

Alberta Clipper Pipeline **Construction Inspection Report**

Enbridge Energy Co., Inc.

Prepared for:

**NORTH DAKOTA
PUBLIC SERVICE COMMISSION**
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Executive Summary

The North Dakota Public Service Commission (PSC) retained Wenck Associates, Inc. (Wenck) to complete a construction inspection of the Alberta Clipper Pipeline, constructed in Cavalier County, ND by Enbridge Energy, Limited Partnership (Enbridge) in 2009. The purpose of the construction inspection was to ensure the project was constructed in compliance with the siting laws and rules and the applicable PSC Order for the Project. Prior to the construction inspection, Wenck reviewed all Project documents to identify those which required site verification.

The Site was visually inspected on August 4, 2011 by Wenck, accompanied by an Enbridge representative. Overall, the Project was very well-maintained and in good condition. It appeared to have been constructed as planned with numerous efforts to minimize impacts. However, there were several non-critical issues that may need to be resolved for the Project to be considered complete and in full compliance. Wenck recommends the PSC request the following from the company:

- Written documentation of several particular aspects of project implementation identified during the document review.
- Fulfillment of the “Tree and Shrub Mitigation Specifications”, including submission of a mitigation plan, planting of tree and shrub replacements, and subsequent survival monitoring for three years.
- Monitoring of open cut roads which had settled and formed slight depressions.
- Verification of the as-built depth of the pipeline along the entire route.

The PSC will need to decide whether these recommendations are necessary for fulfillment of Project obligations. Wenck expects any follow-up action taken by Enbridge to address these particular issues can be corroborated in writing and will not require a further site visit, though it may be suitable to complete a field check of the tree and shrub mitigation planting once installed.

1.0 Background

1.1 INTRODUCTION

The Alberta Clipper Pipeline (Project) was completed in 2009 across the northeast corner of Pembina County, North Dakota (**Figure 1**). The Project is operated by Enbridge Pipelines, Limited Partnership (Enbridge LP), a subsidiary of the Enbridge Energy Company, Inc. (Enbridge). The portion of the Alberta Clipper Line in North Dakota comprises a 28-mile long, 36-inch diameter liquid petroleum pipeline with associated facilities and pipeline interconnections. The Project is under the jurisdiction of the North Dakota Public Service Commission (PSC), which issued its Findings of Fact, Conclusions of Law, and Order in Case No. PU-07-108 on December 31, 2007, granting Certificate of Corridor Compatibility No. 100 and Route Permit No. 110 for the Project.

1.2 PURPOSE AND SCOPE OF INSPECTION

The North Dakota Energy Conversion and Transmission Facility Act (North Dakota Century Code Chapter 49-22) authorizes the Public Service Commission to determine that the location, construction, and operation of jurisdictional energy conversion and transmission facilities will produce minimal adverse effects on the environment and the welfare of citizens of North Dakota. Post-construction inspections ensure the project is constructed in compliance with the siting laws and rules and the applicable Commission Findings of Fact, Conclusions of Law, and Order (Order).

The North Dakota PSC retained Wenck Associates, Inc. (Wenck) to complete a construction inspection of the Alberta Clipper Pipeline Project. The inspection process included a review of the Siting Plan, Order, and other applicable documents to determine Project-specific siting and construction requirements; a site visit and inspection of facilities; documentation of compliance;

and a report summarizing findings. This report includes, but is not limited to, documentation of site visit observations, documentation of compliance deficiencies, and a summary of issues that should be addressed for the Project to be considered complete and in full compliance.

2.0 Document Review

2.1 METHODS

Wenck reviewed North Dakota siting laws and rules, the Application for the Certificate of Site Compatibility (Application), and the Order for the Project to identify what Project-specific documentation was required for compliance. Wenck then reviewed Project documents in the PSC Online Case Search (ND PSC 2011) to identify those siting laws and rules and Application and Order assertions that already had written verification, those which still required documentation, and those which required physical site verification.

2.2 FINDINGS

The following table includes a list of components of the Project that were asserted in the Application and Order which could be documented post-construction to verify compliance with siting laws and rules and the Order for the Project (**Table 1**), via either written documentation or physical site verification. If Wenck found written documentation in the online PSC files for a particular Project component, this is marked in the second column of the table. If physical site verification was possible, this was marked in the third column and that particular component was verified during the site inspection (Section 3.0).

Several components of the Project were asserted in the Application or proposed construction but have no written documentation showing that they were indeed implemented or constructed as planned, and physical site verification is not applicable. *This includes all items listed in Table 1 which have shaded boxes in the second column*, indicating written verification is possible and appropriate, but it is lacking from current files. The PSC should request written verification from Enbridge for these items, to show the Project is in full compliance.

