North Dakota Public Service Commission
Consolidated Application

Amendment of Application for Route Permit

Sacagawea Pipeline Project

PU-15-114

Prepared for:

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E3 ENVIRONMENTAL
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INTRODUCTION

Sacagawea Pipeline Company, LLC (Sacagawea), a joint venture between Paradigm Pipeline, LLC and Grey Wolf Midstream, LLC, submitted a Consolidated Application for Certificate of Corridor Compatibility and Route Permit for the Sacagawea Pipeline Project (Project) on March 16, 2015. Since the original submittal, Sacagawea has identified the need to alter the proposed pipeline route at 29 locations. Sacagawea has prepared this Amended Application for the Route Permit (Amendment) to address these route modifications. The route modifications described in this Amendment reflect areas where the alignment as filed has shifted more than four feet.

The 29 route modifications fall entirely within the original 1-mile corridor described in the initial application for the Project. The Certificate of Corridor Compatibility portion of the Application remains unchanged and, as such, is not part of the Amendment.

This Amended Application for Route Permit provides the requisite information as stipulated by:

- North Dakota Century Code, Energy Conversion and Transmission Facility Siting Act, Section 49-22-08.1 and,
- North Dakota Administrative Code, Chapter 69-06-05, Transmission Facility Permit.

SECTION 1: DESCRIPTION

1.1 TYPE OF TRANSMISSION FACILITY

Refer to the Application as filed; no changes have resulted from the route modifications.

1.2 PURPOSE OF TRANSMISSION FACILITY

Refer to the Application as filed; no changes have resulted from the route modifications.

1.3 LENGTH, SIZE AND DESIGN OF PIPELINE FACILITY

1.3.1 LENGTH OF FACILITY

The previously filed Application detailed the Project to be approximately 70 miles in length; the proposed route modification will not increase the total project length.

1.3.2 PIPE SIZE

Refer to the Application as filed; no changes have resulted from the route modifications.

1.3.3 OPERATING PRESSURE AND THROUGHPUT

Refer to the Application as filed; no changes have resulted from the route modifications.

1.4 ABOVEGROUND FACILITIES

Refer to the Application as filed; no changes have resulted from the route modifications.

1.5 WIDTH OF RIGHT-OF-WAY

Refer to the Application as filed; no changes have resulted from the route modifications.

1.6 LOCATION

The proposed Project is approximately 70 miles in length and is located in McKenzie and Mountrail counties, North Dakota.

The table below provides the length and approximate location of each proposed route modification. Refer to Appendix B of this Amendment for Project location maps.

Route Modification	Starting Mile Post	Ending Mile Post	Approximate Length (Miles)
Re-route 1	2.5	3.35	0.84
Re-route 2	6.25	6.35	0.09
Re-route 3	7.35	7.5	0.17
Re-route 4	10.05	10.55	0.50
Re-route 5	18.4	18.5	0.08
Re-route 6	19.65	19.75	0.10
Re-route 7	21.9	22.4	0.49
Re-route 8	28.6	28.85	0.25
Re-route 9	33.65	34.3	0.67
Re-route 10	35.8	36.2	0.39
Re-route 11	38.75	38.9	0.13
Re-route 12	42.6	43.85	1.27
Re-route 13	45.55	45.65	0.12
Re-route 14	49.9	50.25	0.38
Re-route 15	51.2	51.2	0.05
Re-route 16	52.15	52.3	0.17
Re-route 17	53.2	53.4	0.20
Re-route 18	53.48	53.52	0.04
Re-route 19	54	54	0.03
Re-route 20	54.32	54.33	0.01
Re-route 21	54.50	54.51	0.003
Re-route 22	54.65	54.85	0.20
Re-route 23	54.85	55.55	0.69
Re-route 24	56	56.15	0.13
Re-route 25	57.05	57.5	0.44
Re-route 26	63.1	63.3	0.22
Re-route 27	64.1	64.7	0.59
Re-route 28	65.3	66.8	1.44
Re-route 29	67.35	End of Route	2.12

1.7 PROJECT SCHEDULE

1.7.1 ROUTE PERMIT

Refer to the Application as filed; no changes have resulted from the route modifications.

1.7.2 CERTIFICATE OF CORRIDOR COMPATIBILITY

Refer to the Application as filed; no changes have resulted from the route modifications.

1.7.3 RIGHT-OF-WAY ACQUISITION

Sacagawea anticipates right-of-way (ROW) acquisition for the Project will be completed by September 1, 2015.

1.7.4 CONSTRUCTION SCHEDULE

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 2: ROUTE ANALYSIS AND ENVIRONMENTAL STUDIES

2.1 PIPELINE ROUTE

Subsequent to the filing of the initial Application, Sacagawea identified 29 locations along the proposed route where alternative alignments are necessary. Of the 29 route alterations, 20 closely follow the original alignment and remain within the Survey Corridor as previously filed. The remaining 9 fall outside of the Survey Corridor as previously filed. Sacagawea commissioned and completed environmental field surveys for each of these re-routes. The results of these field surveys are summarized within this document and detailed survey results are provided in Appendices D and E (Natural Resources Report and Cultural Resources Report abstracts). The full Cultural Resources Report and associated maps located in Volume 2 are privileged and not for internet publication. Refer to Appendix B for maps depicting the locations of each route modification and below for a general location description. Section 2.2 provides reasoning as to why each modification was chosen.

Re-route #1 (MP 2.5 to 3.35):

The route modification shifts the alignment approximately 220 feet to the west, outside of the original Survey Corridor.

Re-route #2 (MP 6.25 to 6.35):

The route modification shifts the alignment approximately 30 feet to the north and remains within the original Survey Corridor.

Re-route #3 (MP 7.35 to 7.5):

The route modification shifts the alignment approximately 18 feet south and approximately 10 feet north, within the original Survey Corridor.

Re-route #4 (MP 10.05 to 10.55):

The route modification shifts the alignment approximately 1,300 feet to the east, outside of the original Survey Corridor.

Re-route #5 (MP 18.4 to 18.5):

The route modification shifts the alignment approximately 5 feet north and is within the original Survey Corridor.

Re-route #6 (MP 19.65 to 19.75):

The route modification shifts the alignment approximately 6 feet north and is within the original Survey Corridor.

Re-route #7 (MP 21.9 to 22.4):

The route modification shifts the alignment approximately 120 feet northwest and is within the original Survey Corridor.

Re-route #8 (MP 28.6 to 28.85):

The route modification shifts the alignment approximately 10 feet southeast and is within the original Survey Corridor.

Re-Route #9 (MP 33.65 to 34.3):

The route modification shifts the alignment approximately 50 feet east and is within the original Survey Corridor.

Re-Route #10 (MP 35.8 to 36.2):

The route modification shifts the alignment approximately 17 feet east, 15 feet west, and 115 feet southeast. The modification is located within the original Survey Corridor.

Re-Route #11 (MP 38.75 to 38.9):

The route modification shifts the alignment approximately 110 feet east within the original Survey Corridor, however the temporary workspace area falls outside of the Survey Corridor.

Re-Route #12 (MP 42.6 to 43.85):

The route modification shifts the alignment up to 300 feet north and west outside of the original Survey Corridor.

Re-Route #13 (MP 45.55 to 45.65):

The route modification shifts the alignment 50 feet west and is within the original Survey Corridor.

Re-Route #14 (MP 49.9 to 50.25):

The route modification shifts the alignment approximately 200 feet west. The re-route occurs within the original Survey Corridor, however the temporary workspace area falls outside of the Survey Corridor.

Re-Route #15 (MP 51.2 to 51.2):

The route modification shifts the alignment approximately 8 feet south within the original Survey Corridor.

Re-Route #16 (MP 52.15 to 52.3):

The route modification shifts the alignment approximately 100 feet west within the original Survey Corridor.

Re-Route #17 (MP 53.2 to 53.4):

The route modification shifts the alignment approximately 100 feet north within the original Survey Corridor.

Re-Route #18 (MP 53.48 to 53.52):

The route modification shifts the alignment approximately 40 feet east within the original Survey Corridor.

Re-Route #19 (MP 54 to 54):

The route modification shifts the alignment approximately 11 feet north within the original Survey Corridor.

Re-Route #20 (MP 54.32 to 54.33):

The route modification shifts the alignment approximately 5 feet west within the original Survey Corridor.

Re-Route #21 (MP 54.50 to 54.51):

The route modification shifts the alignment approximately 4 feet west within the original Survey Corridor.

Re-Route #22 (MP 54.65 to 54.85):

The route modification shifts the alignment approximately 120 feet west within the original Survey Corridor.

Re-Route #23 (MP 54.85 to 55.55):

The route modification shifts the alignment a maximum of 812 feet north and is located outside of the original Survey Corridor.

Re-Route #24 (MP 56 to 56.15):

The route modification shifts the alignment approximately 20 feet west within the original Survey Corridor.

Re-Route #25 (MP 57.05 to 57.5):

The route modification shifts the alignment approximately 240 feet west and is located outside of the original Survey Corridor.

Re-Route #26 (MP 63.1 to 63.3):

The route modification shifts the alignment approximately 20 feet south. The re-route occurs within the original Survey Corridor, however the temporary workspace area falls outside of the Survey Corridor.

Re-Route #27 (MP 64.1 to 64.7):

The route modification shifts the alignment a maximum of 30 feet south. The re-route occurs within the original Survey Corridor, however the temporary workspace area falls outside of the Survey Corridor.

Re-Route #28 (MP 65.3 to 66.8):

The route modification shifts the alignment a maximum of 60 feet south, then up to 300 feet northwest. The re-route occurs within and outside of the original Survey Corridor.

Re-Route #29 (MP 67.35 to End of Alignment):

The route modification shifts the alignment approximately 50 feet south, then 50 feet north, and 50 feet southeast. The re-route occurs within the original Survey Corridor.

2.2 ROUTE ALTERNATIVES

Re-route #1 (MP 2.5 to 3.35):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to create greater distance from a potentially occupied structure. The western route alternative keeps the Project more than 500 feet from this structure. Additionally, this route is shorter in overall length compared to the eastern route alternative. For these reasons, the western route was chosen.

Re-route #2 (MP 6.25 to 6.35):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen to improve the crossing alignment of an existing foreign pipeline located west of 106th Avenue NW.

Re-route #3 (MP 7.35 to 7.5):

Sacagawea considered two alternatives, a northern and southern route. This route (southern route) was chosen as it parallels an existing pipeline.

Re-route #4 (MP 10.05 to 10.55):

Sacagawea considered two alternatives for routing the Project around the Little Missouri National Grasslands. The northern route (filed in the initial application) parallels the grassland boundary. The southern route was chosen to increase the

distance from the border of the Little Missouri Grassland. Additionally, this route is shorter in overall length compared to the northern route. For these reasons, the southern route was chosen.

Re-route #5 (MP 18.4 to 18.5):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-route #6 (MP 19.65 to 19.75):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-route #7 (MP 21.9 to 22.4):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to minimize impacts to wetlands and an area of woody vegetation.

Re-route #8 (MP 28.6 to 28.85):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen due to a design change altering the point of inflection (*i.e.* PI location) and therefore slightly shifting the alignment.

Re-Route #9 (MP 33.65 to 34.3):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to create additional temporary workspace on the west side of the alignment and to create distance from an intercontinental ballistic missile (ICBM) launch or launch control facility.

Re-Route #10 (MP 35.8 to 36.2):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to avoid environmentally sensitive features. Additionally, this route is shorter in overall length as compared to the western route alternative. For these reasons, the eastern route was chosen.

Re-Route #11 (MP 38.75 to 38.9):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to avoid an environmentally sensitive feature. Additionally, this route is shorter in overall length compared to the western route alternative. For these reasons, the eastern route was chosen.

Re-Route #12 (MP 42.6 to 43.85):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen as it parallels the existing Targa Badlands, LLC New Town to Stanley Pipeline easement.

Re-Route #13 (MP 45.55 to 45.65):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to minimize impact to a U.S. Fish and Wildlife Service (USFWS) wetland easement.

Re-Route #14 (MP 49.9 to 50.25):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to avoid environmentally sensitive features.

Re-Route #15 (MP 51.2 to 51.2):

Sacagawea considered two alternatives, a northern and southern route. This route (southern route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-Route #16 (MP 52.15 to 52.3):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to minimize impacts to a wetland and reduce the length of the bore to be utilized to install the pipeline under the feature.

Re-Route #17 (MP 53.2 to 53.4):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen to minimize impacts to a USFWS wetland and reduce the length of the bore to cross the feature.

Re-Route #18 (MP 53.48 to 53.52):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to minimize impacts to a wetland and reduce the length of the bore to cross the feature.

Re-Route #19 (MP 54 to 54):

Sacagawea considered two alternatives, a northern and southern route. This route (northern route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-Route #20 (MP 54.32 to 54.33):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-Route #21 (MP 54.50 to 54.51):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to accommodate a landowner's request to shift the alignment east.

Re-Route #22 (MP 54.65 to 54.85):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen as it provides a better alignment to facilitate the required bore of three USFWS wetland easements.

Re-Route #23 (MP 54.85 to 55.55):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen as it parallels the existing Targa Badlands, LLC New Town to Stanley Pipeline easement and avoids crossing a wetland, thereby reducing environmental impacts.

Re-Route #24 (MP 56 to 56.15):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen to minimize environmental impacts by increasing the distance between the Project route and a USFWS wetland easement.

Re-Route #25 (MP 57.05 to 57.5):

Sacagawea considered two alternatives, an eastern and western route. This route (western route) was chosen as it parallels the existing Targa Badlands, LLC New Town to Stanley Pipeline easement. Additionally, this route allows for the bore of a USFWS wetlands easement and the western alternative is shorter in overall length compared to the eastern route alternative. For these reasons, the western route was chosen.

Re-Route #26 (MP 63.1 to 63.3):

Sacagawea considered two alternatives, a northern and southern route. This route (southern route) was chosen due to a design change altering the point of inflection and therefore slightly shifting the alignment.

Re-Route #27 (MP 64.1 to 64.7):

Sacagawea considered two alternatives, a northern and southern route. This route (southern route) was chosen due to a design change resulting in a slight shift to the alignment.

Re-Route #28 (MP 65.3 to 66.8):

Sacagawea considered two alternatives, a northern and southern route. This route (southern route) was chosen to avoid environmentally sensitive features and to minimize wetland crossings and potential impacts by routing around USFWS wetland easements. Additionally, this route is shorter in overall length compared to the northern route alternative. For these reasons, the southern route was chosen.

Re-Route #29 (MP 67.35 to End of Alignment):

Sacagawea considered two alternatives, an eastern and western route. This route (eastern route) was chosen to avoid an environmentally sensitive feature and to avoid a conflicting pipeline easement.

2.3 ENVIRONMENTAL SURVEY

Field surveys were conducted with a typical 200-foot corridor centered upon the proposed re-route alignments. Natural resource and cultural resource surveys were conducted in March, April, and May of 2015.

2.3.1 NOXIOUS WEEDS

Refer to the Application as filed; no changes have resulted from the route modifications.

2.3.2 TREE/SAPLING/SHRUB SURVEY

During field survey, crews performed a detailed tree/shrub inventory. This inventory recorded the pre-construction status of these resources, which would form the baseline for restoration and mitigation reconciliation. Based on this effort, 90 additional trees were observed within the re-route survey area. Including the re-routes, approximately 6,232 trees were identified within the Project Survey Corridor. The number of trees identified within the surveyed 100-foot wide construction ROW decreased from 2,460 in the Application as filed to 1,805. Refer to Appendix D for the Natural Resources Report and Section 5 of the Application as filed for planned mitigation measures.

2.3.3 WETLAND AND WATERBODIES SURVEY

The proposed re-routes and additional survey areas were inventoried for wetland and waterbody features. Field crews identified features, characterized the features as wetland or waterbody and recorded feature boundaries relative to the proposed centerline.

2.3.3.1 WETLAND SURVEY

The Application as filed identified 151 wetland features within the Survey Corridor with 23 of these features identified as potentially jurisdictional wetlands within the 100-foot-wide construction ROW. Field surveys of the re-routes identified five additional wetland features within the Survey Corridor (156 total within Project Survey Corridor). Including the re-routes, the number of features identified as potentially jurisdictional wetlands within the 100-foot-wide construction ROW decreased to 17. Refer to the Project maps in Appendix B for the location of each feature, and Appendix D for the Natural Resources Report.

2.3.3.2 WATERBODIES SURVEY

The Application as filed identified two waterbodies and 23 streams within the Survey Corridor. Field surveys of the re-routes identified one additional waterbody and no additional streams. Refer to the Project maps in Appendix B for the location of each feature, and Appendix D for the Natural Resources Report.

2.3.4 WILDLIFE INVENTORY

Refer to the Application as filed; no changes have resulted from the route modifications.

2.3.4.1 FEDERALLY PROTECTED SPECIES SURVEY

On May 4, 2015, the USFWS final rule listing the northern long-eared bat (*Myotis septentrionalis*) as a threatened species under the Endangered Species Act of 1973 became effective. Sacagawea initiated consultation with the USFWS about the northern long-eared bat as a proposed threatened species on December 18, 2014.

A review of the northern long-eared bat's history, critical habitat, and conservation measures associated with the species was completed to assess the potential effects of the Project on these resources. The results of the assessment are provided below.

Northern long-eared bat: The northern long-eared bat roost underneath bark, in cavities, or in crevices of both live and dead trees. Populations have also been found in cool environments such as caves and mines and prefer to spend winter hibernating in locations with high humidity and no air currents. Most records of northern long-eared bats are from winter hibernacula surveys, and no known hibernacula are located in North Dakota. Refer to Appendix D for the Natural Resources Report and Section 5 for proposed mitigation measures.

Refer to the Application as filed for additional federally protected species; no changes have resulted from the route modifications.

2.3.5 NORTH DAKOTA STATE HISTORIC PRESERVATION OFFICE

Sacagawea commissioned a Class I (literature review) and Class III Cultural Resource Inventory of the re-routes. This was completed on January 29, March 10, 11, 21, 19, and 30, April 10, 12, 16, and May 16, 2015.

The Class I did not identify any additional cultural resources within the Project Area. During the Class III inventory, one newly recorded cultural resource was recorded (32MN1297). This site is unevaluated for inclusion to the National Register of Historic Places (NRHP). The proposed alignment is approximately 63 feet from the site boundary, which provides adequate distance to avoid the resource.

The Class III documented the re-routes increased the avoidance distance for five sites recorded in the original inventory. Four of these sites are now located outside of the 50-foot avoidance boundary, thus removing any need for fencing or monitoring (32MN1131, 32MN1206, 32MN1207, and 32MN1320). The fifth site (32MN1130) is now located 25 feet west of the alignment; however, fencing and monitoring is still recommended.

In addition, the original Class III report recommended a 50 foot avoidance area for 32MN1149. The route modifications shifted the route closer to the resource, which would now be avoided by boring. In order to ensure the resource is protected, the recommendation of fencing and monitoring remains unchanged).

No other changes were made to any previous recommendations as noted in the original Cultural Resources Reports filed on March 16, 2015 and the proposed re-routed alignment would not impact any potentially eligible resources. Therefore, the recommendation stands that a determination of *No Significant Sites Affected* and *No Historical Properties Affected* be granted for the Project to proceed as planned.

Coordination with the State Historic Preservation Office (SHPO) was initiated for the Palermo and original Sacagawea line prior to consolidation of the projects to form the current, approximately 70 mile Project. Therefore, two report addendums were completed for the proposed re-routes. On May 22, 2015, Sacagawea received concurrence for the re-routes of *No Significant Sites Affected* for the Sacagawea Pipeline Report from the SHPO, provided there are no changes to the nature or location of the proposed Project. On June 5, 2015, Sacagawea received concurrence of *No Significant Sites Affected* for the Palermo Gathering Pipeline Report from the SHPO, provided there are no changes to the nature or location of the proposed Project. Refer to Appendix C for related agency consultations, and Appendix E for the Cultural Resources Survey Report Abstracts. The full cultural resources reports and associated maps located in Volume 2 are privileged and not for internet publication.

2.3.6 U.S. FISH AND WILDLIFE SERVICE MANAGED LANDS

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 3: NEED FOR FACILITY

3.1 ANALYSIS OF NEED BASED ON PRESENT AND PROJECTED DEMAND, INCLUDING SYSTEM STUDIES

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 4: SITING CRITERIA ANALYSIS

4.1 FACTORS TO BE CONSIDERED IN EVALUATING APPLICATIONS AND DESIGNATIONS OF SITES, CORRIDORS AND ROUTES (NDCC 49-22-09)

4.1.1 AVAILABLE RESEARCH AND INVESTIGATION RELATING TO THE EFFECTS OF THE LOCATION, CONSTRUCTION, AND OPERATION OF THE PROPOSED FACILITY ON PUBLIC HEALTH AND WELFARE, NATURAL RESOURCES AND THE ENVIRONMENT:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.2 THE EFFECTS OF NEW ENERGY CONVERSION AND TRANSMISSION TECHNOLOGIES AND SYSTEMS DESIGNED TO MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.3 ADVERSE DIRECT AND INDIRECT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROPOSED SITE OR ROUTE BE DESIGNATED:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.4 ALTERNATIVES TO THE PROPOSED CORRIDOR OR ROUTE WHICH ARE DEVELOPED DURING THE HEARING PROCESS AND WHICH MINIMIZE ADVERSE EFFECTS:

Sacagawea would fully participate in the hearing process and would address any alternatives developed during the hearing process, as applicable.

4.1.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF NATURAL RESOURCES SHOULD THE PROPOSED CORRIDOR AND ROUTE BE DESIGNATED:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.6 DIRECT AND INDIRECT ECONOMIC IMPACTS OF THE PROPOSED FACILITY:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.7 EXISTING PLANS OF THE STATE, LOCAL GOVERNMENT, AND PRIVATE ENTITIES FOR OTHER DEVELOPMENTS AT OR IN THE VICINITY OF THE PROPOSED ROUTE:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.8 THE EFFECT OF THE PROPOSED ROUTE ON EXISTING SCENIC AREAS, HISTORIC SITES AND STRUCTURES AND PALEONTOLOGICAL OR ARCHAEOLOGICAL SITES:

Sacagawea commissioned a Class III cultural resource inventory for the proposed re-routes. No scenic areas, historic sites or structures, paleontological, or archaeological sites were identified. The cultural resource survey report abstract is located in Appendix E. The full cultural resources report and associated maps located in Volume 2 are privileged and not for internet publication.

4.1.9 THE EFFECT OF THE PROPOSED ROUTE ON AREAS WHICH ARE UNIQUE BECAUSE OF BIOLOGICAL WEALTH OR BECAUSE THEY ARE HABITATS FOR RARE AND ENDANGERED SPECIES:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.1.10 PROBLEMS RAISED BY FEDERAL AGENCIES, OTHER STATE AGENCIES AND LOCAL ENTITIES:

Refer to the Application as filed; no changes have resulted from the route modifications.

4.2 EXCLUSION AREAS (NDAC 69-06-08-02(1))

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3 AVOIDANCE AREAS (NDAC 69-06-08-02(2))

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.1 FEDERAL RESOURCE REVIEW

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.2 STATE RESOURCE REVIEW

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.3 AREAS OF KNOWN GEOLOGIC INSTABILITY

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.4 AREAS WITHIN 500-FEET OF A RESIDENCE, SCHOOL OR PLACE OF BUSINESS

The previously filed Application detailed the Project had a total of 11 potentially occupied structures located within 500 feet of the proposed alignment. The proposed route modifications will increase the total to 22 potentially occupied structures. Sacagawea is in the process of obtaining landowner waivers from those residences within 500 feet of the Project. Refer to the Application as filed for executed landowner waivers. Additional executed landowner waivers can be found in Appendix G of this Amendment.

4.3.5 RESERVOIRS AND MUNICIPAL WATER SUPPLIES

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.6 WATER SOURCES FOR ORGANIZED RURAL WATER DISTRICTS

Refer to the Application as filed; no changes have resulted from the route modifications.

4.3.7 IRRIGATED LAND

This criterion does not apply to underground transmission facilities; as such, it is not applicable to this project.

4.3.8 AREAS OF RECREATIONAL SIGNIFICANCE WHICH ARE NOT DESIGNATED AS EXCLUSION AREAS

Refer to the Application as filed; no changes have resulted from the route modifications.

4.4 SELECTION CRITERIA (NDAC 69-06-08-02(3))

Refer to the Application as filed; no changes have resulted from the route modifications.

4.4.1 AGRICULTURAL IMPACTS

Agricultural Production: The previously filed Application detailed the Project would temporarily affect approximately 842 acres, approximately 416 acres located on privately owned cropland. The proposed route modifications would temporarily affect approximately 842 acres, and increase the total acres located on privately owned cropland to approximately 419 acres.

Family Farms and Ranches: The previously filed Application detailed the Project would temporarily affect approximately 842 acres of private land in North Dakota and

of the 842 acres, approximately 416 acres are located on privately owned cropland. The proposed route modifications would temporarily affect approximately 842 acres of private land and increase the total acres of privately owned cropland to approximately 419 acres.

Lands Suitable for Irrigation: Refer to the Application as filed; no changes have resulted from the route modifications.

Surface Drainage: Refer to the Application as filed; no changes have resulted from the route modifications.

Groundwater: Refer to the Application as filed; no changes have resulted from the route modifications.

4.4.2 THE IMPACTS UPON OTHER RESOURCES

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5 POLICY CRITERIA (NDAC 69-06-08-02(4))

4.5.1 POLICIES AND COMMITMENTS TO LIMIT ENVIRONEMNTAL IMPACT

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.2 LOCATION AND DESIGN

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.3 TRAINING AND UTILIZATION OF AVAILABLE LABOR IN THIS STATE FOR THE GENERAL AND SPECIALIZED SKILLS REQUIRED

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.4 ECONOMIES OF CONSTRUCTION AND OPERATION

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.5 USE OF CITIZEN COORDINATING COMMITTEES

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.6 COMMITMENT OF A PORTION OF THE TRANSMITTED PRODUCT FOR USE IN THIS STATE

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.7 LABOR RELATIONS

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.8 THE COORDINATION OF FACILITIES

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.9 MONITORING OF IMPACTS

Refer to the Application as filed; no changes have resulted from the route modifications.

4.5.10 UTILIZATION OF EXISTING AND PROPOSED ROW AND CORRIDORS

The previously filed Application incorrectly detailed that approximately 58% (40 miles) of the Project is co-located with existing utility corridors. The alignment as filed is approximately 42% (29 miles) co-located with existing utility corridors. The proposed route modifications will increase the total to approximately 45% (31 miles). Refer to Appendix B for project maps depicting the portions of the Project, which are co-located with other utilities.

4.5.11 OTHER EXISTING OR PROPOSED TRANSMISSION FACILITIES

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 5: MITIGATIVE MEASURES

5.1 LOCATION

The proposed route modifications have been chosen to avoid impacts to environmentally sensitive areas and to create additional workspace along portions of the alignment. Sacagawea has commissioned field surveys of the re-routes to assess the environmental resources that may be impacted as well as to confirm the modified alignment conforms to the siting requirements established by the state of North Dakota.

Trees and shrubs: Additional trees and shrubs were identified during field surveys of the re-routes. Refer to the maps in Appendix B for the location of these features.

Wetlands and Waterbodies: Additional wetlands and waterbodies were identified during field surveys of the re-routes. Refer to the maps in Appendix B for the location of these features.

USFWS Managed Lands: Refer to the Application as filed; no changes have resulted from the route modifications.

Migratory Bird Treaty Act: Refer to the Application as filed; no changes have resulted from the route modifications.

Bald and Golden Eagle: Field surveys confirmed the absence of nests or nesting activities where habitat was suitable along the Route. Refer to the Application as filed; no changes have resulted from the route modifications.

Whooping crane: Refer to the Application as filed; no changes have resulted from the route modifications.

Least Tern: Refer to the Application as filed; no changes have resulted from the route modifications.

Piping Plover: Refer to the Application as filed; no changes have resulted from the route modifications.

Pallid sturgeon: Refer to the Application as filed; no changes have resulted from the route modifications.

Northern long-eared bat: Northern long-eared bats are not known to occur in the Project Area and suitable winter habitat is not present within the Survey Corridor. Trees and rocky outcrops can act as suitable summer habitat and the field survey indicated suitable summer habitat is present within the Survey Corridor. To mitigate any adverse effects, if construction occurs between April and September, surveys would be conducted to confirm the presence or absence of the species.

Cultural Resources: On May 22 and June 5, 2015 Sacagawea received concurrence from SHPO of *No Significant Sites Affected for the Project* for the Addendums to the cultural resources survey reports. Refer to Appendix E for the Cultural Resource Survey Report abstracts. The full cultural resources reports and associated maps located in Volume 2 are privileged and not for internet publication.

Noxious Weeds: Refer to the Application as filed; no changes have resulted from the route modifications.

Areas of Known Geologic Instability: Refer to the Application as filed; no changes have resulted from the route modifications.

5.2 CONSTRUCTION

Refer to the Application as filed; no changes have resulted from the route modifications.

5.3 OPERATION

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 6: DESCRIPTION OF RIGHT-OF-WAY PREPARATION, CONSTRUCTION AND RECLAMATION PROCEDURES

6.1 PIPELINE CONSTRUCTION

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 7: EASEMENT, ACQUISITION, LANDOWNER NOTIFICATION AND EASEMENT COMPENSATION PLAN

7.1 LANDOWNER INFORMATION REGARDING EASEMENT ACQUISITION, AND NECESSARY EASEMENT CONDITIONS AND RESTRICTIONS

Refer to the Application as filed; no changes have resulted from the route modifications.

7.2 COMPENSATION POLICY

Refer to the Application as filed; no changes have resulted from the route modifications.

SECTION 8: LIST OF PREPARERS

Thomas G. Janik
Paradigm Energy Partners, LLC

B.S. Civil Engineering, Texas A&M University. Mr. Janik has 38 years of experience in the oil and gas industry including executive management experience in engineering and corrosion services, project and construction management, operations, and pipeline and facilities construction. Mr. Janik has extensive technical expertise in engineering designs, project and construction management, operations and maintenance of natural gas and liquid pipeline facilities. In addition, he is experienced in the development and management of pipeline integrity management process safety management programs.

William McCarthy, C.W.B.
Senior Environmental Compliance Analyst
E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

M.S. Wildlife Biology, University of Minnesota – Twin Cities; and B.S. Wildlife Biology, Michigan State University. Mr. McCarthy is an environmental compliance analyst with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a compliance analyst, he has managed the environmental requirements for facility siting, pipeline routing, federal licensing and various federal, state and local permits. Mr. McCarthy is a certified wildlife biologist, and in this role conducts and coordinates field studies, agency consolations, mitigation and avoidance plans.

Katie Schmidt, EIT
Environmental Engineer and Senior Consultant
E3 Environmental, LLC, 871 West Jefferson Avenue, St. Paul, MN 55102

B.S. Civil Engineering with an emphasis in Environmental Engineering-Iowa State University. Ms. Schmidt is a Senior Environmental Consultant with ten years of experience working with various energy assets and regulatory agencies. As a consultant, she has managed multiple pipeline projects supporting clients through the construction permitting and siting processes, which included coordination with various federal, state and local agencies.

Melissa Schmit
Consultant
E3 Environmental, LLC, 871 Jefferson Avenue, St. Paul, MN 55102

B.A. in Environmental Studies and Geography, Gustavus Adolphus College; and J.D., Hamline University School of Law. Ms. Schmit has over six years of environmental consulting experience. Ms. Schmit has pursued a career focused on regulatory compliance and supports energy clients by providing regulatory review and permitting services. Ms. Schmit's experience includes authoring technical reports in compliance with NEPA requirements for a variety of infrastructure projects across the Midwest and coordination with federal, state, and local agencies.

Dan Woodward, RPA
Senior Archaeologist
E3 Environmental, LLC, 871 Jefferson Ave St Paul, MN 55102

M.A. Anthropology (archaeology focus), California State University - Fullerton; and B.A. History, University of Florida. Mr. Woodward is a secretary of the interior qualified archaeologist with 15 years of environmental consulting experience working with various energy assets and regulatory agencies. As a senior archaeologist, he has overseen all phases of archaeological fieldwork from class I record searches and class III intensive surveys to detailed excavations and archaeological damage assessments. He has authored dozens of cultural resource technical reports fulfilling NHPA and NEPA cultural resource requirements. Mr. Woodward has also coordinated with multiple Native American groups and has met with interested Tribal representatives in the field to address project concerns. Mr. Woodward has performed historic building analysis and authored built-environment technical reports. Mr. Woodward has also assisted with extensive paleontological fieldwork including paleontological surveys, monitoring, and salvage activities.

Appendix A

Engineering Documents

Refer to Consolidated Application filed with the North Dakota Public Service Commission on March 16, 2015

Appendix B

Project Maps

Document Path: P:\SWCA\Paradigm_Sakakawea\MXDs\PSC_Addendum_Maps\Paradigm_Sacagawea_11x17_NaturalResource_Topo.mxd

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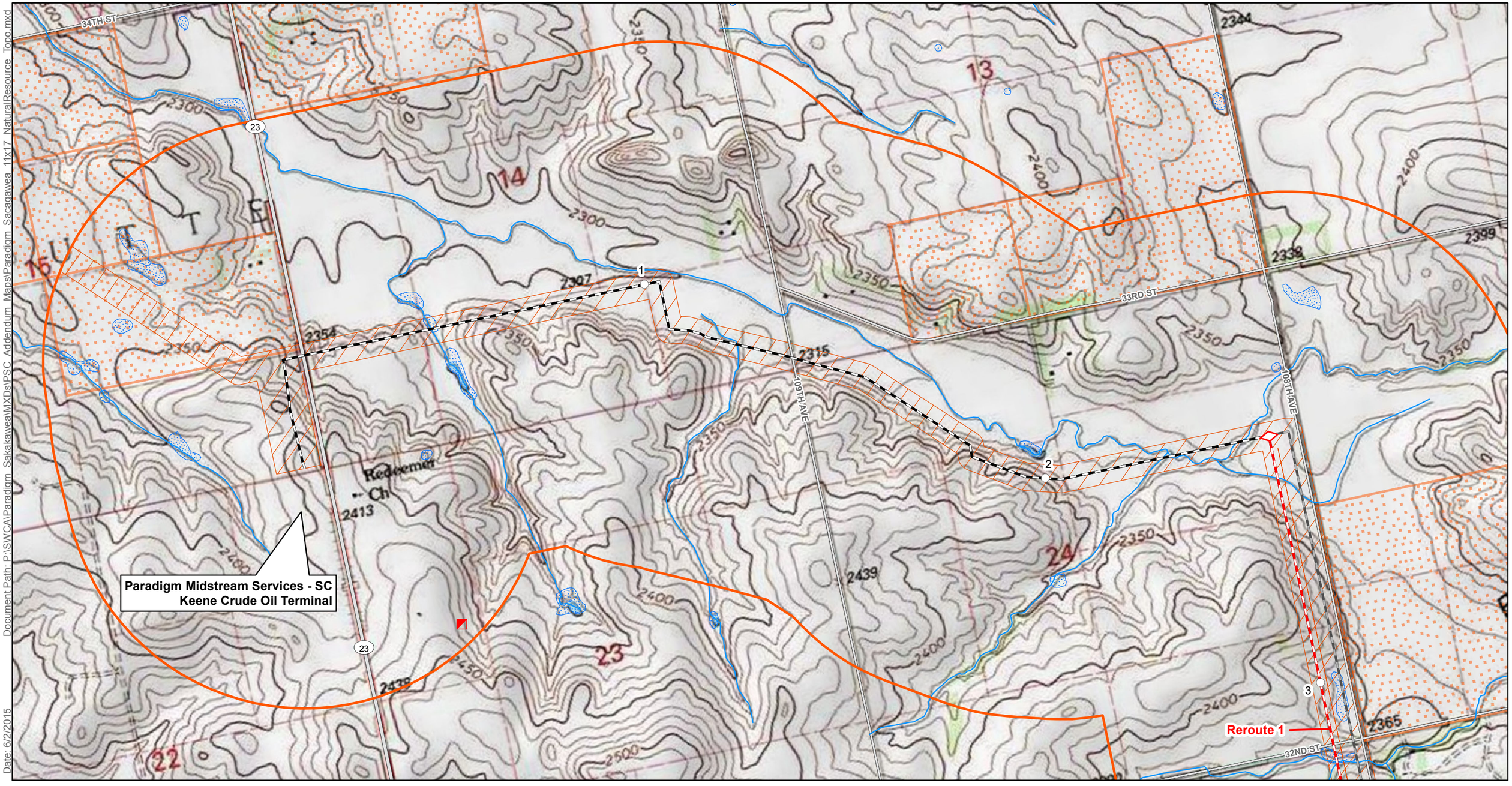
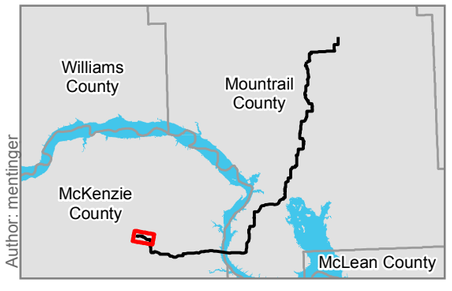
Author: mentinger





Proposed Alignment
Rerouted Alignment
Co-Located Alignment
Abandoned Alignment
Valve
Milepost
NR Survey Corridor
Corridor (1 mile)
NHD Waterways
NHD Waterbody
NWI Wetland

Criteria Data

Federal Land
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State Land
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PLOTS Land
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Abandoned Mine
NDGS Landslide Deposits
Road

N

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

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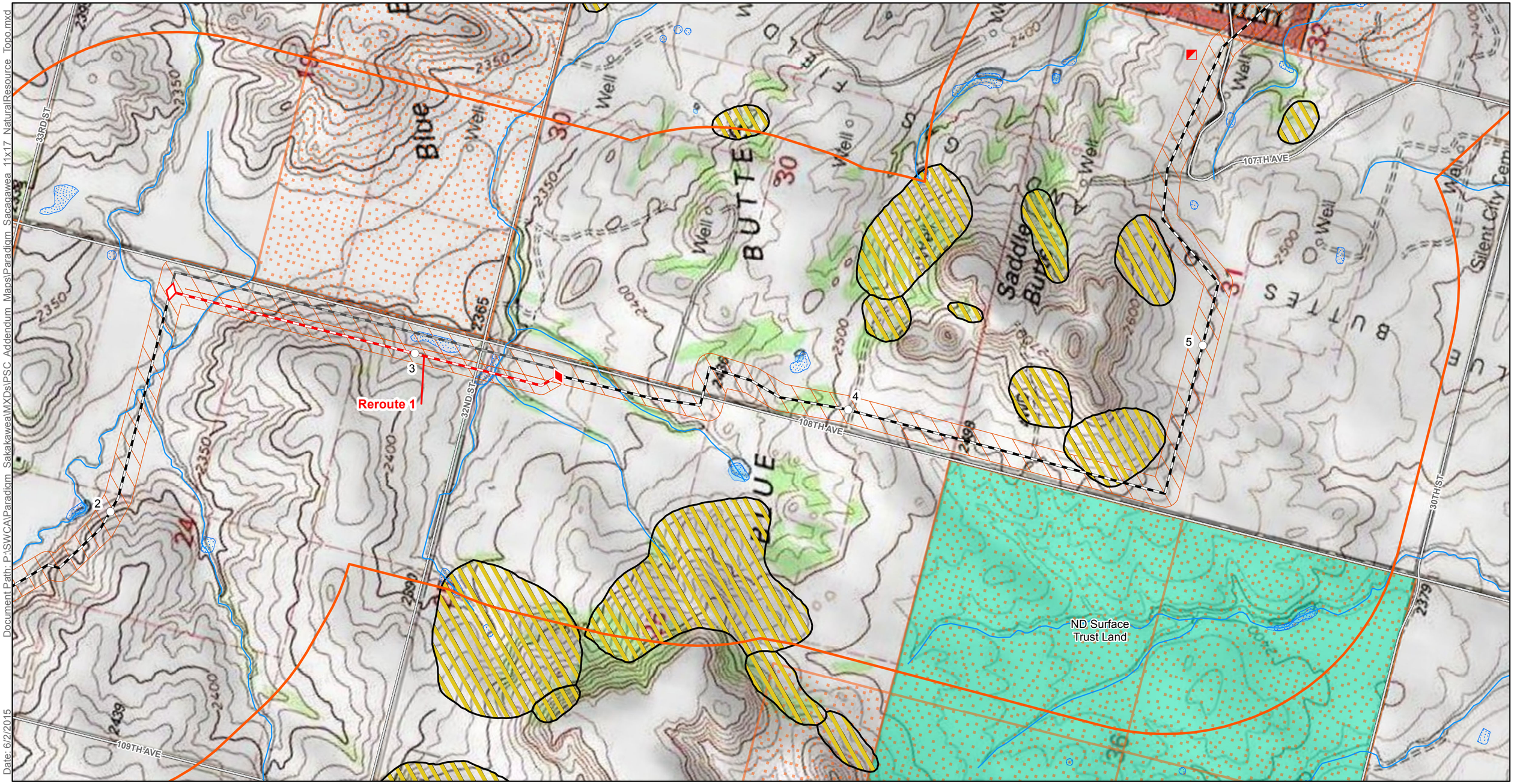

