within a broad herbaceous wetland surrounded by agricultural and forest land. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]												Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Straight River (07010106-558)	HUC5122_200aWB	974.2	Central	9.6	10	Assume 0.0069	0.0069	14.8	3.5	0.1	0.1	2.6	2	11.6	18	Public Water, Trout Stream, 303d Impaired	Dissolved Oxygen	HDD	The Straight River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Straight River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Shell River (07010106-537)	HUC5130aWB	976.6	Central	6.2	30	Assume 0.0069	0.0069	21.1	3.5	0.08	0.1	3.6	2	Assume 18	18	Public Water, 303d Impaired	Fishes bioassessments	Dry Crossing	The Shell River is located within a scrub-shrub and herbaceous wetland complex. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. In addition, there is a remotely controlled block valve on the south side of 109th Avenue, which was strategically placed based on Enbridge's intelligent valve placement study in accordance and approved by PHMSA (DOT Part 195). Moving the mainline valve would require permanent access through a wetland and would reduce its effectiveness as a sectionalizing valve, as it would be further from the waterbody and at an increased elevation. Furthermore, the geotechnical reports also indicate probable cobbles at this location which can be problematic for HDD installation. For these reasons, an HDD at this location is not prudent and feasible. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of the Shell River, the least degrading prudent and feasible installation method is a dry crossing.
Shell River (07010106-537)	HUC5162aWB	981.4	Central	6.2	30	Assume 0.0069	0.0069	21.1	3.5	0.08	0.1	3.6	2	Assume 18	18	Public Water, 303d Impaired	Fishes bioassessments	Dry Crossing	The Shell River crossing at this location has an herbaceous wetland complex. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). The HDD crossing method is not prudent and feasible at this location due to the highway infrastructure in the area which would create entry and exit design challenges. Enbridge shifted the centerline to the south of the oxbow (approximately 25 feet) to avoid crossing at the oxbow. If the drill exit point was shifted to the east, the centerline alignment would have to change to accommodate the drill path, and a false right-of-way would be required for the pull string. The false right-of-way would require additional forest clearing between the two transmission line corridors. Enbridge would also need to obtain additional landowner permission for the pullback section, as well as authorization to work under the transmission lines. Furthermore, the geotechnical reports also indicate probable cobbles at this location which can be problematic for HDD installation. Physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of the riparian wetlands. Based on the evaluation of the Shell River, the least degrading prudent and feasible installation method is a dry crossing.
Shell River (07010106-537)	HUC5175aWB	983.7	Central	6.2	30	Assume 0.0069	0.0069	21.1	3.5	0.08	0.1	3.6	2	10.4	18	Public Water	N/A	HDD	The Shell River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of the large wetland complex and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Shell River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Oxbow Pond (Shell River) (07010106-537)	HUC5179_240aWB	985.3	Central	6.2	30	Assume 0.0069	0.0069	21.1	3.5	0.08	0.1	3.6	2	Assume 18	18	Public Water	N/A	HDD	The Oxbow Pond (Shell River) is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of the large wetland complex and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Oxbow Pond (Shell River) is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Shell River (07010106-537)	WA002aWB	991.2	Central	6.2	30	Assume 0.0069	0.0069	21.1	3.5	0.08	0.1	3.6	2	Assume 18	18	NRI, Public Water, 303d Impaired, Infested Water (faucet snail)	Dissolved oxygen	HDD	The Shell River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Shell River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Crow Wing River (07010106-523)	WA006aWB	993.3	Central	4.6	30	Assume 0.0069	0.0069	12.7	3.5	0.04	0.1	3	2	17.2	18	NRI, Public Water, 303d Impaired, Canoe Route, Infested Water (faucet snail)	Mercury in fish	HDD	The Crow Wing River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Crow Wing River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	WA017aWB	996.5	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Modified Dry Crossing	This unnamed stream is located in a large sedge meadow wetland complex, adjacent to a narrow band of upland forest. The HDD method is not prudent and feasible at this location, because the wetland complex is very large and would increase the physical alteration due to the placement of drilling equipment and drill pits in saturated wetland areas, which also may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Ditch	CAC5001_540bWB	999.1	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This small, unnamed ditch is located in an herbaceous and scrub-shrub wetland. The HDD method is not prudent and feasible at this location, because there is a large adjacent wetland complex which would increase the physical alteration due to the placement of drilling equipment and drill pits in saturated wetland areas, which also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]												Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Ditch	CAC5001_540aWB	999.2	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This small, unnamed ditch has a marginal wetland riparian area. The HDD method is not prudent and feasible at this location, because there is a large adjacent wetland complex which would increase the physical alteration due to the placement of drilling equipment and drill pits in saturated wetland areas, which also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this ditch, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Ditch	CAC5006aWB	999.6	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This unnamed ditch is located at the edge of a large wet meadow wetland complex, adjacent to a large upland forest tract. The HDD method is not prudent and feasible at this location, because the wetland complex is very large and would increase the physical alteration due to the placement of drilling equipment and drill pits in saturated wetland areas, which also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this ditch, the least degrading prudent and feasible installation method is a dry crossing.