Table 1. Alberta Clipper Pipeline Project Document Review Summary

Description of Project Component/Assertion	Written Verification in	
	PSC Files*	Site Verification
Design, construction, and operation according to DOT regulations 49 CFR Part 195 – Transportation of Hazardous Liquids by Pipeline		
Minimal direct impacts to local economy		
Not likely to jeopardize endangered species or critical habitat	X	
No significant impact on fish and wildlife. No endangered or threatened plants or animals occupy proposed route.	X	
Cultural resources avoided	X	X
USFWS Juhl National WMA avoided	X	X
Pembina and Red Rivers crossed by horizontal drilling, trees avoided	X	X
Tongue River crossed by either open cut or horizontal drilling	X	X
Route amendment around very deep pond	X	X
Waivers from residents within 500ft		
Cathodic protection system installed		
Mitigation measures implemented to minimize impact on agricultural land		X
Topsoil removed according to landowners’ and PSC’s requirements		X
Wetlands avoided (Avoidance Area) or mitigation measures to minimize impacts. No surface facilities installed. No permanent draining or filling.		X
Woodland (Avoidance Area) crossing width reduced to 50ft, leaving mature shrubs and trees in place where practical.		X
No construction through wetlands during nesting season		
Use of environmental inspector during construction	X	
Post-construction monitoring reports		
Cultural resource report submitted to SHPO with concurrence	X	
Compliance with “Tree and Shrub Mitigation Specifications”		X
Pipeline buried to 48in (72in undeveloped section lines)		
Private/new access roads identified and reclaimed	X	X
North Valley Water District resolution/mitigation	X	
Commission approval of route changes	X	
Permits/Approvals from other agencies	X	
Pre-Construction conference record	X	
Intent to start construction notice	X	
Weekly construction reports	X	
Construction according to Application and safety requirements		
Pipeline bored under graded roads, unless permitted to open cut		X
Reports of presence of threatened, endangered species or bald or golden eagles, if applicable		
Reports of cultural, archeological, historical resources found, if applicable		
Topsoil segregated and replaced at 12in depth or depth of cultivation		X
Reclamation and clean-up continuous with construction	X	
Restoration of pre-existing roads, lanes, temporary roads		X
Reclamation/reseeding according to NRCS or landowner		X
Repair/replace all fences and gates, if applicable		X
As-built drawings and GIS within 90 days after construction	X	
Reclamation and maintenance throughout life of facility		X

*Note: Shaded boxes indicate documentation is lacking and site verification is not applicable.

3.0 Site Inspection

3.1 METHODS

Kevin Magstadt, P.E. and Sara Simmers of Wenck visited the Project area on August 4, 2011. Rachael Shetka, Enbridge Environment Analyst II for the Project, provided an introduction of the site and a safety briefing for Wenck staff. Ms. Shetka accompanied Wenck staff during the site visit and assisted with navigation, pointed out problem areas, and answered questions. Both the LSr pipeline and the Alberta Clipper pipeline were inspected simultaneously.

The site was inspected visually along portions of the pipeline route by accessing as many points as feasible where the pipeline crossed roads. Some features were accessed by walking within the pipeline right-of-way to the crossing of the feature. Above-ground pipeline valves were also checked. The survey began at the crossing of Interstate 29 and the railroad south of 94th St NE, proceeded to the crossing of the Red River at the state line which was the end of the pipeline route within North Dakota, resumed at the state and U.S. boundary northeast of Neche, ND which was the start of the pipeline route within North Dakota, and continued southeast to the point where the survey began at Interstate 29. Digital photographs (Canon Power Shot SD1300 IS, 12 megapixel) were taken showing typical Project infrastructure and documenting problem areas (**Appendix A**). Geographic coordinates were recorded at observation points or potential problem areas using a handheld Global Positioning System (GPS) (Garmin GPSMAP 60CSx; <10m accuracy; NAD83 datum) (**Figure 1; Appendix B**).

3.2 OBSERVATIONS & FINDINGS

3.2.1 Engineering/Construction/Design & Soils

The following aspects pertaining to engineering, construction, or design of Project infrastructure were inspected at the site.

- *Mitigation Measures Implemented to Minimize Impact on Agricultural Land.* The Environmental Mitigation Plan in the Application outlined and described numerous erosion and sediment control measures which were to be implemented during construction of the Project. It is assumed that these measures were applied as stated; some were corroborated in weekly construction report photos from the PSC files (ND PSC 2011). Post-construction mitigation on cropland was limited to proper subsoil recontouring and replacement of topsoil at sufficient depths to support crop production. Physical erosion control materials cannot be placed on cropland post-construction. However the topography of the project area was very flat, and Wenck did not observe any areas where erosion control within cropland would have been necessary. In general, the route of the pipeline through agricultural fields where soils had been disturbed was indistinguishable from the adjacent soils, topography, and crops. Crops were in nearly full development at the time of the survey and were good indicators of proper soil replacement. There were a few slight depressions noted where the soil appeared to have settled along the pipeline route or within the construction right-of-way (**Appendix A, Photos 9 and 22**). There was also one location where crops appeared to be stunted along the pipeline route (**Appendix A, Photo 4**). No areas of active erosion, rutting, or sediment deposition were observed. Enbridge noted that when problems arise on agricultural fields due to the pipeline, landowners inform the company quickly.
- *Topsoil Removed According to Landowners' and PSC's Requirements.* The Environmental Mitigation Plan in the Application described topsoil segregation methods and depth of stripping at a minimum 12in. The PSC requirement is at least 12in or to the depth of cultivation, whichever is greater. Individual landowner requirements were unknown. Weekly construction report photos from the PSC files (ND PSC 2011) showed that topsoil removal and segregation did occur. Wenck observed that all topsoil appeared to have been removed and replaced to the required depth. Cropland that was disturbed during construction appeared the same as adjacent undisturbed cropland (**Appendix A, Photos 5, 22, 25, 26, and 34**), except

for one location which showed minor stunting (**Appendix A, Photo 4**). This was a good indication that topsoil had been segregated appropriately.