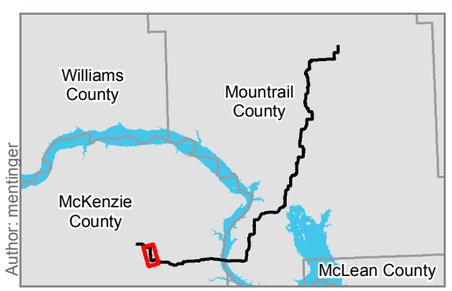

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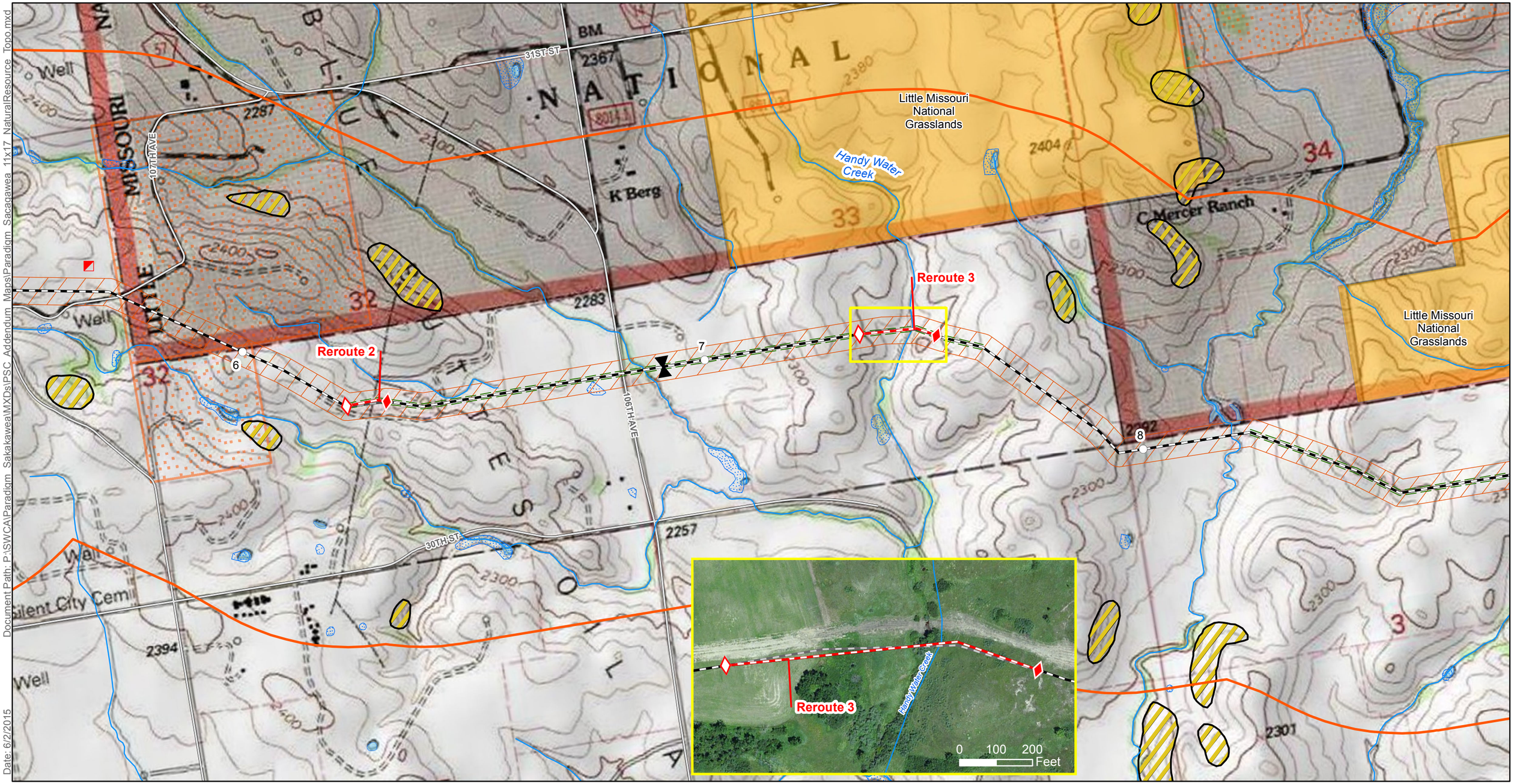

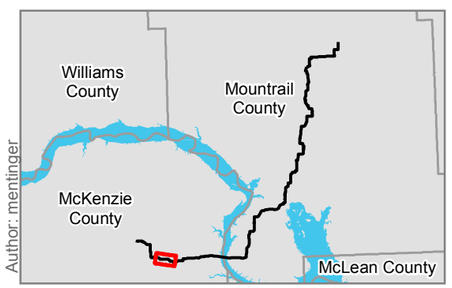

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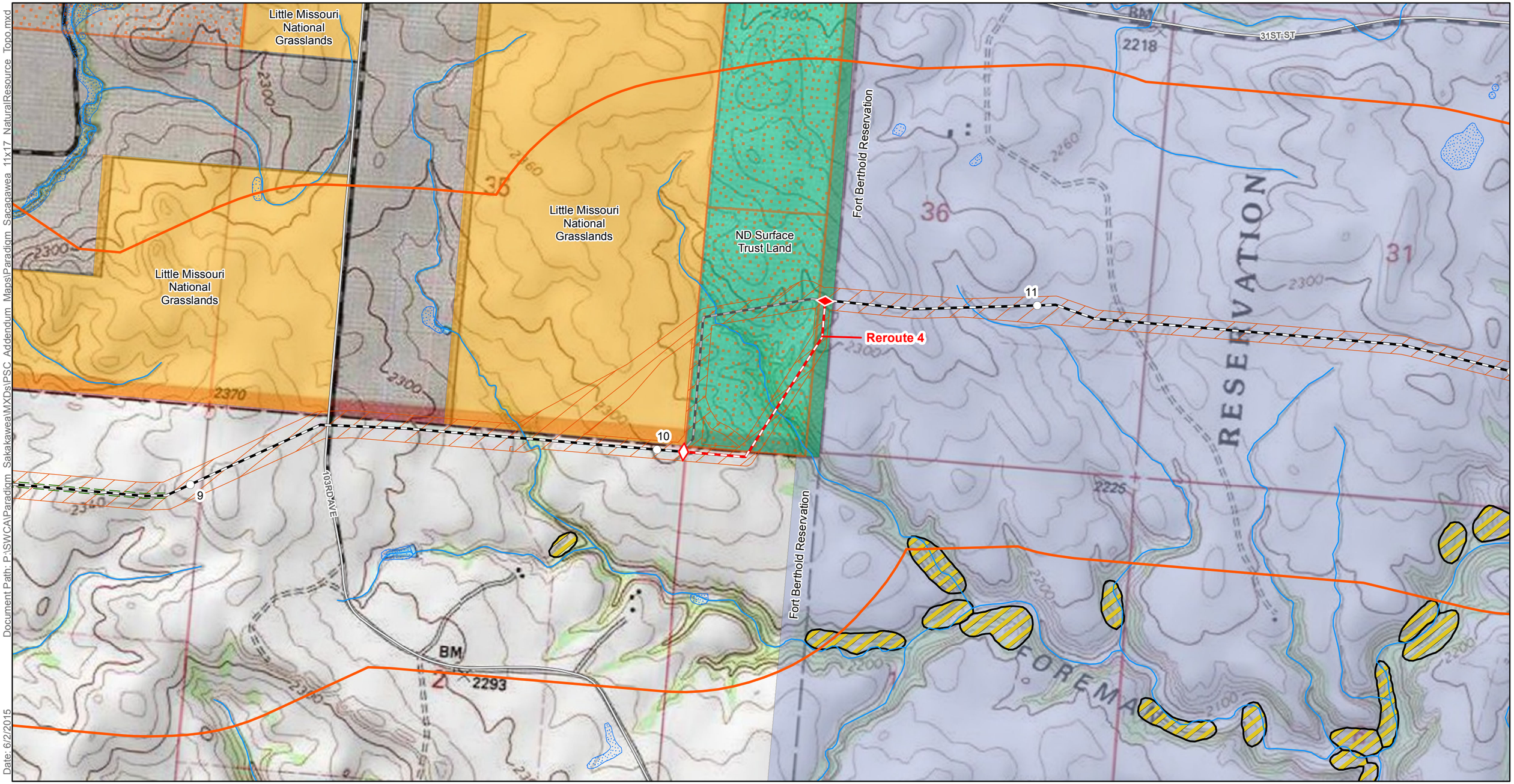

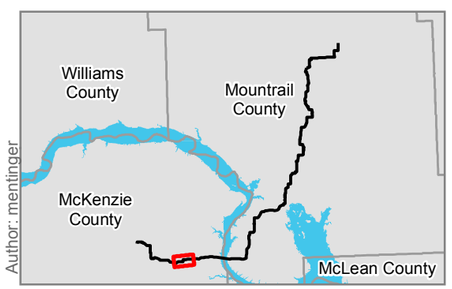

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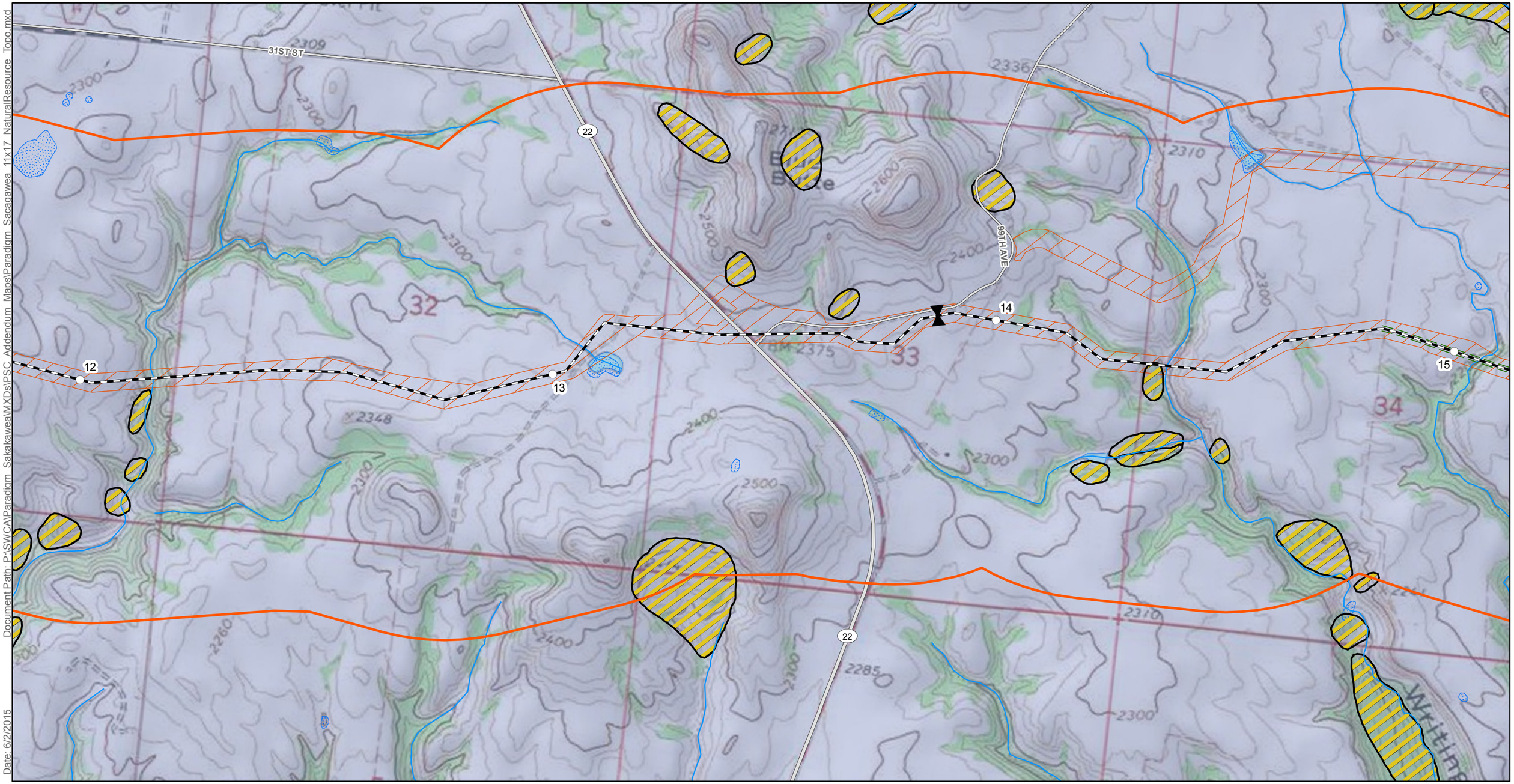

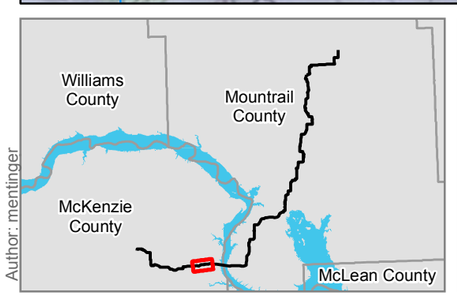

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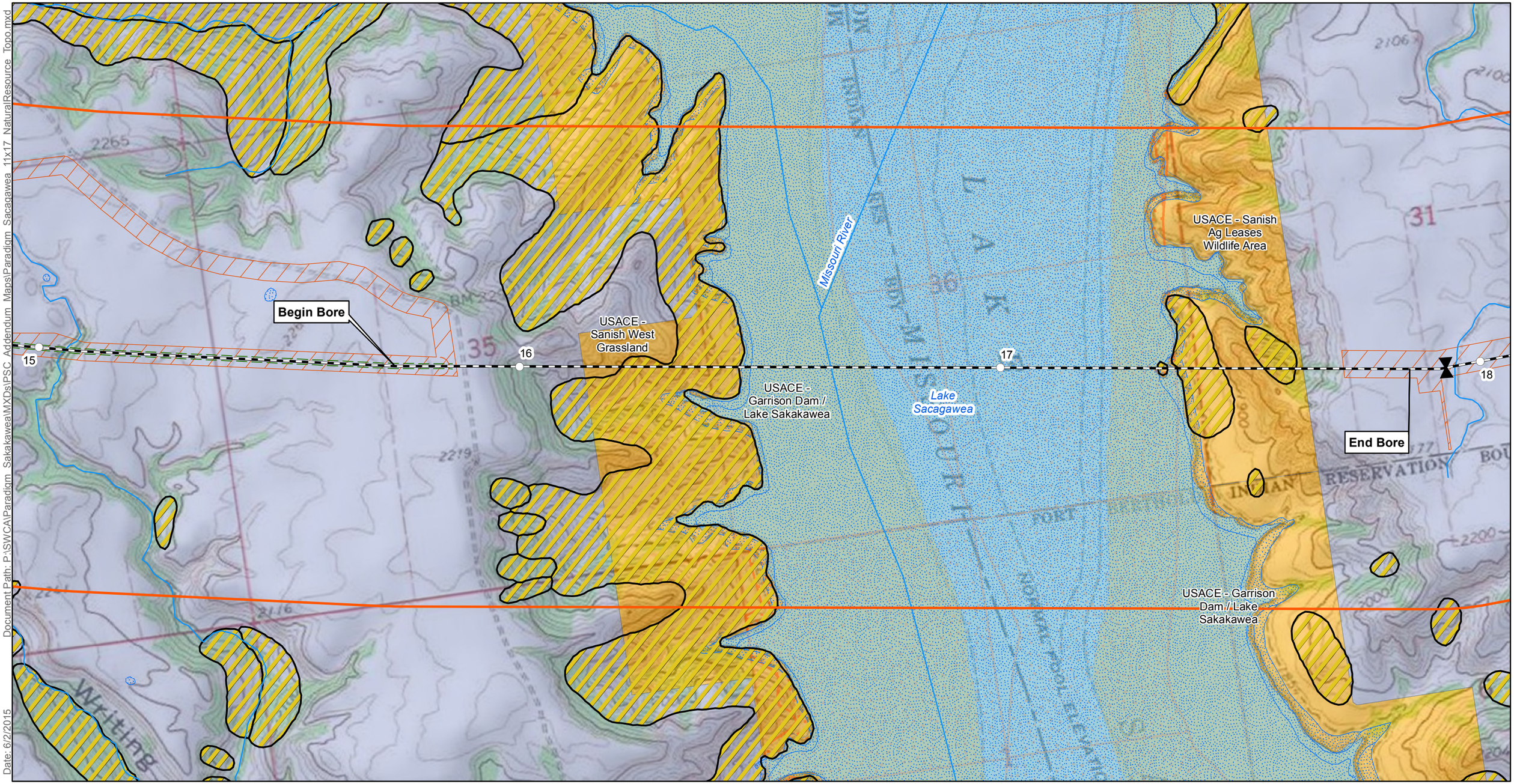

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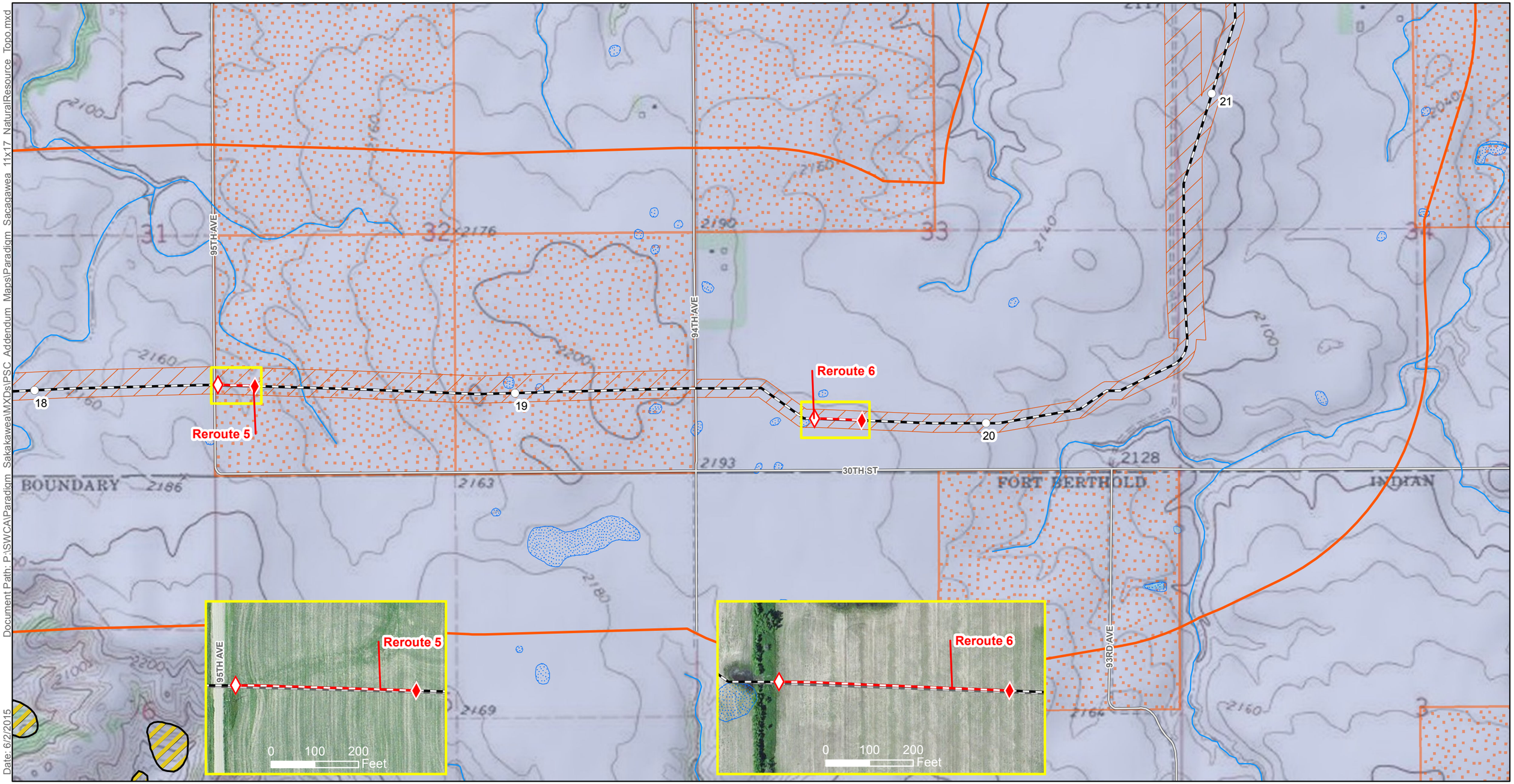

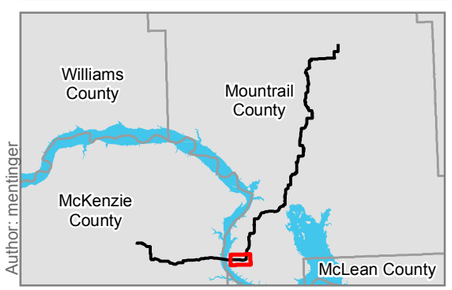

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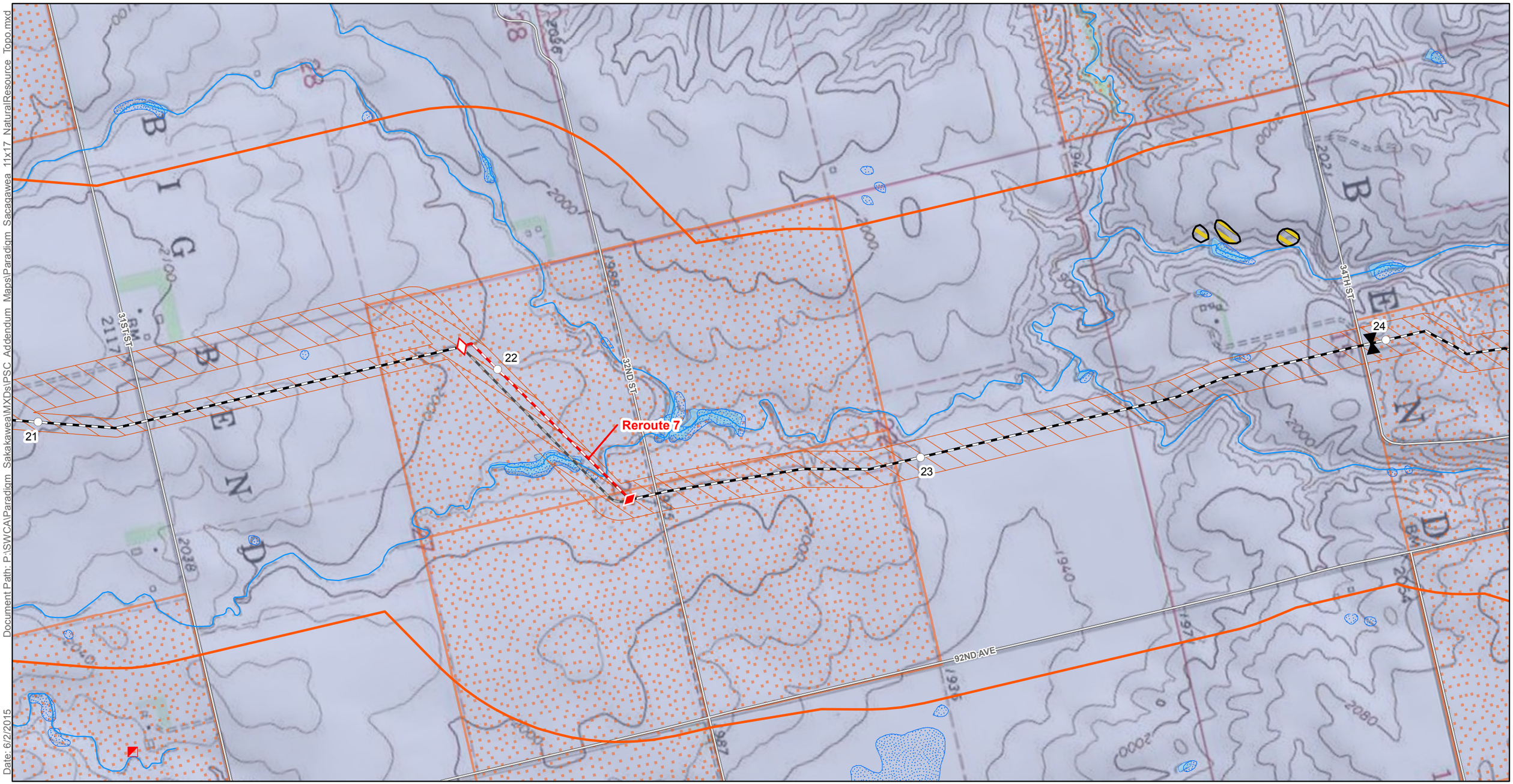

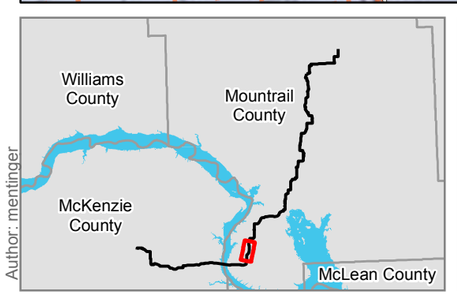

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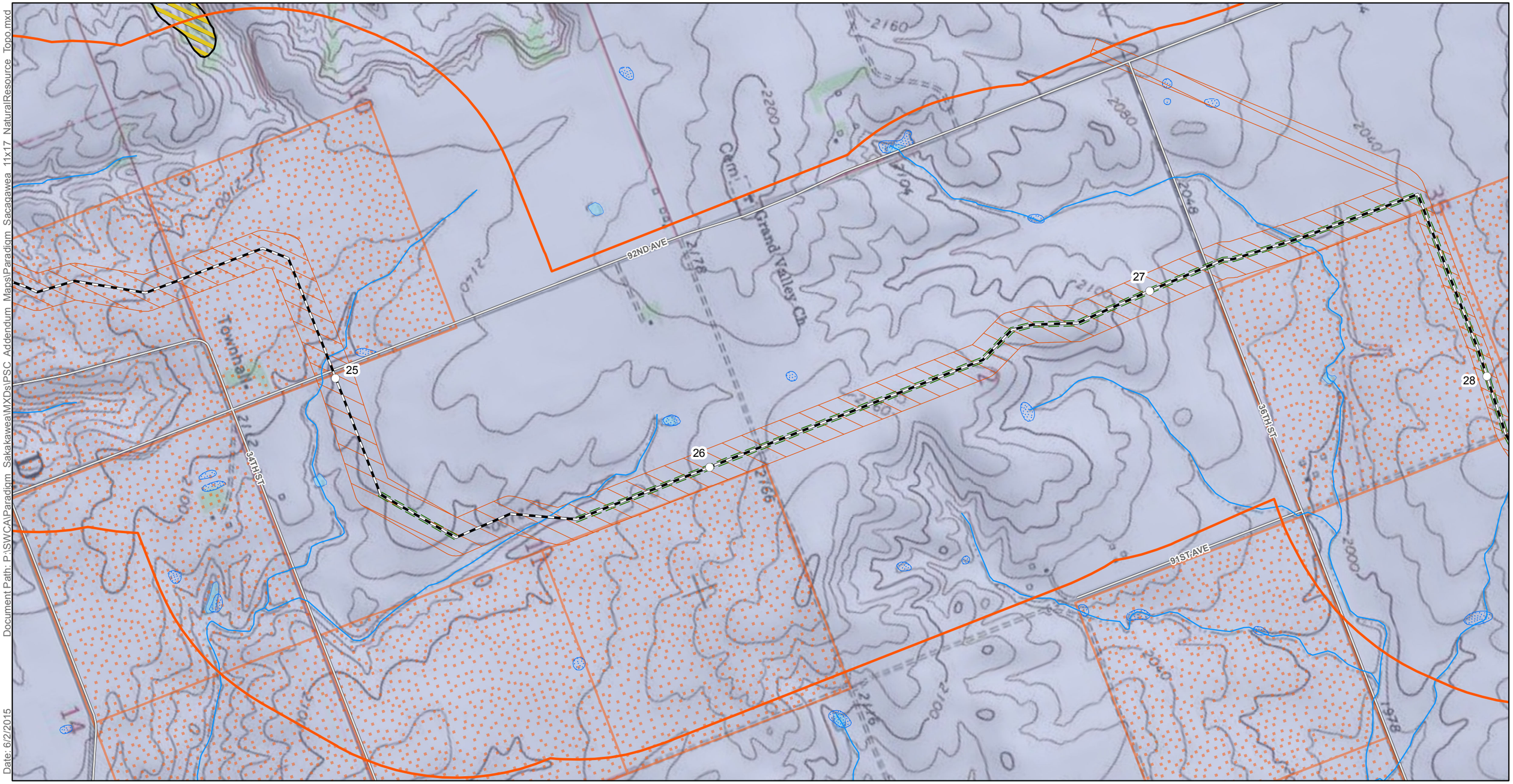

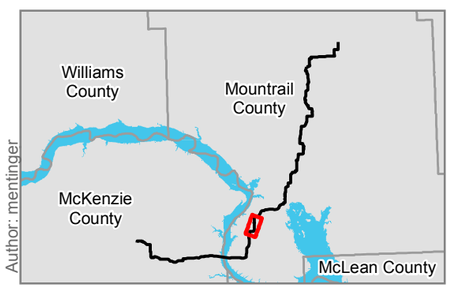

Author: mentinger

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E3 Environmental
Enhancing Execution with Experience

0 500 1,000 2,000 Feet

1:12,000

Map not to scale, for environmental review purposes only.

Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

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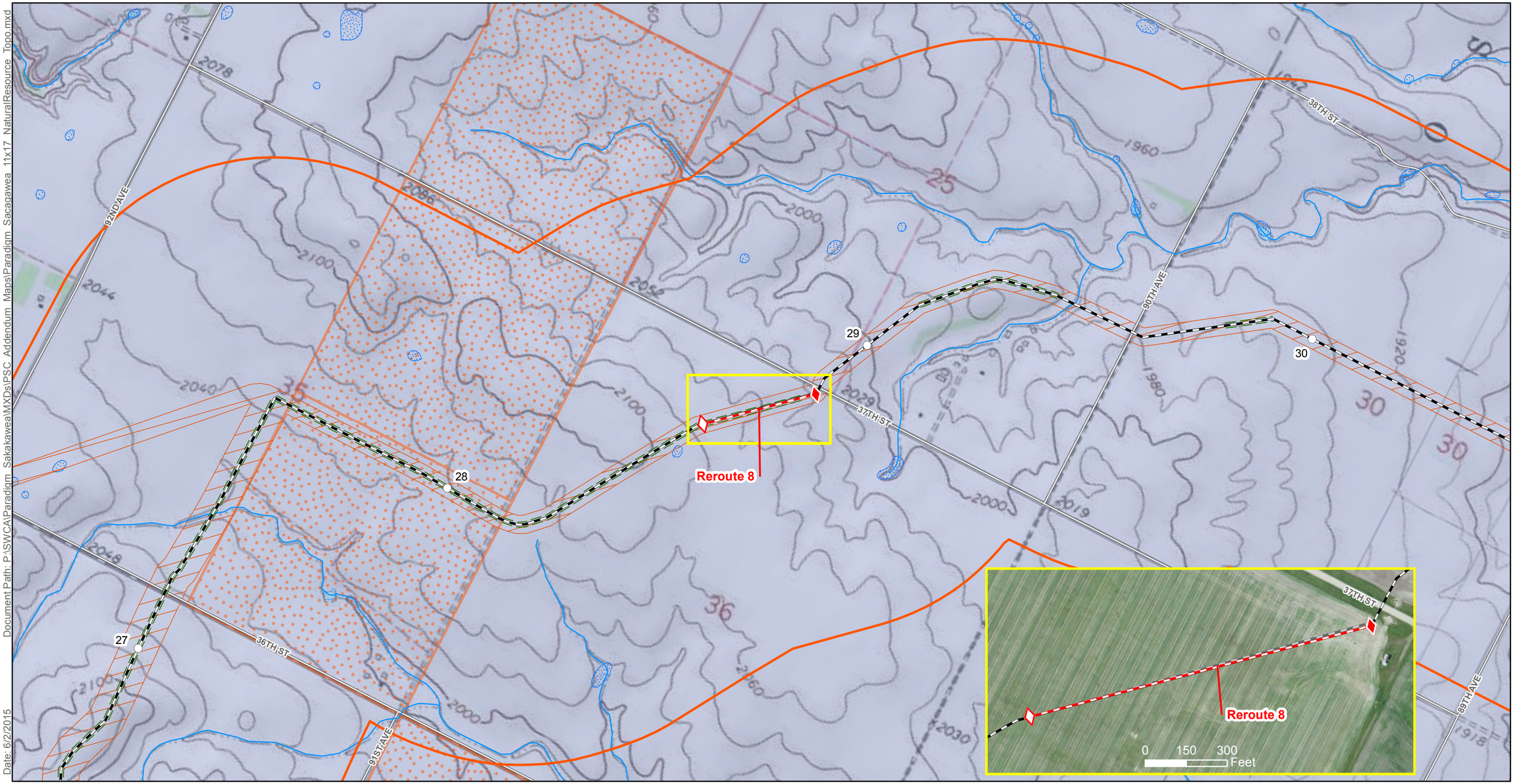

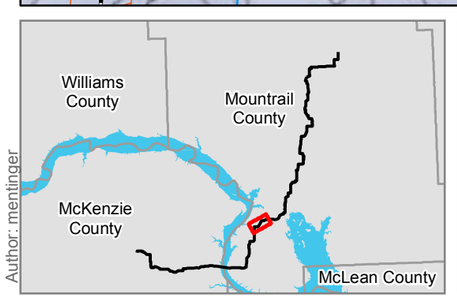

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Siting Criteria
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McKenzie and Mountrail Counties, ND

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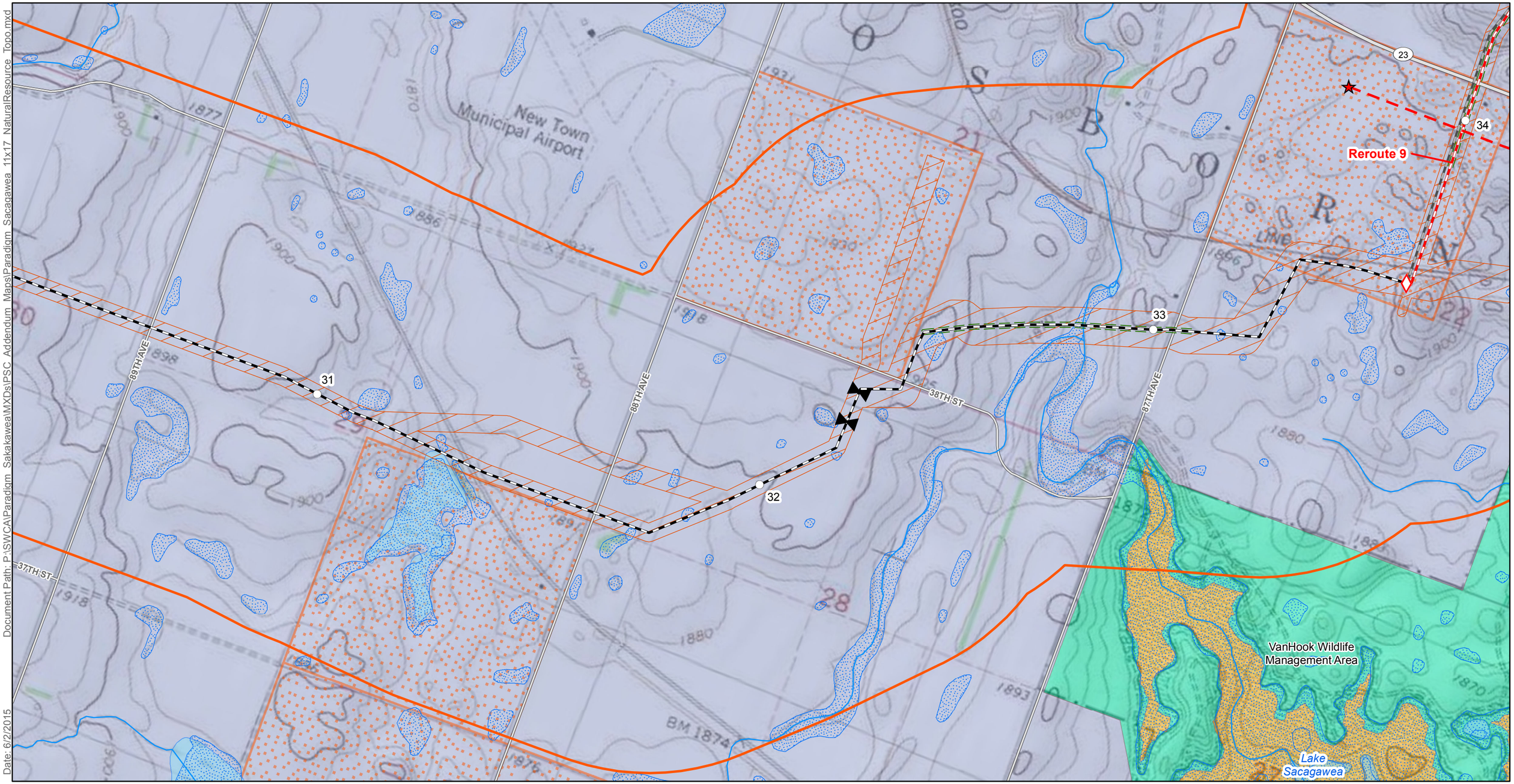

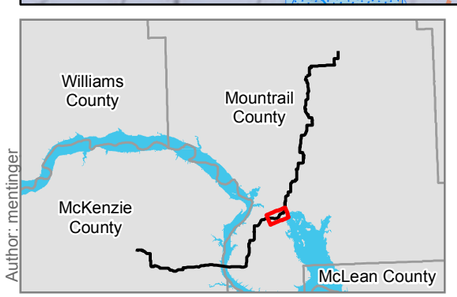

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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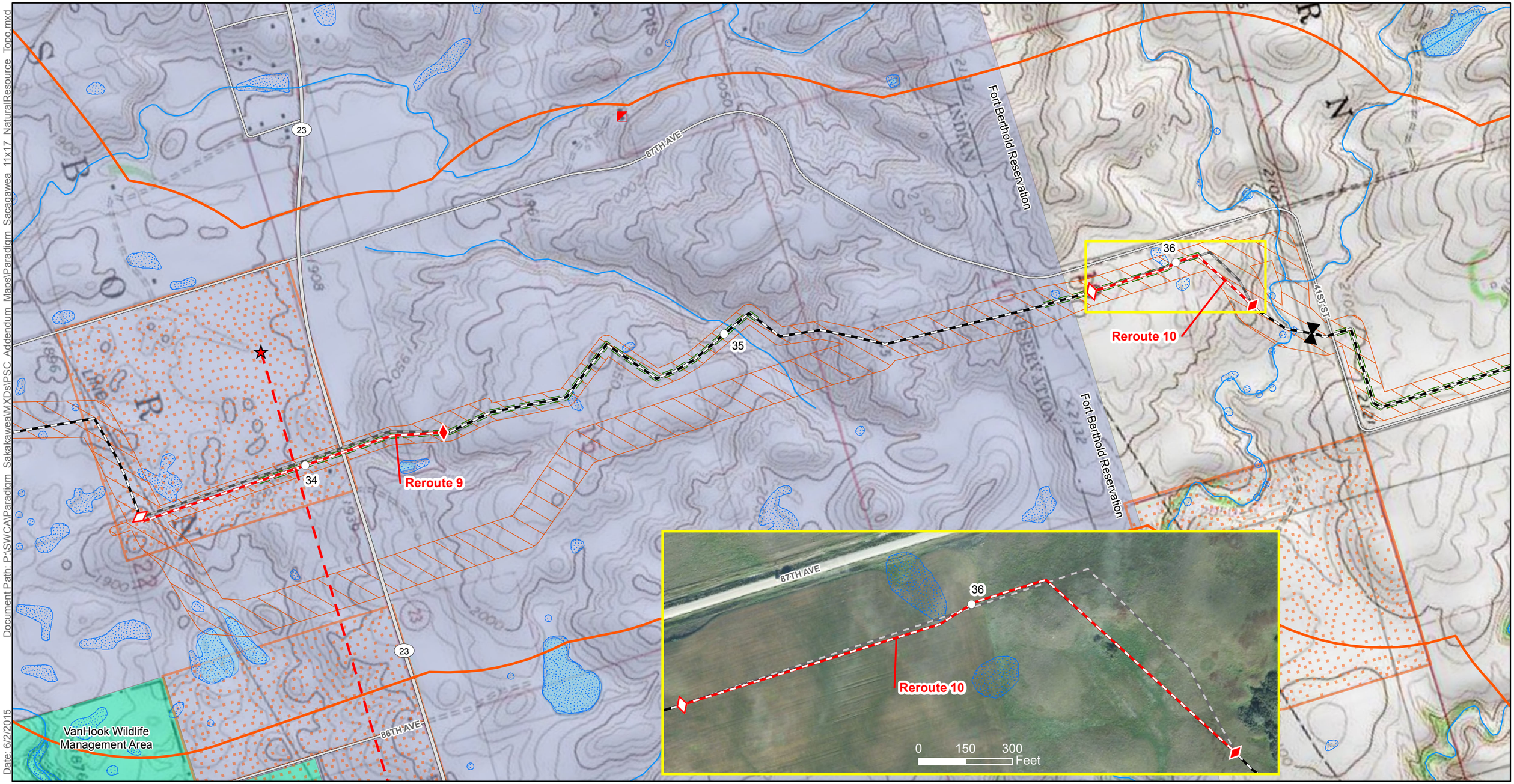