Big Swamp Creek (07010106-531) [c]	CAC5007aWB	1000.5	Central	6.4	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	Public Water	N/A	Modified Dry Crossing	Big Swamp Creek is located within an extensive fresh wet meadow wetland complex. The HDD method is not prudent and feasible at this location. The wetland complex is very large and would increase the physical alteration to the wetland due to the placement of drilling equipment and drill pits in saturated wetland areas, which also may not adequately support the equipment. An HDD would also likely require the closure of Minnesota Highway 64 during the pullback process. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of Big Swamp Creek, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CAC5010aWB	1001.2	Central	Assume 30	30	Assume 0.0069	0.0069	Assume 3.5	3.5	Assume 0.1	0.1	Assume 2.0	2	Assume 18	18	N/A	N/A	Dry Crossing	This unnamed stream is located within a wet meadow wetland. The HDD method is not prudent and feasible at this location due to a large adjacent wetland complex which would increase the physical alteration to the wetland due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. An HDD would also likely require the closure of Minnesota Highway 64. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Pine River (07010105-669)	CA063aWB	1017.4	North	5.2	15	Assume 0.0069	0.0069	12.5	3	0.04	0.05	2.6	1.5	7.2	7	Public Water, Canoe Route	N/A	HDD	The Pine River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Pine River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	CW014aWB	1021.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a shrubby, open area with a narrow riparian band of herbaceous wetland. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CW021aWB	1022.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This unnamed stream flows through a saturated shallow marsh wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CW027aWB	1023.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream flows through an herbaceous wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Ada Brook / Blind Lake Creek	CA085aWB	1026.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	Ada Brook/Blind Lake Creek occurs within a fresh wet meadow wetland and has a marginal riparian zone which is surrounded by managed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CA096aWB	1029.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small unnamed stream occurs within a fresh wet meadow riparian zone surrounded by a complex of upland forest and herbaceous wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CA104aWB	1030.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream occurs within a small forested wetland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CA116aWB	1033.2	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream occurs within an upland forested area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]												Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Stream	CA118_200aWB	1033.9	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This unnamed stream flows through a saturated sedge meadow wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill, in addition to the road infrastructure in the area which would create entry and exit design challenges. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CA120_200AWB	1034.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream occurs within an upland forested area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CA127aWB	1036.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream has a scrub-shrub wetland riparian area and is in close proximity to large wetland complexes. The HDD method is not prudent and feasible at this location due to a large adjacent wetland complex which would increase the physical alteration to the wetland due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Daggett Brook (07010105-562)	CA133aWB	1037.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	0.03	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	HDD	The Daggett Brook is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. HDD entry and exit ATWS have been sited to prevent physical alteration of wetlands and riparian habitat. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at Daggett Brook is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Spring Brook	CA147_525a1WB	1041.3	North	Assume 10	10	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water, Trout Stream	N/A	Dry Crossing	Spring Brook occurs within a narrow forested wetland corridor. Enbridge's original route followed the existing transmission line corridor in this general location. Based on consultation with agencies; however, Enbridge adjusted its route to a greenfield location downstream of the fish hatchery and outside of the Spire Valley AMA. Enbridge prepared the "Spire Valley Construction Plan" to document the existing environment, survey efforts, and its construction methodology review process for the Project at this location. The HDD method is not prudent and feasible several reasons. First, the moderately steep slopes on either approach to the streambed valley create excessive risk. Second, the valley floor, while nearly level, is too narrow (approximately 180 feet wide) and constrained. Third, the steep slopes on either side of the valley would significantly increase the risk of an inadvertent return at the drill entrance and require an extreme drill path configuration. This in turn would make the drill highly susceptible to a pullback failure. Finally, the medium soft clay sand and gravel substrate may not provide sufficient strength to contain hydraulic drilling fluid pressures generated by either drilling or boring. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of Spring Brook, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CAC5160aWB	1046.0	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream has a forested wetland riparian area. The HDD method is not prudent and feasible at this location due to a large nearby wetland complex which would increase the physical alteration to the wetland due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CAC5161aWB	1046.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This unnamed stream flows through a saturated shallow marsh wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetlands for the ATWS required for the drill. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CA162aWB	1047.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream has a forested wetland riparian area. The HDD method is not prudent and feasible at this location due to the angling of the Project route. It would also increase the physical alteration to the wetlands in the area for the ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Tributary to Moose River	CA163cWB	1048.0	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small Tributary to Moose River has a forested wetland riparian zone. The HDD crossing method is not prudent and feasible at this location as it would require more ATWS for the drill pits and pullback section in adjacent forest land, some of which would require an increase in physical alteration of wetland. Furthermore, an HDD would require Pikus Forest Road to be shut down through the duration of an HDD installation, which would also close access to a driveway. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Moose River (07010103-749)	CA163aWB	1048.0	North	4.7	15	Assume 0.0069	0.0069	13.9	3	0.08	0.05	Assume 1.5	1.5	Assume 7	7	NRI, Public Water, 303d Impaired	Dissolved oxygen	Modified Dry Crossing	The Moose River has a saturated fresh wet meadow riparian zone. The HDD crossing method is not prudent and feasible at this location as it would require more ATWS for the drill pits and pullback section in adjacent forest land, some of which would require an increase in physical alteration of wetland. Furthermore, an HDD would require Pikus Forest Road to be shut down through the duration of an HDD installation, which would also close access to a driveway. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of the Moose River, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CA166aWB	1049.7	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	AI001aWB	1049.9	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream has a forested wetland riparian area. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n27w27-a_DESKTOP	1051.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Push-pull	This unnamed stream is located within an extensive fresh wet meadow wetland complex. The HDD method is not prudent and feasible at this location. The wetland complex is very large and would increase the physical alteration to the wetland due to the placement of drilling equipment and drill pits in wetland areas. A dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the push-pull method to install the pipeline (see Sections 3.4 and 4.1 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this unnamed stream, the least degrading prudent and feasible installation method is push-pull.
Unnamed Stream	AI020aWB	1053.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This small unnamed stream has a broad fresh wet meadow riparian zone. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n27w36-a_DESKTOP	1053.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a broad fresh wet meadow riparian zone. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	AI027aWB	1054.7	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This unnamed stream flows through a saturated wet meadow wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetlands for the ATWS required for the drill. Additionally, Highway 29, would need to be closed during drilling operations. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n26w32-a_DESKTOP	1054.7	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This unnamed stream flows through a saturated wet meadow wetland. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of forested wetlands for the ATWS required for the drill. Additionally, Highway 29, would need to be closed during drilling operations. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Sections 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n26w33-c_DESKTOP	1055.8	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small stream occurs within an extensive wetland complex. The HDD method is not prudent and feasible at this location because physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in wetland areas, which may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n26w33-a	1056.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This unnamed stream has a forested upland riparian area. The HDD method is not prudent and feasible at this location due to the angling of the Project route. It would also increase the physical alteration to the large adjacent wetland complexes in the area for the entry and exit ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n26w33-b	1056.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small unnamed stream associated with Moose Lake flows within a very broad fresh wet meadow riparian zone. The HDD crossing method is not prudent and feasible at this location due to the angling of the Project route. It would also increase physical alteration of forested wetlands for the ATWS required for the drill. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using erosion control best management practices with the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Willow River (07010103-748)	s-51n24w31-b	1066.5	North	7.6	15	Assume 0.0069	0.0069	14.4	3	0.13	0.05	Assume 1.5	1.5	8.5	7	NRI, Public Water	N/A	HDD	The Willow River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. Physical alteration of wetlands at HDD entry and exit ATWS is unavoidable on the east side of the river, but has been minimized as much as is prudent and feasible. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Willow River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	s-51n24w31-a	1067.0	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream runs along 270th Avenue and is in an area which is generally forested wetland. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n24w29-a	1067.2	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream runs along 590th Street and is in an area which is generally forested wetland. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n24w28-a	1068.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small channelized ditch has a sedge meadow riparian area to the west and is surrounded by agricultural land to the west. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Mississippi River (07010103-708)	s-51n24w27-a	1069.7	North	18.8	15	1.1	0.0069	13.2	3	1.42	0.05	5.3	1.5	10.1	7	Canoe Route, Section 10, 303d Impaired, Public Water, Restricted ORVW	Mercury in fish; TSS	HDD	The Mississippi River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. Physical alteration of wetlands at HDD entry and exit ATWS is unavoidable on the west side of the river, but has been minimized as much as is prudent and feasible. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the Mississippi River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	s-51n24w26-a	1070.9	North	Assume 10	10	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water, Trout Stream	N/A	Modified Dry Crossing	This unnamed stream occurs within a mixed forested and herbaceous wetland area. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. Using the HDD method would also shut down Highway 65 during drilling operations. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n23w29-b	1073.8	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has an upland forest riparian zone. The HDD crossing method is not prudent and feasible at this location as it would increase physical alteration of wetlands for the ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n23w27-a	1075.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Modified Dry Crossing	This small unnamed stream occurs within a shallow marsh wetland. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n23w27-b_DESKTOP	1075.8	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small stream occurs within a large sedge/fresh wet meadow wetland complex. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way in addition to siting ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