- *Pipeline Buried to 48in (72in Undeveloped Section Lines)*. The Environmental Mitigation Plan in the Application stated pipeline depth would be at 3ft (36in) and that for increased depth requirements a waiver would be sought. No waiver was included in the PSC files (ND PSC 2011) or discussed in the Order for the Project. It is assumed that the pipeline is buried at the required depth.
- *Private/New Access Roads Identified and Reclaimed*. No new roads were identified for the LSr project. Enbridge submitted a letter and map identifying one new temporary access road required for the Alberta Clipper project (Docket #64, PU-07-108). Wenck observed the location of the temporary road, which extended north about 2,350 feet from 109th St NE in Neche Township, Pembina County, and joined the pipeline right-of-way at Mile 773.9. The road had been removed and reclaimed (**Appendix A, Photo 18**). There were presently no signs of the road. The road had passed through an agricultural field; the soils had been recontoured and were functioning for crop production. The road ditch of 109th St NE was restored.
- *Road Crossings Bored, Unless Permitted to Open Cut*. Road crossings for the Project included both horizontally bored and open cut crossings. For bored crossings, Wenck verified that the pipeline route was marked and that the vegetation appeared undisturbed (**Appendix A, Photos 1-5, 22, 25, 33**). Enbridge reported that the bore for these crossings began and ended further out in adjacent agricultural fields, not in the road ditches. Most markers were in place, though a few locations were noted which were marked on one side only (**Figure 1**). For open cut crossings, Wenck verified that all soil had been replaced appropriately, that all road surfacing materials had been replaced, and that the vegetation in the ditch appeared to be similar to adjacent vegetation and had sufficient cover (**Appendix A, Photos 7- 8, 10-11, 27, 30, 34, 36**). There were a few examples of open cut road crossings where there was a slight dip in the roadway on the pipeline route (**Appendix A, Photos 11, 27, 30, 34,**

- 36). These depressions did not impair traffic and there was no erosion, but they should be monitored; if the dips worsen as soil continues to settle repair may be necessary.
- *Topsoil Replacement 12in Depth or Depth of Cultivation.* The Environmental Mitigation Plan in the Application described topsoil segregation methods and depth of stripping at a minimum 12in. The PSC requirement is at least 12in or to the depth of cultivation, whichever is greater. Wenck observed that all topsoil appeared to have been removed and replaced to the required depth. Cropland that was disturbed during construction appeared the same as adjacent undisturbed cropland (**Appendix A, Photos 5, 22, 25, 26, and 34**), except for one location which showed minor stunting (**Appendix A, Photo 4**). This was a good indication that topsoil had been replaced to the appropriate depth. Wenck also excavated soil pits in cropland in two locations within the pipeline right-of-way. The first location was in a field south of 90th St SE at approximately Mile 800.6. The topsoil layer was very dark brown in color and went to a depth of 10 in. It had been plowed. Below this, light brown clays were mixed in and formed the subsoil (**Appendix A, Photo 16**). The second pit was to the east of Neche, ND along 109th St NE on the north side of the road, at approximately Mile 774.5. The topsoil, also plowed, was measured to at least 20 inches (**Appendix A, Photo 17**). The clays of the subsoil could not be detected.
 - *Roads Restored to Previous Use.* There was one temporary road constructed for the Alberta Clipper project which had been removed and the cropland reclaimed, described above. Wenck noted that all county roads and highways within the Project area appeared to be in good condition and properly maintained. There were a few examples of open cut road crossings across gravel roads with slight dips in the roadway on the pipeline route (**Appendix A, Photos 11, 27, 30, 34, 36**). These depressions did not impair traffic and there was no erosion, but they should be monitored if future repair becomes necessary.

- *Fences/Gates Repaired/Replaced.* Enbridge reported that there were no locations where fences or gates were removed for the Project. Wenck did not observe any fences or gates missing which would have been impacted by construction.
- *On-going Reclamation and Maintenance.* Wenck did not observe any areas of exposed soil remaining from construction activity or the on-going operation of the Project that were in need of reclamation. Above-ground valves and other infrastructure such as a densitometer were observed and appeared to be in working condition (**Appendix A, Photos, 23, 24, 40**). Enbridge completes on-going maintenance checks (Rachael Shetka, pers. comm. 2011).
- *As-built Drawings and GIS Files.* Enbridge had submitted as-built drawings and GIS files to the PSC as required within 90 days after construction of the Project. Wenck verified during the inspection that the Project had been constructed according to the as-built drawings. Wenck also suggested that Enbridge submit a copy of the as-builts signed and sealed by a registered engineer. To date, sealed as-builts have not been submitted for the Project (ND PSC 2011).

3.2.2 Natural Resources (Wildlife, Wetlands, Vegetation)

The following requirements pertaining to natural resources, including wildlife, wetlands, and vegetation, were inspected at the Project site.

- *USFWS Juhl National WMA Avoided.* Wenck confirmed that the Juhl National WMA was avoided by moving the pipeline route less than 100 feet south and west at the southwest corner of the WMA, which was a mile north of the Joliette substation, between Miles 791 and 792. Two tracts of the Pembina Prairie National WMA and another tract of the Juhl National WMA were avoided by the pipeline route by a distance of between 0.3 to 0.5 miles. There was another WMA or conservation easement area bordering the south side of the Pembina River which was avoided by extending the directional boring underneath the Pembina River (**Appendix A, Photo 21**).