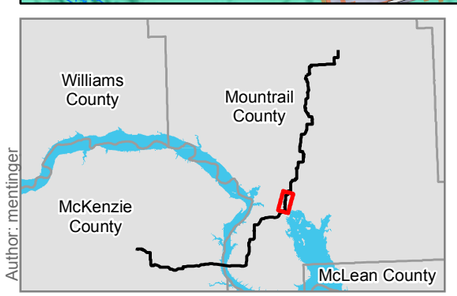

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Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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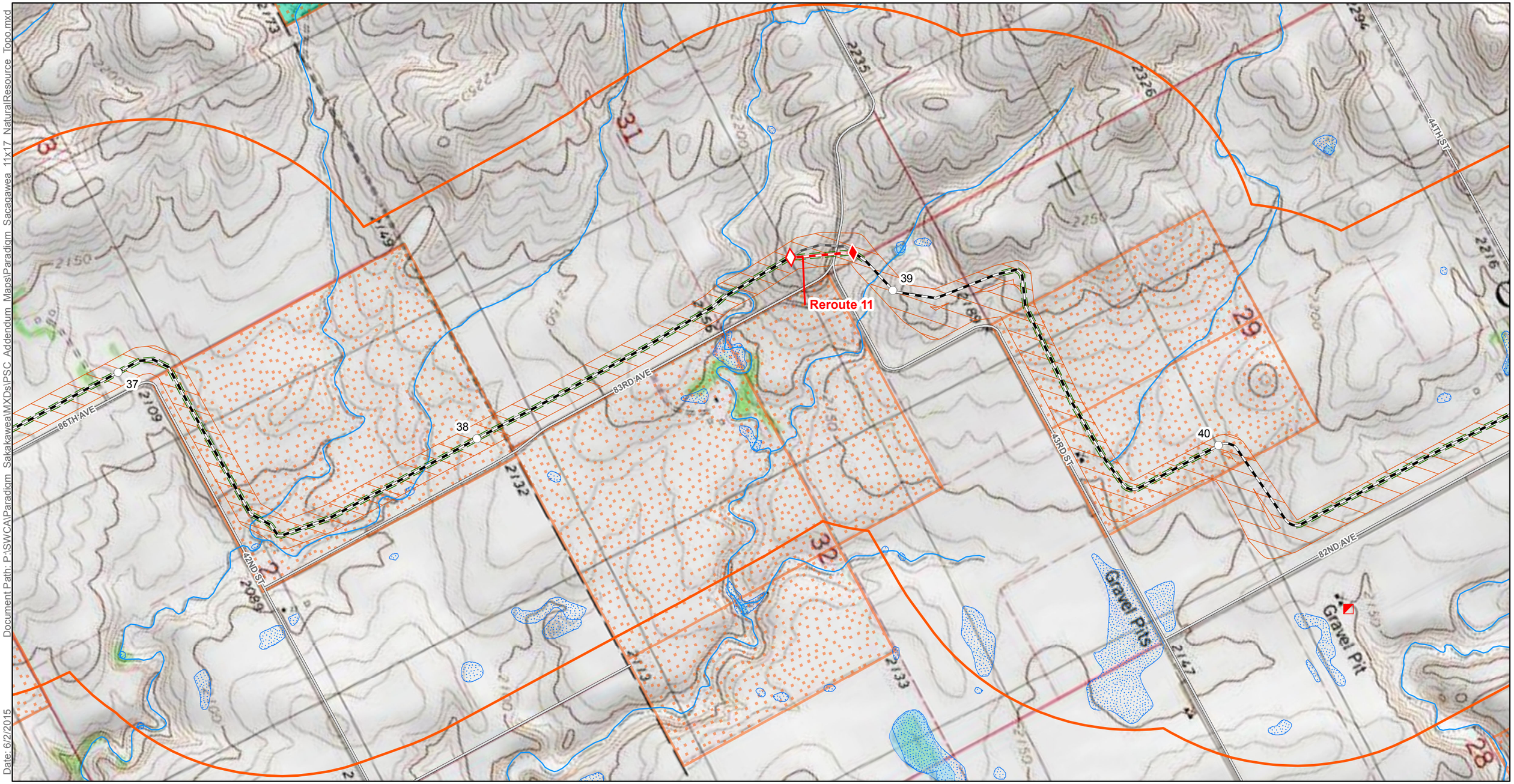

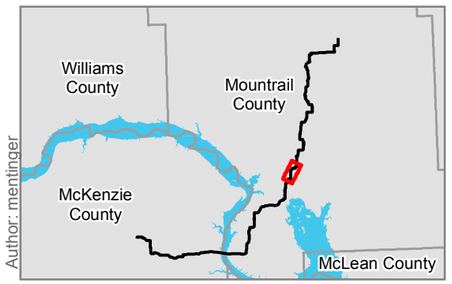

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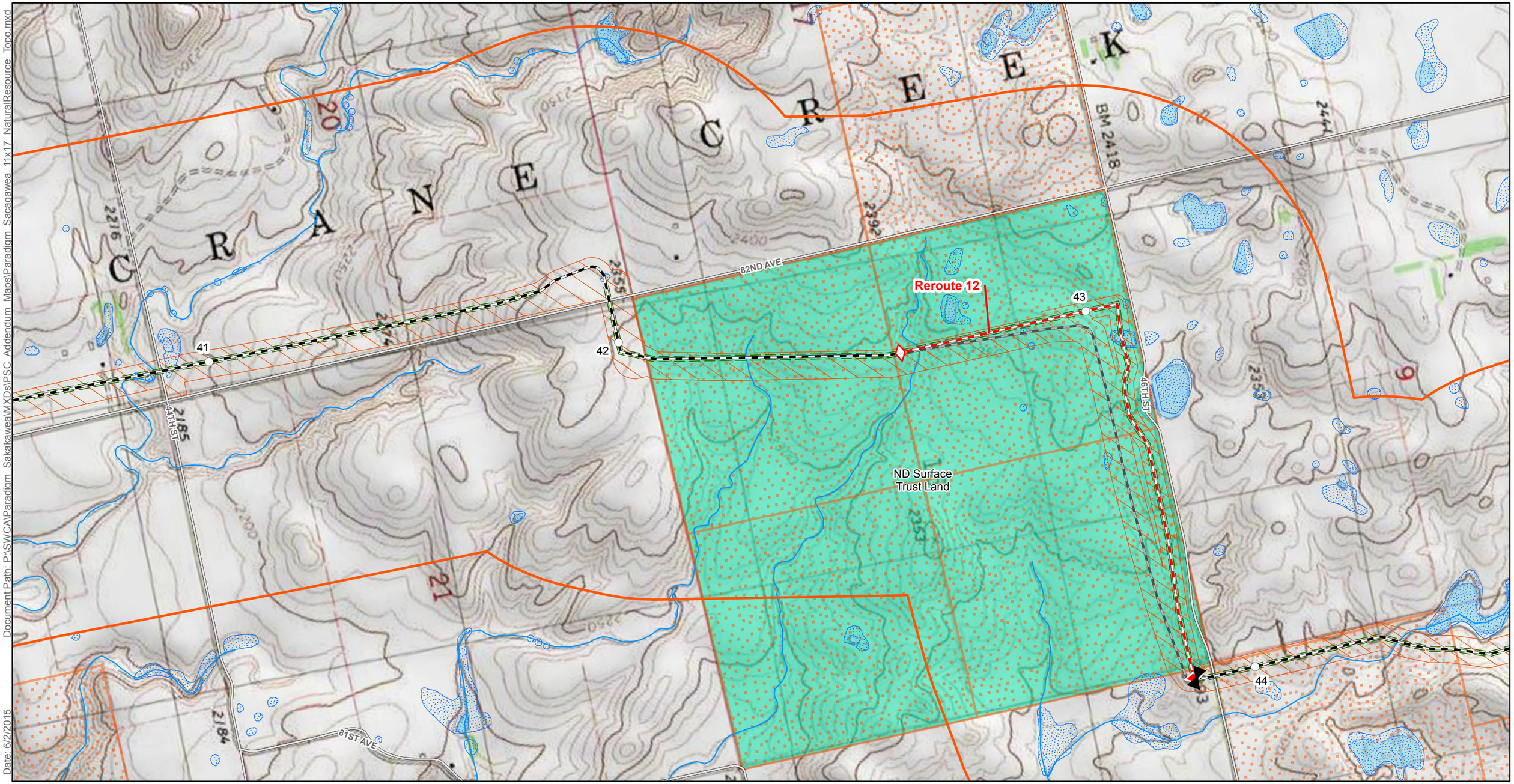

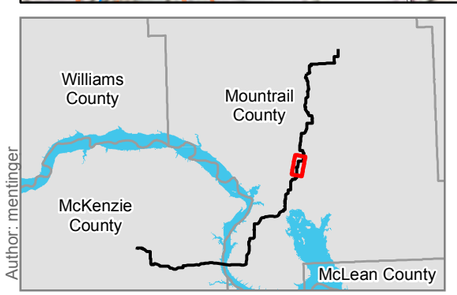

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McKenzie and Mountrail Counties, ND

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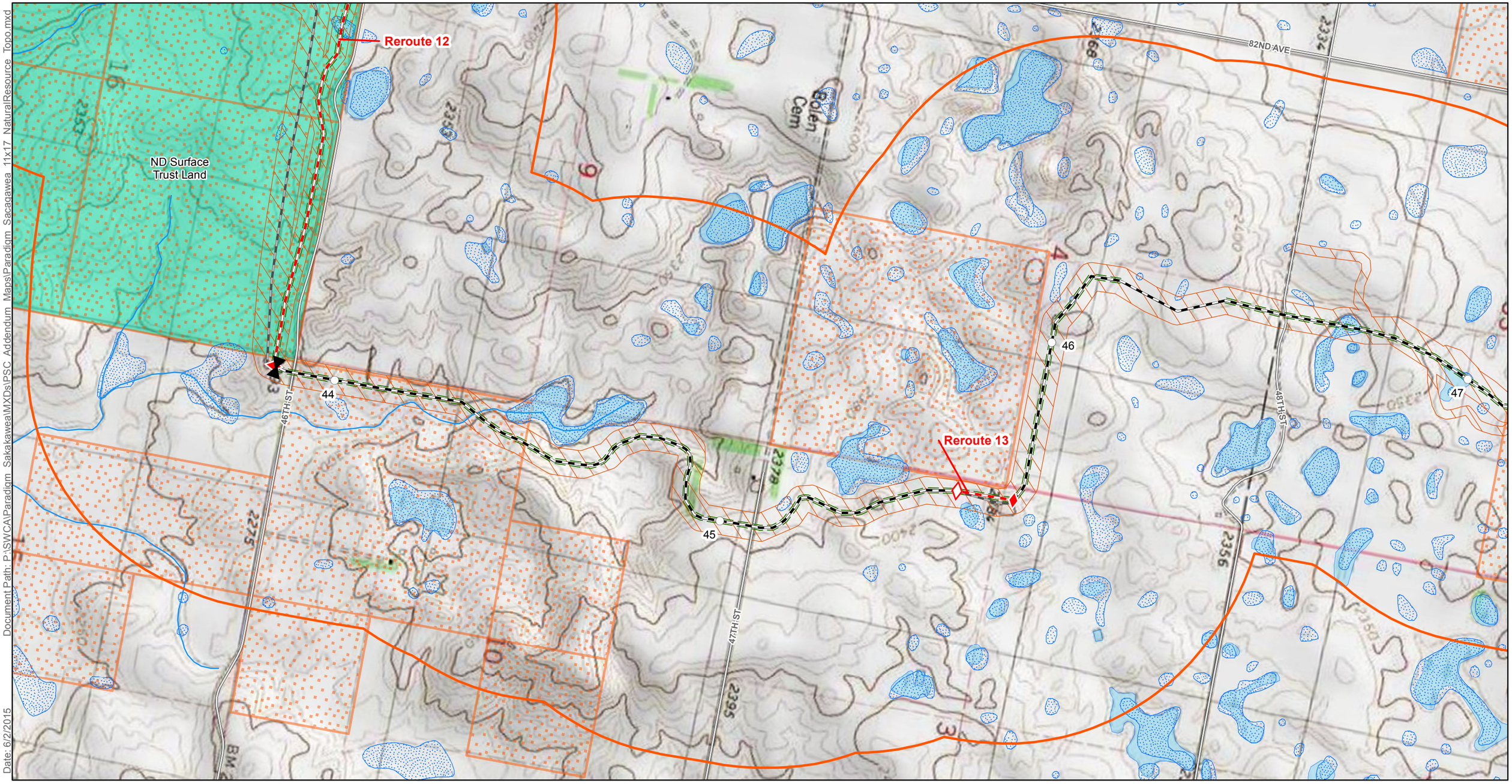

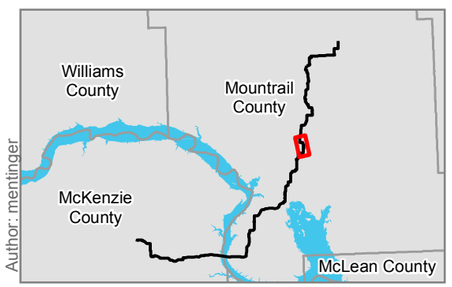

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McKenzie and Mountrail Counties, ND

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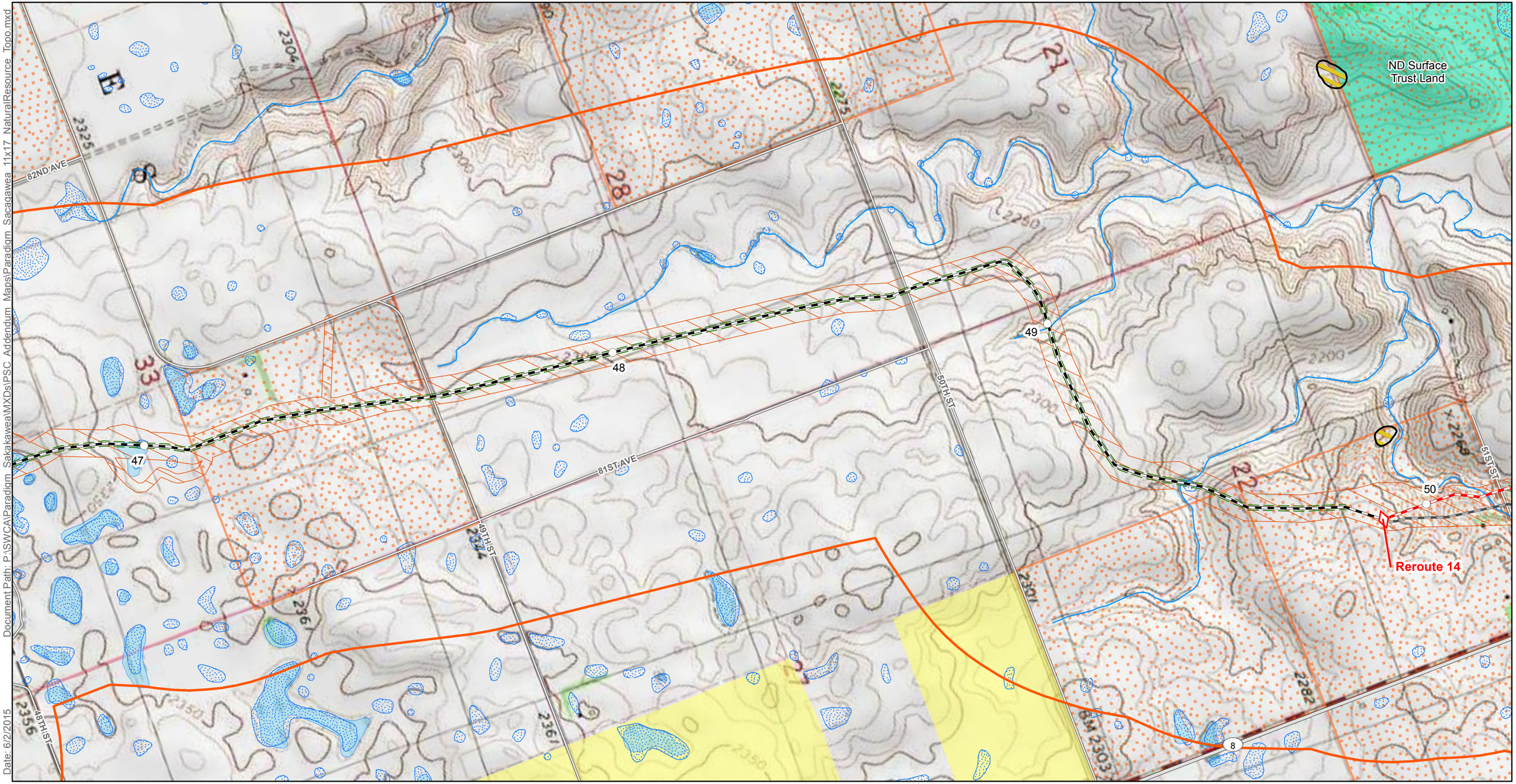

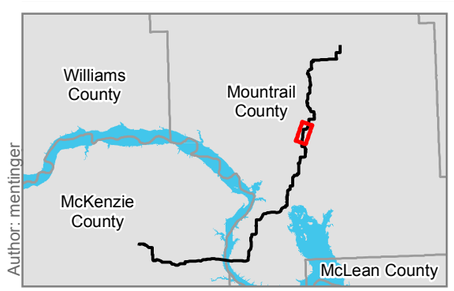

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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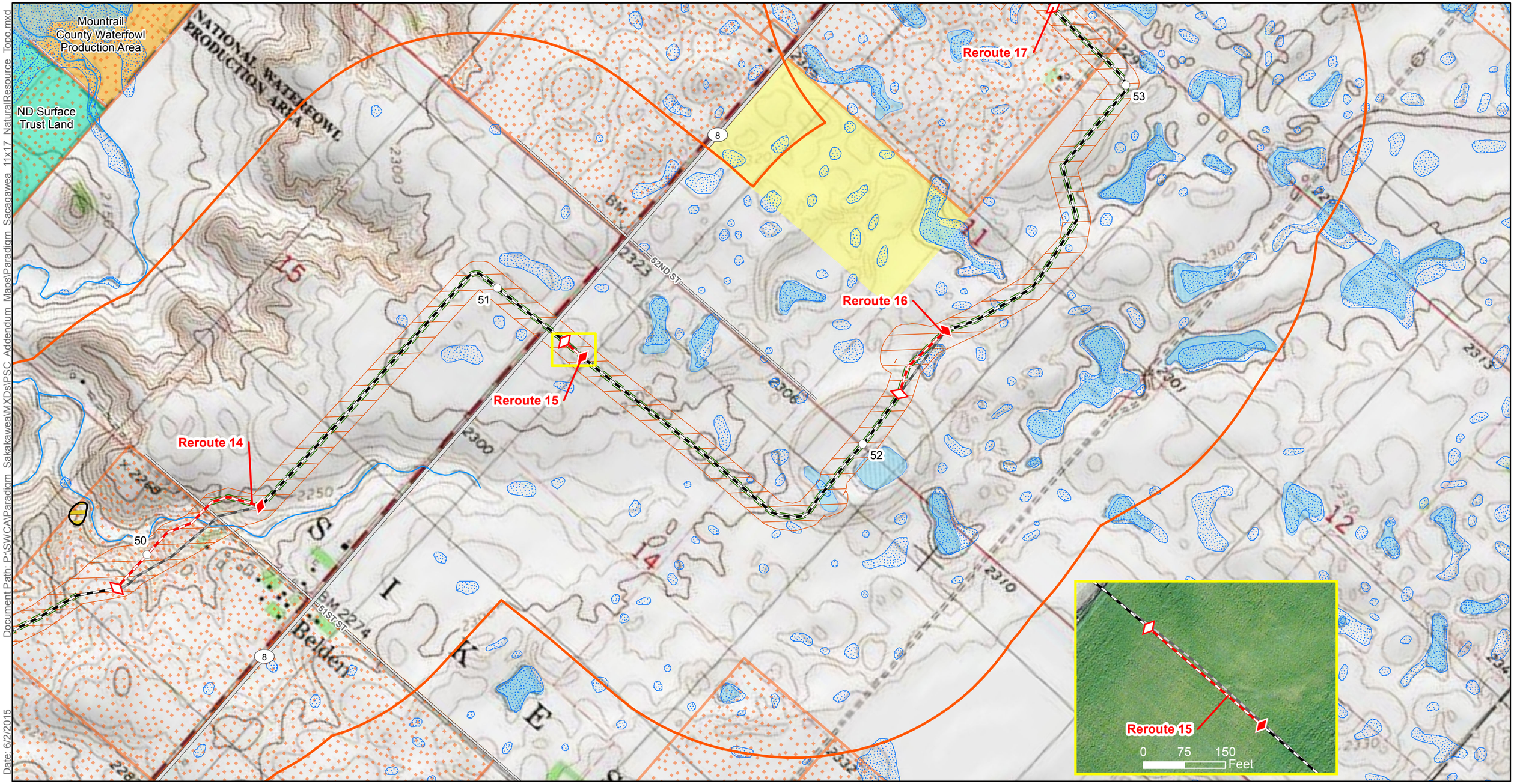

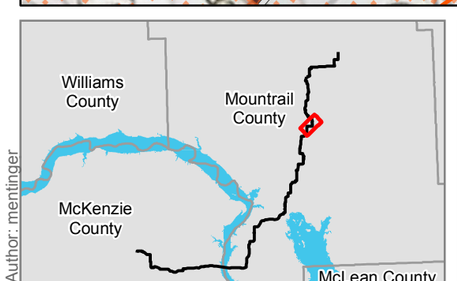

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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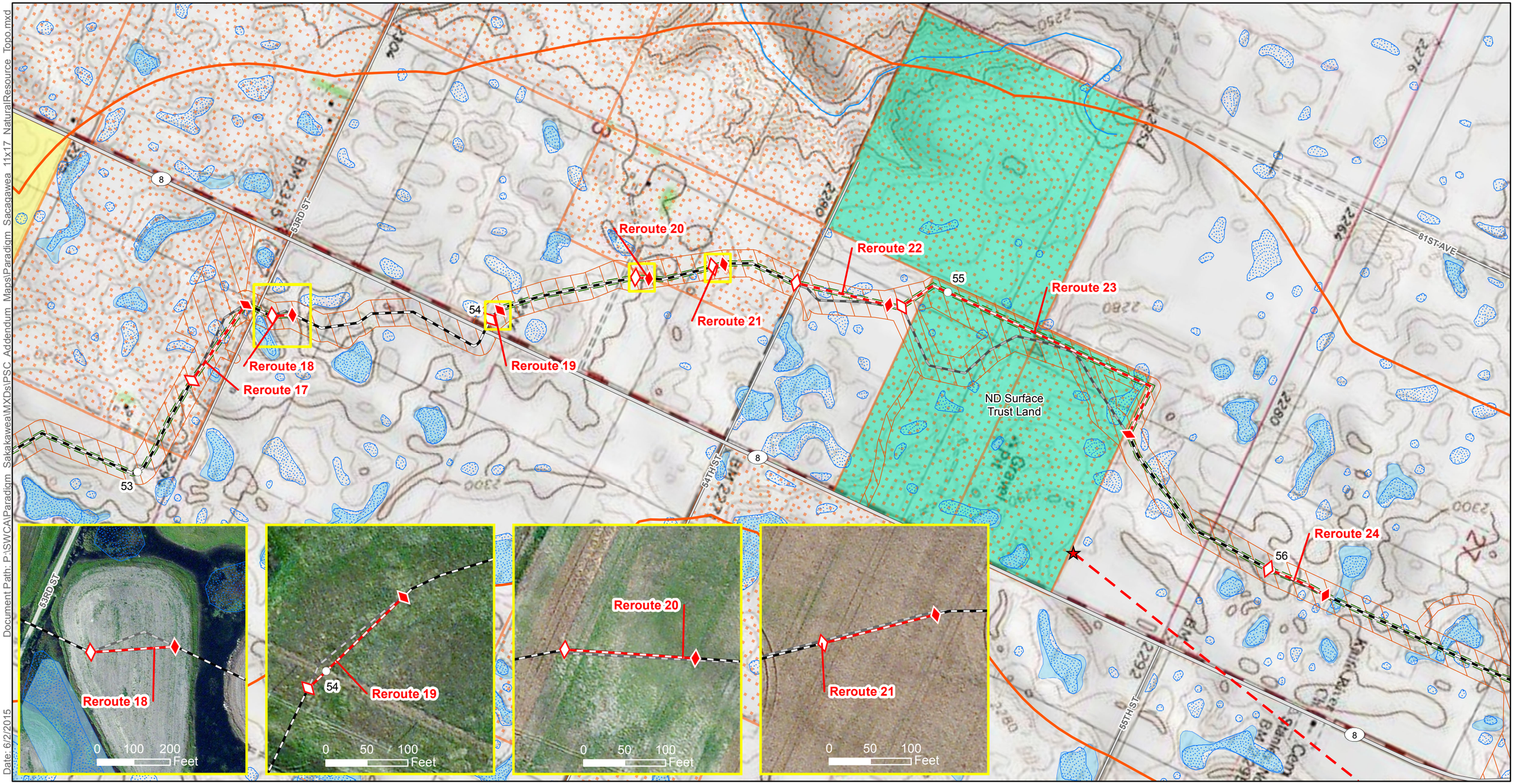

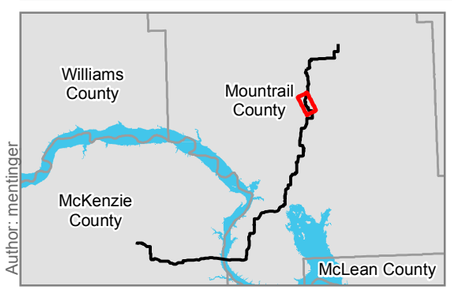

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McKenzie and Mountrail Counties, ND

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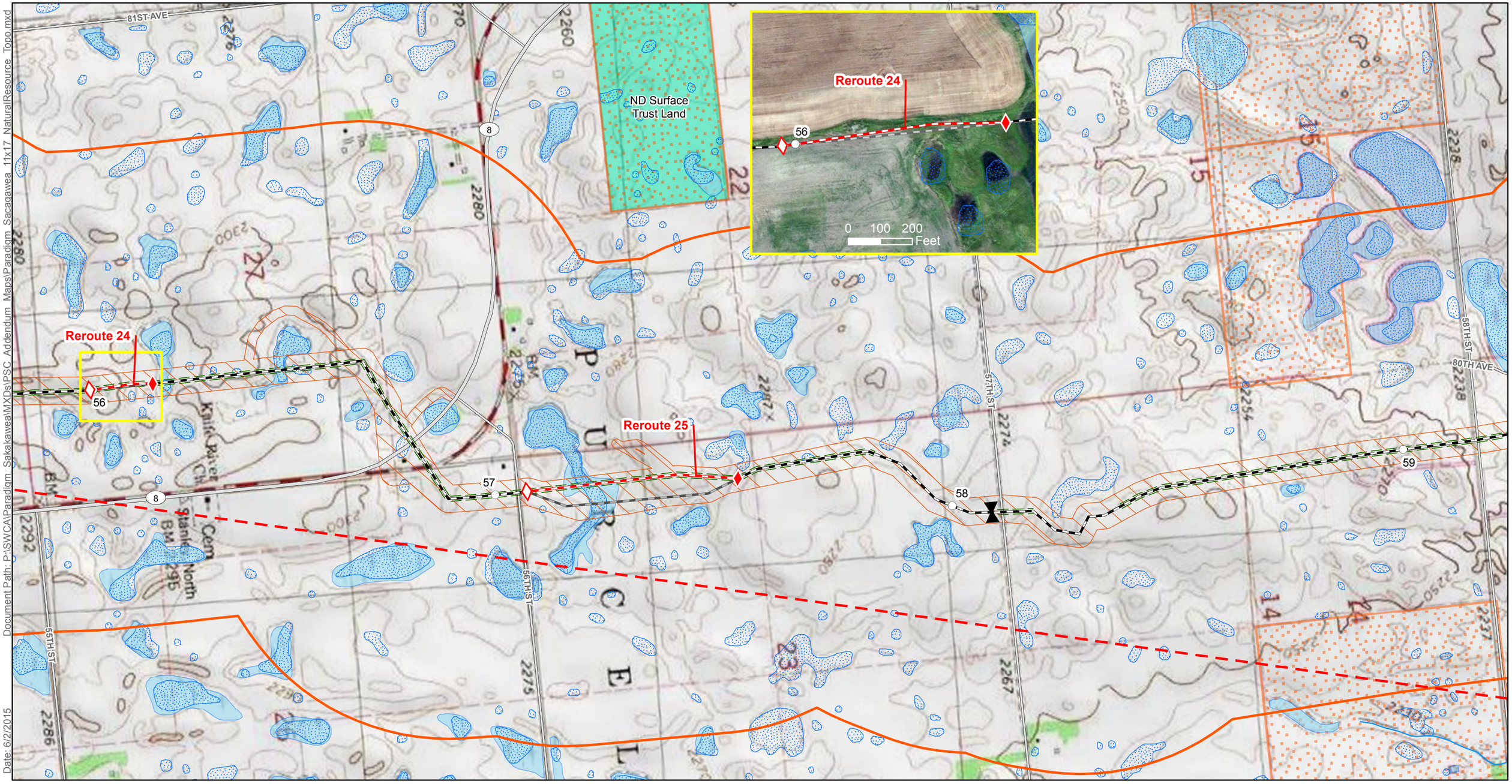
81ST AVE
ND Surface Trust Land
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57TH ST
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55TH ST
58TH ST
80TH AVE
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Knife River Ch
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North
Stanley
BM 2295
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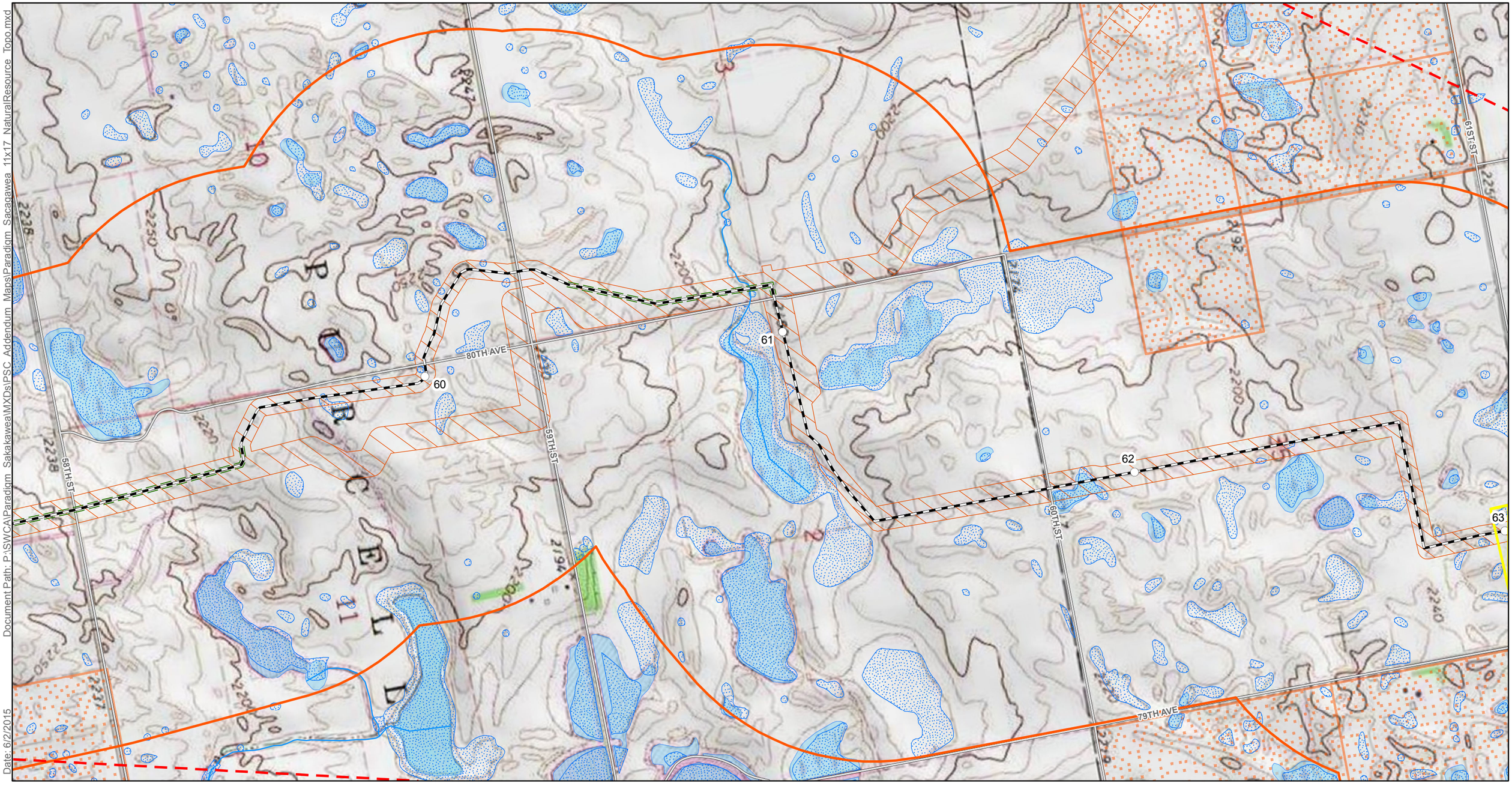

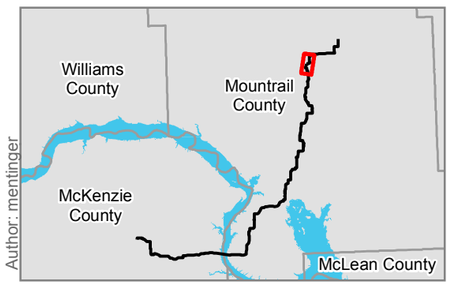

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Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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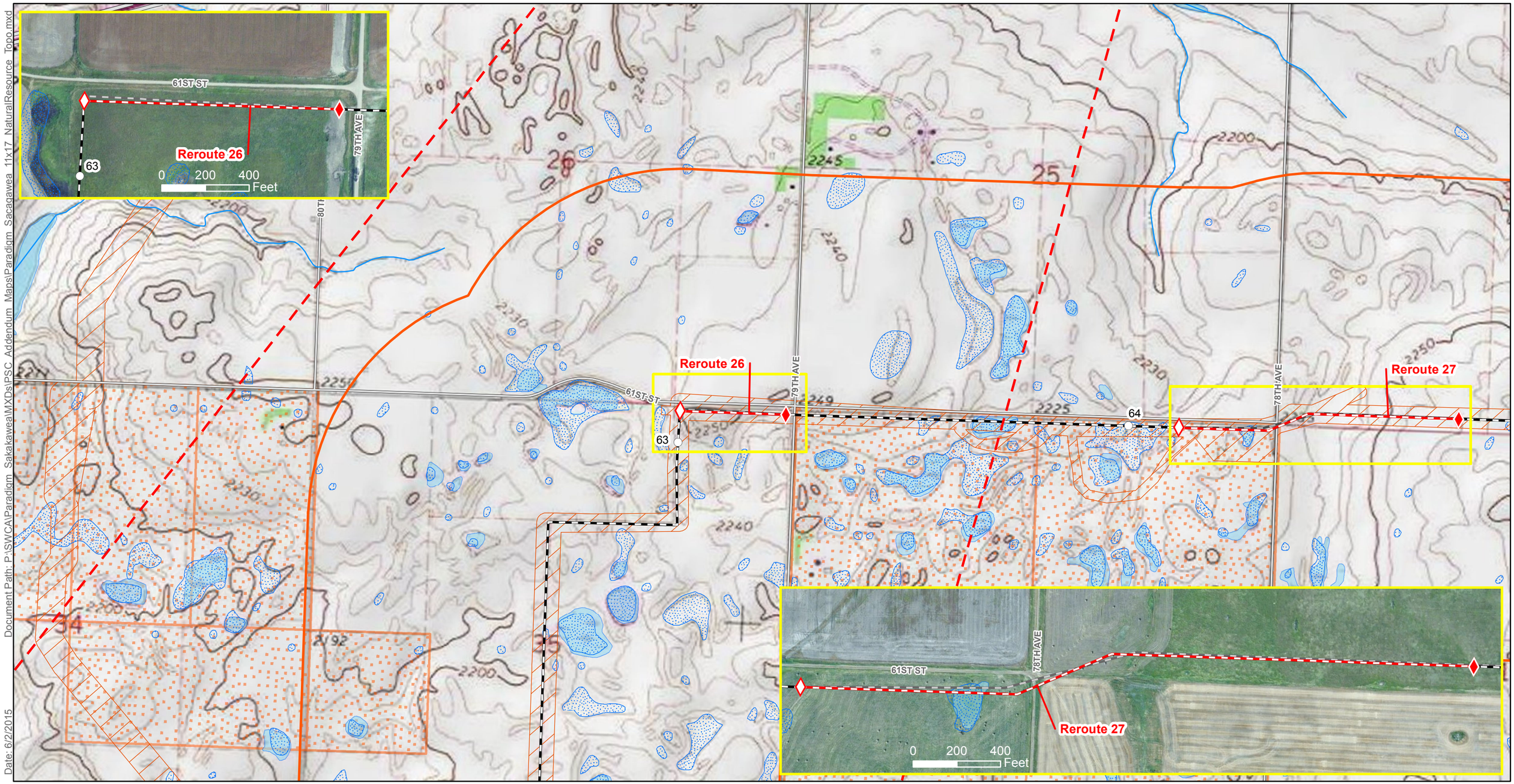
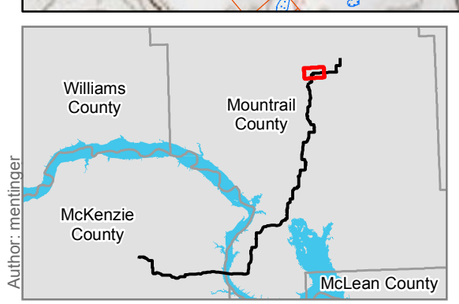
McKenzie and Mountrail Counties, ND





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McKenzie and Mountrail Counties, ND

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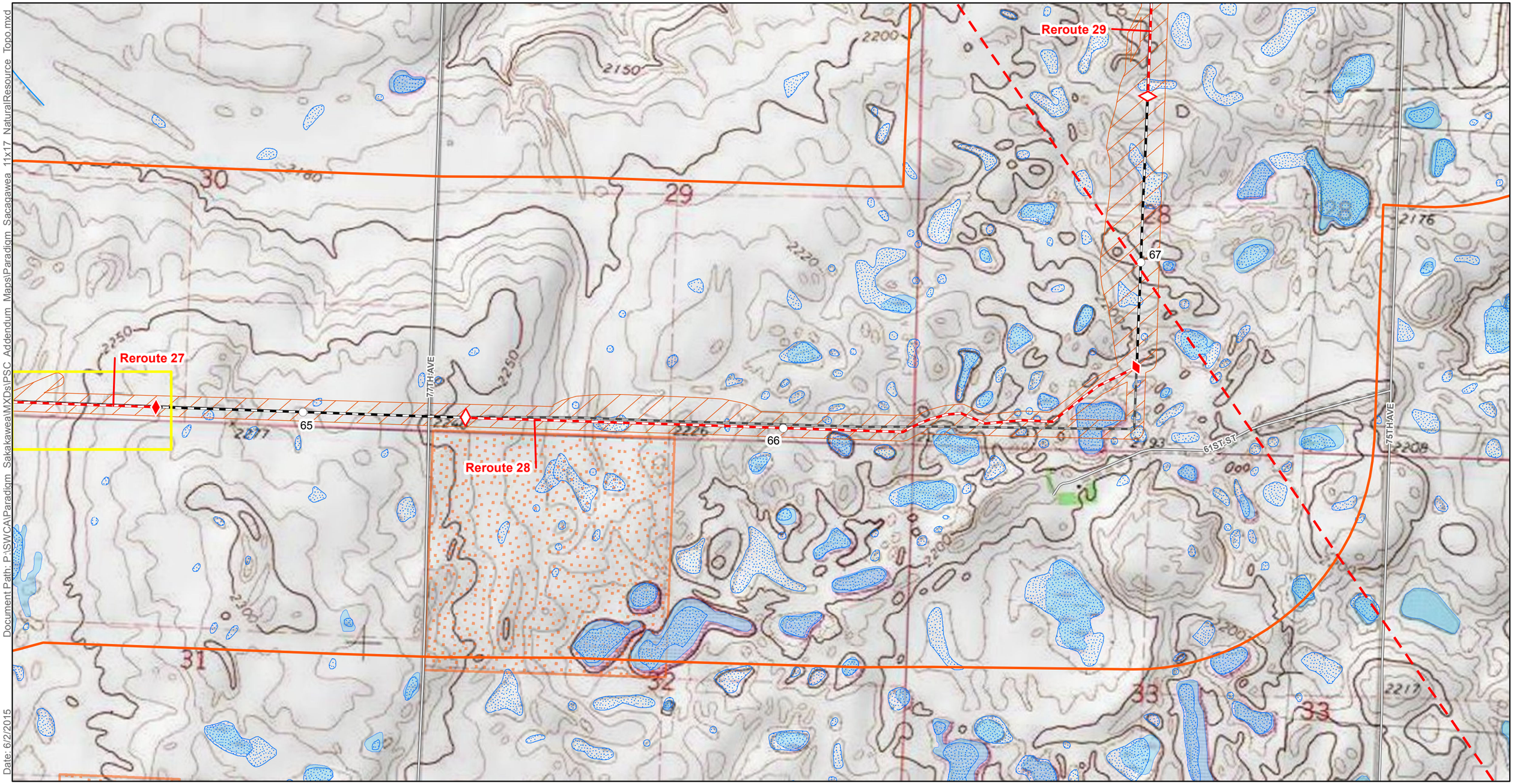

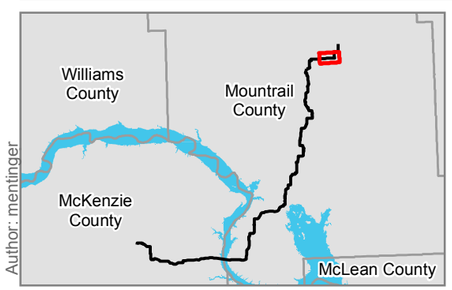

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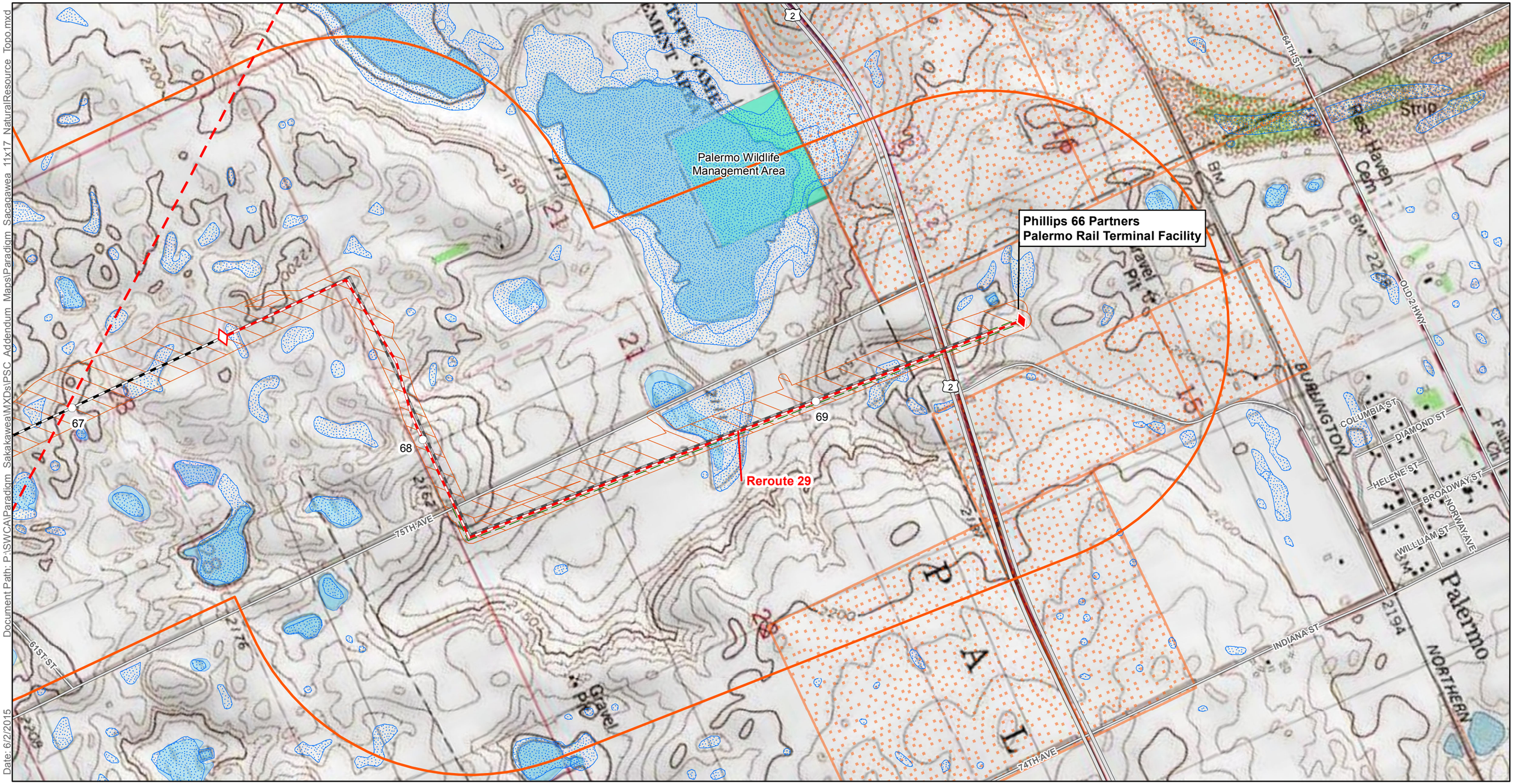

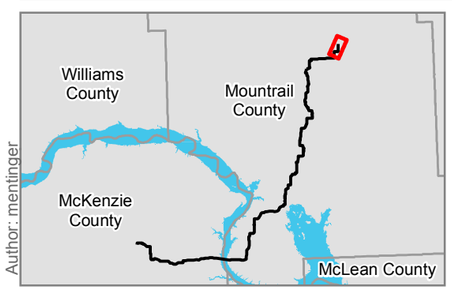

Proposed Alignment
Rerouted Alignment
Co-Located Alignment
Abandoned Alignment
Valve
Milepost
NR Survey Corridor
Corridor (1 mile)
NHD Waterways
NHD Waterbody
NWI Wetland

Criteria Data

Federal Land
Native American Land
State Land
North Dakota Mineral Trust Lands
PLOTS Land
ICBM
ICBM Direct Line to Control Facility
Abandoned Mine
NDGS Landslide Deposits
Road

E3 Environmental
Enhancing Execution with Experience

0 500 1,000 2,000 Feet

1:12,000

Map not to scale, for environmental review purposes only.

Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

Document Path: P:\SWCA\Paradigm_Sakakawea\MXDs\PSC_Addendum_Maps\Paradigm_Sacagawea_11x17_NaturalResource_Aerial.mxd

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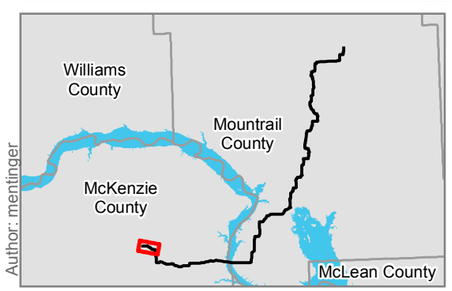

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- Potentially Occupied Structure
- NDWC Well

Survey Data

- Ephemeral Stream
- Wetland
- Wetland - FWS Easement
- Waterbody
- Stream
- Woody Vegetation
- Noxious Weed

N

E3 Environmental
Enhancing Execution with Experience

0 500 1,000 2,000 Feet

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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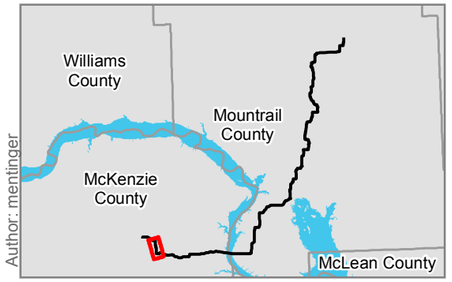

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Corridor (1 mile)

Potentially Occupied Structure (w/in 500ft)
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Wetland
Wetland - FWS Easement

Waterbody
Stream
Woody Vegetation
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Enhancing Execution with Experience

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

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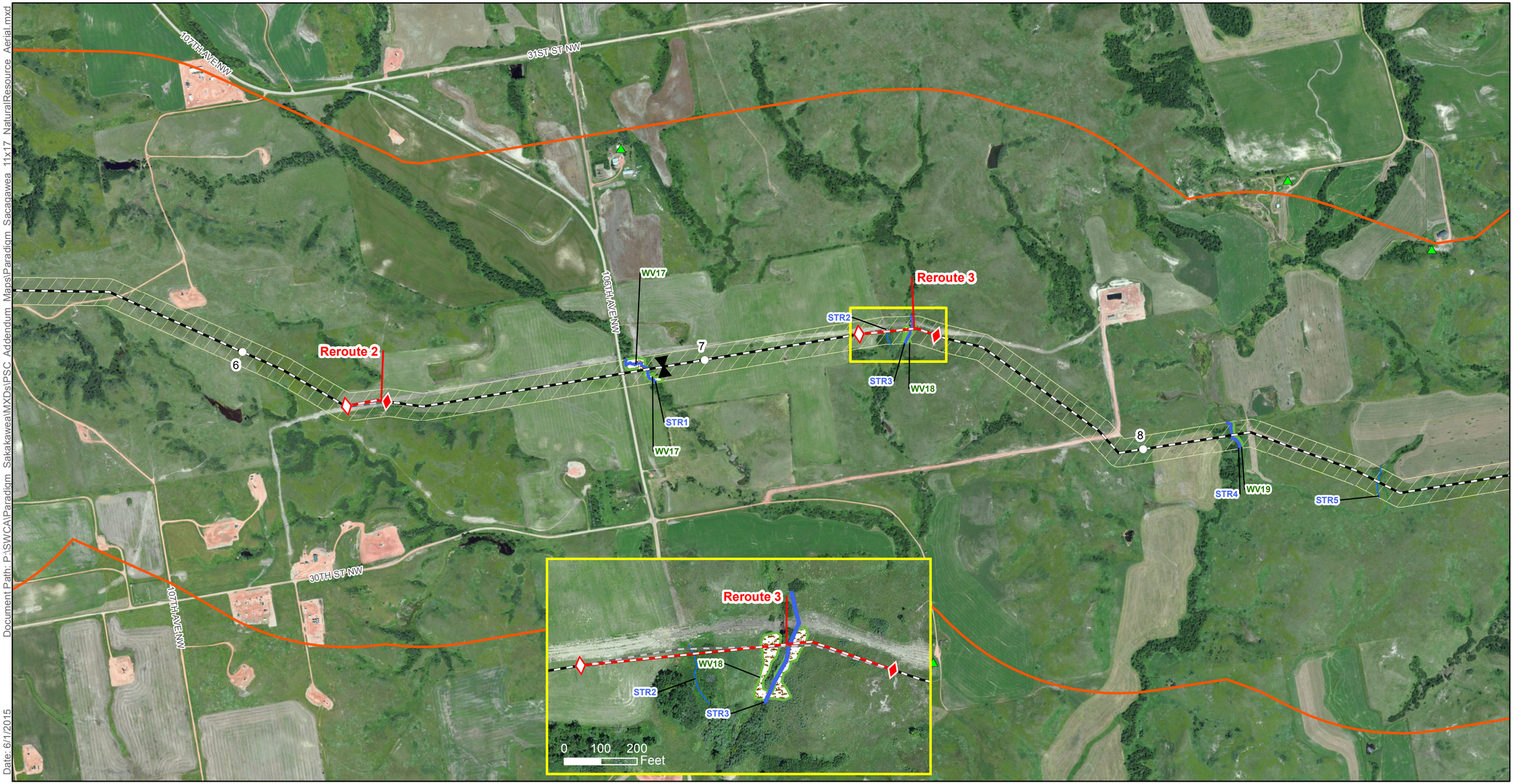

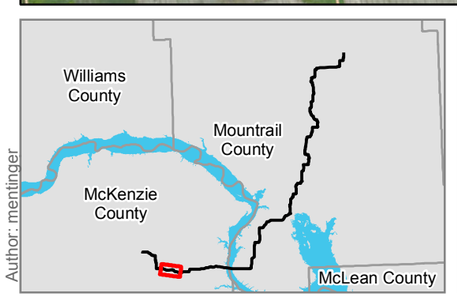

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E3 Environmental
Enhancing Execution with Experience

Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

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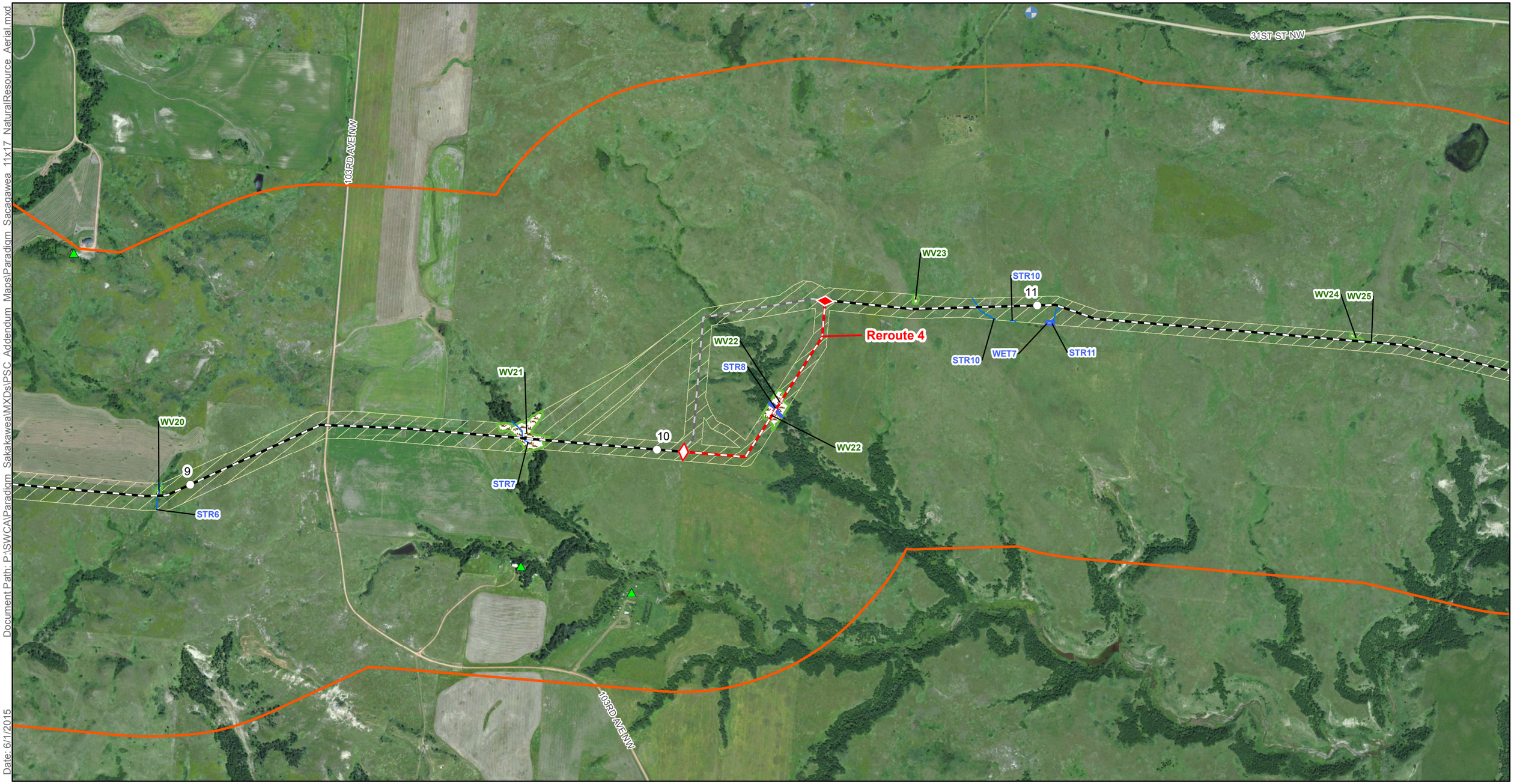

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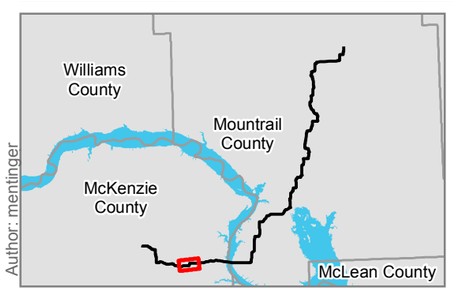

Proposed Alignment
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McKenzie and Mountrail Counties, ND

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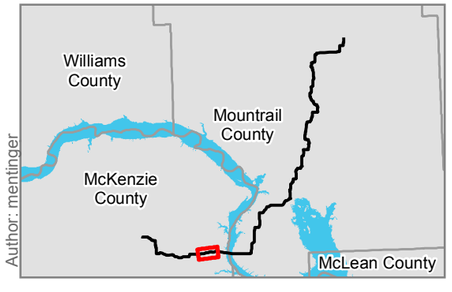

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Sacagawea Pipeline Company, LLC

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McKenzie and Mountrail Counties, ND

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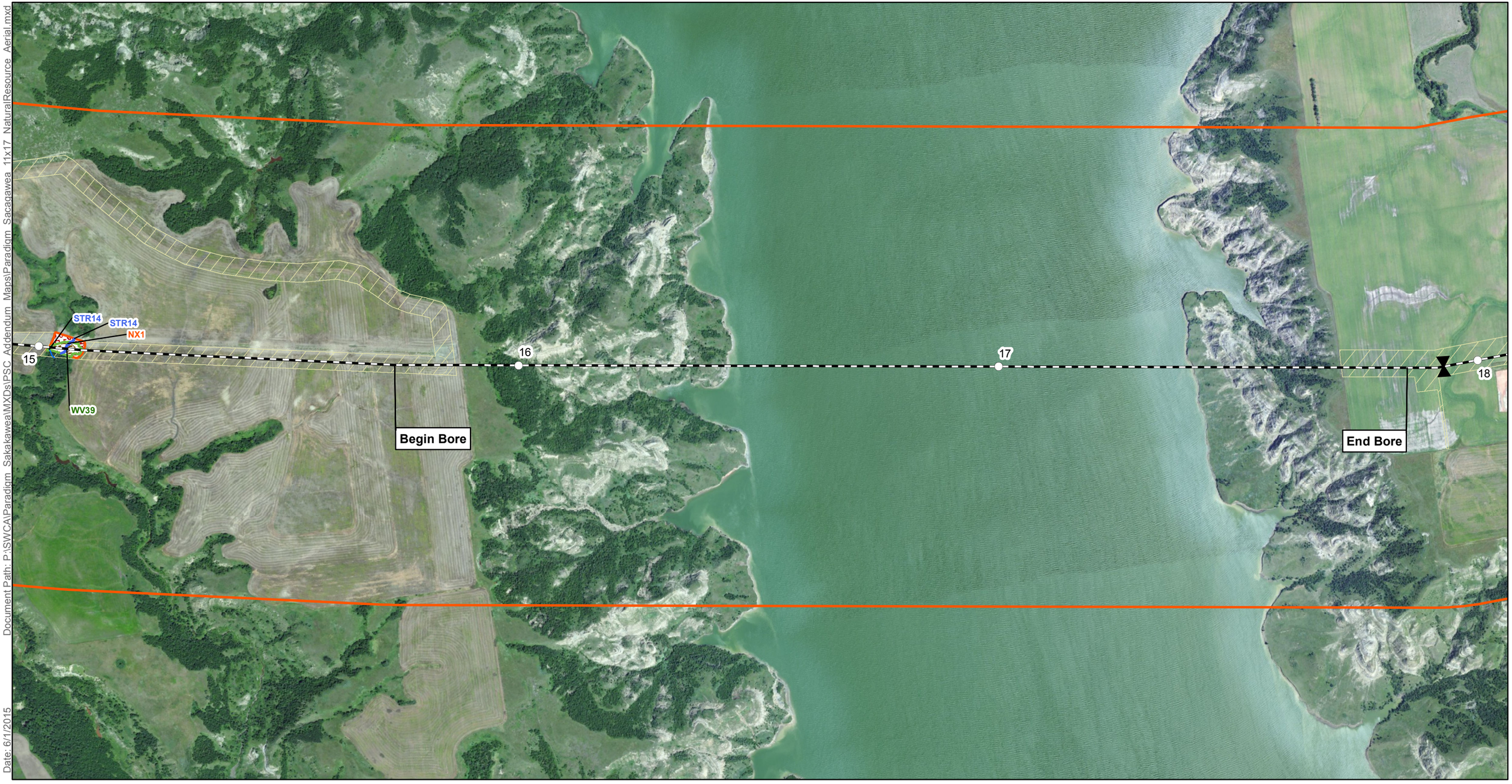

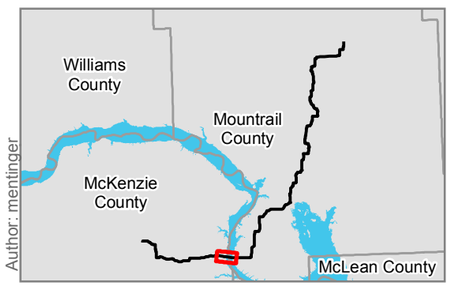

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Sacagawea Pipeline Company, LLC

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Siting Criteria
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McKenzie and Mountrail Counties, ND

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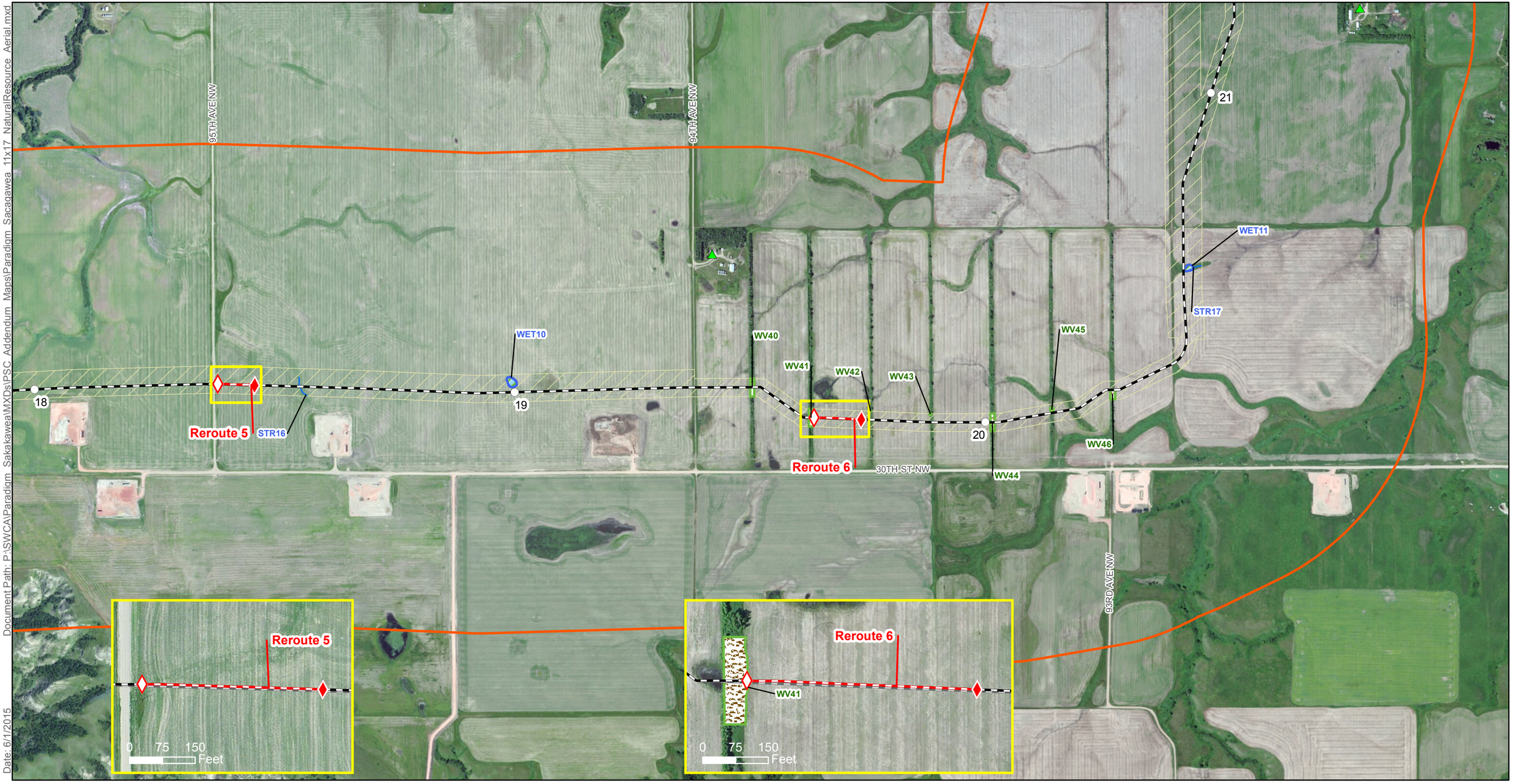

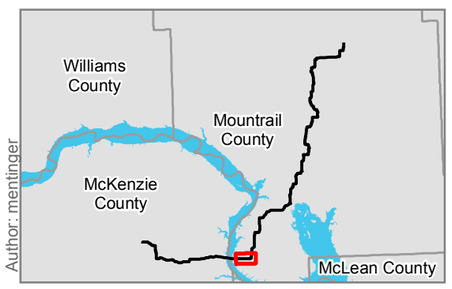

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E3 Environmental
Enhancing Execution with Experience

Sacagawea Pipeline Company, LLC

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Siting Criteria
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McKenzie and Mountrail Counties, ND

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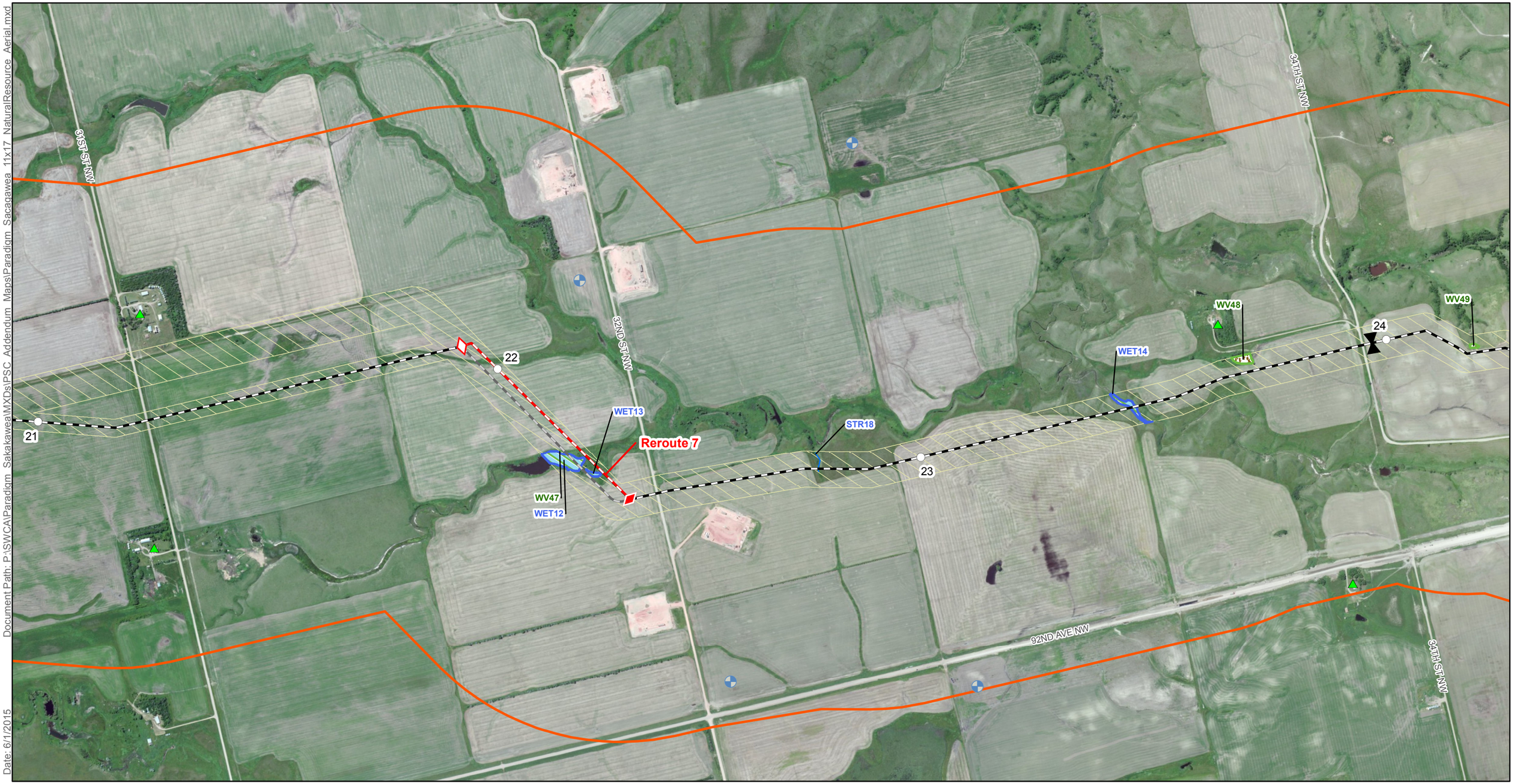

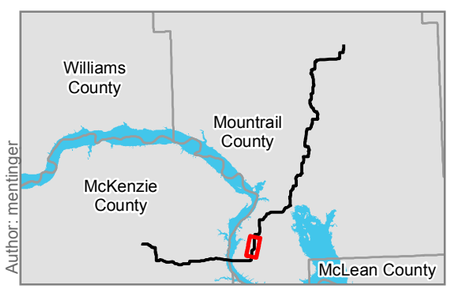

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Enhancing Execution with Experience

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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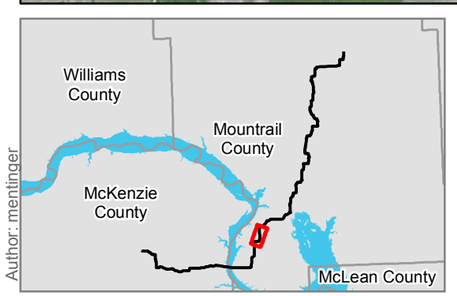

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E3 Environmental
Enhancing Execution with Experience

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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McKenzie and Mountrail Counties, ND

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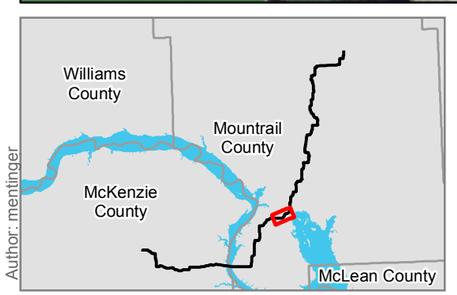

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Sacagawea Pipeline Project

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McKenzie and Mountrail Counties, ND

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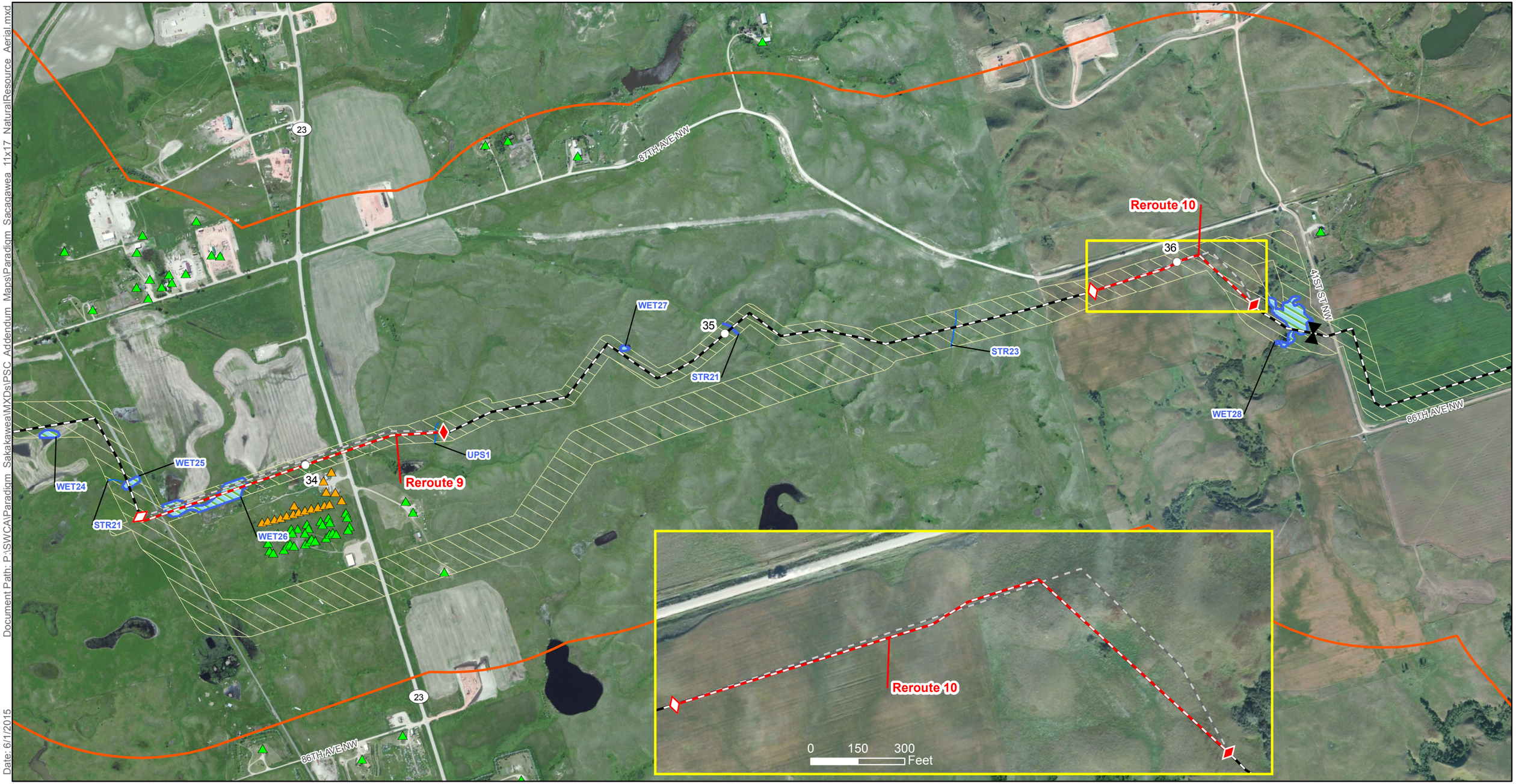

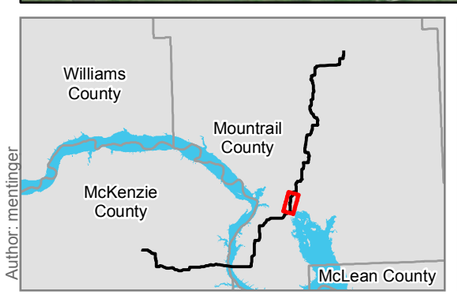

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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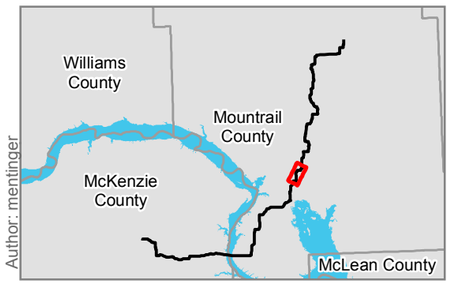

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
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McKenzie and Mountrail Counties, ND

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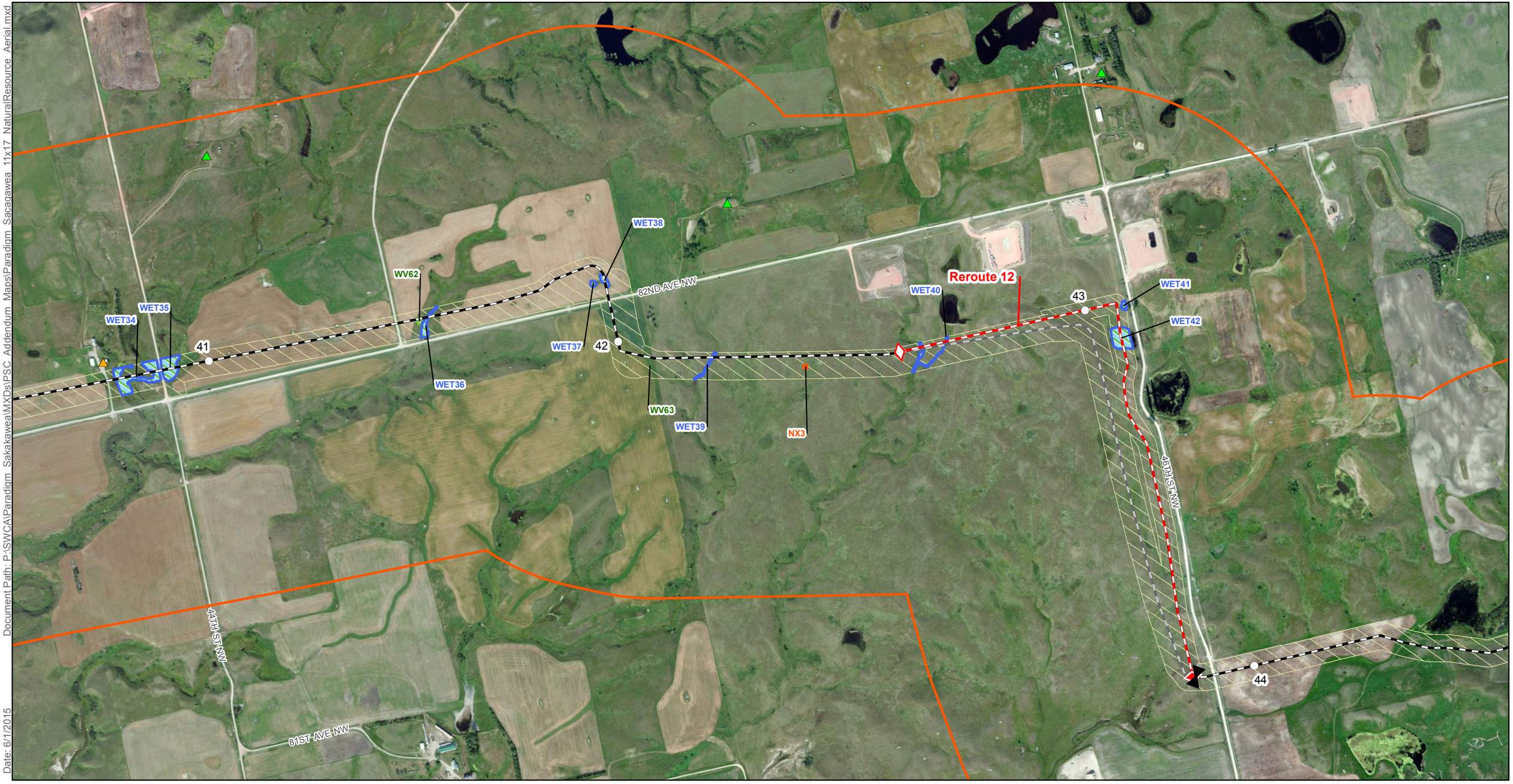

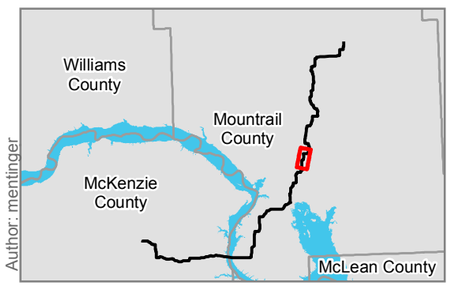

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Enhancing Execution with Experience

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

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McKenzie and Mountrail Counties, ND

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E3 Environmental
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McKenzie and Mountrail Counties, ND

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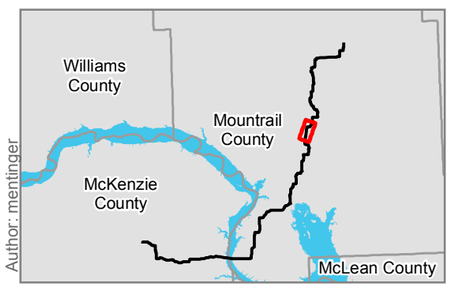

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

Page 16 of 23

McKenzie and Mountrail Counties, ND

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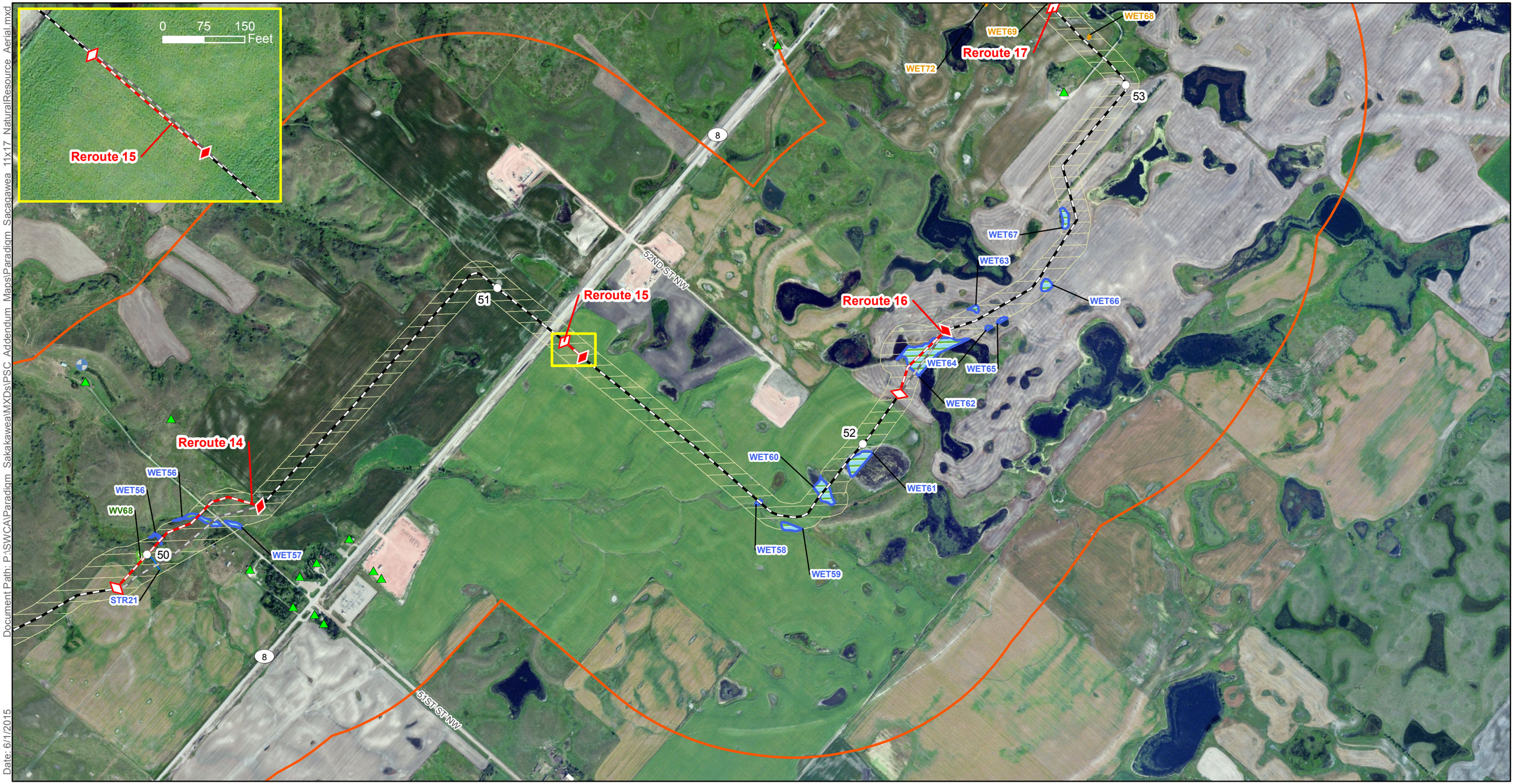
Date: 6/1/2015

Author: mentinger



Proposed Alignment
Rerouted Alignment
Abandoned Alignment
Valve
Milepost
Survey Corridor
Corridor (1 mile)

Potentially Occupied Structure (w/in 500ft)
Potentially Occupied Structure
NDWC Well