West Savanna River (07010103-514)	s-51n23w23-a	1076.9	North	3.6	15	Assume 0.0069	0.0069	17.3	3	0.07	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	The West Savanna River flows through a shallow marsh wetland. The HDD method is not prudent and feasible at this location due to the angling of the Project route and the existing road infrastructure. It would also increase the physical alteration to the large adjacent wetland complexes in the area for the entry and exit ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of the West Savanna River, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n23w23-b_DESKTOP	1077.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small stream occurs within a shallow marsh wetland. The HDD method is not prudent and feasible at this location because physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in wetland areas. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]												Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Stream	s-51n22w19-c_DESKTOP	1078.8	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small stream occurs within a large shallow marsh wetland complex. The HDD method is not prudent and feasible at this location because physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in wetland areas, which may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	s-51n22w22-a	1081.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small channelized ditch is located within a large coniferous bog. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n22w24-a	1084.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This moderately sized stream flows within a large peatland complex. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
East Savanna River (04010201-561)	s-51n21w20-a	1085.9	North	6.3	15	Assume 0.0069	0.0069	8.4	3	0.15	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	HDD	The East Savanna River is proposed to be crossed using the HDD method which prevents net increases in loading or other causes of degradation during installation as no excavation will occur within the bed and banks (see Section 11.0 of Attachment H). The HDD method is also supported by the data provided in the Hydrofracture Analysis (see Attachment K), which include geotechnical studies. Physical alteration of wetlands at HDD entry and exit ATWS is unavoidable due to the extent of the large wetland complex. Finally, although the HDD method is not impacted by peak flows, the crossing will not be attempted during flood conditions. Therefore, the least degrading prudent and feasible method for installing the pipeline at the East Savanna River is an HDD. Refer to Section 7.4.4 and Attachments K and M of the Section 401 Antidegradation Assessment for more information.
Unnamed Stream	s-51n21w21-a	1086.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small channelized ditch is located within a large wetland complex. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n21w22-a	1087.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small channelized ditch is located within a large wetland complex. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n21w24-a	1089.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small stream occurs along South Savanna Road within a forested wetland. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n21w24-b	1089.9	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small stream occurs within a forested wetland. The HDD method is not prudent and feasible at this location due to the large adjacent wetland complex, where physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in saturated wetland areas, and also may not adequately support the equipment. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream (04010201-A07)	s-51n20w27-a	1094.0	North	14.1	15	Assume 0.0069	0.0069	11.4	3	0.09	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This small unnamed stream has a scrub-shrub wetland riparian zone. The HDD method is not prudent and feasible at this location due to surrounding the existing road infrastructure. It would also increase the physical alteration to the large adjacent wetland complex for the entry and exit ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n20w27-b	1094.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a shallow marsh wetland riparian zone, surrounded by agricultural land and a farmstead. The HDD method is not prudent and feasible at this location as it would require more ATWS for the drill pits and pullback section laydown area in adjacent agricultural land/farmstead to the south, and to the north Genew Road would be closed during drilling operations which would also block access to Highway 2 at this location. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n20w27-c	1094.8	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a scrub-shrub wetland riparian zone. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-51n20w35-a	1095.9	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	This small unnamed stream has a narrow wet meadow riparian zone surrounded by agricultural land and grazed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

Attachment G

Anticipated Water Quality - Parameters of Concern and Waterbody Crossing Justifications

Receiving Water Name (WID)	Receiving Water Feature ID	MP	River Nutrient Region	Parameter of Concern [a, b]										Resource Category	Relevant 303(d) Impairment	Crossing Method [e]	Waterbody Crossing Method Justification
				TSS (mg/L)		Mercury (ug/L)		Dissolved Oxygen (mg/L)		Phosphorus (mg/L)		Biochemical oxygen		Chlorophyll-a (seston)					
				Existing [d]	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard	Existing	Standard				
Unnamed Stream	s-51n20w35-b	1096.0	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a narrow wet meadow riparian zone surrounded by agricultural land and grazed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Ahmik River (04010201-945) [c]	s-50n20w2-a	1096.7	North	Assume 15	15	Assume 0.0069	0.0069	15.3	3	0.16	0.05	4.7	1.5	Assume 7	7	Public Water	N/A	Dry Crossing	The Ahmik River has a fresh wet meadow riparian zone. The HDD method is not prudent and feasible at this location due to the angling of the Project route. It would also increase the physical alteration to the wetlands in the area for the entry and exit ATWS required for the drill. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Based on the evaluation of the Ahmik River, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	s-48n17w8-a	1117.0	North	56.3	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Modified Dry Crossing	This small stream occurs within a large wetland complex. The HDD method is not prudent and feasible at this location because physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in wetland areas. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a modified dry crossing.