- Pembina and Red Rivers Crossed by Horizontal Drilling, Trees Avoided.* The Pembina River was avoided by directionally boring underneath it. During the site visit, the Pembina River was accessed by walking to the south bank along the pipeline right-of-way from 108th St NE. There were markers on the south bank of the river but not on the north bank (**Appendix A, Photos 19-21**). The bore began on the north side of the river in cropland beyond the wooded banks, went underneath the woods, river channel, and a grassy WMA/conservation easement area to the south of the river, went underneath 108th St NE, and ended in cropland to the south of 108th St NE. The Red River was also avoided by directional drilling. The bore underneath the Red River began and ended on both sides in low, open, grassy floodplain, avoiding the woodland on the river banks and the river channel (**Appendix A, Photo 15**). Along both rivers, it did not appear that the vegetation along the banks or within the woodlands had been disturbed.
- Tongue River Crossed by Open Cut or Horizontal Drilling, Trees Avoided.* Enbridge originally proposed to open cut through the Tongue River to install the pipeline, however it was later approved to use directional drilling (Docket #71 and #73, PU-07-75). The bore underneath the Tongue River began in cropland on the north side, went underneath the river channel and adjacent woodland, and ended in cropland or hayland on the south side. It did not appear that the vegetation along the banks or within the woodlands had been disturbed.
- Route Amendment around Very Deep Pond.* Wenck observed marker posts which indicated induction bends of the pipeline around a very deep wetland just to the south of Mile 793 (**Appendix A, Photo 41**).
- Wetlands Avoided or Mitigation Measures Implemented to Minimize Impacts. No Surface Facilities Installed. No Permanent Draining or Filling.* Enbridge reported that an estimated 27 wetlands would be crossed by the pipeline route and that any impacts to these wetlands were covered by a US Army Corps of Engineers Permit. The Environmental Mitigation Plan in the Application described the trenching

methods used to cross wetlands, which attempt to minimize disturbance. It is assumed that these measures were applied as stated; some were corroborated in weekly construction report photos from the PSC files (ND PSC 2011). Wetlands along the route that were open cut to install the pipeline included road ditches, irrigation ditches, and depressional wetlands in fields and idle lands. Vegetation along open cut wetlands appeared to have revegetated naturally. In most cases, there was no difference in species composition or relative abundance in the pipeline right-of-way compared to the adjacent undisturbed area (**Appendix A, Photos 6, 10, 32**). It was also noted that for wetland depressions that were in fields, for which all natural vegetation had been eliminated, it appeared the original soils and topographical contours of the depression had been restored after pipeline installation (**Appendix A, Photos 29 and 33**). At one of the observation points in the extensive area of wetlands surrounding the Juhl National WMA between Miles 790 and 793, there were remains of jute netting in place for erosion control. The netting was functioning properly to control soils but allow vegetation growth through it as it slowly decomposed (**Appendix A, Photo 37**). In this area there were some visible differences in vegetation in versus out of the pipeline corridor; the vegetation that had been disturbed was not growing as vigorously and had not fully filled in the disturbed area (**Appendix A, Photo 38**). There were also slight differences in species composition, though this was not necessarily problematic since the disturbed area had a natural assemblage of native early successional species which would be expected. Canada thistle (*Cirsium arvense*) infestations, considered a noxious weed in North Dakota, were a problem in some of the wetlands and road ditches; however there were similar abundances outside of the pipeline route so it did not appear to be a problem caused or amplified by the pipeline disturbance (**Figure 1**). Enbridge reported that it responds to Canada thistle outbreaks along the pipeline upon landowner request. Wenck confirmed that there were no surface facilities installed in wetlands along the route and there were no permanently drained or filled wetlands.

- *Woodland Crossing Width Reduced to 50ft, Leaving Mature Shrubs and Trees Where Practical.* There were no natural woodlands within the Project area that were

impacted by construction of the Project; these had been avoided by directionally boring underneath. There were two locations along the route at the ends of two mature planted tree rows which were impacted by the Project (**Appendix A, Photos 28 and 35**). Wenck verified that the workspace width along the pipeline had been reduced in those locations to less than 50ft to minimize the number of trees that had to be removed.

- *Compliance with “Tree and Shrub Mitigation Specifications”*. A tree removal inventory had not been submitted for the LSr project, though an inventory had been submitted for the Alberta Clipper project (ND PSC 2011, Docket #88, PU-07-108). Wenck confirmed that there were trees removed for the Project, and that the width of clearing was less than 50ft to minimize the number removed (**Appendix A, Photos 28 and 35**). Enbridge reported that the tree and shrub replacement plantings have not been completed for this Project; only one landowner wanted replanting so an alternate location had to be found to replace the trees. Enbridge reported they are working with Grahams Island State Park in Ramsey County, ND to arrange a tree and shrub planting, and that a status report will be provided to the PSC in the near future (Rachael Shetka, pers. comm. 2011). To date, a tree and shrub mitigation plan or planting reports have not been submitted for the Project (ND PSC 2011).
- *Reclamation/Reseeding According to NRCS or Landowner, if applicable*. The majority of the Project area was within cropland, which does not require reseeding after construction. Several areas of natural vegetation adjacent to rivers or waterways were avoided by horizontally drilling underneath them (**Appendix A, Photos 14-15, 19-21, 31**). Road ditches and unsaturated wetlands which were open cut were sown, according to Enbridge, with annual ryegrass after soil was recontoured to stabilize the soil. Wenck did not observe any remnant material of this annual plant and it appeared that most areas with semi-natural vegetation had filled in with surrounding vegetation to the point that the disturbed area could not be distinguished from the undisturbed area (**Appendix A, Photos 6, 10, 32**). Weekly construction report photos from the PSC files indicated an area of CRP land had been restored “north of 147th”,

presumably west of 147th Ave NE between Miles 776 and 777 (Docket #83, PU-07-75, ND PSC 2011). Individual landowner requests for reseeding were unknown, though presumably Enbridge responded to any particular needs. There was an area marked as a conservation easement between Miles 800 and 801, bordered on the west by 163rd Ave NE, which appeared to have been seeded with a wheatgrass or small grain crop only within the pipeline right-of-way (**Appendix A, Photos 12 and 13**). Outside of the right-of-way, the soil had not been tilled and there were several species of annual weeds present. It is unclear why the right-of-way was being managed differently. The easement was also presumably either new or had been recently taken out of easement, since normally easements preserve grassland vegetation types. Enbridge's Project records did not show the site to be CRP land or under conservation easement (Rachael Shetka, pers. comm. 2011).