Survey Data

Ephemeral Stream
Wetland
Wetland - FWS Easement

Waterbody
Stream
Woody Vegetation
Noxious Weed

E3 Environmental
Enhancing Execution with Experience

0 500 1,000 2,000 Feet

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

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Page 17 of 23

McKenzie and Mountrail Counties, ND

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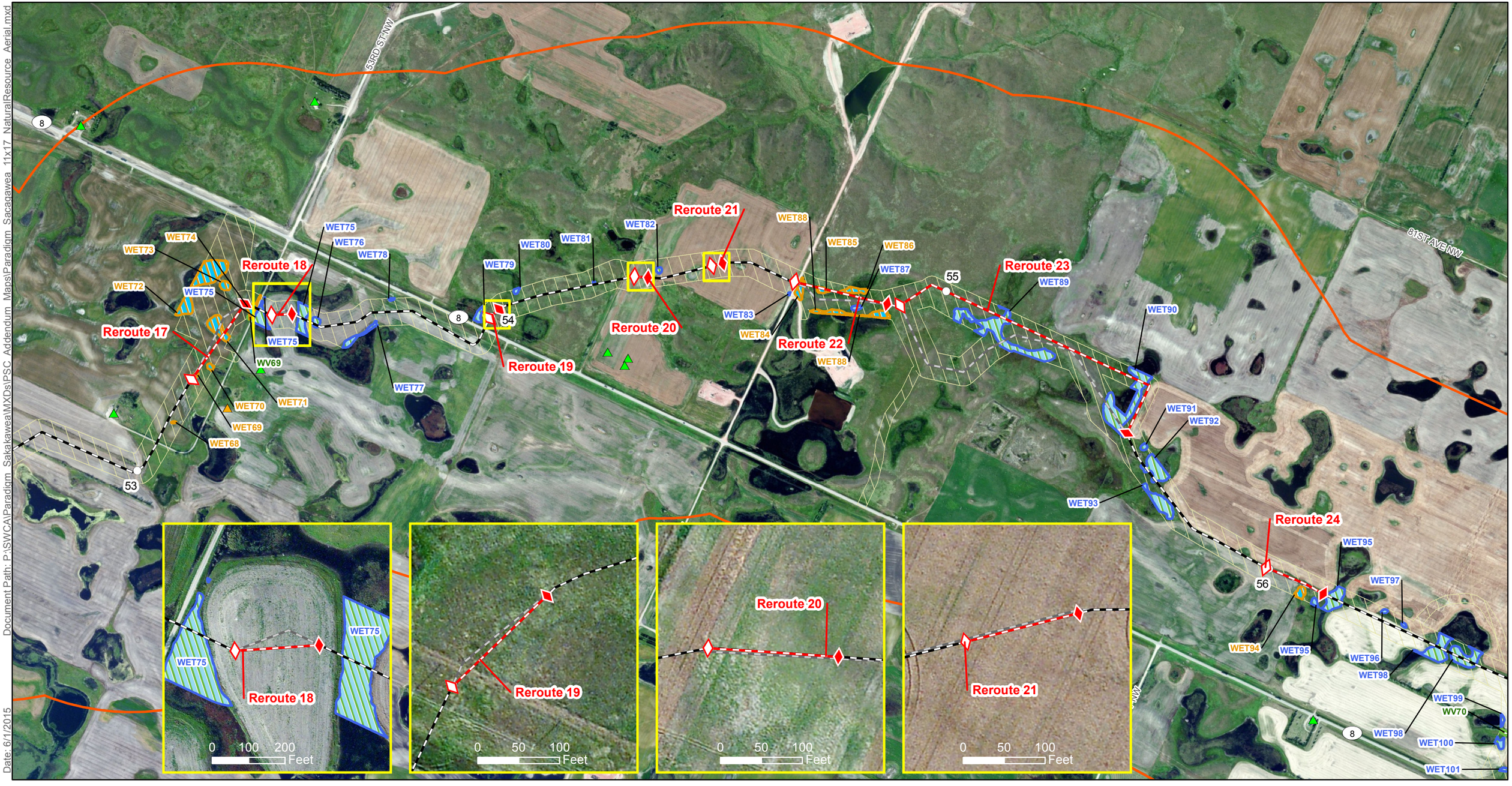

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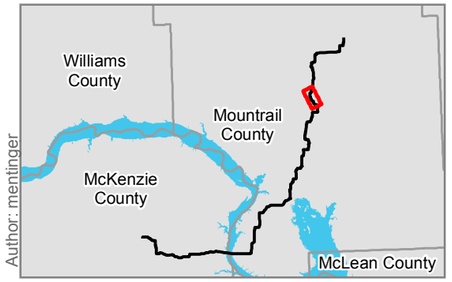

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

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McKenzie and Mountrail Counties, ND

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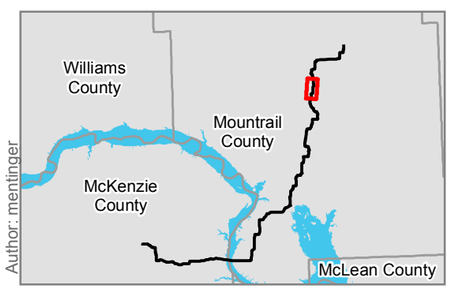

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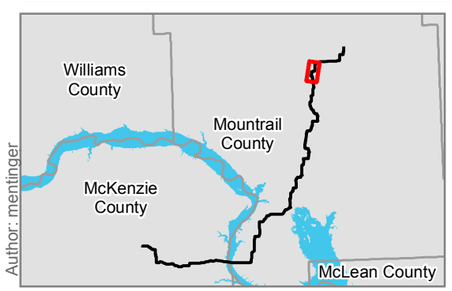

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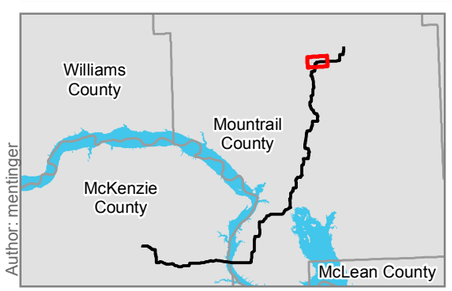

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Sacagawea Pipeline Company, LLC

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McKenzie and Mountrail Counties, ND

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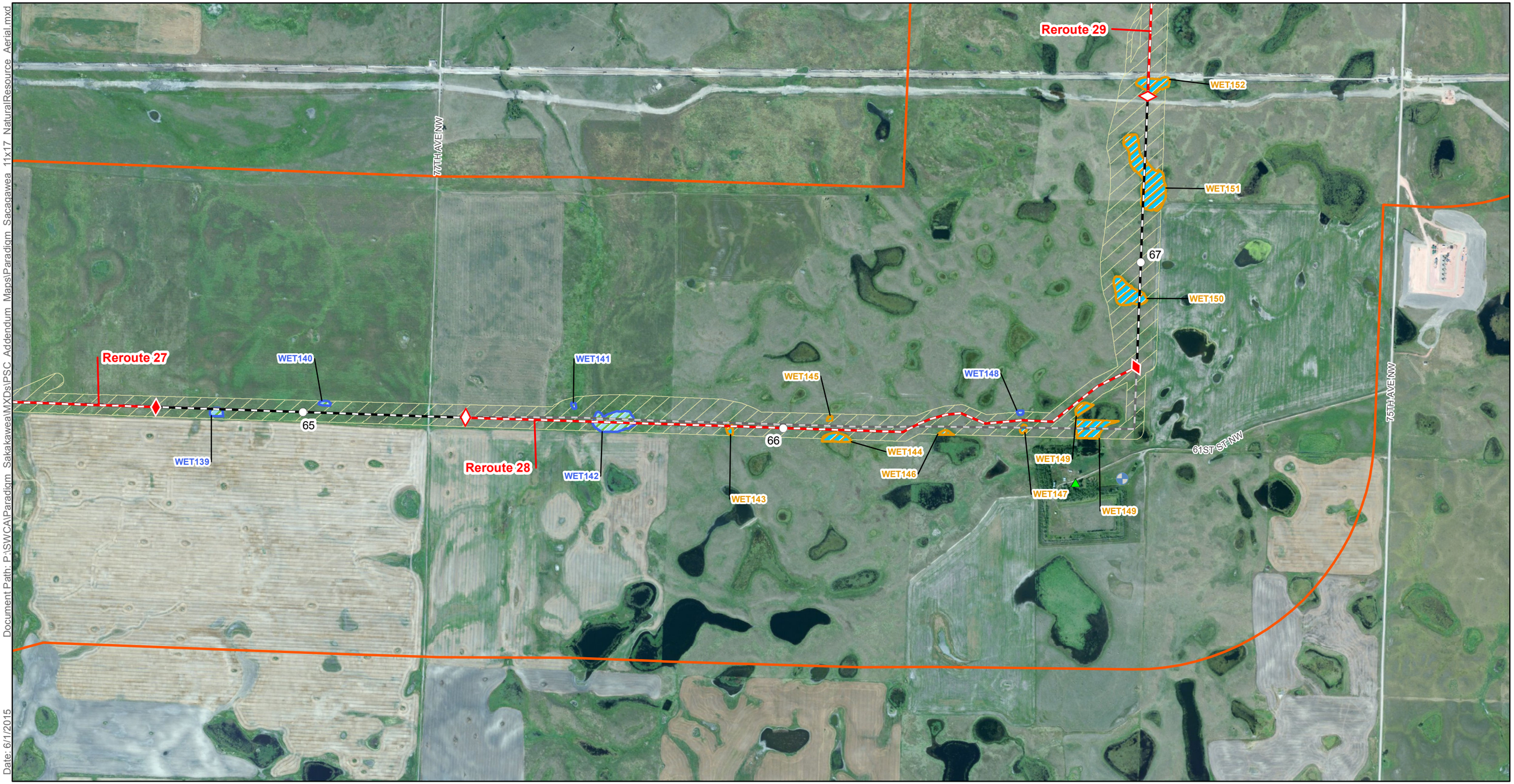

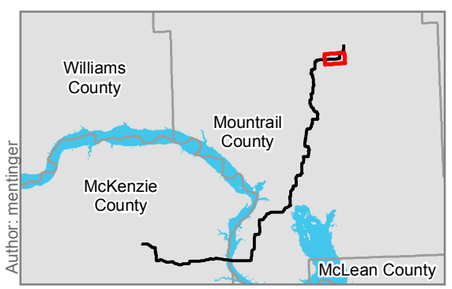

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

Siting Criteria
Natural Resource

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McKenzie and Mountrail Counties, ND

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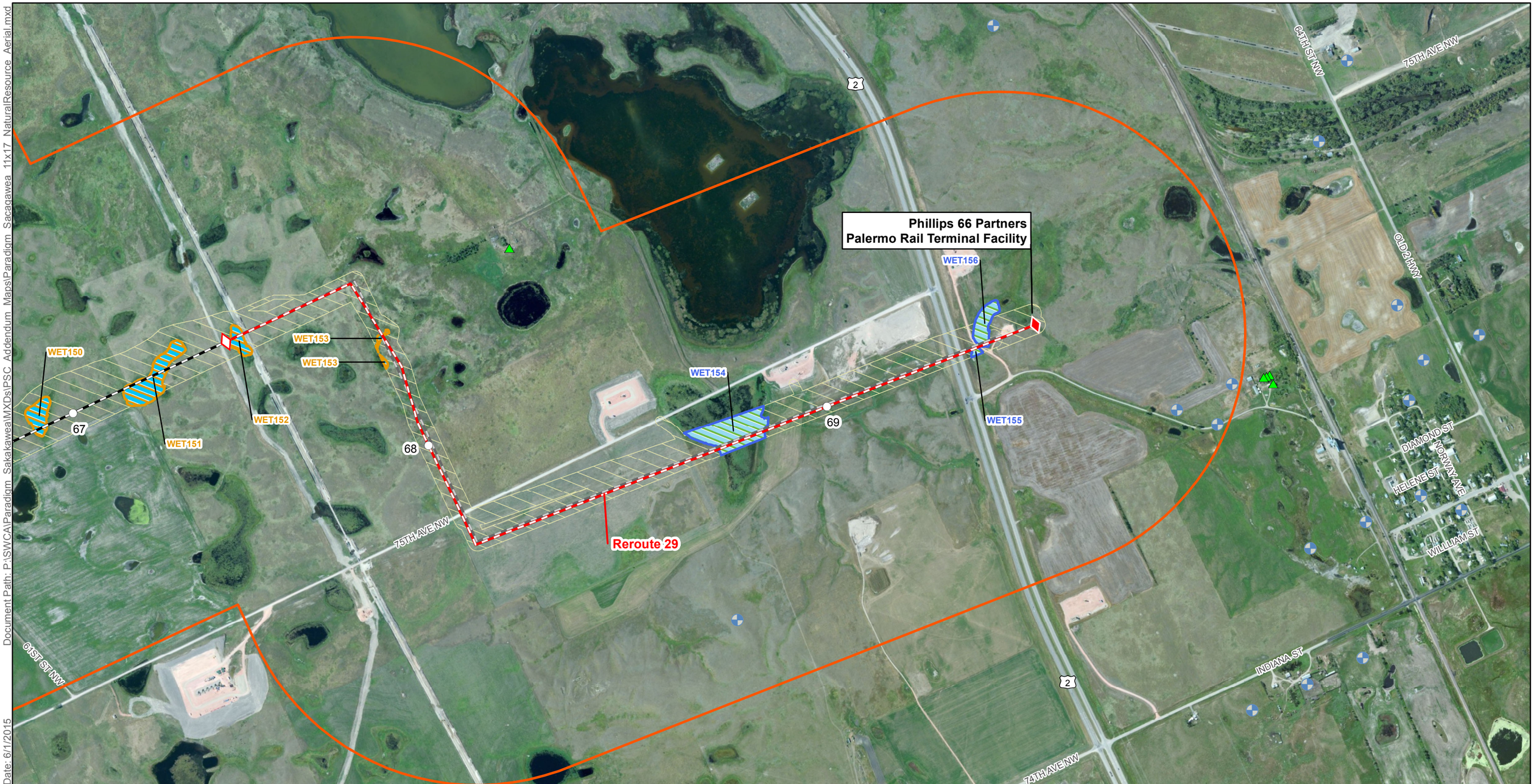

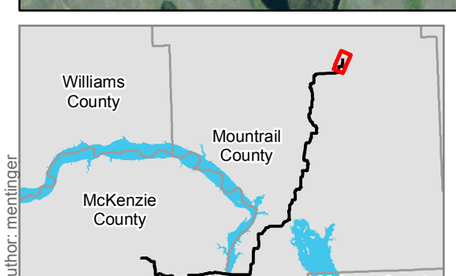

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Sacagawea Pipeline Company, LLC

Sacagawea Pipeline Project

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McKenzie and Mountrail Counties, ND

Appendix C

Consultations

May 21, 2015

Paul R. Picha, Chief Archaeologist
State Historical Society of North Dakota
Archaeology & Historic Preservation Division
612 East Boulevard Avenue
Bismarck, North Dakota 58504-0830

Dear Mr. Picha:

I have attached to this letter one copy of a cultural resources addendum report prepared by SWCA Environmental Consultants (SWCA) on behalf of Paradigm Midstream, LLC (Paradigm) entitled *Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space*. SWCA submitted a report entitled *A Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota* in February 2015. Subsequent to SWCA's original cultural resource inventory, Paradigm proposed adjustments to the project to facilitate access to the proposed pipeline right-of-way, to provide work spaces to be used for the staging of equipment and materials, and to provide adequate avoidance of cultural resources. Therefore, this addendum report documents the inventory in support of these changes, and includes a 180.58-acre Class III cultural resource inventory conducted by SWCA located on privately owned and state trust lands in Mountrail and McKenzie Counties, North Dakota.

During the Class III inventory, no cultural resources were newly observed, and no previously recorded cultural resources were revisited. McCarty and Riordan (2015) made recommendations for 20 sites associated with the proposed project. Subsequent to the initial reporting, Paradigm updated the proposed alignment resulting in increased distance from five of the previously recorded resources (32MN1130, 32MN1131, 32MN1206, 32MN1207, and 32MN1320). The proposed alignment has been shifted outside of the 50-foot avoidance boundaries for four of the five previously recorded sites (32MN1131, 32MN1206, 32MN1207, and 32MN1320), thereby negating the need for fencing and monitoring. The proposed alignment has been shifted approximately 25 feet farther to the west of 32MN1130; however, fencing and monitoring is still recommended. The alignment has not moved closer to any site. The proposed project changes do not require alterations to any of the remaining cultural resource management recommendations detailed in the original inventory report for the remaining 15 previously recorded cultural resources; therefore, SWCA suggests no change to these recommendations. It is recommended that a determination of *No Significant Sites Affected* be granted for the project to proceed as planned.

Please let me know if you have any questions regarding the attached report.

Sincerely,

William M. Harding

William M. Harding
Principal Investigator

WMH:am
Enclosures: 1

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

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Governor of North Dakota

North Dakota State Historical Board

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Director

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May 22, 2015

Mr. William Harding
Principal Investigator
SWCA
116 North 4th, Suite 200
Bismarck, ND 58501

ND SHPO Ref: 15-0759 "Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space"

Dear Mr. Harding:

We reviewed ND SHPO Ref: 15-0759 "Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space." If consulted by a state agency, we would concur with a "***No Significant Sites Affected***" determination provided the project is of the nature stated and it takes place in the locations plotted, mapped, and described in the aforementioned project documentation.

Thank you for the report. If you have questions please contact Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Claudia J. Berg
Director, State Historical Society of North Dakota

May 21, 2015

Paul R. Picha, Chief Archaeologist
State Historical Society of North Dakota
Archaeology & Historic Preservation Division
612 East Boulevard Avenue
Bismarck, North Dakota 58504-0830

Dear Mr. Picha:

I have attached to this letter one copy of a cultural resources addendum report prepared by SWCA Environmental Consultants (SWCA) on behalf of Paradigm Midstream, LLC (Paradigm) entitled *A Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space*. SWCA submitted a report entitled *A Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota* in December 2014. Subsequent to the submittal of this report, Paradigm proposed adjustments to the project to facilitate access to the proposed pipeline right-of-way, to provide workspaces to be used for the staging of equipment and materials, and to provide adequate avoidance of cultural resources. Therefore, this addendum report documents the inventory in support of these changes, and includes a 77.3-acre Class III cultural resource inventory conducted by SWCA on private lands in Mountrail County..

During the current Class III inventory SWCA newly recorded one additional cultural resource (32MN1297), a cairn site, which was left unevaluated regarding its eligibility for the National Register of Historic Places. Avoidance of at least 50 feet is recommended, and as proposed, the gathering pipeline right-of-way is approximately 63 feet from the site boundary. During the original inventory, three cultural resources (32MN1149, 32MN1317, and 32MN1318) were left unevaluated regarding their eligibility for the National Register of Historic Places, and avoidance of the sites by at least 50 feet was recommended. Should avoidance of 50 feet not be possible, temporary fencing and archaeological monitoring was recommended. As currently proposed, Paradigm would bore the gathering pipeline adjacent to 32MN1149 to avoid the resource. Fencing and monitoring is still recommended for this resource to ensure no disturbance. If the above stipulations are met, it is recommended that a determination of *No Significant Sites Affected* be granted for the project to proceed as planned.

Please let me know if you have any questions regarding the attached report.

Sincerely,

William M. Harding

William M. Harding
Principal Investigator

WMH:am
Enclosures: 1

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

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Grant Levi
Director
Department of Transportation

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Director

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June 5, 2015

William M. Harding
Principal Investigator
SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

NDSHPO REF.: 15-0694A PSC "Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space"

Dear Bill:

We have reviewed project correspondence: NDSHPO REF.: 15-0694A PSC "Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space," by Aidan McCarty and Carolyn Riordan (May 21, 2015) and find it acceptable, and we concur with a "No Significant Sites Affected" determination provided 32MN1149, 32MN1297, 32Mn1317 and 32MN1318 are avoided. Fencing and monitoring to be utilized as needed to protect these cultural resources.

Thank you for the opportunity to review this project. If you have questions please contact either Paul Picha at ppicha@nd.gov or (701) 328-3574 or Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Claudia J. Berg
Director, State Historical Society of North Dakota
and
State Historic Preservation Officer (North Dakota)

North Dakota Heritage Center • 612 East Boulevard Avenue, Bismarck, ND 58505-0830 • Phone: 701-328-2666 • Fax: 701-328-3710
Email: histsoc@nd.gov • Web site: http://history.nd.gov • TTY: 1-800-366-6888

Appendix D

Natural Resources Report

SWCA®
ENVIRONMENTAL CONSULTANTS
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The Natural Resources and Wetland Delineation Report for the Paradigm Sacagawea Pipeline System and Palermo Extension, McKenzie and Mountrail Counties, North Dakota

Prepared for

Paradigm Midstream Services - ND, LLC

Prepared by

SWCA Environmental Consultants

June 2015

The Natural Resources and Wetland Delineation Report for the Paradigm Sacagawea Pipeline System and Palermo Extension, McKenzie and Mountrail Counties, North Dakota

Prepared for:

Paradigm Midstream Services – ND, LLC

Prepared by:

Ashley C. Persinger, B.S.
Environmental Specialist

Reviewed by:

Jeffrey K. Towner, M.S.
Natural Resources Team Lead

SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
Phone (701) 258-6622, Fax (701) 258-5957

SWCA Project No. 27100

June 8, 2015

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1.0INTRODUCTION

1.1 BACKGROUND

Paradigm Midstream Services – ND, LLC (Paradigm) is proposing to construct and operate the proposed Sacagawea oil and gas pipeline system and Palermo Extension in McKenzie and Mountrail Counties, North Dakota. SWCA Environmental Consultants (SWCA) conducted natural resources field surveys in order to identify exclusion and avoidance areas as specified in North Dakota Administrative Code 69-06-08-02 for the proposed Sacagawea Pipeline project.

As proposed, the Sacagawea Pipeline and Palermo Extension is approximately 70 miles long, spanning privately owned lands, state trust lands, Fort Berthold Indian Reservation (Reservation) lands (fee surface, allotted, and tribal lands), and U.S. Army Corps of Engineers (USACE) lands in North Dakota (Appendix A). The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. SWCA is preparing an Environmental Assessment to assess impacts within the Ft. Berthold Indian Reservation segment of the pipeline. An Environmental Assessment is required for the USACE for the Missouri River crossing and SWCA is working with the agency to complete that document. Compliance with Section 10 of the Rivers and Harbors Act (33 USC 403) is required for the passage under Lake Sakakawea, which is addressed through authorization under Nationwide Permit 12 by the Corps of Engineers. The USACE is also responsible for review and issuance of a realty permit and regulatory program authorization for the lake crossing. The North Dakota Public Service Commission (NDPSC) has jurisdiction over the survey area off the reservation and is requiring a certificate of corridor compatibility and route permit be obtained prior to the commencement of construction activities.

SWCA conducted field surveys of a 200-foot-wide corridor, including reroutes, in August, September, and November 2013, August 2014, October 2014, January 2015, March 2015 and April 2015 to determine the potential presence and extent of wetlands and waterbodies, including jurisdictional waters of the U.S., within the proposed survey area. Concurrently with the wetland determinations, SWCA conducted a cursory threatened and endangered species survey and habitat assessment; a tree, sapling, and shrub enumeration survey; and a noxious weed survey. Site layout maps of the survey area and natural resource features identified during the field surveys are provided in Appendix A.

This report outlines the methodology used by SWCA's ecologists to complete each of the aforementioned surveys. Additionally, this report presents the results of the completed field surveys and regulatory recommendations to ensure compliance with the NDPSC and the USACE Nationwide Permit 12.

1.2 REGULATORY BACKGROUND

1.2.1 Clean Water Act, Section 404

Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the U.S., also known as jurisdictional waters, without a permit from the USACE.

1.2.2 USACE Nationwide Permit 12

The USACE Nationwide Permit 12 authorizes the construction of utility lines and associated facilities in waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5 acre of waters of the U.S., including wetlands.

Nationwide Permit 12 requires that the permittee submit a pre-construction notification prior to commencing construction if any of the following criteria are met.

- The activity involves mechanized land clearing in a forested wetland.
- A Section 10 permit is required to cross a navigable waterbody (Rivers and Harbors Act). Compliance with Section 10 of the Rivers and Harbors Act (33 USC 403) is required for the passage under Lake Sakakawea.
- The utility line exceeds 500 feet in length through any single crossing of a water of the U.S.
- The utility line is placed within a jurisdictional area (i.e., water of the U.S.) and it runs parallel to a stream bed that is within that jurisdictional area.
- Discharges result in the permanent loss of greater than 0.1 acre of waters of the U.S.
- Permanent access roads are constructed above grade in waters of the U.S. for a distance of more than 500 feet.
- Permanent access roads are constructed in waters of the U.S. with impervious materials.

1.2.3 USACE Regional Conditions

The USACE has published several regional conditions for projects operating under Nationwide Permits in North Dakota. The regional conditions apply to wetlands classified as "fens," waters adjacent to natural springs, the Missouri River, historic properties, and fish spawning areas.

2.0METHODS

2.1 SURVEY AREA

Overall, northwest North Dakota is characterized by a moderate to cool climate, with cold, dry winters and mild to warm summers. Mean annual precipitation for the area is 14 to 16 inches (Bryce et al. 1998).

The proposed project is located in the Great Plains (level I) ecoregion. Further, the alignment is in the West-Central Semi-Arid Prairies (level II ecoregion). The northern portion of the alignment is located in the Northwestern Glaciated Plains (level III) and Glaciated Dark Brown Prairie (level IV ecoregion) region and the southern extent of the alignment is located in the Northwestern Great Plains (level III ecoregion) and River Breaks (level IV ecoregion) ecoregion.

The Northwestern Glaciated Plains marks the westernmost extent of glacial activity and contains significant surface irregularity, characteristic of a youthful morainal landscape, with

hills and depressions and high concentrations of wetlands (Bryce et al. 1998). Further, the Glaciated Dark Brown Prairie ecoregion has a well-defined drainage system and fewer wetlands compared to the more recently glaciated ecoregions to the east (Bryce et al. 1998). The Northwest Great Plains are characterized by unglaciated topography, complex stream drainage systems, and susceptibility to erosion. The typical landscape of the project area is illustrated in Figure 1. Primary land uses are grazing, small-grain agriculture, and recreation (Bryce et al. 1998).

Figure 1. Overview of the general topography towards the northern half of pipeline corridor, facing east.

The proposed Sacagawea Pipeline System project corridor that was surveyed in 2013, 2014 and 2015 encompasses portions of 71 sections within 11 townships and ranges.

- Sections 27 and 34, Township (T) 156 North (N), Range (R) 91 West (W)
- Sections 3, 10, 11, 14, 23, 26, 27, and 34, T155N, R91W
- Sections 2, 3, 11, 14, 15, 21, 22, 28, and 33, T154N, R91W
- Sections 3, 4, 10, 15, 16, 20, 21, 29, 31, and 32, T153N, R91W
- Sections 35 and 36, T152N, R93W
- Sections 2, 3, 10, 15, 21, 22, 28, 29, 30, and 25, T152N, R92W

- Sections 13, 14, 15, 24, and 25, T151, R96W
- Sections 30, 31, 32, 33, 35, and 36, T151N, R95W
- Sections 2, 10, 11, 15, 22, 27, 31, 32, 33, and 34, T151N R93W
- Sections 31, 32, 33, 34, 35, and 36, T151N, R94W
- Sections 2, 3, and 4, T150N, R95W

The proposed Palermo Extension project corridor that was surveyed on October 29 and 30, 2014, encompasses portions of 11 sections within three townships and ranges.

- Sections 2 and 3, T155N, R91W
- Sections 15, 21, 22, 28, 29, 30, and 31, T156N, R90W
- Sections 35 and 36, T156N, R91W

2.2 WETLANDS

National Wetlands Inventory mapping for the region indicates the presence of wetlands (U.S. Fish and Wildlife Service [USFWS] 2012a). SWCA ecologists conducted wetland delineations within the survey area based on the principles and guidelines provided in the 1987 *Corps of Engineers Wetlands Delineation Manual* (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Determination Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010). According to the Manual, an area is a wetland if three mandatory wetland indicators are present in a given area, with special exceptions. These criteria include the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. All wetlands and waterbodies geographically referenced within the survey area during field survey are depicted on the site layout maps in Appendix A.

2.2.1 Hydrophytic Vegetation

Ecologists recorded all plants within the vegetative community based on the respective stratum each species occupied. A tree is defined by the Supplement to be a woody-stemmed plant with a trunk diameter at breast height (DBH) of equal to or greater than 3 inches, regardless of height. The sapling and shrub stratum is defined by the Supplement to be composed of woody-stemmed plants with a trunk DBH of less than 3 inches, regardless of height. The herbaceous stratum includes all non-woody-stemmed plants regardless of height. Finally, the woody vine stratum includes all woody-stemmed vines, regardless of diameter.

SWCA recorded the binomial scientific name and percent cover of all plants within a 30-foot radius for the tree stratum, a 15-foot radius for the sapling/shrub stratum, a 5-foot radius for the herbaceous stratum, and a 30-foot radius for the woody vine stratum. SWCA ecologists noted each plant species' respective USFWS indicator status (i.e., upland [UPL], facultative upland [FACU], facultative [FAC], facultative wetland [FACW], and obligate [OBL]). Vegetation communities met the hydrophytic vegetation criterion for wetlands if greater than 50% of dominant species had an indicator status of FAC, FACW, and OBL. SWCA also noted and geospatially referenced all populations of North Dakota state- or county-listed noxious weeds identified within the survey area.

2.2.2 Wetland Hydrology

A wetland was determined to contain wetland hydrology if at least one primary indicator or at least two secondary indicators of wetland hydrology were present, as defined by the Manual and Supplement. Common hydrologic indicators include the presence of surface water, high water table, soil saturation, water marks on trees or other objects, sediment deposits, water-stained leaves, and oxidized rhizospheres on living roots.

2.2.3 Hydric Soil

Ecologists recorded detailed notes regarding soil profiles including the hue, value, and chroma (i.e., color) of the soil (using Munsell Soil Color Charts), the depth and extent of that soil color within the entire soil profile, the concentration of any redoximorphic concentrations or depletions, and the texture of the soil at each depth where a color change was observed. Soil pits were excavated to a minimum depth of 20 inches at each data point. Due to timing of year, soils in some locations were frozen below the first 6 inches. Common hydric soil indicators of the Northern Great Plains subregion include the presence of hydrogen sulfide gas within the soil pit, redox depressions, redox dark surfaces, and depleted matrix.

2.3 WATERBODIES

Waterbodies (i.e., ponds, creeks, streams, lakes) were identified by the presence of an ordinary high water mark (OHWM). Common identifiable indicators of an OHWM include open water or evidence of a clear, natural line visible on the bank; shelving; changes in soil characteristics; the destruction of terrestrial vegetation; the presence of litter and debris; and watermarks on structures that are inundated during normal high water conditions. The OHWM typically represents the potential limits of the USACE jurisdiction. Please note that the USACE has full discretion in determining the jurisdictional status of referenced wetlands and waterbodies.

SWCA classified streams as perennial, intermittent, or ephemeral based on field observations. During a typical year, a perennial stream contains flowing water year-round and the water table is located above the stream bed. Groundwater is the primary water source for stream flow while precipitation runoff is supplemental. Ecologists classified streams that showed significant flow during the field survey or were named or designated as solid blue lines on the U.S. Geological Survey topographic maps as perennial.

An intermittent stream has flowing water for only portions of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

2.4 TREE, SAPLING, AND SHRUB COUNT

SWCA ecologists determined the total number of trees, saplings, and shrubs present within the survey area by employing several different techniques depending on the type of woody vegetation habitat (i.e., forested upland, shrubland, or shelterbelt) encountered and the overall extent of each habitat within the right-of-way (ROW). The boundary of all forested upland, shrubland, and shelterbelt habitat was geographically referenced using a Trimble GeoXT series handheld global positioning system (GPS) unit. In forested upland and shrubland habitat, SWCA counted the number of all woody-stemmed vegetation with a DBH of ≥1 inch. In shelterbelt areas, all woody-stemmed vegetation, regardless of DBH, was inventoried via direct count. Ecologists taxonomically identified all recorded individuals to the species level within each habitat type.

2.5 NOXIOUS WEED SURVEYS

SWCA conducted a noxious weed survey of all populations of North Dakota state- or county-listed noxious weeds within the project area. Surveys were conducted late in the growing season and it is possible that small isolated patches of noxious weeds could have been missed or could emerge in other areas in the spring. Paradigm will monitor and control noxious weeds within their ROW prior to and subsequent to construction.

2.6 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

Prior to conducting field surveys, SWCA reviewed information obtained from the USFWS list of threatened and endangered species by North Dakota county (USFWS 2014a) regarding the presence of threatened or endangered species that may occur within the survey area. This document does not represent a comprehensive survey, but rather acknowledges the past and/or current presence of listed species. The lack of discovery of threatened or endangered species does not signify their non-existence within the area, but only that no primary or secondary indications of these species were recorded. SWCA completed a random survey for all listed species and suitable habitat.

A line-of-sight binocular survey for raptor species was also conducted for a distance of approximately 0.5 mile. SWCA ecologists noted all wildlife observed during the field survey. Wildlife sightings can involve primary observations (i.e., actual sighting of an animal) or secondary observations (i.e., observation of scat, tracks, or fur deposits).

2.7 MAPPING

The boundaries of each wetland, waterbody, woody vegetation habitat, and noxious weed assemblage were geographically recorded using a Trimble GeoXT GPS unit. The aforementioned GPS unit is capable of recording geographic data with sub-meter accuracy. SWCA used Universal Transverse Mercator Zone 13 North as the projected coordinate system and North American Datum 1983 as the datum. ArcGIS v10.0 (ESRI Redlands, California) was used to analyze recorded features, calculate areas, and generate the maps provided in Appendix A. Please note that all data collected using the GPS unit, and displayed

on the attached maps, are for review purposes only and do not represent a professional civil survey.

3.0RESULTS

3.1 VEGETATION

During the field survey, SWCA ecologists identified four general types of vegetative communities within the survey area. These vegetative communities were classified as herbaceous upland, shrubland and upland woody vegetation, cropland, and palustrine emergent (PEM) wetland. PEM wetlands are characterized by the presence of herbaceous hydrophytic or submergent aquatic macrophytes. Photographs of the survey area are provided in Appendix C.

Vegetation communities met the hydrophytic vegetation criterion for wetlands if greater than 50% of dominant species had an indicator status of FAC, FACW, or OBL. The upland communities failed to meet at least one of the three assessed wetland criteria.

3.1.1 Herbaceous Upland

The herbaceous upland community consists of areas dominated by non-woody vegetation such as grasses and forbs. Two types of herbaceous upland communities were observed during the survey. The dominant herbaceous community within the proposed pipeline survey area includes non-native grasses and forbs including smooth brome (*Bromus inermis*), western wheatgrass (*Pascopyrum smithii*), crested wheatgrass (*Agropyron cristatum*), sweetclover (*Melilotus* spp.), stiff sunflower (*Helianthus pauciflorus*), and Kentucky bluegrass (*Poa pratensis*). The remaining herbaceous upland consisted of native mixed grass prairie comprised of blue grama (*Bouteloua gracilis*), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), white sagebrush (*Artemisia ludoviciana*), curlycup gumweed (*Grindelia squarrosa*), prairie coneflower (*Ratibida columnifera*), prairie rose (*Rosa arkansana*), purple coneflower (*Echinacea angustifolia*), and American licorice (*Glycyrrhiza lepidota*).

3.1.2 Shrubland and Woody Vegetation

Shrubland communities occurring throughout the survey area consisted of upland areas dominated by woody-stemmed vegetation including western snowberry (*Symphoricarpos occidentalis*), downy hawthorn (*Crataegus mollis*), and chokecherry (*Prunus virginiana*),

Forested upland vegetation consisted of Siberian elm (*Ulmus pumila*), Russian olive (*Elaeagnus angustifolia*), cottonwood (*Populus deltoids*), boxelder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), peach leaf willow (*Salix amygdaloides*), and burr oak (*Quercus macrocarpa*).

3.1.3 Cropland

Cropland was confirmed in the survey area and classified as wheat (*Triticum aestivum*). Other common crops in the area include flax (*Linum usitatissimum*), canola (*Brassica napus*), and sunflowers (*Eriophyllum* sp.)

3.1.4 Hydrophytic Vegetation

Aquatic vegetation species confirmed during the survey included reed canarygrass (*Phalaris arundinacea*), prairie cordgrass (*Spartina pectinata*), water smartweed (*Polygonum amphibium*), curly dock (*Rumex crispus*), and broad-leaf cattail (*Typha latifolia*).

3.2 HYDROLOGY

Wetland communities observed during the determination effort displayed at least one primary or two secondary indicators of wetland hydrology, as defined by the Manual and Supplement. Upland communities either failed to display hydrologic indicators or failed to meet the hydrophytic vegetation and hydric soils criterion, as defined by the Manual and Supplement. In some instances, the presence of above average precipitation obscured the wetland/waterbody boundary and OHWM usually present during normal hydrologic conditions. Common indicators of wetland hydrology observed during field surveys include Surface Water (A1), High Water Table (A2), Saturation (A3), Water-Stained Leaves (B9), Algal Mat or Crust (B4), and Inundation Visible on Aerial Imagery (B7).

According to National Weather Service preliminary climatological data for Williston, North Dakota, 5.69 inches of precipitation were recorded from June 1 through September 31, 2014 (Table 1). This amount is 2.46 inches below normal for this time period. Williston is approximately 60 miles west of the project area.

Table 1. Monthly Recorded Rainfall at National Weather Service Station in Williston, North Dakota

Month	Recorded Precipitation (inches)	Normal Precipitation (inches)	Difference (inches)
June 2014	1.44	2.52	-1.08
July 2014	0.66	2.54	-1.88
August 2014	2.24	1.45	0.79
September 2014	1.35	1.64	-0.29
Total	**5.69**	**8.15**	**-2.46**

Source: National Oceanic and Atmospheric Administration 2014

According to National Weather Service preliminary climatological data for Minot, North Dakota, 11.68 inches of precipitation were recorded from June 1 through September 31, 2014 (Table 2). This amount is 2.17 inches above normal for this time period. Minot is approximately 50 miles east-northeast of the project area.

Table 2. Monthly Recorded Rainfall at National Weather Service Station in Minot, North Dakota

Month	Recorded Precipitation (inches)	Normal Precipitation (inches)	Difference (inches)
June 2014	5.34	3.58	1.76
July 2014	1.72	2.43	-0.71

Month	Recorded Precipitation (inches)	Normal Precipitation (inches)	Difference (inches)
August 2014	3.77	2.04	1.73
September 2014	0.85	1.46	-0.61
Total	**11.68**	**9.51**	**2.17**

Source: National Oceanic and Atmospheric Administration 2014

Although there is no available precipitation data for the exact project area, it is likely analogous to the precipitation data for Williston and Minot for that same timeframe.

3.3 WETLANDS

SWCA recorded 156 PEM wetlands within the survey area, totaling approximately 94.79 acres. In total, approximately 13.41 acres of PEM wetland within the 100-foot-wide construction ROW (Table 3) would be potentially disturbed. Of these, seventeen (17) potentially jurisdictional wetlands totaling 2.62 acres which would be temporarily disturbed. However, the USACE has the final authority to determine jurisdictional status. SWCA has determined preliminarily that the proposed pipeline would be in compliance with the terms and conditions of Nationwide Permit 12. The Corps of Engineers would make the final determination of compliance. Further, a pre-construction notification (PCN) is required due to the project design crossing of Lake Sakakawea.

SWCA-identified NWI wetlands within USFWS wetland easements will be avoided by horizontal boring techniques and protected with proper BMP installation. Wetlands will be fenced 10-feet from the determined boundary of all wetland basins within wetland easement parcels. Easement wetlands will be fenced either with lath and fluorescent ribbon or t-posts and ½-inch polyester rope. T-posts and rope will be used in areas with active cattle grazing.

Table 3. PEM Wetland Acreage within the Survey Area.