Little Otter Creek (04010201-628) [c]	s-48n17w16-f	1118.4	North	13.2	10	Assume 0.0069	0.0069	13.2	3	0.11	0.05	1.1	1.5	Assume 7	7	Public Water, Trout Stream, Aquatic Management Area	N/A	Modified Dry Crossing	Little Otter Creek has a scrub-shrub wetland riparian zone within an extensive wetland complex. The HDD method is not prudent and feasible at this location because physical alteration to wetlands would increase due to the placement of drilling equipment and drill pits in wetland areas. A true dry crossing at this location is also not prudent and feasible due to the surrounding saturated wetland area and associated high water table. Potential net increases in loading will be reduced by using the modified dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way. Based on the evaluation of Little Otter Creek, the least degrading prudent and feasible installation method is a modified dry crossing.
Unnamed Stream	CR144aWB	1126.2	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	Public Water; Trout Stream	N/A	Dry Crossing	This small unnamed stream has a narrow wet meadow riparian zone surrounded by agricultural land and grazed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR145bWB	1126.4 1126.5	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	Refer to Section 7.1.1.2 of the Section 401 Antidegradation Assessment and Section 4.0 of Appendix A of Attachment H for additional information on the selection of pipeline installation crossing method at this type of feature.
Unnamed Stream	CR147aWB	1126.7	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a sparsely forested riparian zone surrounded by agricultural land and grazed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream (04010201-A61)	CRR51010_640bWB	1127.6	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream has a sparsely forested riparian zone surrounded by agricultural land and grazed pasture. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR157_200a1WB	1128.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR159_200aWB	1128.1	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR159_200bWB	1128.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR159_200cWB	1128.3	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.
Unnamed Stream	CR159bWB	1128.4	North	Assume 15	15	Assume 0.0069	0.0069	Assume 3.0	3	Assume 0.05	0.05	Assume 1.5	1.5	Assume 7	7	N/A	N/A	Dry Crossing	This small unnamed stream is located in a woodland/shrub dominated upland area. Potential net increases in loading will be reduced by using the dry crossing method to install the pipeline (see Section 4.2 of Appendix A of Attachment H). Furthermore, physical alteration of wetlands will be minimized by working within the necked-down right-of-way and by siting the ATWS entirely outside of wetlands. Based on the evaluation of this stream, the least degrading prudent and feasible installation method is a dry crossing.

[a] Data presented is based on monitoring data received from MPCA on September 4 and 12, 2018 and March 21 and October 21, 2019. Evaluation is based on comparison with the 95 percent UCL. Evaluation may differ if an alternate method of assessing existing water quality is used.
[b] For waterbodies where data is not available (unassessed waters), Enbridge has assumed that if the waterbody is not listed as impaired, then these waters are, at a minimum, achieving the applicable standard. Refer to Section 8 for a discussion of anticipated impacts resulting from construction activities.
[c] Includes downstream and/or upstream data to support lack of data on stream reach crossed by the Project.
[d] Enbridge used the ProUCL system recommended by the MPCA to calculate the 95 percent upper confidence limit for TSS.
[e] Refer to Section 7.1.1.5 of the Section 401 WQC Antidegradation Assessment for additional justification for not proposing the HDD crossing method at all waterbody crossings.