3.2.3 Cultural Resources

The following aspects pertaining to cultural resources were inspected at the Project site.

- *Cultural Resources Avoided.* Several isolated finds were identified during cultural studies for the Project which were not eligible for listing and did not require avoidance. However, three cultural sites were identified within the pipeline construction right-of-way. Site 32PB0206 was a historic ox-cart trail referred to as the Angle Road, which was recommended eligible for listing and required avoidance. Site 32PB0161 included archeological materials on the west bank of the Red River and was recommended potentially eligible for listing and also required avoidance. Site 32PB0173 was a railroad and was recommended eligible for listing and required avoidance. Wenck observed the markers where the pipeline was directionally bored underneath each of these cultural sites to avoid impacts (**Appendix A, Photos 1 and 15; Figure 1**). The vegetation did not appear to have been disturbed adjacent to the sites.

4.0 Issues to Resolve and Recommendations

4.1 WRITTEN VERIFICATION OF PROJECT IMPLEMENTATION

As noted in Section 2.0, several components of the Project were asserted in the plans or proposed during construction, but have not been documented with the PSC. Many of these components could be verified simply with copies of final construction reports or ongoing reports from the local operations office – any type of written documentation showing that the Project was indeed implemented or constructed as planned, or that particular impacts have not occurred. Wenck recommends that the PSC requests from Enbridge the list of items which, according to our review of the PSC files, have not been documented in writing. This would include all items which are not marked in the second and third columns of Table 1 (Section 2.0). The PSC may be able to verify some of the items/issues before the request to Enbridge.

4.2 TREE & SHRUB REPLACEMENT

There were no records of mitigation planting for the trees and shrubs removed for this Project. Enbridge reported they are working with Grahams Island State Park in Ramsey County, ND to arrange a tree and shrub planting, but to date, there have been no plans submitted for the Project (ND PSC 2011). Wenck recommends that the PSC request that a mitigation plan be prepared by March 2012, with plantings to occur spring 2012 to initiate fulfillment of the “Tree and Shrub Mitigation Specifications”, which are part of the Order for the Project.

4.3 DEPRESSIONS ON OPEN CUT ROADS

Some roads within the Project area which had been open cut where the pipeline crossed exhibited a slight depression where the soil had settled on the rebuilt roadway (Section 3.2.1). Currently these dips in the road are not a problem; they are shallow and do not affect vehicle

traffic. However, because these areas have potential to erode or settle further, Wenck recommends these locations be monitored to ensure they do not worsen over time.

4.4 PIPELINE DEPTH

The depth of the buried pipeline is unknown. Because no waiver is included in the PSC files or discussed in the Order for the Project, Wenck assumes the required depth of 48in was followed. However, Wenck recommends the PSC obtain written verification of the as-built depth of the pipeline along the entire route for their records.

4.5 MARKER POSTS

In several locations, marker posts were missing from one or both sides of intersections of the pipeline route with roads (Section 3.2.1). At the time of the survey, the reason for this was unclear. Since the survey, Enbridge representatives responded with information on the DOT regulations the company followed for marker installation (49 CFR Part 195.410 Line markers) (Rachael Shetka, pers. comm. 2011). Wenck considers this issue resolved and recommends no further action.