Feature ID	Type	USACE Jurisdiction*	Wetland Area within 100-foot-wide ROW (acres)	Total Recorded Size (acres)	Length of Required Crossing (feet)
WET1	Seasonal	Isolated	0.00	0	0
WET2	Seasonal	Likely jurisdictional	0.03	33	31
WET3	Seasonal	Likely jurisdictional	0.00	0	0
WET4	Seasonal	Isolated	0.02	78	106
WET5	Seasonal	Likely jurisdictional	0.14	48	34
WET6	Permanent	Isolated	0.07	43	107
WET7	Seasonal	Isolated	0.00	0	0
WET8	Semipermanent	Likely jurisdictional	0.00	0	18
WET9	Semipermanent	Likely jurisdictional	0.00	0	190
WET10	Seasonal	Isolated	0.00	0	66
WET11	Semipermanent	Isolated	0.09	64	303

Feature ID	Type	USACE Jurisdiction*	Wetland Area within 100-foot-wide ROW (acres)	Total Recorded Size (acres)	Length of Required Crossing (feet)
WET12	Permanent	Likely jurisdictional	0.05	70	131
WET13	Semipermanent	Likely jurisdictional	0.06	0	101
WET14	Semipermanent	Likely jurisdictional	0.12	63	0
WET15	Semipermanent	Likely jurisdictional	0.00	0	0
WET16	Semipermanent	Likely jurisdictional	0.00	0	0
WET17	Semipermanent	Isolated	0.00	0	86
WET18	Seasonal	Likely jurisdictional	0.18	77	108
WET19	Seasonal	Isolated	0.03	104	144
WET20	Semipermanent	Isolated	0.00	0	0
WET21	Permanent	Isolated	0.18	154	426
WET22	Permanent	Isolated	1.06	511	486
WET23	Seasonal	Likely jurisdictional	0.10	77	71
WET24	Semipermanent	Isolated	0.09	191	92
WET25	Semipermanent	Isolated	0.13	85	85
WET26	Semipermanent	Isolated	0.82	567	815**
WET27	Semipermanent	Likely jurisdictional	0.06	75	55
WET28	Semipermanent	Likely jurisdictional	0.24	208	253
WET29	Semipermanent	Isolated	0.06	34	33
WET30	Seasonal	Likely jurisdictional	0.09	43	85
WET31	Semipermanent	Likely jurisdictional	0.00	0	19
WET32	Permanent	Likely jurisdictional	0.07	50	45
WET33	Permanent	Likely jurisdictional	0.08	53	32
WET34	Permanent	Likely jurisdictional	0.70	475	454
WET35	Permanent	Likely jurisdictional	0.47	208	177
WET36	Semipermanent	Likely jurisdictional	0.06	36	49
WET37	Seasonal	Isolated	0.00	0	0
WET38	Seasonal	Isolated	0.11	107	125
WET39	Semipermanent	Isolated	0.06	48	18
WET40	Semipermanent	Likely Jurisdictional	0.10	66	53
WET41	Seasonal	Isolated	0.00	0	0
WET42	Semipermanent	Isolated	0.56	237	16
WET43	Seasonal	Isolated	0.001	2	106
WET44	Permanent	Isolated	0.00	0	0
WET45	Seasonal	Isolated	0.00	0	0
WET46	Semipermanent	Isolated	0.00	0	401
WET47	Permanent	Isolated	0.00	0	288
WET48	Semipermanent	Isolated	0.00	0	56
WET49	Permanent	Isolated	0.00	0	56

Feature ID	Type	USACE Jurisdiction*	Wetland Area within 100-foot-wide ROW (acres)	Total Recorded Size (acres)	Length of Required Crossing (feet)
WET50	Semipermanent	Isolated	0.00	0	340
WET51	Semipermanent	Isolated	0.57	293	10
WET52	Semipermanent	Isolated	0.00	0	0
WET53	Semipermanent	Isolated	0.00	0	86
WET54	Semipermanent	Likely jurisdictional	0.07	84	186
WET55	Permanent	Isolated	0.12	169	129
WET56	Semipermanent	Isolated	0.16	122	42
WET57	Semipermanent	Isolated	0.00	0	0
WET58	Seasonal	Isolated	0.06	39	147
WET59	Semipermanent	Isolated	0.01	80	235
WET60	Semipermanent	Isolated	0.33	156	515
WET61	Permanent	Isolated	0.31	277	0
WET62	Permanent	Isolated	0.24	347	0
WET63	Semipermanent	Isolated	0.00	0	0
WET64	Semipermanent	Isolated	0.00	0	0
WET65	Permanent	Isolated	0.00	0	42
WET66	Semipermanent	Isolated	0.04	112	10
WET67	Permanent	Isolated	0.00	0	57
WET68	Seasonal	Isolated	0.00	0	0
WET69	Semipermanent	Isolated	0.00	0	182
WET70	Semipermanent	Isolated	0.00	0	95
WET71	Permanent	Isolated	0.00	0	225
WET72	Semipermanent	Isolated	0.00	0	92
WET73	Seasonal	Isolated	0.00	0	83
WET74	Permanent	Isolated	0.00	0	0
WET75	Permanent	Isolated	0.34	214	0
WET76	Semipermanent	Isolated	0.16	93	0
WET77	Permanent	Isolated	0.00	0	0
WET78	Semipermanent	Isolated	0.00	0	0
WET79	Permanent	Isolated	0.01	32	0
WET80	Permanent	Isolated	0.00	0	69
WET81	Semipermanent	Isolated	0.00	0	0
WET82	Seasonal	Isolated	0.01	54	0
WET83	Seasonal	Isolated	0.00	0	8
WET84	Semipermanent	Isolated	0.00	0	0
WET85	Semipermanent	Isolated	0.00	0	0
WET86	Semipermanent	Isolated	0.00	0	0
WET87	Semipermanent	Isolated	0.00	0	99

Feature ID	Type	USACE Jurisdiction*	Wetland Area within 100-foot-wide ROW (acres)	Total Recorded Size (acres)	Length of Required Crossing (feet)
WET88	Semipermanent	Isolated	0.00	0	0
WET89	Permanent	Isolated	0.29	173	378
WET90	Permanent	Isolated	0.22	124	0
WET91	Permanent	Isolated	0.00	0	265
WET92	Permanent	Isolated	0.19	200	217
WET93	Permanent	Isolated	0.22	280	75
WET94	Permanent	Isolated	0.00	0	192
WET95	Permanent	Isolated	0.38	187	0
WET96	Seasonal	Isolated	0.00	0	50
WET97	Seasonal	Isolated	0.04	62	532**
WET98	Permanent	Isolated	0.76	415	0
WET99	Permanent	Isolated	0.00	0	0
WET100	Semipermanent	Isolated	0.00	0	33
WET101	Semipermanent	Isolated	0.00	0	35
WET102	Semipermanent	Isolated	0.01	24	0
WET103	Permanent	Isolated	0.00	0	487
WET104	Permanent	Isolated	0.00	0	142
WET105	Seasonal	Isolated	0.00	0	0
WET106	Semipermanent	Isolated	0.00	0	0
WET107	Permanent	Isolated	0.00	0	0
WET108	Semipermanent	Isolated	0.00	0	0
WET109	Semipermanent	Isolated	0.00	0	0
WET110	Semipermanent	Isolated	0.00	0	0
WET111	Semipermanent	Isolated	0.00	0	34
WET112	Seasonal	Isolated	0.03	29	0
WET113	Semipermanent	Isolated	0.004	65	0
WET114	Seasonal	Isolated	0.00	0	69
WET115	Seasonal	Isolated	0.001	9	0
WET116	Seasonal	Isolated	0.01	61	0
WET117	Semipermanent	Isolated	0.01	35	0
WET118	Seasonal	Isolated	0.02	64	49
WET119	Seasonal	Isolated	0.04	60	244
WET120	Semipermanent	Isolated	0.20	235	25
WET121	Seasonal	Isolated	0.01	16	0
WET122	Seasonal	Isolated	0.00	0	61
WET123	Semipermanent	Isolated	0.12	56	171
WET124	Permanent	Isolated	0.04	40	528**
WET125	Semipermanent	Isolated	0.00	0	0

Feature ID	Type	USACE Jurisdiction*	Wetland Area within 100-foot-wide ROW (acres)	Total Recorded Size (acres)	Length of Required Crossing (feet)
WET126	Semipermanent	Isolated	0.59	508	96
WET127	Seasonal	Isolated	0.00	0	30
WET128	Seasonal	Isolated	0.12	82	134
WET129	Seasonal	Isolated	0.08	70	84
WET130	Seasonal	Isolated	0.07	132	270
WET131	Semipermanent	Isolated	0.01	81	484
WET132	Seasonal	Isolated	0.21	150	667**
WET133	Semipermanent	Isolated	0.00	0	128
WET134	Seasonal	Isolated	0.00	0	139
WET135	Seasonal	Isolated	0.00	0	85
WET136	Seasonal	Isolated	0.00	0	0
WET137	Semipermanent	Isolated	0.00	0	465
WET138	Seasonal	Isolated	0.00	0	42
WET139	Seasonal	Isolated	0.11	140	56
WET140	Seasonal	Isolated	0.00	0	0
WET141	Seasonal	Isolated	0.00	0	71
WET142	Semipermanent	Isolated	1.03	457	350
WET143	Seasonal	Isolated	0.00	0	309
WET144	Seasonal	Isolated	0.00	0	92
WET145	Seasonal	Isolated	0.00	0	162
WET146	Semipermanent	Isolated	0.00	0	495
WET147	Seasonal	Isolated	0.00	0	189
WET148	Seasonal	Isolated	0.01	53	64
WET149	Semipermanent	Isolated	0.00	0	676**
WET150	Semipermanent	Isolated	0.00	0	126
WET151	Semipermanent	Isolated	0.00	0	162
WET152	Semipermanent	Isolated	0.00	0	0
WET153	Seasonal	Isolated	0.00	0	0
WET154	Permanent	Isolated	0.00	0	0
WET155	Seasonal	Isolated	0.20	134	134
WET156	Semipermanent	Isolated	0.10	108	108
Total			**13.41**	**94.79**	**10,162**

*The USACE has the final authority on the jurisdictional status of a waterbody.

** SWCA recommends boring any wetland over 500 feet, unless the USACE makes a jurisdictional determination.

PEM = palustrine emergent;
ROW = right-of-way;
USACE = U.S. Army Corps of Engineers

3.4 WATERBODIES

SWCA identified 26 waterbodies, including 23 streams, one upland swale and two ponds within the survey area. Crossings without impacts within the 100-foot ROW are either ephemeral streams which would be crossed by 24-hour open cut or are being bored by project design.

Table 4. Waterbodies and Streams within the Survey Area

Feature ID	Description	USACE Jurisdiction**	Area within 100-foot-wide ROW (acres)	Total Size within Survey area(acres)	Length of Required Crossing (feet)
STR1	Intermittent	Likely Jurisdictional	0.01	0.05	8
STR2	Ephemeral	Isolated	0.00	0.00	0
STR3	Intermittent	Likely Jurisdictional	0.01	0.04	5
STR4	Perennial	Likely Jurisdictional	0.02	0.06	16
STR5	Ephemeral	Isolated	0.00	0.00	0
STR6	Ephemeral	Isolated	0.00	0.00	0
STR7	Ephemeral	Isolated	0.00	0.00	0
STR8	Intermittent	Isolated	0.00	0.07	0
STR9	Ephemeral	Isolated	0.00	0.00	0
STR10	Ephemeral	Isolated	0.00	0.00	0
STR11	Ephemeral	Isolated	0.01	0.02	6
STR12	Intermittent	Likely Jurisdictional	0.03	0.06	14
STR13	Ephemeral	Likely Jurisdictional	0.00	0.00	0
STR14	Ephemeral	Isolated	0.01	0.02	7
STR15	Ephemeral	Likely Jurisdictional	0.00	0.00	0
STR16	Ephemeral	Isolated	0.00	0.00	0
STR17	Ephemeral	Likely Jurisdictional	0.00	0.00	0
STR18	Intermittent	Isolated	0.02	0.05	36
STR19	Ephemeral	Likely Jurisdictional	0.00	0.00	0
STR20	Ephemeral	Isolated	0.00	0.00	0
STR21	Intermittent	Isolated	0.02	0.03	8
STR22	Ephemeral	Isolated	0.00	0.00	0
STR23	Ephemeral	Isolated	0.00	0.00	0
UPS1	Upland Swale	Isolated	0.00	0.00	0
WB1	Stock Pond	Isolated	0.00	0.09	0
WB2	Intermittent	Isolated	0.00	0.14	0
Total			**0.13**	**0.63**	**100**

* The USACE has the final authority on the jurisdictional status of a waterbody.
ROW = right-of-way
USACE = U.S. Army Corps of Engineers

3.5 SOILS

Based on Natural Resources Conservation Service (NRCS) mapping (NRCS 2014), 86 soil types are present in the project construction corridor. The project area analyzed for soils covers the 100-foot-wide construction corridor. Table 5 lists all soil units within the project area. The following soil component descriptions represent the most prevalent soil series found within the survey area (NRCS 2014).

Table 5. NRCS Derived Soil Series Present within the ROW

Soil Types	Map Unit Symbol	Slopes (%)	Acres within 100-foot-wide ROW	Percent within Map Unit
McKenzie County Soils (100-foot Construction ROW)				
Dogtooth-Janesburg-Cabba complex	E0701F	6 to 35	26.99	11.25
Belfield-Grail clay loams	E0605A	0 to 2	17.25	7.19
Williams-Bowbells loams	E3527B	3 to 6	16.45	6.86
Williams-Zahl loams	E3541C	6 to 9	11.08	4.62
Cabba-Badland-Arikara complex	E3103F	9 to 70	10.53	4.39
Moreau-Barkof silty clays	E1009B	3 to 6	10.06	4.19
Cabba-Chama-Shambo loams	E2617F	9 to 50	8.38	3.49
Zahl-Williams-Cabba complex	E3639C	6 to 9	8.35	3.48
Dogtooth-Janesburg silt loams	E0559B	0 to 6	8.30	3.46
Farnuf loam	E2120B	2 to 6	8.29	3.46
Zahl-Cabba-Williams complex	E3641D	9 to 15	7.06	2.94
Williams loam	E3531C	6 to 9	6.74	2.81
Niobell-Williams loams	E3513B	3 to 6	6.74	2.81
Amor-Cabba loams	E2601D	9 to 15	6.02	2.51
Zahl-Williams-Arikara loams	E3569F	9 to 45	5.78	2.41
Zahl-Cabba-Maschetah complex	E3609F	6 to 70	5.65	2.35
Noonan-Niobell-Williams loams	E3517B	3 to 6	5.48	2.29
Cabba-Chama-Sen silt loams	E2741D	9 to 15	5.14	2.14
Chama-Cabba-Sen silt loams	E2737C	6 to 9	4.53	1.89
Zahl-Williams loams	E3555D	9 to 15	4.34	1.81
Williams-Zahl loams	E3541B	3 to 6	3.86	1.61
Belfield-Savage-Daglum complex	E0617B	2 to 6	3.78	1.57
Rhoades-Daglum complex	E0515B	0 to 6	3.68	1.53
Arikara-Shambo-Cabba loams	E2725F	9 to 70	3.60	1.50

Soil Types	Map Unit Symbol	Slopes (%)	Acres within 100-foot-wide ROW	Percent within Map Unit
Sen-Janesburg silt loams	E2439C	6 to 9	2.96	1.23
Savage-Grail silty clay loams	E0835A	0 to 2	2.63	1.10
Water	E4999	0	2.40	1.00
Farnuf loam	E2120A	0 to 2	2.03	0.84
Daglum-Belfield complex	E0447B	0 to 6	1.99	0.83
Lawther silty clay	E0821A	0 to 2	1.91	0.80
Amor-Cabba loams	E2601C	6 to 9	1.84	0.77
Regent-Janesburg complex	E0651C	6 to 9	1.78	0.74
Cabba-Badland complex	E3107F	6 to 70	1.78	0.74
Amor-Shambo loams	E2803B	3 to 6	1.65	0.69
Lehr-Bowdle loams	E4542B	2 to 6	1.63	0.68
Moreau-Wayden silty clays	E0913C	6 to 9	1.52	0.64
Zahl-Max loams	E3559E	15 to 25	1.48	0.62
Moreau-Cabba complex	E0907D	9 to 15	1.42	0.59
Zahl-Cabba-Arikara complex	E3607F	9 to 70	1.37	0.57
Korchea-Fluvaquents complex, channeled, frequently flooded	E4139A	0 to 2	1.33	0.55
Savage silty clay loam	E0837B	2 to 6	1.30	0.54
Brandenburg-Cabba-Dogtooth complex	E3013F	15 to 70	1.25	0.52
Regent-Cabba complex	E0921C	6 to 9	1.25	0.52
Brandenburg-Searing-Dogtooth complex	E3013D	6 to 15	1.19	0.50
Savage silty clay loam	E0837C	6 to 9	1.11	0.46
Beisigl-Flasher-Telfer loamy fine sands	E1403D	6 to 15	0.98	0.41
Zahl-Max loams, dissected	E3567F	15 to 45	0.92	0.38
Noonan-Williams-Niobell loams	E3521C	6 to 9	0.86	0.36
Flasher-Vebar-Parshall complex	E1423F	9 to 35	0.83	0.35
Harriet loam, occasionally flooded	E4005A	0 to 2	0.81	0.34
Vebar-Flasher-Tally complex	E1355D	9 to 15	0.66	0.28
Flasher-Rock outcrop-Vebar complex	E1475F	9 to 70	0.50	0.21
Vebar-Cohagen fine sandy loams	E1333B	3 to 6	0.37	0.16
Total McKenzie County			**239.84**	**100.00**
Mountrail County Soils (100-foot Construction ROW)				
Williams-Zahl loams	C132B	3 to 6	175.30	26.56
Zahl-Williams loams	C135D	9 to 15	120.35	18.20
Williams-Zahl-Zahill complex	C132C	6 to 9	100.87	15.25

Soil Types	Map Unit Symbol	Slopes (%)	Acres within 100-foot-wide ROW	Percent within Map Unit
Zahl-Williams-Bowbells loams	C154C	3 to 9	58.16	8.80
Lehr loam	C816B	2 to 6	34.36	5.20
Zahl-Max-Parnell complex	C165F	0 to 35	23.20	3.51
Wabek-Appam complex	C874C	6 to 9	22.02	3.33
Wabek-Lehr-Appam complex	C870E	9 to 25	21.97	3.32
Bowdle loam	C810A	0 to 2	17.16	2.59
Shambo loam	C480B	2 to 6	12.22	1.85
Parnell silty clay loam	C3A	0 to 1	7.61	1.15
Williams-Bowbells loams	C210A	0 to 3	7.15	1.08
Bowbells loam	C201A	0 to 3	6.55	0.99
Zahl-Max-Arnegard loams	C155F	15 to 60	6.24	0.94
Divide loam	C825A	0 to 2	5.26	0.80
Dogtooth-Janesburg-Werner loams	C593E	3 to 25	5.10	0.77
Appam sandy loam	C800B	2 to 6	4.52	0.68
Water	EW	0	3.48	0.53
Tansem loam	C415A	0 to 2	3.27	0.49
Vebar-Flasher-Zahl complex	C959E	6 to 25	3.20	0.48
Bowbells-Tonka complex	C205A	0 to 3	2.93	0.44
Hamerly-Tonka complex	C272A	0 to 3	2.62	0.40
Harriet loam	C584A	0 to 2	2.28	0.34
Badland-Cabba complex	E3101F	9 to 70	2.08	0.31
Rhoades-Savage complex	C592B	0 to 6	1.77	0.27
Makoti silty clay loam	C411A	0 to 2	1.62	0.25
Sakakawea silty clay loam	C409B	2 to 6	1.50	0.23
Tonka silt loam	C2A	0 to 1	1.23	0.19
Parshall fine sandy loam,	C751B	2 to 6	1.14	0.17
Savage silty clay loam	C477A	0 to 2	0.92	0.14
Straw-Fluvaquents channeled, complex, frequently flooded	C491A	0 to 2	0.86	0.13
Vallers loam, saline	C75A	0 to 1	0.77	0.12
Hamerly loam	C270A	0 to 3	0.75	0.11
Orthents-Aquents-Urban land, highway complex	C999F	0 to 35	0.64	0.10
Nutley west, silty clay	C424A	0 to 2	0.55	0.08
Shambo loam	E2145B	2 to 6	0.50	0.08
Cherry-Cabba silt loams	E3161F	9 to 45	0.42	0.06
Water	C996	0	0.16	0.02
Krem-Lihen loamy fine sands	C370B	0 to 6	0.11	0.02
Noonan-Niobell-Williams loams	C665B	0 to 6	0.08	0.01
Southam silty clay loam	C5A	0 to 1	0.01	0.00

Soil Types	Map Unit Symbol	Slopes (%)	Acres within 100-foot-wide ROW	Percent within Map Unit
Total			**660.96**	**100.00**
Total Both Counties			**900.80**	

Source: NRCS 2014.
ROW = right-of-way

3.5.1 Williams

The Williams series consists of very deep, slowly permeable, well-drained soils found on glacial till plains and moraines with slopes at approximately 0% to 35%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation. Native vegetation species common to this soil type include western wheatgrass, needle and thread (*Hesperostipa comata*), blue grama, and green needlegrass (*Nasella viridula*) (NRCS 2014).

3.5.2 Zahl

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1% to 60%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem, and needle and thread (NRCS 2014).

3.5.3 Dogtooth

The Dogtooth series consists of moderately deep, well-drained, very slowly permeable soils found in uplands where the predominant slope is between 0% and 25%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. The most common vegetation species found on this soil type are range and pasture grasses including western wheatgrass and blue grama (NRCS 2014).

3.5.4 Janesburg

The Janesburg series consists of moderately deep, well-drained soils formed in residuum weathered from alkaline, soft shale, siltstone, and mudstone. These soils have slow or very slow permeability and are on upland plains with slopes of 0% to 25%. The mean annual precipitation found throughout the spatial extent of this soil type is about 15 inches and the mean annual air temperature is about 42°F. Most of these soils are used for range, pasture, and small grains. Native vegetation is western wheatgrass, blue grama, green needlegrass, sedges (*Carex* sp.), and forbs (NRCS 2014).

3.5.5 Cabba

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2% and 70%. The mean annual precipitation found throughout the spatial extent of this soil type is

approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem, green needlegrass, and other various herbs, forbs, and shrub species (NRCS 2014).

3.5.6 Belfield

The Belfield series consists of deep and very deep, well- to moderately well-drained, very slowly permeable soils found on upland flats, terraces, and swales with slopes ranging from approximately 0% to 9%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 43°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, blue grama, and green needlegrass (NRCS 2014).

3.5.7 Grail

The Grail series consists of deep to very deep, slowly permeable soils which are well- to moderately well-drained. This soil type is found on uplands with slopes ranging from 0% to 15%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivating crops. Native vegetation species common to this soil type include western wheatgrass, big bluestem (*Andropogon gerardii*), and green needlegrass (NRCS 2014).

3.5.8 Bowbells

The Bowbells series consists of very deep, well- and moderately well-drained soils found on glacial till plains and moraines. Permeability is moderate in the upper portions and moderately slow to slow in the substratum. Slopes range from approximately 0% to 9%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 42°F. This soil type is used for cultivation of small grains. Native vegetation species historically common to this soil type include western wheatgrass, green needlegrass, and big bluestem (NRCS 2014).

3.6 TREE, SAPLING, AND SHRUB COUNT

During SWCA's field survey, 71 tree and shrubland areas were geographically referenced within the survey area. Table 6 summarizes the number of trees SWCA counted that may be impacted by the project as currently proposed. The NDPSC requires a 2:1 post- to pre-construction mitigation for all trees, saplings, and shrubs impacted during the construction of the proposed pipeline. Therefore, SWCA estimates approximately 3,610 2-year-old sapling individuals would need to be replanted in order to fulfill the 2:1 mitigation requirement.

SWCA recommends that only native species of trees and shrubs be used, and that they be planted in habitats where they are typically found on the landscape. Trees and shrubs should not be planted in native prairie. Invasive species such as Siberian elm and Russian olive should be replaced with native species.

Table 6. Tree, Sapling, and Shrub Count

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Corridor	100-foot-wide Construction ROW	
WV1	Russian Olive	Natural	6	0	0
	Buffalo Berry		6	0	0
WV2	Chokecherry	Natural	3	0	0
	Hawthorn		4	0	0
	Boxelder		3	0	0
	Cottonwood		8	0	0
WV3	Boxelder	Natural	4	0	0
WV4	Green Ash	Natural	4	5	4
	Prunus Americana		300	157	314
WV5	Boxelder	Natural	4	0	0
	Green Ash		1	0	0
	Siberian Elm		1	0	0
	Buffalo Berry		2	0	0
WV6	Boxelder	Natural	172	107	214
	Green Ash		16	10	20
	Siberian Elm		22	14	27
	Buffalo Berry		74	46	92
WV7	Green Ash	Natural	100	0	0
WV8	Green Ash	Natural	60	0	0
	Silver Berry		30	0	0
	Silver Buffaloberry		10	0	0
WV9	Green Ash	Natural	105	67	133
	Silver Buffaloberry		45	29	57
WV10	Green Ash	Natural	5	0	0
WV11	Green Ash	Natural	3	0	0
	Silver Buffaloberry		2	0	0
WV12	Green Ash	Natural	50	0	0

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Corridor	100-foot-wide Construction ROW	
WV13	Green Ash Silver Buffaloberry	Natural	150 100	38 26	77 51
WV14	Green Ash Silver Buffaloberry	Natural	36 24	0 0	0 0
WV15	Green Ash	Natural	60	7	14
WV16	Green Ash	Natural	11	0	0
WV17	Green Ash Burr Oak	Natural	140 60	43 19	87 37
WV18	Green Ash Silver Buffaloberry	Natural	7 140	4 83	8 166
WV19	Green Ash Burr Oak	Natural	180 120	67 45	135 90
WV20	Green Ash Silver Buffaloberry	Natural	2 23	1 7	1 13
WV21	Green Ash Burr Oak Silver Buffaloberry White Poplar	Natural	173 403 50 38	51 121 15 11	104 242 30 23
WV22	Aspen Siberian Elm Burr Oak	Natural	50 45 175	0 0 0	0 0 0
WV23	Silver Buffaloberry Hawthorn American Elm	Natural	34 17 6	8 4 1	16 8 2
WV24	Green Ash Silver Buffaloberry	Natural	3 43	0 0	0 0
WV25	Green Ash Burr Oak	Natural	63 142	61 137	122 274

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Corridor	100-foot-wide Construction ROW	
WV26	Green Ash Burr Oak	Natural	64 141	0 0	0 0
WV27	Green Ash Burr Oak	Natural	113 212	0 0	0 0
WV28	Green Ash Silver Buffaloberry	Natural	7 17	3 13	6 25
WV29	Green Ash	Natural	15	7	14
WV30	Green Ash Silver Buffaloberry	Natural	6 100	0 2	0 3
WV31	Green Ash Silver Buffaloberry	Natural	17 100	0 0	0 0
WV32	Carraganna	Planted	300	73	146
WV33	Willow	Natural	100	0	0
WV34	Green Ash Burr Oak	Natural	47 21	0 0	0 0
WV35	Green Ash Burr Oak	Natural	33 62	20 37	39 74
WV36	Green Ash Chokecherry Downy Hawthorn	Planted	20 4 6	0 0 0	0 0 0
WV37	Green Ash American Elm Chokecherry Downy Hawthorn	Planted	3 12 9 6	0 0 0 0	0 0 0 0
WV38	Green Ash American Elm Chokecherry Downy Hawthorn	Planted	21 13 10 8	3 2 1 1	6 4 3 2

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Corridor	100-foot-wide Construction ROW	
WV39	Green Ash Burr Oak Chokecherry	Natural	48 95 95	37 73 73	74 147 147
WV40	American Elm Blue Spruce	Planted	5 16	2 8	5 16
WV41	American Elm Blue Spruce	Planted	15 12	8 6	15 12
WV42	Siberian Elm	Natural	1	0	0
WV43	Siberian Elm	Natural	1	0	0
WV44	Blue Spruce Siberian Elm	Planted	10 6	5 3	10 6
WV45	Siberian Elm	Natural	2	0	0
WV46	Siberian Elm Blue Spruce	Planted	3 5	2 4	5 8
WV47	Cottonwood	Natural	14	0	0
WV48	Cottonwood Blue Spruce S. Elm	Planted	6 5 20	0 0 0	0 0 0
WV49	Siberian Elm	Natural	16	0	0
WV50	Siberian Elm	Natural	50	0	0
WV51	Siberian Elm	Natural	1	0	0
WV52	Siberian Elm	Natural	4	0	0
WV53	Peach-leaf Willow	Natural	30	8	16
WV54	Cottonwood	Natural	2	2	4
WV55	Peach-leaf Willow	Natural	3	0	0
WV56	Siberian Elm	Natural	15	5	11

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Corridor	100-foot-wide Construction ROW	
WV57	Elm Ash	Natural	24 4	6 1	13 2
WV58	Siberian Elm	Natural	4	4	8
WV59	Cottonwood Green Ash Peach-leaf Willow	Natural	14 3 1	9 2 1	17 4 1
WV60	Plum	Natural	6	2	4
WV61	Plum	Natural	12	0	0
WV62	Green Ash Carraganna	Planted	6 6	2 2	4 4
WV63	Green Ash	Natural	1	0	0
WV64	Siberian Elm Green Ash Carraganna	Planted	4 2 12	2 1 6	4 2 12
WV65	Chokecherry	Natural	760	129	258
WV66	Peach-leaf Willow	Natural	1	0	0
WV67	Chokecherry	Natural	21	21	42
WV68	Downy Hawthorn	Planted	50	45	90
WV69	Cottonwood	Natural	1	0	0
VW70	Siberian Elm	Natural	10	0	0
WV71	Cottonwood	Natural	5	0	0
Total			**6,232**	**1,805**	**3,610**

ROW = right-of-way

3.7 NOXIOUS WEEDS

North Dakota Century Code Chapter 63-01.1 and the North Dakota Department of Agriculture recognize 11 species as noxious weeds. The species include absinth wormwood (*Artemisia absinthium*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), purple loosestrife (*Lythrum salicaria*), Russian knapweed (*Acroptilon repens*), spotted knapweed (*Centaurea stoebe*), yellow toadflax (*Linaria vulgaris*), dalmatian toadflax (*Linaria dalmatica*), and salt cedar (*Tamarix ramosissima*). SWCA identified four areas of Canada thistle within the survey corridor (Table 7).

Table 7. Canada thistle Occurrence within the Survey Corridor

Noxious Weed Area ID	Total Area (acres)	Total Impacted Acreage
NX1	0.98	0.42
NX2	0.10	0.10
NX3	0.04	0.04
NX4	18.42	6.16
Total	**19.54**	**6.72**

3.8 WILDLIFE

SWCA submitted supplementary information to the USFWS on May 28, 2015 after receiving the final changes to the project design and alignment. Additions to the construction plans include locations of temporary access roads around U.S. Fish and Wildlife Service (USFWS) wetland easements; temporary work spaces; pull-back work spaces to facilitate bore locations under roads and wetlands; and a 300-foot shift in the east bore entrance for the proposed bore under Lake Sakakawea.

Several wildlife species that may exist in Mountrail and McKenzie Counties are listed as threatened or endangered under the Endangered Species Act (ESA) (16 United States Code 1531 et seq.). According to the USFWS, listed species in McKenzie County, North Dakota, include the black-footed ferret (*Mustela nigripes*), gray wolf (*Canis lupus*), whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*). Threatened species include the piping plover (*Charadrius melodus*) along with its designated critical habitat, Dakota skipper (*Hesperia dacotae*), northern long-eared bat (*Myotis septentrionalis)* and rufa red knot (*Calidris canutus rufa*). In addition, Sprague's pipit (*Anthus spragueii*) is a candidate species (USFWS 2015a). Mountrail County includes all of the above listed species except the black-footed ferret. SWCA conducted a cursory threatened and endangered species survey concurrently with the wetland determination. Ecologists did not observe any primary (i.e., actual sighting) or secondary (i.e., tracks, scat, fur) indication of the presence of threatened or endangered species.

The proposed project would have no effect on black-footed ferret, gray wolf, northern long-eared bat and rufa red knot. Interior least tern, whooping crane, and piping plover have the

potential to occur within the project area as migrants. As a result, these species may be, but are not likely to be adversely affected by the proposed project. Due to the lack of high-quality diverse native grasslands featuring the plant species necessary for the life requirements of larval and adult Dakota skippers. SWCA concludes the species is not likely to be present within the action area, and therefore, surveys for adults are not necessary. The USFWS has been requested to indicate their agreement with this conclusion. Once the USFWS's response is received, SWCA will complete an effect analysis and determination. Additionally, the proposed project occurs within the same watershed as, and passes underneath Lake Sakakawea and therefore may affect, but is not likely to adversely affect the pallid sturgeon or designated critical habitat for piping plover. The proposed project is not likely to contribute to the listing of the Sprague's pipit.

3.8.1 Black-footed Ferret

Federal Status: Endangered
Affects Determination: No effect
Black-footed ferrets (*Mustela nigripes*) are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys sp*.) ecosystem (Kotliar et al. 1999). They have been listed by the USFWS as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2013a). Ferrets inhabit extensive prairie dog complexes of the Great Plains, typically composed of several smaller colonies in proximity to one another that provide a sustainable prey base. The Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size are not found in the project area. In addition, there have been no reported sightings of ferrets on the FBIR (Mann-Klager 2011). Therefore, the proposed project would have no effect on this species.

3.8.2 Gray Wolf

Federal Status: Endangered
Affects Determination: No effect

The gray wolf (*Canis lupus*), listed as endangered in the United States in 1978 (USFWS 1978), was believed extirpated from North Dakota in the 1920s and 1930s with only sporadic reports from the 1930s to present (Licht and Huffman 1996). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings that have occurred within North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountains region in north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 28 kilometers (km) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2013b). Due to a lack of suitable

habitat and distance from Minnesota and Manitoba resident populations, as well as their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation, in particular road construction as a result of oil and gas development, may further act as a barrier against wolf recolonization in western North Dakota. Although there are no recent documented occurrences, wolves that are sighted on the FBIR are likely transients, dispersing from populations elsewhere (Mann-Klager 2011). Overall, while there are lower densities of people and roads in western North Dakota, which is favorable for gray wolves, the establishment of a pack within the action area is highly unlikely, given existing infrastructure development and the potential for detrimental human/wolf interactions. Although dispersing wolves could occur in the proposed project area, they would be expected to avoid the immediate project area due to human disturbance. Therefore, the proposed project will have **no effect** on the gray wolf.

3.8.3 Whooping Crane

Federal Status: Endangered
Affect Determination: May affect, is not likely to adversely affect

The whooping crane (*Grus Americana*) was listed as endangered in the United States in 1970 by the USFWS and in 1978 in Canada. Historically, population declines were caused by shooting and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species include habitat destruction, especially of suitable wetland habitats that support breeding and nesting, as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and USFWS 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2013c). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and USFWS 2007; USFWS 2013c). Mountrail County, including the project area, is within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and USFWS 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and USFWS 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 0.6 mile (1 km) of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and USFWS 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland and wetlands >0.04 hectare) was observed within the action area and project area. In addition, the project area is located within the migratory corridor for the whooping crane, with the nearest sighting being 1.3 miles from the northern portions of the pipeline system corridor north of Newtown

(USFWS, M. Tacha, unpublished data). The surface disturbance and changes to native vegetation due to the project are unlikely to adversely affect whooping cranes. Cranes could be deterred from using an otherwise suitable roosting wetland due to nearby human disturbance during the construction phase. However, construction crews will be instructed to cease work and notify USFWS and BIA if a whooping crane is sighted within 1 mile of the construction area. Therefore, the proposed project **may affect, but is not likely to adversely affect** the endangered whooping crane.

3.8.4 Piping Plover

Federal Status: Threatened
Affect Determination: May affect, is not likely to adversely affect

The piping plover (*Charadrius melodus*) is a small shorebird which breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened, and the Great Lakes population listed as endangered (USFWS 1985a).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2012). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2012). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2012).

Suitable shoreline habitat for breeding and nesting plovers does not occur within the project area and Lake Sakakawea is approximately 0.5 mile from the proposed project area disturbance corridor. However, designated critical habitat is located within the action area approximately 0.35 mile from the project area. Construction crews will be instructed to ensure no activity within 0.5-mile line-of-sight of the shoreline of Lake Sakakawea or the nearest designated critical habitat unit during the nesting period (April 1–August 31); and potential habitat was avoided during site selection/on-site process. If construction is to occur within 0.5 mile of critical habitat during the nesting period, a qualified biologist will be engaged to ensure that construction does not occur while piping plovers are present, unless a visual barrier caused by surrounding terrain provides an adequate screen. Therefore, the proposed project **may affect, but is not likely to adversely affect** piping plovers.

3.8.5 Designated Critical Habitat of Piping Plover

Affect Determination: May affect, is not likely to adversely affect

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat, including areas near the proposed project, along the shoreline of Lake Sakakawea in McKenzie and Mountrail Counties, North Dakota (USFWS 2002).

The proposed project will not modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams. No alkaline wetlands that have been designated as critical habitat for the piping plover occur in the project area. However, piping plover designated critical habitat occurs within the action area; an alkali lake is 0.35 mile northeast of the ROW near the Palermo State Game Management Area. Therefore, the proposed project **will not destroy or adversely modify** designated critical habitat of the piping plover.

3.8.6 Interior Least Tern

Federal Status: Endangered
Affect Determination: May affect, is not likely to adversely affect

The interior population of the least tern (*Sternula antillarum*) is listed as endangered by the USFWS (USFWS 1985b). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2013d).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota will often be found sharing sandbars with the piping plover, a threatened species (USFWS 2013d).

Census data indicate over 8,000 least terns in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS 1990a, 2013d). Approximately 100 pairs breed in North Dakota (USFWS 2013d). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2013d).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande river systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2013d). Current conservation strategies include

identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2013d).

Suitable shoreline habitat on Lake Sakakawea for breeding and nesting terns occurs in the project action area, and a portion of the project will be located beneath the bed of the lake. However, given the protective measures and best management practices (BMPs) referenced above, the potential for disturbance or adverse effects from construction, operation, and reclamation of the project is extremely small. Terns may visit wetlands and waterbodies off the lake that contain forage fish. However, any disturbance or alterations to wetlands will be temporary and minor. Therefore, the proposed project **may affect, but is not likely to adversely affect** endangered least terns.

3.8.7 Pallid Sturgeon

Federal Status: Endangered
Affect Determination: May affect, is not likely to adversely affect

The pallid sturgeon (*Scaphirhynchus albus*) was listed as endangered in 1990 in the United States by the USFWS (USFWS 1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas; destroyed spawning habitat; altered flow conditions which can delay spawning cues; and reduced food sources by lowering productivity (USFWS 2007). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels, dynamic flow patterns, flooding of terrestrial habitats, and extensive microhabitat diversity (USFWS 1990b).

Pallid sturgeon populations occur in the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007). Hatchery-reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to use the 15.5 miles (25 km) of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, the North Dakota Game and Fish Department has caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook areas. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, USFWS, to SWCA, September 3, 2010).

Potential pollution occurring as a result of construction activities, hydrostatic testing, and pipeline operations is a concern for downstream populations of endangered pallid sturgeon. Continuous monitoring of input and output volumes and pressures would detect leaks in the pipeline. However, given the protective measures and BMPs referenced above, the potential for disturbance or adverse effects from construction, operation, and reclamation of the project is extremely small. Activities associated with the proposed project are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the proposed project **may affect, but is not likely to adversely affect** pallid sturgeon.

3.8.8 Dakota Skipper

Federal Status: Threatened
Conclusion: Not likely to be present within the action area

The action area analyzed was defined as a 0.6-mile radius around the entire project, including the proposed pipeline and associated features, derived from the estimated maximum dispersal distance of adult Dakota skippers, including those portions that cross allotted lands under jurisdiction of the BIA, the portions that cross private land, and the portion under Lake Sakakawea that is regulated by the USACE.

Two habitat types have been described for Dakota skipper in North Dakota. 'Type A' habitat is low, wet-mesic prairie with little topographic relief occurring in near-shore glacial lake deposits (Royer and Marrone 1992). Three plant species dominate 'Type A' habitat and include wood lily (*Lilium philadelphicum*), bluebell bellflower (*Campanula rotundifolia*), and mountain deathcamas (*Zigadenus elegans*) (McCabe 1981). 'Type B' habitat of the Dakota skipper occurs on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and needlegrasses (*Stipa* spp.), and may include bluebell bellflower and wood lily (USFWS 2014). Additionally, 'Type B' habitat supports extensive stands of purple coneflower (*Echinacea angustifolia*), upright prairie coneflower (*Ratibida columnifera*), and common gaillardia (*Gaillardia artistata*) (USFWS 2014).

In the rolling terrain of river valleys and the Missouri Coteau of North Dakota, on the western edge of the species' known range, Dakota skippers inhabit a variant of Type B habitats. These habitats typically contain an association of little bluestem, big bluestem, and needlegrasses that is often invaded by Kentucky bluegrass (*Poa pratensis*) (Royer and Marrone 1992:22). These prairies also typically contain wood lily, bluebell bellflower, coneflowers, and other asters as nectar sources; in some areas, mountain deathcamas also occurs (Royer and Marrone 1992:22).

Within western North Dakota, the species inhabits dry-mesic habitats characterized by little bluestem, needlegrasses, and Kentucky bluegrass (Cochrane and Delphey 2002). Dry mesic habitats are marginally dry climate for Dakota skipper (Cochrane and Delphey 2002; Environment Canada 2007). In dry-mesic habitats, Dakota skipper use microhabitats on rolling upland sites, such as north slopes of river valleys, that mimic mesic areas found in the eastern tallgrass prairies (Cochrane and Delphey 2002; Environment Canada 2007). Dakota skipper populations in dry-mesic habitats are typically less dense than those in wet-mesic habitats (Environment Canada 2007).

Habitat requirements for larvae survival include specific food and edaphic features as soil moisture, soil compaction, and soil bulk density, as well as related non-biotic factors such as temperature and relative humidity at and near (within 2.0 centimeters of) the soil surface (Royer et al. 2008). Vegetation required for larval food sources and shelter in dry-mesic mixed grass includes prairie dropseed (*Sporobolus heterolepis*) or little bluestem (USFWS 2014). Exotic cool season grasses (e.g., smooth brome [*Bromus inermis*] and Kentucky bluegrass) may reduce food availability for and survival of skipper larvae (USFWS 2011a).

Larval Dakota skipper habitat within dry-mesic habitat is associated with more gravelly glacial landscapes of relatively higher relief, more variable soil moisture, and somewhat higher soil temperatures (Royer et al. 2008). Soils in these habitats are classified predominantly as sandy loams, and occasionally as loamy sands (Royer et al. 2008). Royer et al. (2008) found that mean season-long larval nest zone temperatures range from 17.8 to 20.5 degrees Centigrade. Relative humidity in the larval nest zone was recorded as ranging from 72.5% to 78.4% (lowest recorded season-long mean) and 84.2% to 85.1% (highest recorded season-long mean) (Royer et al. 2008). Soil compaction and vegetation removal substantially alter soil water movement and evaporation, thereby altering near-surface humidity (Royer et al. 2008). Livestock grazing has been shown to increase bulk density and soil compaction,

which are correlated with decreased soil water content and hydraulic conductivity (Royer et al. 2008). Dakota skippers will tolerate little to no grazing in mixed-grass prairie (Conchrane and Delphay 2002; McCabe 1981).

The U.S. Forest Service (USFS) developed a GIS tool to focus on habitat available for larval Dakota skipper, Ottoe skipper (*Hesperia ottoe*), and tawny crescent (*Phyciodes batesii*) in drought conditions (personal communication, telephone call from Laura Burckhardt, SWCA, to Gary Foli, USFS, September 9, 2014). The GIS tool has been used to focus adult Dakota Skipper surveys on areas with potential larval habitat. Dr. Royer with Minot State University uses the habitat modeled as Good and Best habitat to identify survey areas and then searches for adult Dakota skipper in available feeding habitats within 0.25 mile of the suggested larval habitat (personal communication, telephone call from Laura Burckhardt, SWCA, to Gary Foli, USFS, September 9, 2014). Although the GIS tool has not been scientifically tested, it is estimated to be 70% accurate in representing available larval habitats (personal communication, telephone call from Laura Burckhardt, SWCA, to Gary Foli, USFS, September 8 and 9, 2014). The Good and Best habitat attributes used in the model include the following.

- Higher slope ranges (10% to 35%) represent areas where cattle are less likely to graze and the vegetative community and height of vegetation is suitable habitat for larval survival.
- Aspects ranging from 315 to 90 degrees (northwest-west to east) represent areas with the highest likelihood of moist soil conditions necessary for larval survival (Royer et al. 2008).
- Distance from existing range livestock water developments (greater than 264 feet) and naturally occurring wetlands and waterbodies (greater than 660 feet) also represents areas that are less likely to have grazing pressure and have the little bluestem and other tall grass-dominated plant communities intact. The closer an area is to a water source used by livestock, the greater the intensity their vegetation utilization (Derner et al. 2009; Launchbaugh and Howery 2005).

A desktop analysis of potential Dakota skipper habitat in the action area was completed, using the field notes and photographs for reference, by SWCA personnel experienced with Dakota skipper habitat requirements and desktop analysis, particularly aerial imagery interpretation. The desktop analysis assessed the potential for habitat based on the USFS GIS tool attributes and documented habitat requirements for Dakota skipper in western North Dakota. Slope and aspect were modeled using 10-meter digital elevation models. Aerial imagery was reviewed to determine plant communities; previously disturbed areas including non-native vegetation and cultivated land; aspect; distance to water; location of adjacent habitat; and distance to known occurrences and proposed critical habitat.

SWCA conducted habitat field surveys in the action area between August 15, 2013, and May 16, 2015. The dominant landcover within the survey area was non-native or in agricultural production with hard red spring wheat (*Triticum aestivum*) and/or barley (*Hordeum vulgare*). Hayland was also a common land cover within the survey area. Hayland is land used in

agriculture to produce forage for livestock with the intent of harvesting and letting cure before feeding. It can consist of native vegetation, but most often is comprised of introduced grasses and legumes.

Additional habitat types identified during the field surveys included mixed grass prairie, forested upland, and shrubland. Northern mixed grass prairie can include wetlands, native grassland, and grass-shrub habitats, with riparian and floodplain forests along major drainages.