5.0 Conclusion

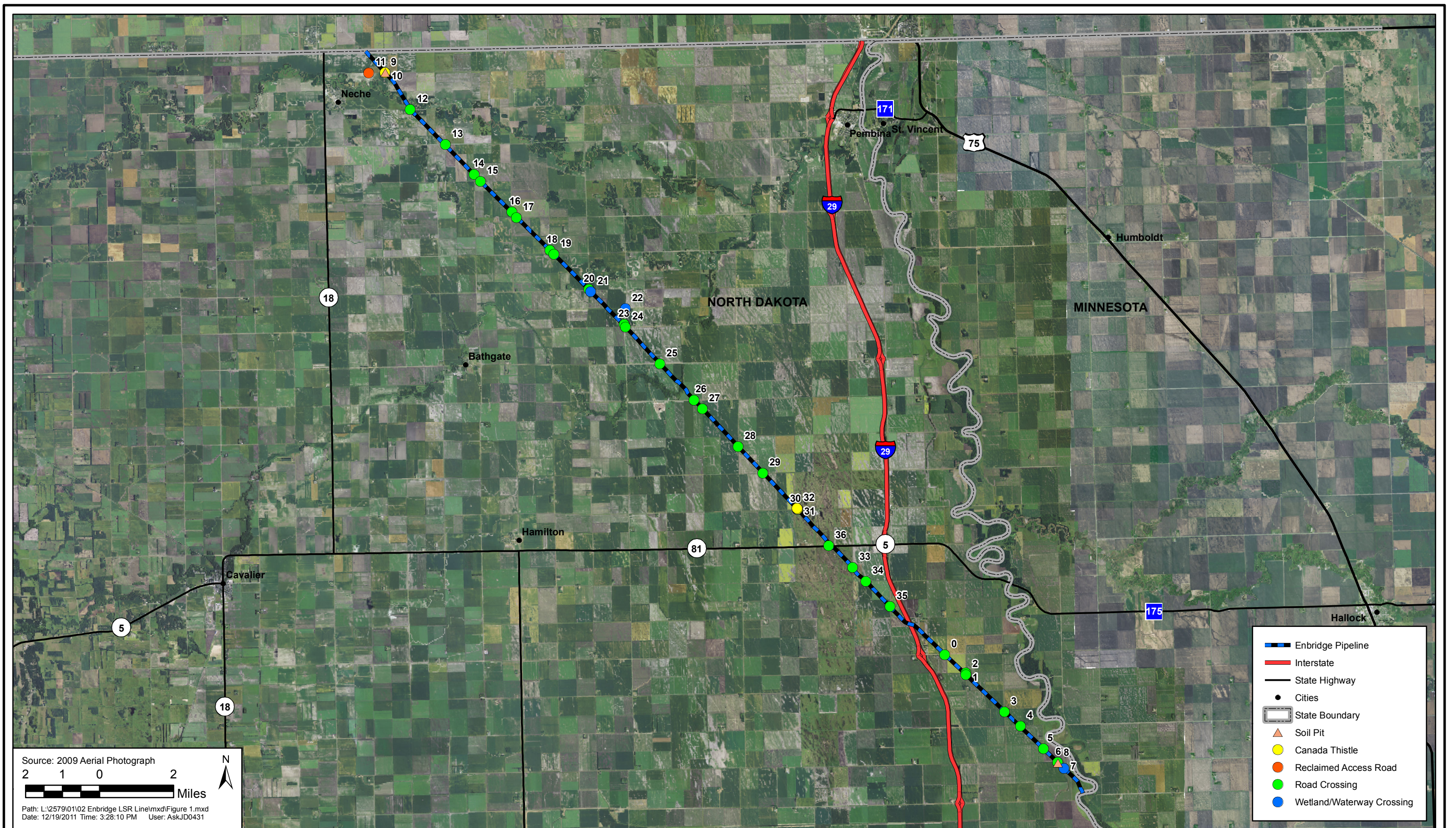
Overall, the Project appeared to have been constructed as designed with minimal impacts to the surrounding natural or human environment. The Project site was well-maintained and in good condition. However, Wenck observed several issues that may need to be resolved before the Project is considered complete and in full compliance. This includes provision of written documentation of particular aspects of project implementation, tree and shrub replacement, monitoring of depressions on open cut roads, and verification of the as-built depth of the pipeline along the entire route. None of these are critical issues, but they should be reviewed by the PSC to determine what the company should comply with. It should be noted that the Enbridge representative was very easy to work with during the construction inspection process. She was fully transparent and answered any questions we had during the survey. She stated they will be willing to provide any further documentation necessary to fulfill requests of the PSC.

6.0 References

North Dakota Public Service Commission (ND PSC). 2011. Online Case Search. Available from: http://www.psc.nd.gov/database/company_case_list.php. Accessed December 1, 2011.

Shetka, Rachel. 2011. Enbridge Environmental Analyst II, Major Projects. Personal Communication: discussion during site visit August 4, 2011 and follow-up email responding to questions on August 9, 2011.

Figures



Appendix A



Photo 1. Direction: Northwest. Pipeline markers from left of photo denote Alberta Clipper and LSR pipelines to the east of Mile 795 of the pipeline route. Interstate 29 in the distance (on which pickup is located), Burlington Northern Railroad in mid-ground, the gravel frontage road in foreground, and a wetland on the west side of Interstate 29 (not visible) were all crossed underneath using one large horizontal drilling bore to avoid impacts to all these features. The railroad was cultural site 32PB0173.



Photo 2. Direction: Northwest. Frontage road (Old Highway 44) to the east of Interstate 29 crossed underneath by the pipelines. All markers were in place and it appeared no vegetation had been disturbed in the ditches.



Photo 3. Direction: Southeast. Ditch and field to the southeast of gravel frontage road at Mile 795.2. Markers denote pipeline routes, which were barely visible in wetland vegetation. The bore would have ended within the field in the distance. There was no settling observed in the field along the route.



Photo 4. Direction: Northwest. Ditch and field to the northwest of 93rd Street NE at Mile 796.4. The road had been directionally bored underneath, denoted by pipeline marker in foreground. There appeared to be a slight depression and stunted, slightly yellowed crop at the end of the bore in the field.



Photo 5. Direction: Southeast. South side of 93rd Street NE crossing. Right-of-way appeared to be in good condition. Vegetation in ditch and crop appeared to have no impacts.



Photo 6. Direction: West. Irrigation ditch crossed by open cut to the southeast of Mile 797 and to the west of 161st Ave NE between fields. Orange markers indicate pipeline right-of-way. The vegetation was in good condition and was indistinguishable from surrounding vegetation. Dominant species included giant ragweed (*Ambrosia trifida*), cattails (*Typha* sp.), and curly dock (*Rumex crispus*).



Photo 7. Direction: Northeast. Culvert installed at crossing of 161st Ave NE, to the southeast of Mile 797. There were no signs of settling or erosion around the culvert. It appeared to be in good condition.



Photo 8. Direction: North. Minimum maintenance section line road was restored (161st Ave NE) and showed no signs of construction. This was to the southeast of Mile 797.



Photo 9. Direction: Northwest. View of field to the northwest of crossing of 161st Ave NE. There was a depression in the field within the construction right-of-way but off the pipeline route which may be due to settling or improper topsoil replacement (red arrow), though it may also be a natural depression. Pipeline markers were in place along 161st Ave NE (foreground).



Photo 10. Direction: North. West ditch of 161st Ave NE which was open cut. Pipeline markers are visible on edge of field. Revegetation of the ditch appeared to be successful. Dominant species included smooth brome (*Bromus inermis*), reed canarygrass (*Phalaris arundinacea*), curly dock (*Rumex crispus*), and arrowhead (*Sagittaria cuneata*). The crop to the southeast of this crossing showed no impacts.



Photo 11. Direction: West. Southeast of Mile 799 at crossing of 91st St NE. There was a slight depression in the road where the pipeline crossed (red arrow). The dip was not problematic and there was no erosion, but the location should be monitored. The vegetation in the ditch and the crops adjacent to this area appeared to have no impacts.



Photo 12. Direction: Southeast. Conservation Easement boundary markers along 163rd Ave NE, just to the southeast of Mile 800. The pipeline right-of-way through the field was planted to a wheatgrass (*Agropyron* sp.) or small grain crop, whereas the adjacent field was not tilled and had annual weeds. It was unclear why there was a difference in treatment and why the conservation easement had been tilled, since these are typically uncultivated grassland areas.



Photo 13. Direction: Southeast. View of pipeline right-of-way marked as conservation easement, showing the wheatgrass or crop that was planted.



Photo 14. Direction: South. View of County Ditch 66-1 to the south, which diverges from the Red River within 0.5 miles north of this point. The crossing of the pipeline is indicated by the marker posts on either bank, and is just to the northwest of Mile 801. This crossing was directionally drilled underneath the ditch. There were no indications of vegetation disturbance or erosion problems.



Photo 15. Direction: Southeast. Another view of the County Ditch 66-1 crossing, indicated by the pipeline markers on either side. In the distance slightly right of center the above-ground Mainline Valve site is visible. The trees in the distance indicate the woodland on the east side of the Red River, which marks the end of the pipeline in North Dakota. The Red River and cultural site 32PB0161, which were scattered materials on the west bank, were avoided by a directional drill underneath them.



Photo 16. Topsoil exploration pit in an agricultural field south of 90th St SE within the pipeline right-of-way (at approximately Mile 800.6). Topsoil was very dark brown to a depth of 10-inches, underlain by light brown mixed clays in the subsoil layer.



Photo 17. Topsoil exploration pit in an agricultural field north of 109th St NE within the pipeline right-of-way (at approximately Mile 774.5). Topsoil went to a depth of greater than 20-inches. Subsoil could not be distinguished.



Photo 18. Direction: North. Location of temporary access road, going straight north from 109th St NE to approximately Mile 773.9 on the pipeline route. There was no indication of the access road. The cropland and road ditches of 109th St NE had been completely restored to prior condition.



Photo 19. Direction: Northwest. Pembina River crossing. View from south bank across to north bank. No pipeline markers were visible on north side of river, though they could have been obscured by tall vegetation. The river had been avoided by horizontally drilling underneath. There was no indication of soil or vegetation disturbance along the banks that would have been caused by pipeline installation.



Photo 20. Direction: Northwest. Pembina River crossing. View of south bank, showing orange pipeline markers amidst the tall grasses, at approximately Mile 775.6. The river had been avoided by horizontally drilling underneath.



Photo 21. Direction: Northwest. View of WMA between the south bank of the Pembina River (trees in distance) to 108th St NE (ditch in foreground). This area and the road were avoided along with the river via one long directional bore that ended in a field on the south side of the road.



Photo 22. Direction: Southeast. Field to the south of 108th St NE along the pipeline route. There was a slight depression within the pipeline right-of-way which could have been subsidence after pipeline installation.



Photo 23. Direction: Southeast. Pipeline valve system to the northeast of the intersection of 147th Ave NE and 107th St NE (County Hwy 55), near Mile 777. The LSr valve is on the left and the Alberta Clipper valve is on the right.



Photo 24. Direction: Southeast. Densitometer next to the valve system, which measures the density of the oil flowing through the pipeline. Information on the line served was not available at the time of the survey.



Photo 25. Direction: Northwest. Looking back across field to valves in the distance, with the road ditch of 107th St NE (County Hwy 55) in the foreground. This road had been bored underneath. The crop appeared to be in good condition.



Photo 26. Direction: Southeast. To the southeast of 107th St NE (County Hwy 55) along the pipeline route. The crops appeared to be in good condition, with no differences within versus outside the pipeline route. Markers were in place in the ditch.



Photo 27. Direction: South. 148th Ave NE just to the southeast of Mile 778. This road had been open cut and there was a slight depression where the pipeline route crossed (red arrow). It was not problematic for driving and there was no erosion, but the location should be monitored. The vegetation in the ditch had regrown completely and the crops adjacent to this area appeared to have no impacts.



Photo 28. Direction: Northwest. To the southeast of Mile 781 along 150th Ave NE showing view looking across field toward end of tree rows surrounding a farmyard. The workspace width was reduced to less than 50ft to minimize the number of trees removed. The back row of trees was totally avoided, whereas the front rows had to have some trees removed at the end.



Photo 29. Direction: Southeast. On 150th Ave NE across the road from the trees showing a restored wetland depression within a field along the pipeline route. The wetland depression appeared to have been in the field before construction, according to aerial imagery. The wetland was currently naturally revegetated and was not supporting crops well, though this was due to wetland conditions and not the pipeline construction.