Native vegetation noted within isolated areas of the action area includes big bluestem, red three awn (*Aristida purpurea*), sideoats grama (*Bouteloua curtipendula*), common yarrow (*Achillea millefolium*), meadow anemone (*Anemone canadensis*), green sagewort (*Artemisia campestris*), silver sagebrush (*Artemisia cana*), blue grama, prairie sandreed (*Calamovilfa longifolia*), green needlegrass (*Nassella viridula*), fringed sage (*Artemisia frigida*), white sagebrush (*Artemisia ludoviciana*), purple coneflower, curlycup gumweed (*Grindella squarrosa*), little bluestem, tall dropseed (*Sporobolus asper*), porcupine grass (*Hesperostipa spartea*), and western poison ivy (*Toxicodendron rydbergii*).

Non-native grasses were dominant on agricultural field edges, roadway ditches, and haylands. These areas held species such as crested wheatgrass (*Agropyron cristatum*), smooth brome, Kentucky bluegrass, and Canada thistle (*Cirsium arvense).*

Common forested upland and shrubland habitat noted within the survey area include green ash (*Fraxinus pennsylvanica*), eastern red cedar (*Juniperus virginiana*), bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), downy hawthorn (*Crataegus mollis*), creeping juniper (*Juniperus horizontalis*), American plum (*Prunus americana*), common chokecherry (*Prunus virginiana*), silver buffaloberry (*Shepherdia argentea*), and western snowberry (*Symphoricarpos occidentalis*).

Within the privately owned section of the pipeline corridor under jurisdiction of the North Dakota Public Service Commission, the majority of landcover is in agricultural production, is dominated by non-native species such as smooth brome and crested wheatgrass, or is impacted by livestock grazing activities and does not meet the requirement for either larvae habitat or adult foraging habitat. Although, small and or isolated areas of native dominated grassland patches were identified in these areas, they lacked forb diversity and abundance of known forage species for larval and adult Dakota skippers.

Habitat and vegetation within the project area disturbance corridor within allotted land includes species such as little bluestem, western snowberry, white sagebrush, red three awn, and curly cup gumweed. Although these are native grasslands, these areas lacked forb diversity and known forage species for larvae habitat or adult foraging habitat. Within the allotted lands under jurisdiction of the BIA, SWCA did not identify any areas of potential larval or adult habitat within the proposed project area.

Habitat and vegetation within the action area surrounding the project footprint is likely comparable due to similar land use, such as grazing and agriculture. The action area also has similar levels of fragmentation due to oil and gas infrastructure and rural development.

Considering the presence of native grasses within sections of the project area, marginal suitable habitat may also exist within the action area.

The USFWS's guidance, *Dakota Skipper Guidance for Interagency Cooperation Under Section 7(a)(2) of the Endangered Species Act Version 1.0*, recommends that if the action area overlaps partially or entirely with a county that contains proposed critical habitat, to contact USFWS to determine if the action area contains proposed critical habitat. McKenzie County contains three proposed critical habitat units, according to the *Federal Register* Vol. 78, No. 206, Thursday, October 24, 2013. The action area does not overlap with proposed critical habitat units. The closest proposed critical habitat unit (Eagle Nest Butte unit) is approximately 10.67 miles north of the action area; therefore, the action would not adversely modify proposed critical habitat for the Dakota skipper.

We have also reviewed the latest available survey report (Royer et al. 2014). No positive detections were reported closer than the Eagle Nest Butte site.

Due to the lack of high-quality diverse native grasslands featuring the plant species necessary for the life requirements of larval and adult Dakota skippers, combined with the over 10-mile distance to the nearest proposed critical habitat unit, and nearest documented population, SWCA concludes that the species is not likely to be present within the action area, and therefore, surveys for adults are not necessary. The USFWS has been requested to indicate their agreement with this conclusion. Once the USFWS's response is received, SWCA will complete an effect analysis and determination.

3.8.9 Northern Long-eared Bat

Federal Status: Threatened
Affect Determination: No effect

On October 2, 2013, the USFWS proposed the northern long-eared bat (*Myotis septentrionalis*) for listing as endangered under the Endangered Species Act (USFWS 2013f). On April 1, 2015, the USFWS determined a threatened species status for the northern long-eared bat, pending final rule on May 4, 2015. This medium-sized bat ranges across the eastern and north central United States and all of the Canadian provinces (USFWS 2013g). Throughout most of this species' range, populations are patchily distributed. They emerge at dusk to fly through the understory of forested hillsides and ridges, feeding on moths, flies, leafhoppers, caddis flies, and beetles.

Most records of northern long-eared bats are from winter hibernacula surveys, with more than 780 hibernacula identified within the United States (USFWS 2013f). Generally, North Dakota has no deposits of thick carbonate rocks at or near the surface except for the Killdeer Mountains in North Dakota. No known hibernacula are located in North Dakota, due to either no suitable hibernacula present or a lack of survey effort (USFWS 2013f). This bat species occupies a wide range of rocky and forested habitats. Suitable winter habitat contains large caves and mines (USFWS 2013g). Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, under loose bark, and rock fissures (Jones and Choate 1978).

Northern long-eared bats are not known to occur in the project area, although species-specific surveys have not been conducted. Suitable winter habitat for northern long-eared bats does not occur within the action area. Nearby trees and rocky outcrops can act as suitable summer day roosts. Within the 100-foot construction corridor, SWCA identified 1,805 trees and shrubs over 1 inch diameter at breast height. If forested upland habitat is identified during the field surveys, and construction occurs between April and September, then bat surveys would be conducted to confirm the presence or absence of the species. Therefore, the proposed project would have **no effect** on the northern long-eared bat.

3.8.10 Rufa Red Knot

Federal Status: Threatened
Affect Determination: No effect

The rufa red knot (*Calidris canutus*) is a medium-sized shorebird approximately 9 to 11 inches in height with breeding plumage consisting of red around the face and a prominent stripe above the eye, breast, and upper belly, and non-breeding plumage a dusky gray and white (BIA 2014). The USFWS published a proposal to list the rufa red knot as threatened under the ESA in the *Federal Register* in September 2013 (78 *Federal Register* 60023). On January 12, 2015, the USFWS determined a threatened species status for the rufa red knot (79 *Federal Register* 73705).

The primary reason for decline includes reduced food supplies in Delaware Bay due to commercial harvest of horseshoe crabs, but also includes areas of range loss due to rising sea levels, shorelines project, and development (USFWS 2013e). The rufa red knot breeds in the Canadian Arctic and migrates 19,000 miles to winter on the U.S. Gulf Coast and in South America. The species generally occurs along the ocean coasts during migration, but a small number have been reported across the interior United States, with the closest sighting approximately 80 miles east of the FBIR in 1998 (eBird.org 2014). The rufa red knot generally prefers sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments, and lagoons for its migration and wintering habitat. The knot's diet during migration, at least on the coast, is similar to what it eats while wintering: hard-shelled mollusks supplemented by softer invertebrate prey such as shrimp, crab, marine worms, and horseshoe crab eggs (USFWS 2013e).

Suitable habitat along the lake is approximately 0.5 straight-line mile from the proposed project location disturbance corridor. There may be wetlands with suitable shoreline habitat for migrating red knots in the action area. However, the closest reported sighting of a red knot in North Dakota was approximately 80 miles east of the FBIR in 1998 (eBird.org 2014).

If the rufa red knot were to traverse the FBIR during migration, the greatest potential stressor from the proposed action is loss or degradation of the species' potential migration habitat. Construction of the pipeline, roads, or other facilities in migratory habitat could result in the direct loss of suitable migratory habitat if the species traversed over the FBIR.

Potential spills and sedimentation occurring within the proposed project location are concerns for downstream water quality and could indirectly affect suitable stopover habitat for the rufa red knot. However, a variety of mitigation measures have been incorporated into the proposed

project as mandatory BMPs that, when implemented, would minimize the potential for spills, or provide immediate remediation should spills occur. Additionally, protective measures for sensitive water resource areas would be implemented, providing protection to potential migratory habitat including the rufa red knot.

As referenced above, Lake Sakakawea is 0.5 mile from the proposed project disturbance corridor. Wetlands with over a 500-foot crossing and all wetlands within USFWS easements will be directionally bored to avoid impacts. Other wetlands within the ROW will be temporarily disturbed while implementing proper erosion control methods to avoid additional impacts.

Activities associated with the construction, production, or reclamation of the proposed project are not anticipated to adversely affect suitable stopover habitat for the rufa red knot. Additionally, there is a low likelihood of occurrence of the rufa red knot in the action or project area, and the likelihood of any adverse effects due to disturbance from construction activities is extremely low. Therefore, the proposed project would have **no effect** on the rufa red knot.

3.8.11 Sprague's Pipit

Federal Status: Candidate
Affect Determination: Not likely to contribute to the future listing of the species

The Sprague's pipit is a small passerine, 10 to 15 centimeters in length, endemic to the Northern Great Plains (USFWS 2011b). The Sprague's pipit requires large tracts of native prairie habitat, unplowed, throughout their life cycle. Because native grasslands are disturbance-dependent, Sprague's pipit prefers grassland habitats that are regularly disturbed. The frequency of disturbance required for habitat maintenance depends on how quickly grasses grow to an intermediate height (4 to 12 inches) following a disturbance event.

In North Dakota, Sprague's pipit has been found in areas of moderate grazing. Sprague's pipits are sensitive to patch size and avoid edges between grasslands and other habitat features (USFWS 2011b). They may avoid non-grassland features including roads, trails, oil wells, croplands, woody vegetation, and wetlands. The Sprague's pipit is reported to stay up to 350 meters away from anthropogenic features such as roads, oil wells, and wind turbines (USFWS 2011b). The USFWS has estimated that each new oil well and associated road in North Dakota results in potential impacts to approximately 51 acres of pipit habitat due to avoidance and habitat fragmentation (USFWS 2011b). Because of increasing habitat fragmentation, especially by energy development, throughout the Sprague's pipit range, and the loss of native prairie habitat, the Sprague's pipit was listed as a Candidate Species under the ESA in 2010 (USFWS 2011b).

In North Dakota, Sprague's pipit breeds throughout the state except for the easternmost counties. During the breeding season they prefer large patches of well drained, open native grassland with a minimum size of 358.3 acres (range = 170 to 776 acres). They have not been observed in areas smaller than 71.6 acres on their breeding grounds (USFWS 2011b).

Native prairie habitat with grasses of intermediate height does occur within the project area. The proposed project is unlikely to directly affect habitat due to lack of adequate patch sizes required by the Sprague's pipit for breeding grounds in the immediate project area, but may indirectly contribute to reduced use of any nearby suitable grassland habitat patches within 350 meters of the proposed project. Sprague's pipit is a candidate for listing; therefore, an effects determination is not required for this species. However, the BIA has determined the effects of the action is **not likely to contribute to the future listing of the species.**

3.8.12 Migratory Birds

Status: Not listed, protected under the Migratory Bird Treaty Act
Effects of Project: No unauthorized take anticipated

Suitable habitat for migratory birds exists in the entire project area. Specifically, grassland nesting birds have the potential to occur and nest in the project area, especially during the migratory bird breeding season. Suitable woodland nesting habitat also occurs in the project area. Options for Paradigm to avoid all incidental take during construction of the project include one of the following options.

- Complete all construction outside of the migratory bird breeding season, which occurs generally between February 1 and July 15.
- Clear and grub or mow the project alignment prior to the bird breeding season and maintain vegetation in a degraded state within the project construction area during the breeding season to deter migratory birds from nesting in the project area until construction is completed.
- If project construction commences during the bird breeding season, have a qualified avian biologist conduct a survey of breeding birds in the project area no more than 5 days before construction begins, and if active nests are discovered, notify the USFWS for further direction.
- If nests are identified in the construction area, they will be taxonomically identified to determine if the species are considered migratory. If the species are migratory, the construction ROW will be marked by placing wooden laths on each side of the construction ROW, then string caution tape across the ROW between laths. A 100-foot set back from active nests will be maintained. Per the recommendation of the USFWS, no ground clearing may commence within an avoidance area, including mowing, until the identified nest ceases to be active.

With one of the proposed options listed above followed by Paradigm, **no adverse effects are anticipated to migratory birds or active nests**.

3.8.13 Bald Eagle

Federal Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act
Effects of Project: No adverse effects anticipated

The bald eagle (*Haliaeetus leucocephalus*) feeds on fish and carrion and typically roosts in large trees near a water source. Bald eagle nesting habitat is typically any mature stands of

conifer (*Pinophyta* sp.) or cottonwood (*Populus* sp.) trees in association with rivers, streams, reservoirs, lakes, or any significant body of water. Bald eagles are uncommon in North Dakota and are usually observed along the Missouri River (Gomes n.d.) and Yellowstone River. Bald eagles frequently migrate through the grassland habitats; however, no bald eagles or nests were observed during the field surveys. Therefore, **no adverse effects** to bald eagles are anticipated.

3.8.14 Golden Eagle

Federal Status: Unlisted; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

The golden eagle (*Aquila chrysaetos*) prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. The nearest known Golden eagle nest to the pipeline corridor is located 1.26 miles northwest of the Van Hook portion of the corridor (Carlson McCain, Inc. 2014). Golden eagles may occur within or near the survey area; however, no golden eagles or nests were observed during the field surveys. Some temporary impacts may occur during construction due to disturbance, but no long-term impacts to golden eagles are anticipated. Therefore, **no adverse effects** to golden eagles are anticipated.

3.8.15 Wildlife Observed

During the field survey, SWCA ecologists observed various wildlife species which use wetlands and other habitat within the survey area (Table 8). Common wildlife species may be affected both directly via death or injury from construction activities indirectly through the temporary fragmentation of habitat as a result of construction activities and disturbance which may disrupt normal activities such as breeding, feeding, and sheltering.

Table 8. Wildlife Observed during Field Surveys at the Proposed Pipeline Route

Common Name	Scientific Name	Observation Type
Blue-winged teal	*Anas discors*	Primary
Mallard	*Anas platyrhynchos*	Primary
Canada goose	*Branta canadensis*	Primary
Red-tailed hawk	*Buteo jamaicensis*	Primary
Lark bunting	*Calamospiza melanocorys*	Primary
Coyote	*Canis latans*	Primary
American goldfinch	*Carduelis tristis*	Primary
Killdeer	*Charadrius vociferus*	Primary
Snow goose	*Chen caerulescens*	Primary
American crow	*Corvus brachyrhnchos*	Primary
Gray catbird	*Dumetella carolinensis*	Primary
Horned lark	*Eremophila alpestris*	Primary
Blackbird	*Euphagus cyanocephalus*	Primary
Wilson's snipe	*Gallinago delicate*	Primary
Ring-billed gull	*Larus delawarensis*	Primary
White-tailed rabbit	*Lepus townsendii*	Primary
Brown-headed cowbird	*Molothrus ater*	Primary
Whitetail deer	*Odocoileus virginianus*	Primary
Grey partridge	*Perdix perdix*	Primary
Ringneck pheasant	*Phasianus colchicus*	Primary
Black-billed magpie	*Pica hudsonia*	Primary
Vesper sparrow	*Pooecetes gramineus*	Primary
Raccoon	*Procyon lotor*	Primary
American avocet	*Recurvirostra americana*	Primary
Clay-colored sparrow	*Spizella pallida*	Primary
Chipping sparrow	*Spizella passerina*	Primary
Field sparrow	*Spizella pusilla*	Primary
Western meadowlark	*Sturnella neglecta*	Primary
Badger	*Taxidea taxus*	Primary
Willet	*Tringa semipalmata*	Primary
American robin	*Turdus migratorius*	Primary
Sharp-tailed grouse	*Tympanuchus phasianellus*	Primary
Eastern kingbird	*Tyrannus tyrannus*	Primary
Western kingbird	*Tyrannus verticalis*	Primary
Mourning dove	*Zenaida macroura*	Primary

4.0CONCLUSIONS AND RECOMMENDATIONS

1. SWCA ecologists recorded approximately 94.79 acres of wetlands within the 200-foot-wide survey area.
2. In total, approximately 13.21 acres of PEM wetland are within the 100-foot construction ROW. Of these, 17 are potentially jurisdictional wetlands which would be temporarily disturbed totaling 2.62 acres within the 100-foot construction ROW.
3. SWCA recorded 26 waterbodies, including 23 streams, two ponds and one upland swale within the survey corridor.
4. Compliance with Section 10 of the Rivers and Harbors Act (33 USC 403) is required for the passage under Lake Sakakawea. The Section 10 permit package for the proposed project was submitted to the USACE for approval on February 23, 2015 with an update sent April 21, 2015. The Sovereign Lands Permit to the Office of the State Engineer for approval on March 4, 2015.
5. SWCA enumerated 1,805 trees, saplings, and shrubs that may be impacted by construction activities. Therefore, approximately 3,610 2-year-old saplings may need to be replanted to fulfill the 2:1 mitigation requirement. SWCA recommends the use of native trees only
6. According to the recommendations of the North Dakota Forest Service, tree species selection for replacement should be accomplished through collaboration with a reputable area nursery. This will allow for species to be selected based on various factors including species hardiness and area soil type.
7. No threatened or endangered species were observed during the field survey. Suitable roosting and foraging habitat exists within the project area for the whooping crane. SWCA recommends that if construction is to occur within whooping crane spring and fall migration periods, and a whooping crane is observed within 1 mile of the project, to stop construction and notify the USFWS.
8. Suitable nesting and foraging habitat for piping plover and interior least tern is less than 1 mile from the project area along the shorelines of Lake Sakakawea. Additionally, Lake Sakakawea is suitable habitat for pallid sturgeon. With proper best management practices in place, the proposed project is not likely to affect Lake Sakakawea and subsequently piping plover, interior least tern, and pallid sturgeon.
9. The project construction plans include the removal of woody vegetation. SWCA identified 1,805 trees and shrubs a DBH of over 1 inch within the 100-foot construction corridor. If forested upland habitat is identified during the field surveys, and construction occurs between April and September, then bat surveys would be conducted to confirm the absence of the species.
10. Final guidance has not been received from the USFWS regarding the Dakota skipper.

    The other listed threatened and endangered species which occur in McKenzie and Mountrail Counties are not likely to be detrimentally impacted by construction activities.

11. Migratory birds and habitat were observed throughout the entire project area and a 0.5-mile line-of-sight raptor survey was conducted throughout the survey area.

    No active raptor nests or other species of raptor were observed. In order to reduce impacts to migratory birds, SWCA recommends conducting all construction outside of the migratory bird breeding season. If construction occurs during the bird breeding season, SWCA recommends to either mow, maintain, or completely remove vegetation within the project construction area, or conduct an avian survey of the project area no greater than 5 days before construction begins. If active nests, i.e. nests with eggs or young, are discovered, notify the USFWS.

12. Four areas of state-listed noxious weeds were discovered within the surveyed areas. These areas all consisted of Canada thistle. When noxious weeds are encountered during construction activities, actions should be taken to reduce the potential to spread any state listed noxious weed species, especially to native areas.

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APPENDIX A

Vicinity Maps and Site Layout Maps

Sacagawea Pipeline

- City
- Proposed Sacagawea Pipeline
- U.S. Highway
- State Highway
- Reservation Boundary
- Township/Range Boundary
- County Boundary

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Base Map: 2014 Aerial Imagery
Source:USDA/FSA -
Aerial Photography Field Office
Mountrail and
McKenzie Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

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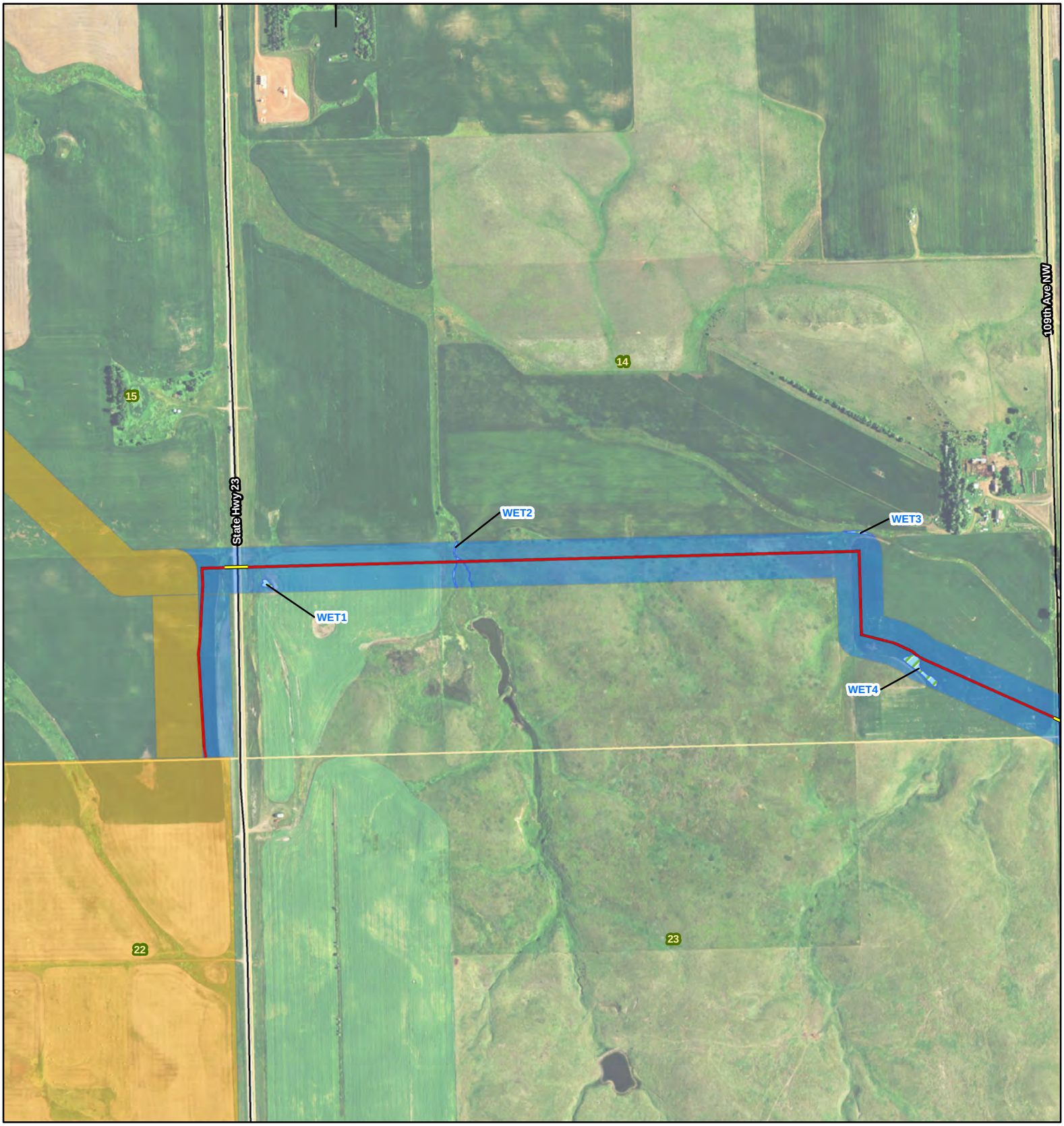

Sacagawea Pipeline

- Bore Location
- Upland Data Point
- Wetland Data Point
- NR_Survey_Area
- Proposed Pipeline System
- Ephemeral Stream
- Upland Swale
- Bore Path
- Existing Road
- Previously Inventoried Area
- Wetland
- Stream
- Waterbody
- Woody Vegetation
- Noxious Weed
- Wetland Easement
- Grassland Easement
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Keene (1995)

Township/Range: T. 151N, R. 96W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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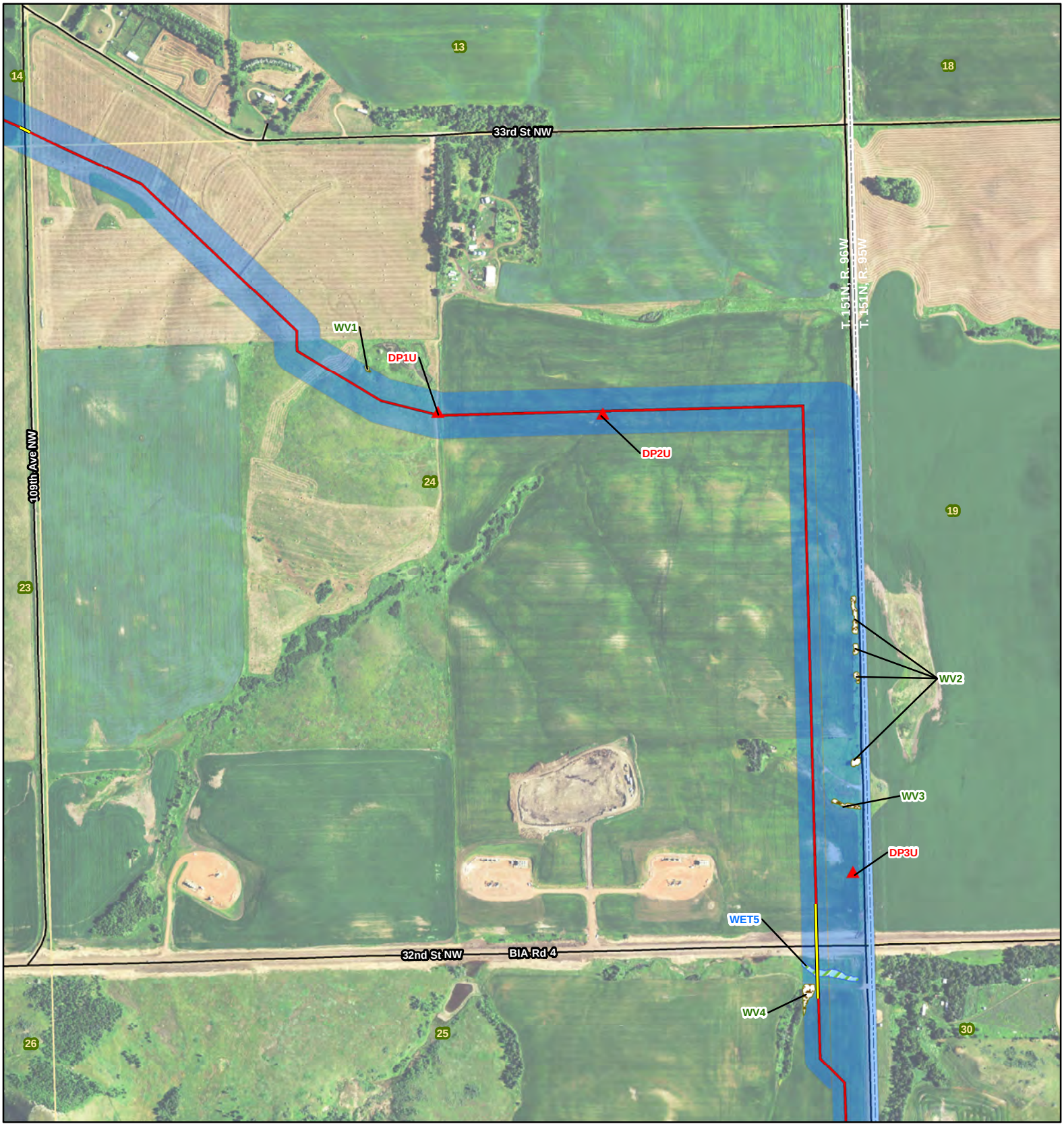

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Base Map: 2014 Aerial Imagery
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McKenzie County, North Dakota

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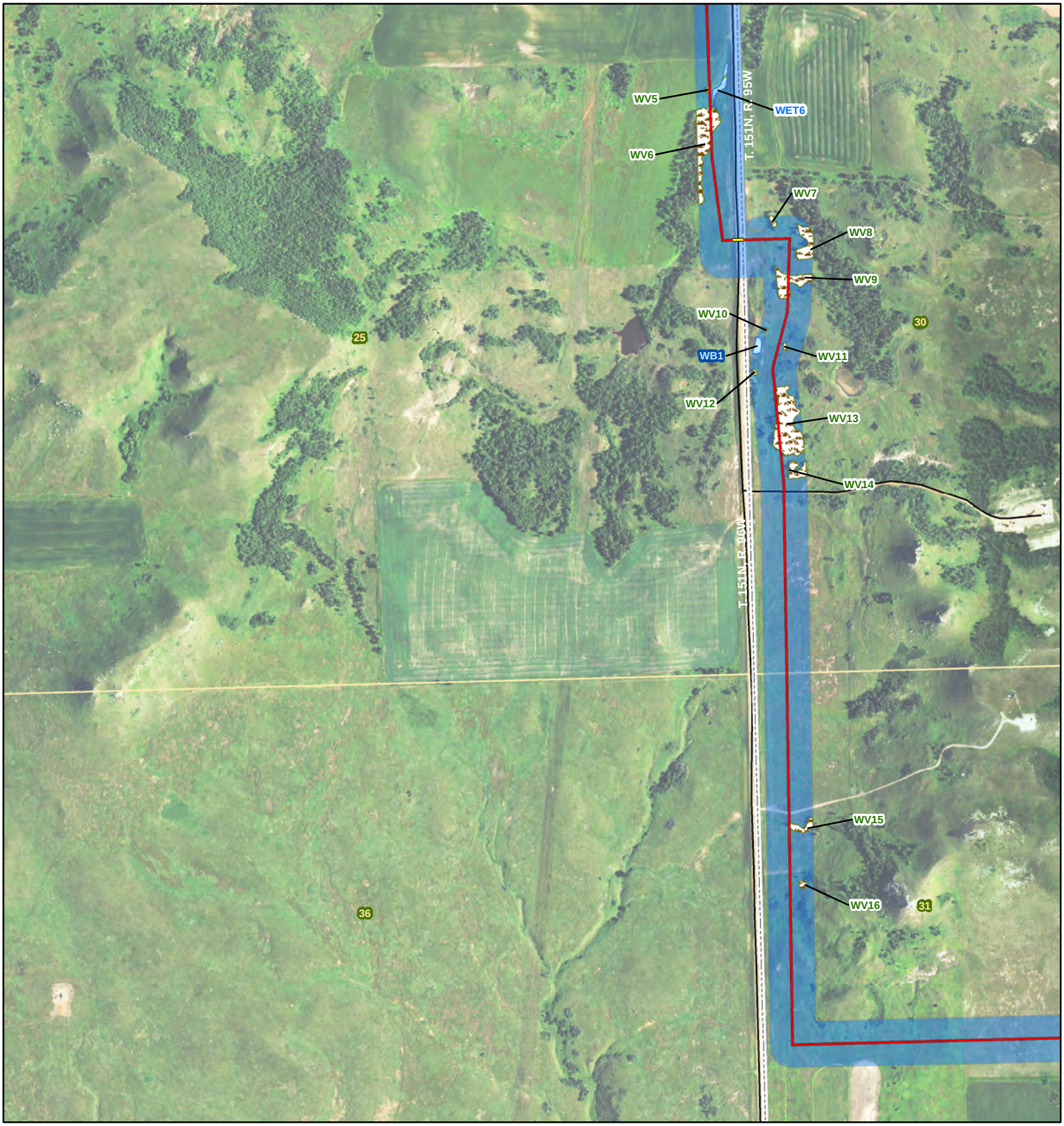

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Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Johnsons Corner (1995)

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McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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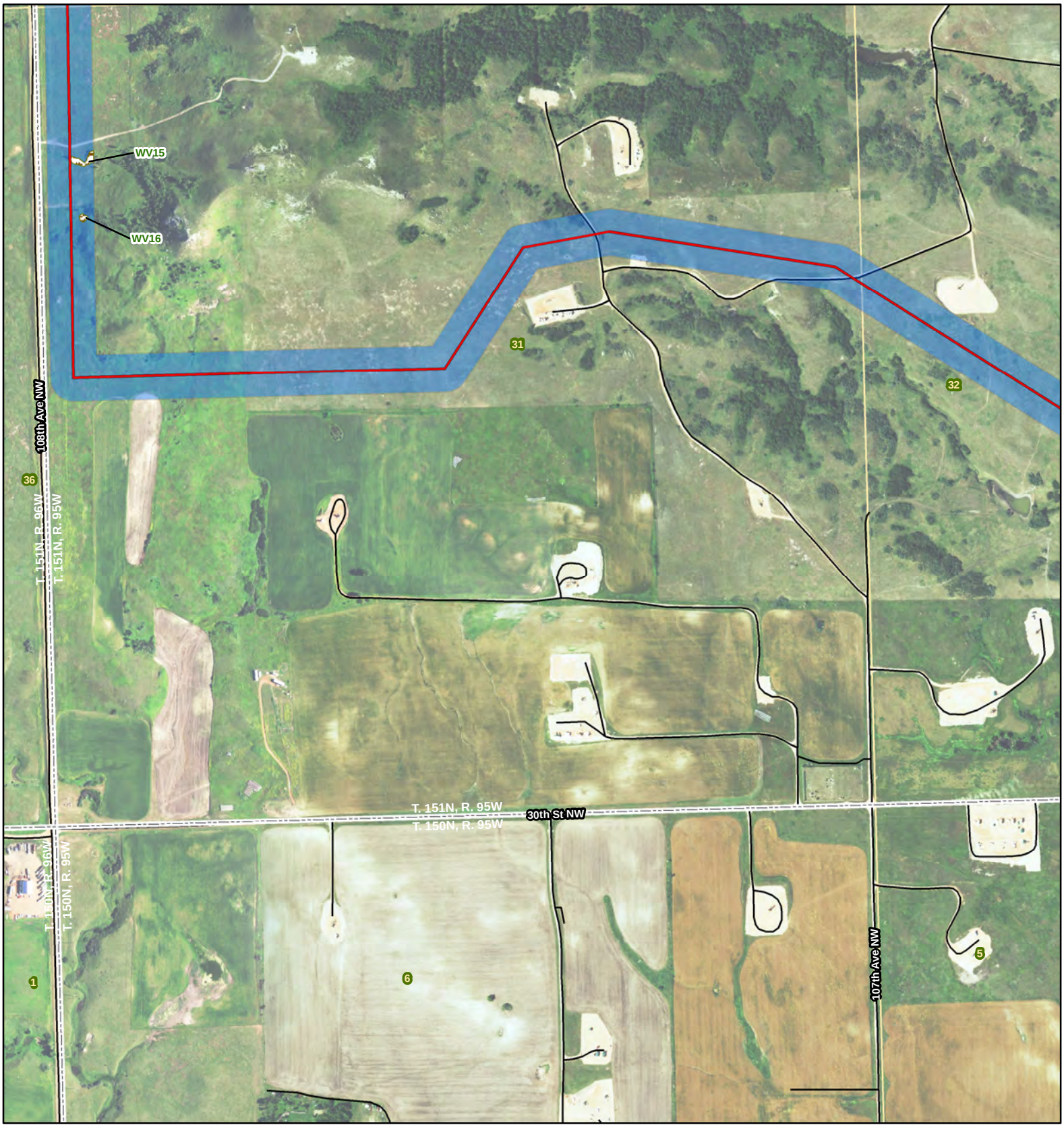

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Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996),
Johnsons Corner (1995)
Township/Range: T. 151N, R. 95W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996)

Township/Range: T. 150N, R. 95W &
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McKenzie County, North Dakota

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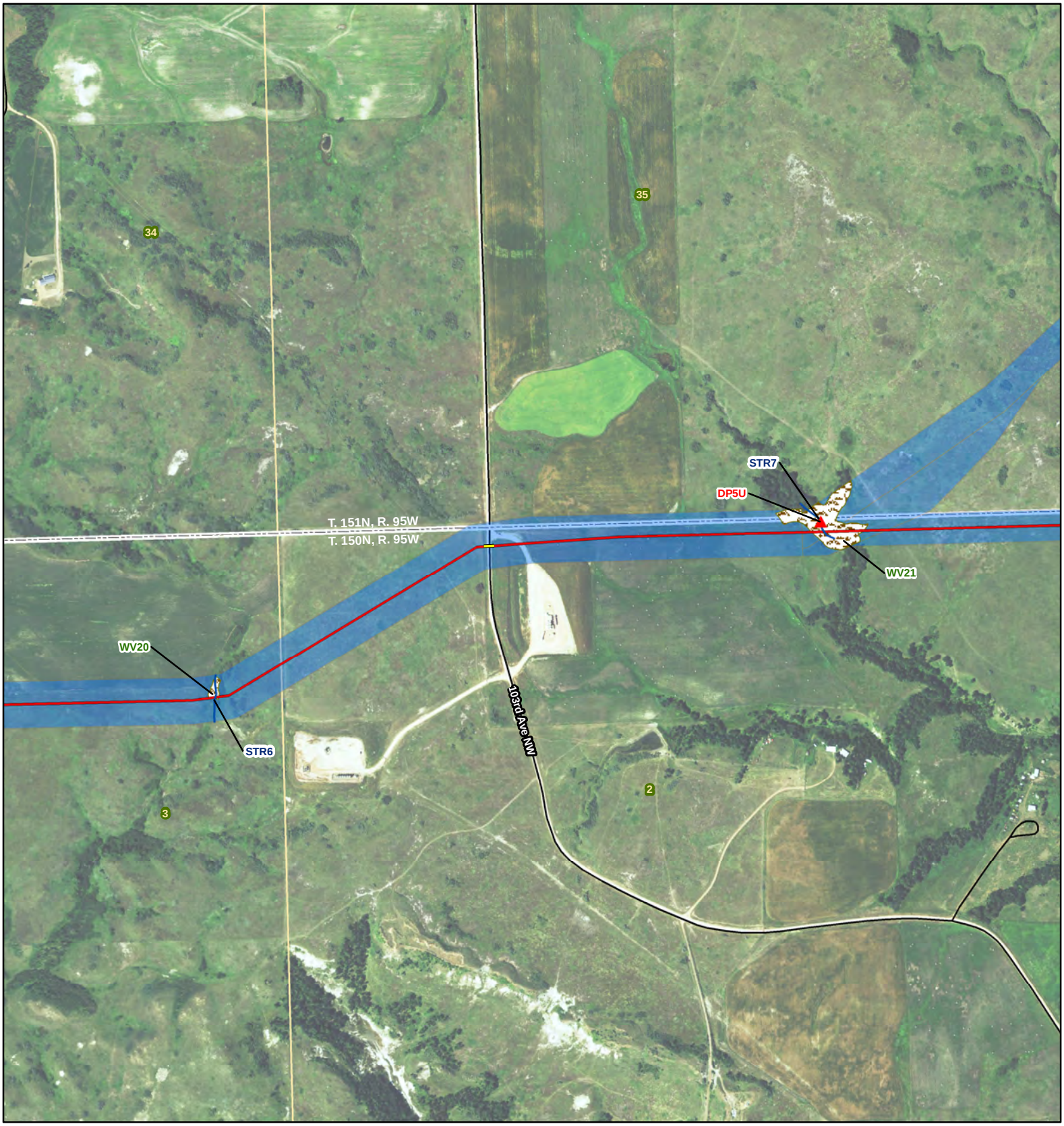

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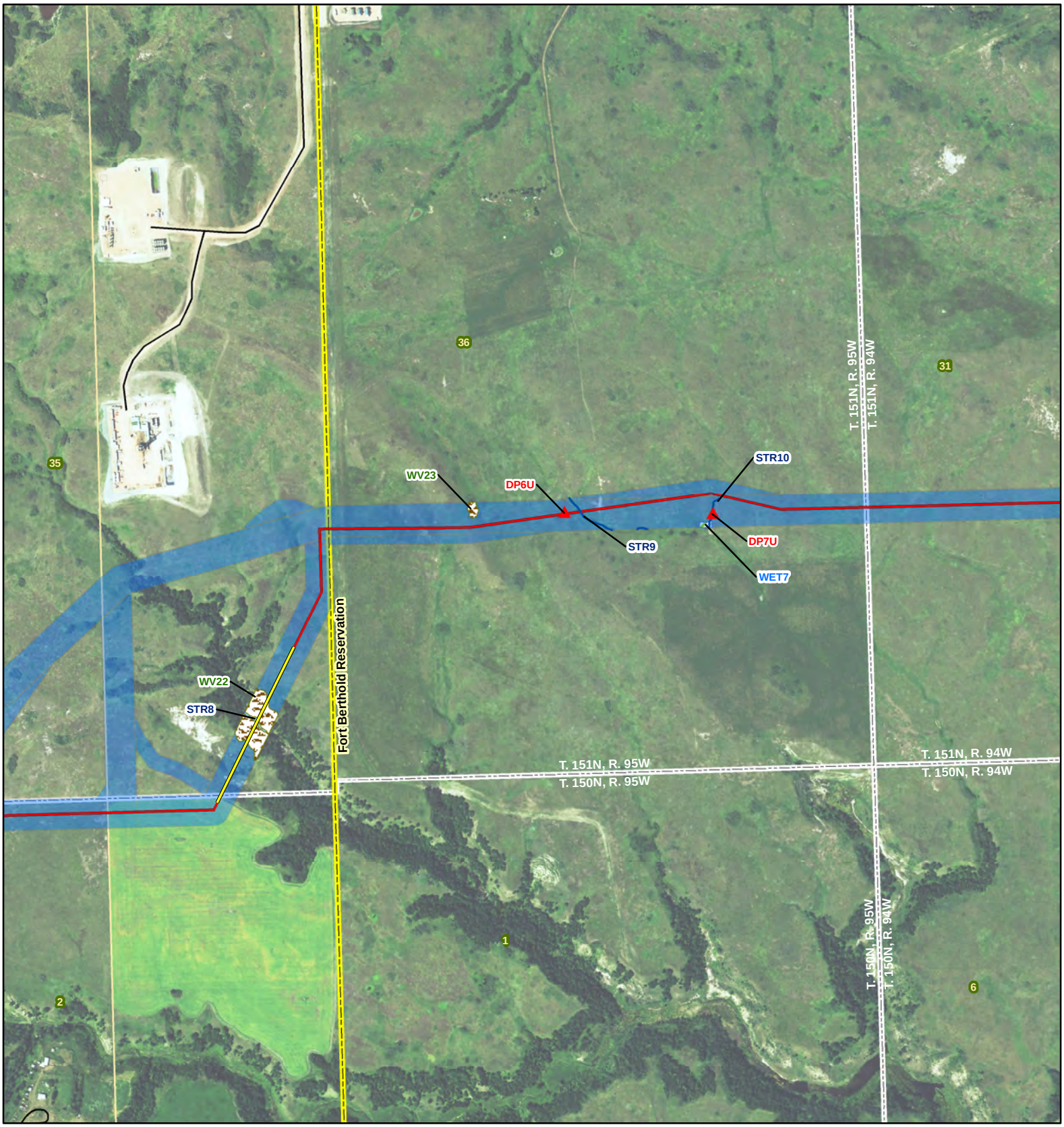

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- Wetland Data Point
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Kilometers
0 0.25 0.5

Miles
0 0.25 0.5

Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996)