Photo 30. Direction: Southeast. Minimum maintenance portion of 104th St NE to the southeast of Mile 781. The ditch vegetation and crops looked fine on either side, but there was a slight depression on the road from where the pipeline crossed (red arrow), which is difficult to see with this photo angle.



Photo 31. Direction: Northwest. Pipeline route across a tributary to the Tongue River (County Ditch 33) between Miles 782 and 783, just to the southeast of the intersection of 151st Ave NE and 103rd St NE. Records indicate the waterway and the two roads were bored underneath. Markers were in place and vegetation was intact, including cattails (*Typha* sp.), reed canarygrass (*Phalaris arundinacea*), smooth brome (*Bromus inermis*), panicked aster (*Aster simplex*), and curly dock (*Rumex crispus*).



Photo 32. Direction: West. Tongue River cutoff ditch which had been open cut. The crossing of the pipeline is in the distance (though markers are not visible on photo). There were no revegetation or erosion problems.



Photo 33. Direction: Southeast. Field southeast of 102nd St NE at Mile 784 had a restored wetland depression (based on aerial imagery) within the pipeline route. Road had been bored underneath and all markers were in place.



Photo 34. Direction: Southeast. Looking across a minimum maintenance portion of 154th Ave NE at Mile 787 with ditch in the foreground and field in the distance. Crops, soils, and ditch vegetation were in good condition. The road had a slight depression from being open cut along the pipeline route.



Photo 35. Direction: Northwest. Along 155th Ave NE between Miles 788 and 789, showing route of pipeline where the workspace width was reduced to less than 50ft to minimize the number of trees removed from tree rows surrounding another farmyard.



Photo 36. Direction: Southeast. Crossing of minimum maintenance 98th St SE at approximately Mile 789.5. The crops and road ditches were in good condition but there was a slight depression in the road bed where the open cut had crossed (red arrow) which should be monitored.



Photo 37. Direction: East. Ditch along minimum maintenance portion of 97th St NE between Miles 790 and 791, within the wetlands surrounding Juhl National WMA. Pipeline route is marked by the posts on the left. Jute netting was in place in the ditch to stabilize soils and was functioning well. New vegetation was growing through the netting, including many native species such as prairie cordgrass (*Spartina pectinata*) and cattails (*Typha* sp.) and the non-native but common grass quackgrass (*Agropyron repens*).



Photo 38. Direction: Northwest. On 97th St NE in the same location as above but showing the view of the pipeline route to the northwest. The plant composition was different within the pipeline route and the vegetation was not as tall or dense compared to outside of the route, however the species within the route were typical early successional native plants and regrowth of the vegetation should continue on its own with no problems.



Photo 39. Direction: Southeast. Also on 97th St NE but showing the pipeline route on the other side of the road, which went through an extensive wetland area to the southeast. The Juhl National WMA intersects the pipeline route about 0.5 miles to the southeast of this point. The Joliette pumping station is just over one mile to the southeast.



Photo 40. Direction: Northwest. West side of Joliette pumping station grounds near Mile 792 where the pipeline veers south to cross State Highway 5. Pipeline runs to the south of above-ground valve visible on right.



Photo 41. Direction: Southeast. The pipeline route was altered to avoid a “very deep pond” just to the southeast of Mile 793, which is the deep wetland on the left of the photo. This view is from 158th Ave NE and the induction bends of the pipeline where it went around the pond are marked by posts along the edge of the field.

Appendix B

Appendix B. Field Observation Points (GPS Coordinates)

Point	Feature	Northing (m)*	Easting (m)*
0	Road Crossing	5402369.72	632502.91
1	Road Crossing	5401581.18	633423.33
2	Road Crossing	5401499.95	633424.60
3	Road Crossing	5399892.12	635104.36
4	Road Crossing	5399273.34	635800.11
5	Road Crossing	5398285.53	636786.75
6	Road Crossing	5397695.91	637406.79
7	Wetland/Waterway Crossing	5397438.57	637678.19
8	Soil Pit	5397676.12	637421.76
9	Soil Pit	5427635.39	608216.28
10	Canada Thistle	5427626.91	608209.67
11	Reclaimed Access Road	5427614.68	607505.48
12	Road Crossing	5426027.79	609300.83
13	Road Crossing	5424503.78	610831.16
14	Road Crossing	5423210.86	612069.63
15	Road Crossing	5422911.34	612346.78
16	Road Crossing	5421586.25	613710.40
17	Road Crossing	5421340.80	613915.04
18	Road Crossing	5419926.29	615369.61
19	Road Crossing	5419749.81	615532.46
20	Road Crossing	5418222.97	617054.31
21	Wetland/Waterway Crossing	5418123.89	617141.75
22	Wetland/Waterway Crossing	5417394.96	618639.84
23	Road Crossing	5416702.15	618586.41
24	Road Crossing	5416590.81	618648.65
25	Road Crossing	5414994.82	620142.15
26	Road Crossing	5413415.54	621625.40
27	Road Crossing	5413042.03	621984.17
28	Road Crossing	5411402.97	623537.66
29	Road Crossing	5410240.97	624610.48
30	Wetland/Waterway Crossing	5408666.58	626107.20
31	Canada Thistle	5408687.59	626119.59
32	Canada Thistle	5408717.28	626088.32
33	Road Crossing	5406157.22	628508.79
34	Road Crossing	5405545.39	629083.72
35	Road Crossing	5404455.75	630126.31
36	Road Crossing	5407097.97	627469.34

*Northing/Easting are in Universal Transverse Mercator Coordinate System.