Township/Range: T. 151N, R. 94W &
T. 151N, R. 95W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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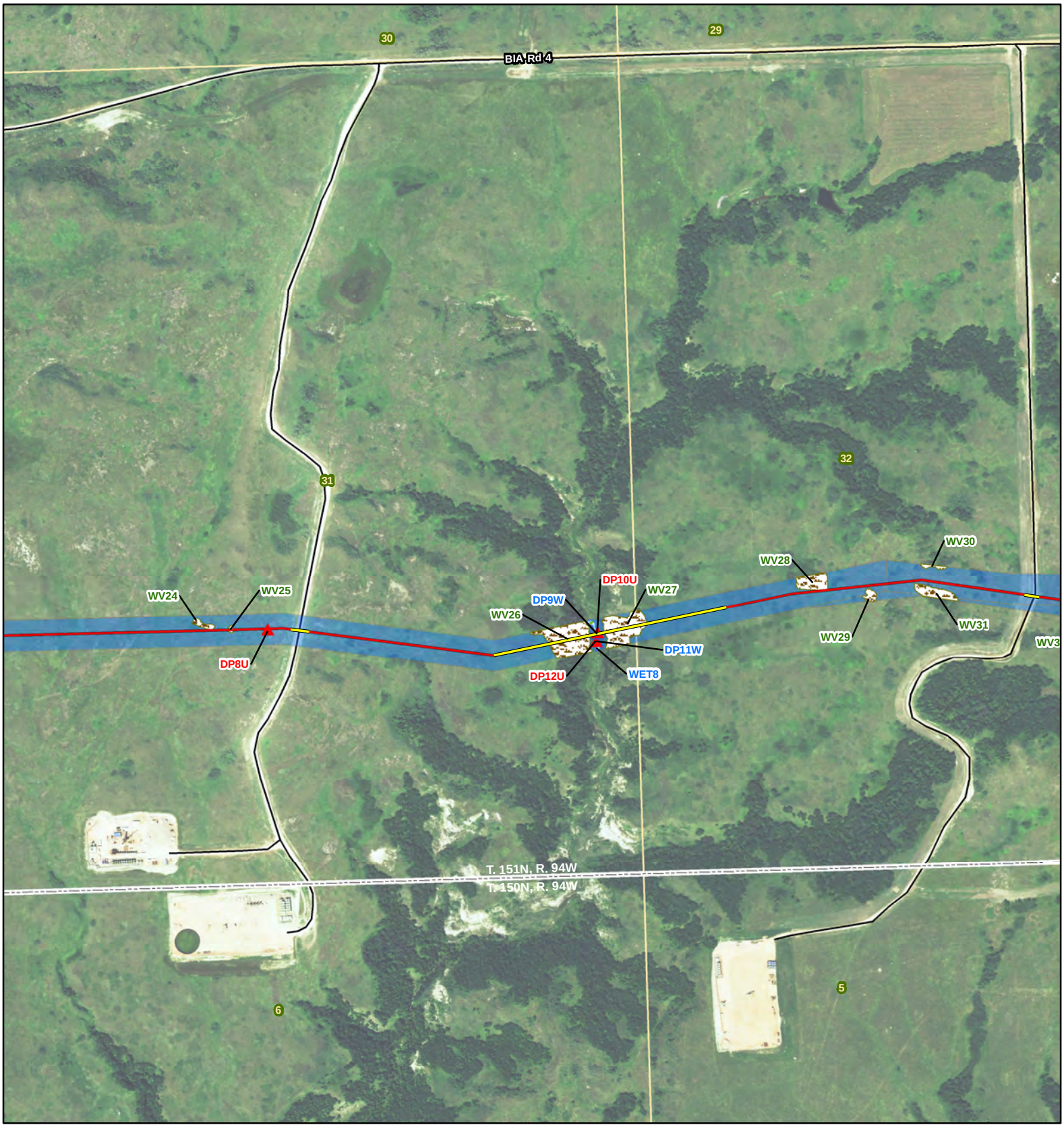

Sacagawea Pipeline

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Quadrangle: Sanish SW (1969),
Blue Buttes SE (1996)
Township/Range: T. 151N, R. 94W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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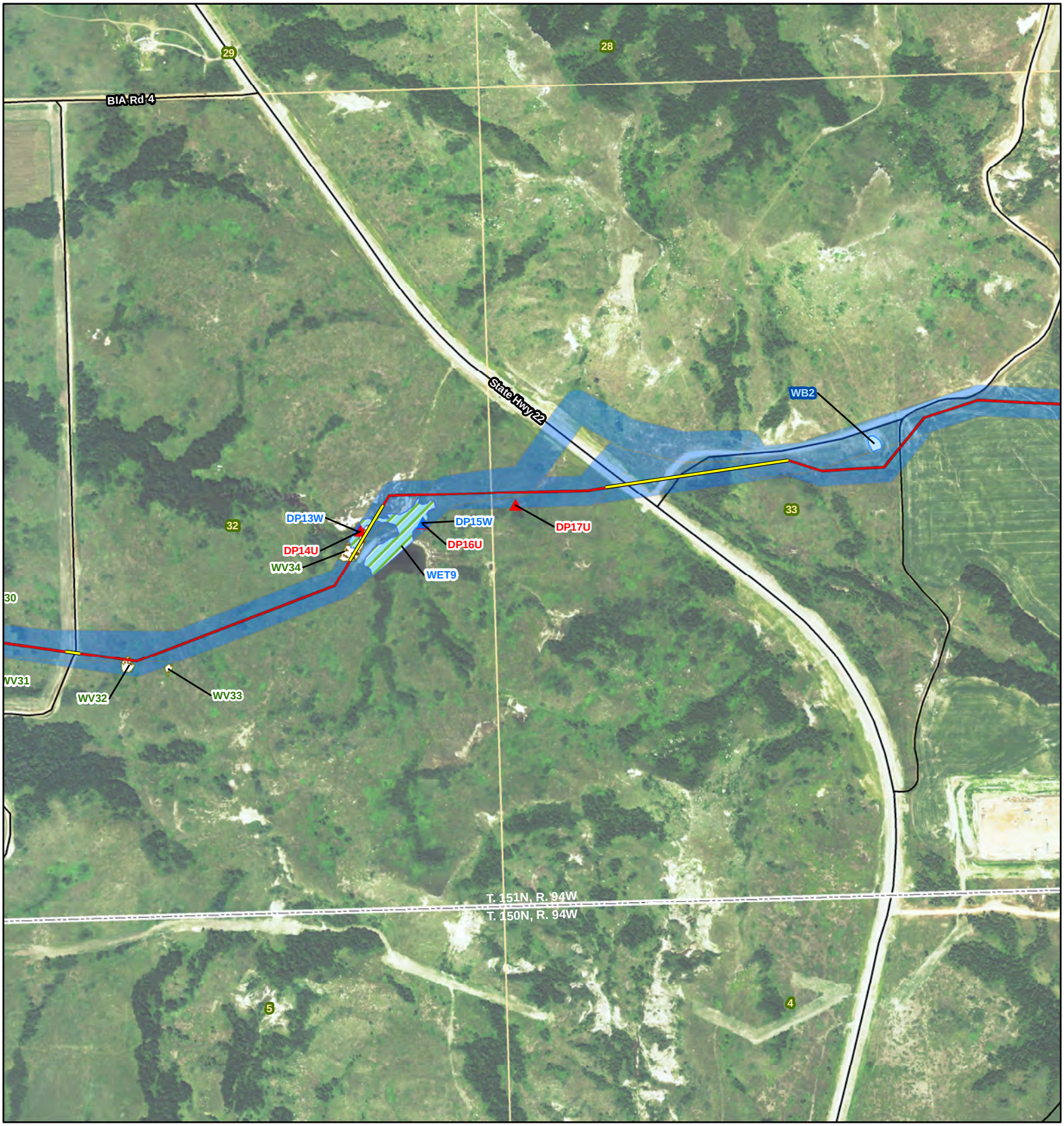

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McKenzie County, North Dakota

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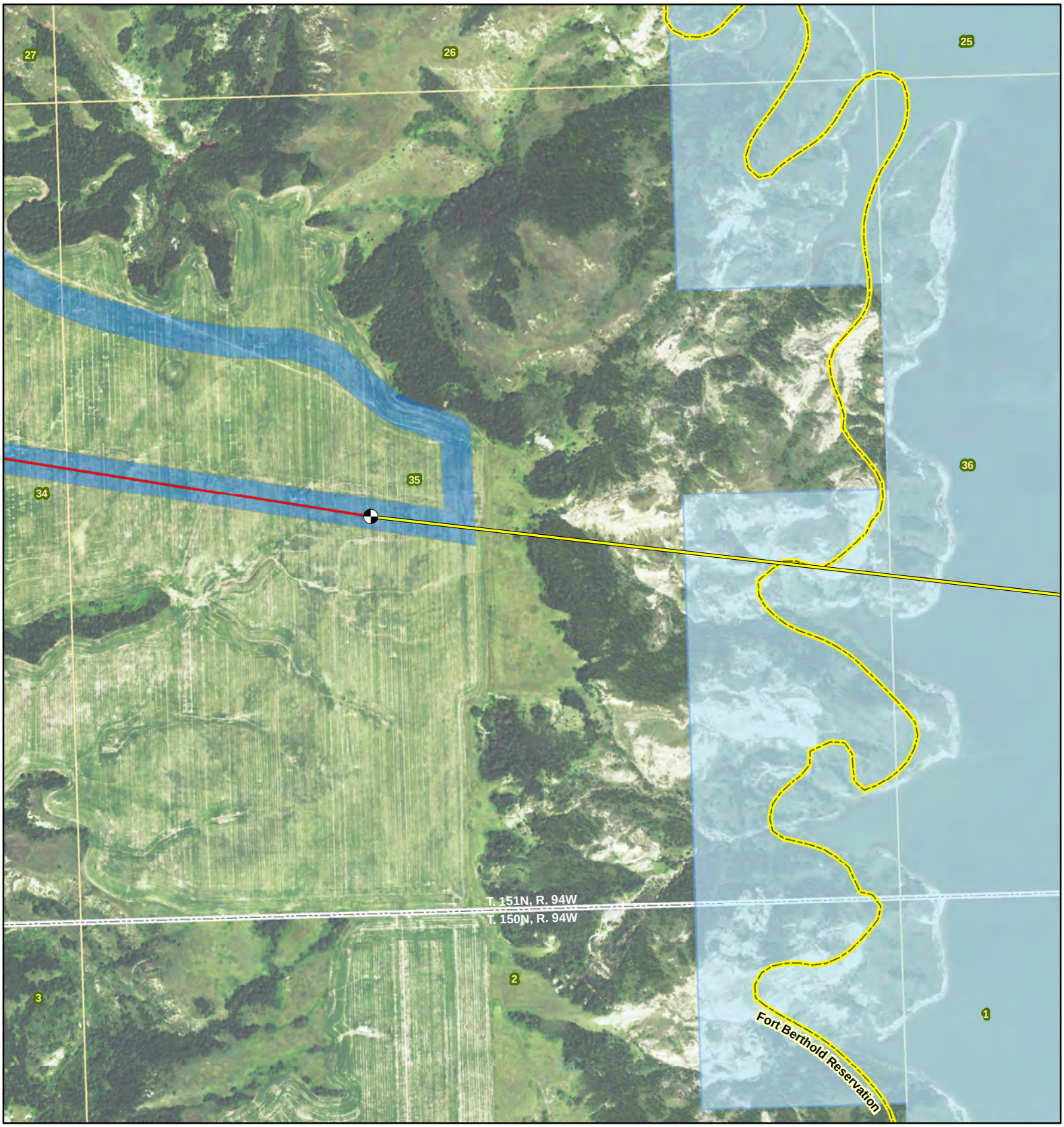

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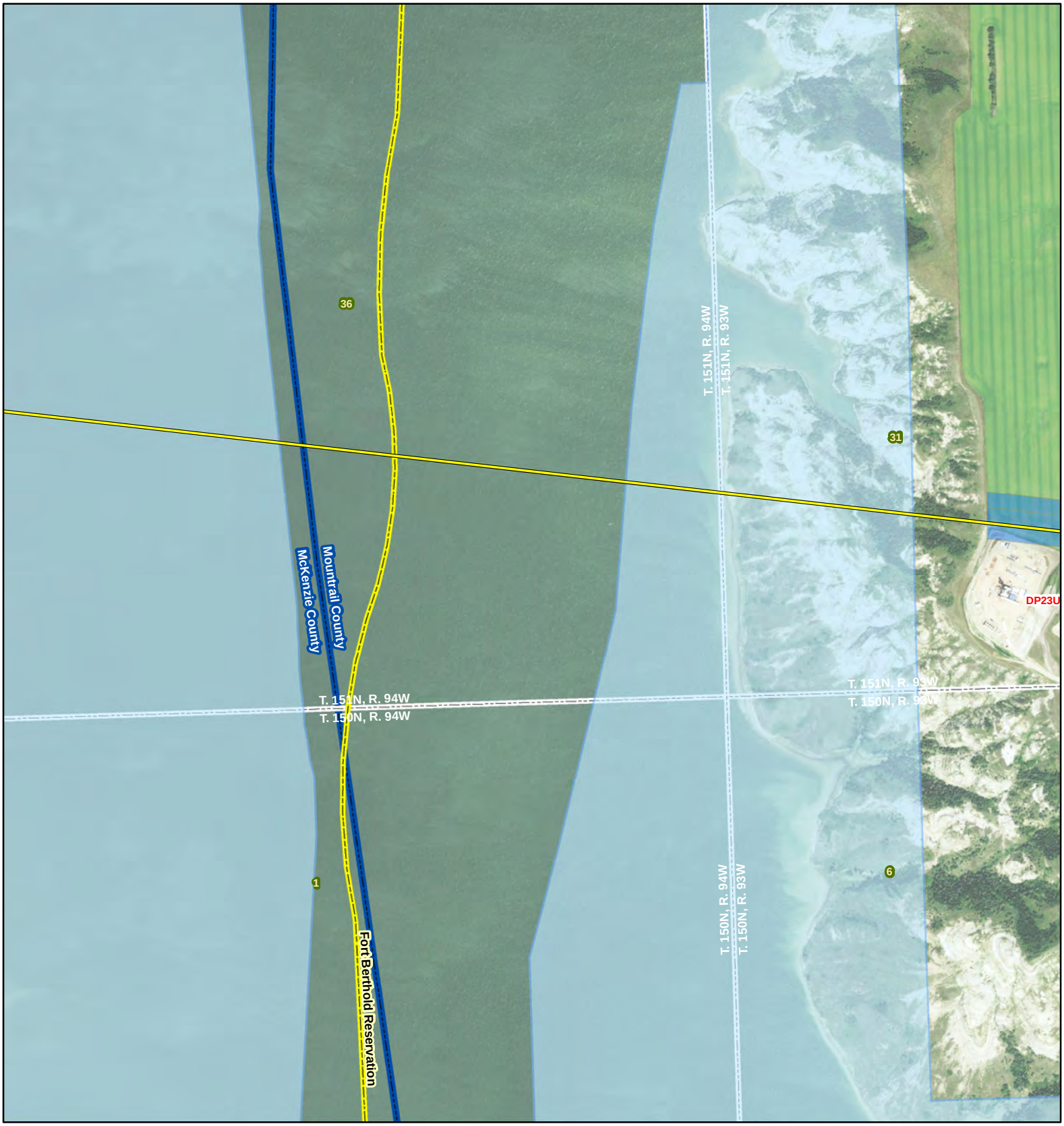

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Quadrangle: Sanish SW (1969)

Township/Range: T. 151N, R. 93W &
T. 151N, R. 94W
Mountrail and McKenzie Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

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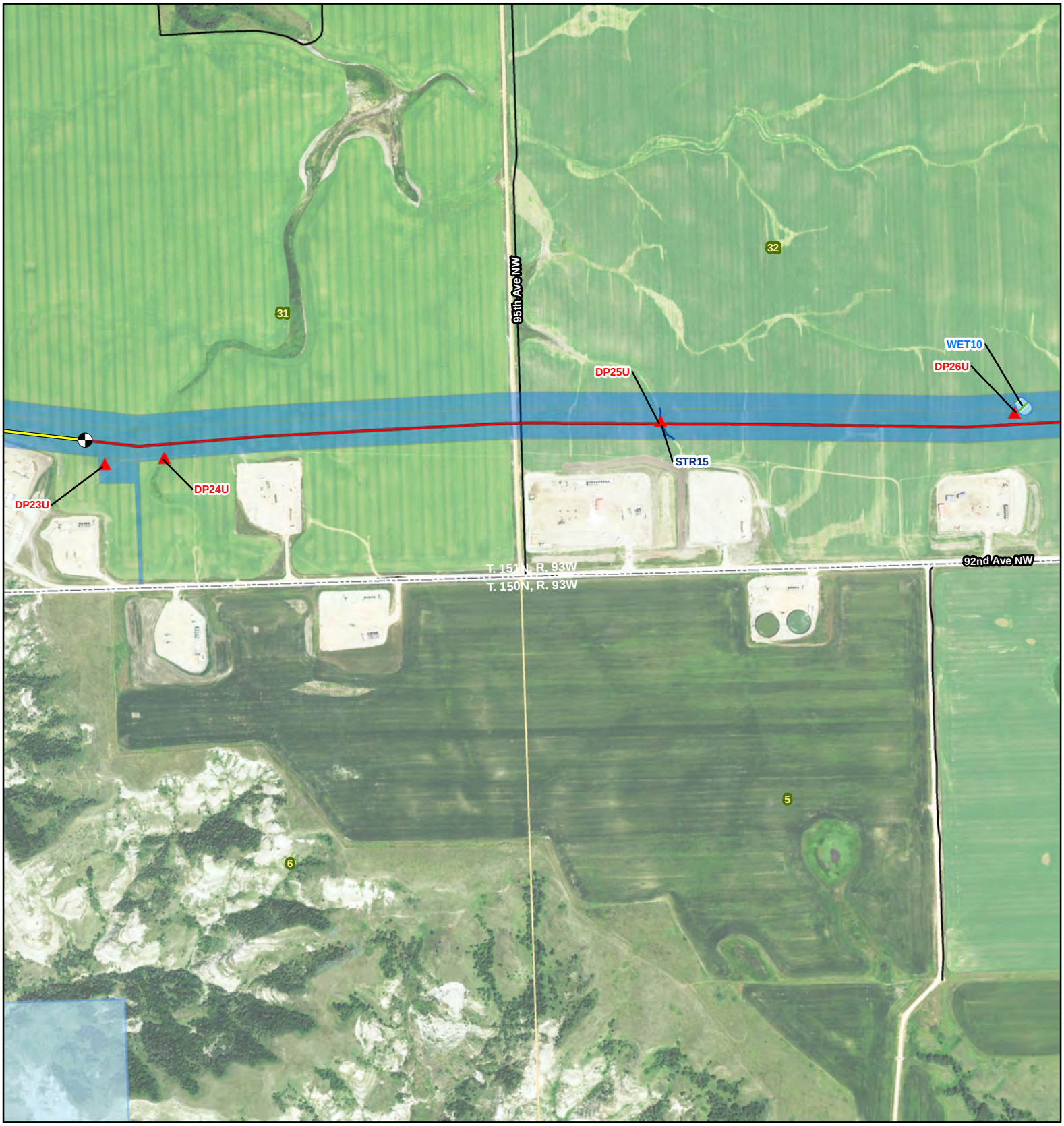

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Mountrail County, North Dakota

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Mountrail County, North Dakota

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Mountrail County, North Dakota

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Township/Range: T. 151N, R. 93W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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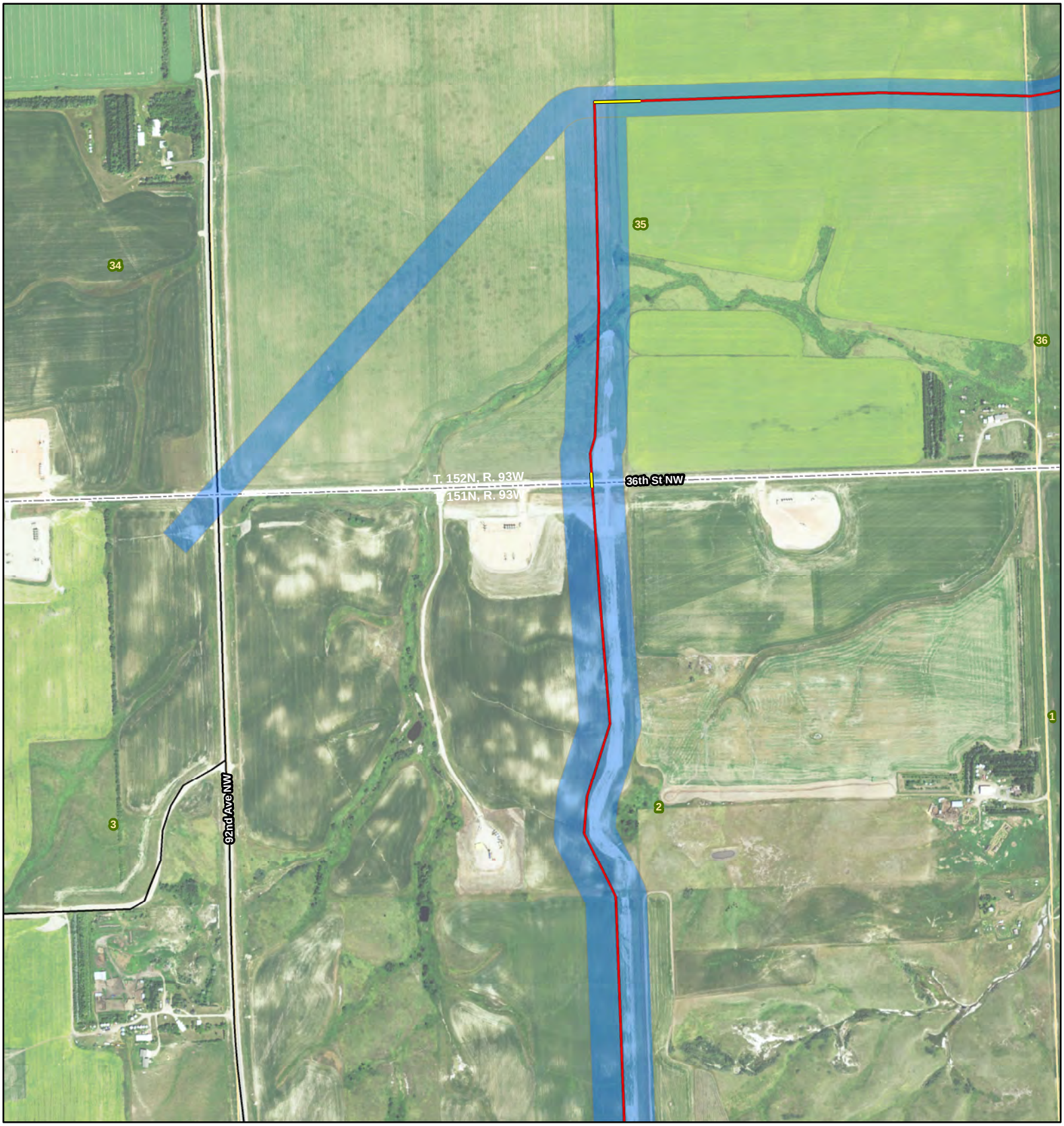

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Township/Range: T. 152N, R. 93W &
T. 151N, R. 93W
Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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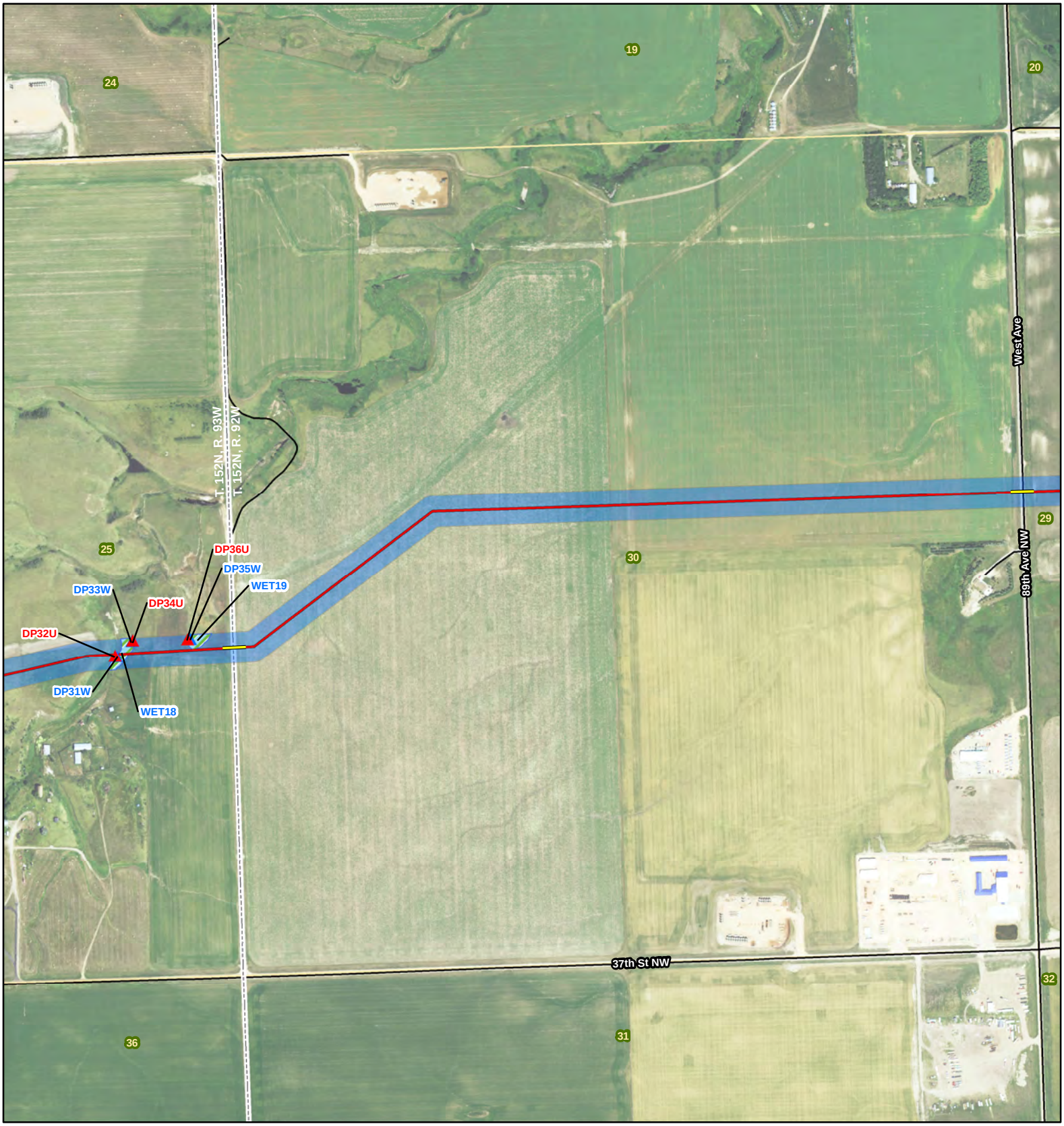

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Quadrangle: New Town (1981),
Sanish (1969)
Township/Range: T. 152N, R. 92W &
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Projection: NAD 1983 UTM Zone 13N

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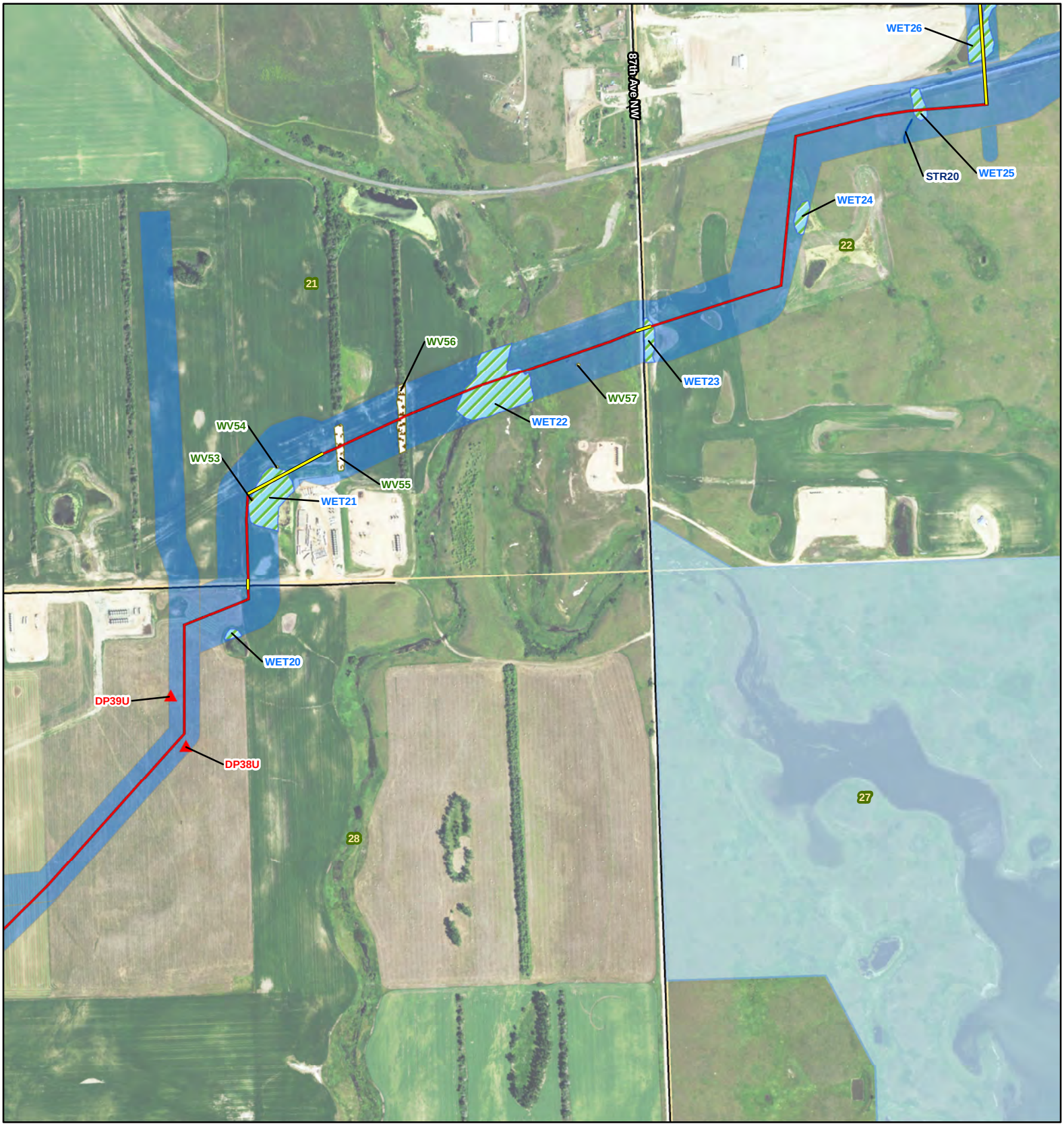

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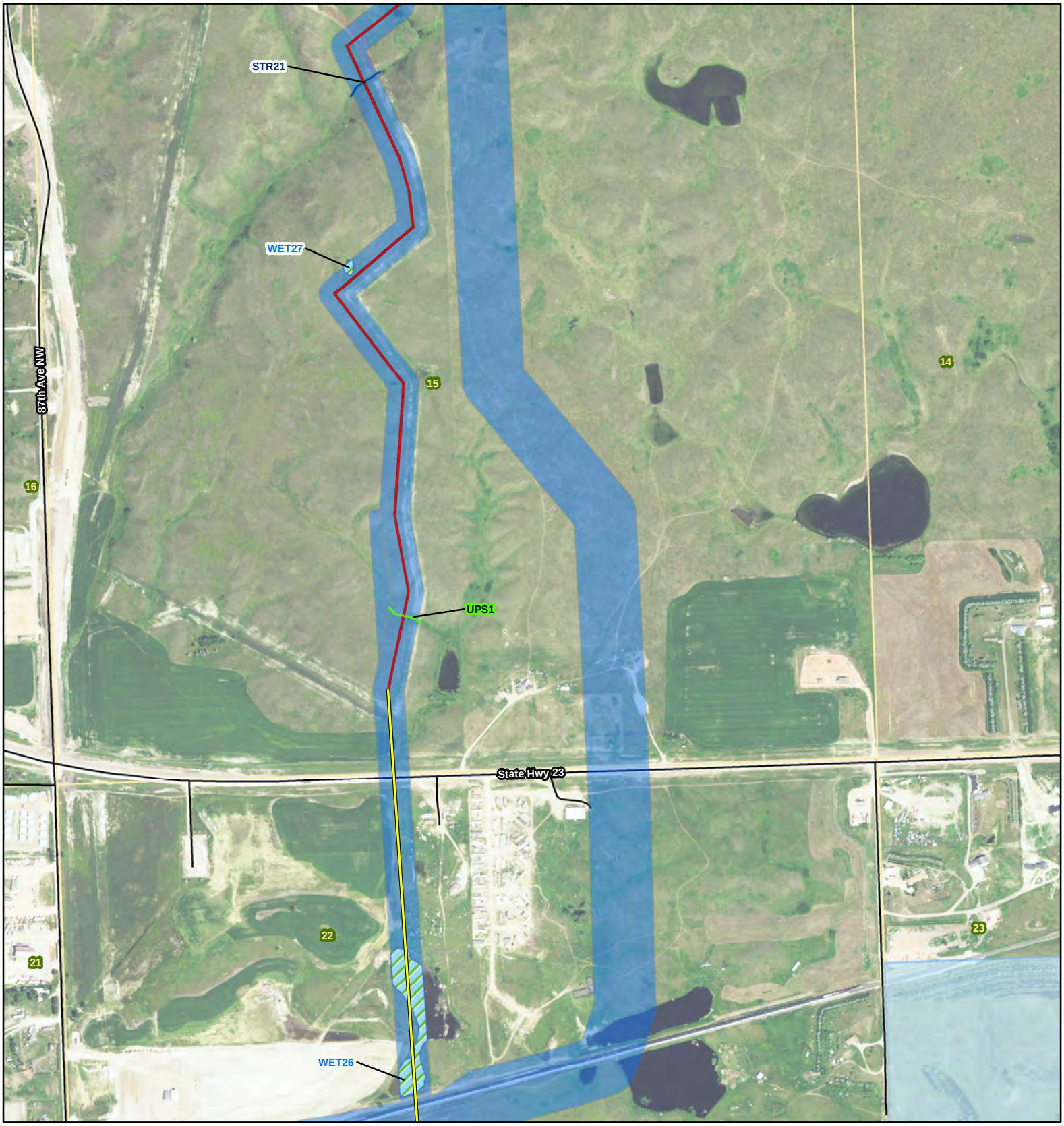

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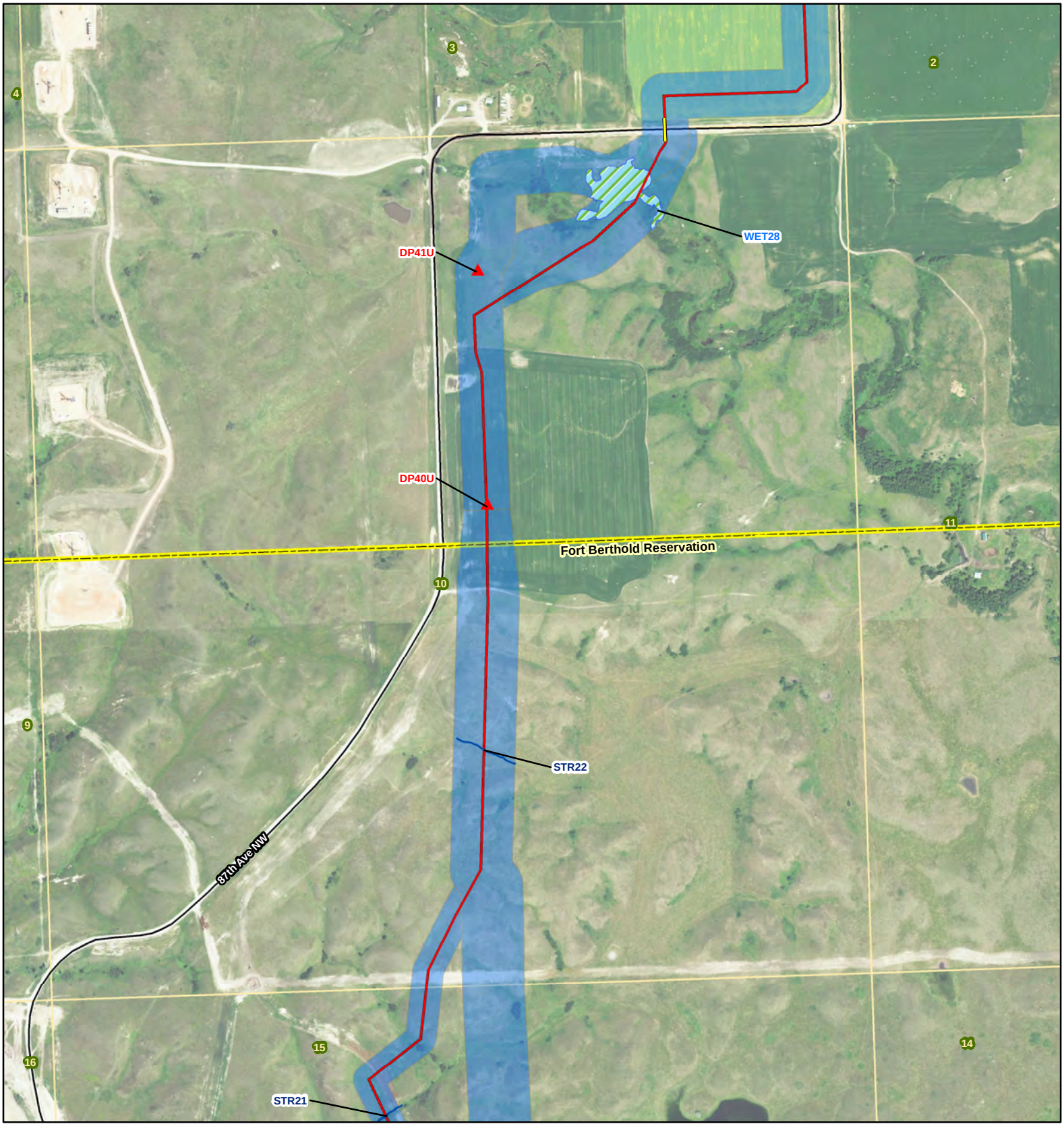

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Mountrail County, North Dakota

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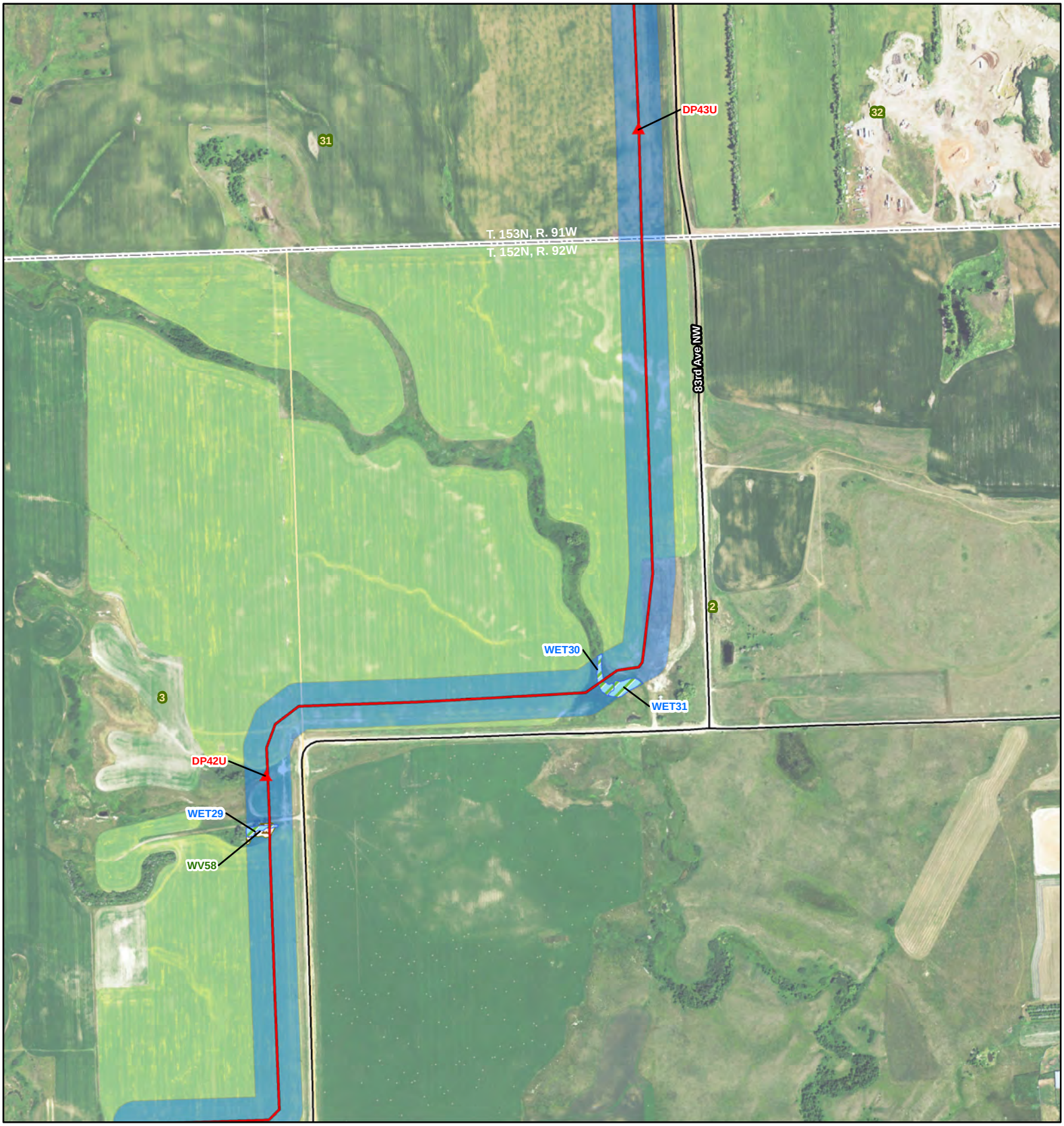

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- Grassland Easement
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- U.S. Army Corps of Engineers
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Miles
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Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Belden SW (1981)

Township/Range: T. 153N, R. 91W &
T. 152N, R. 92W
Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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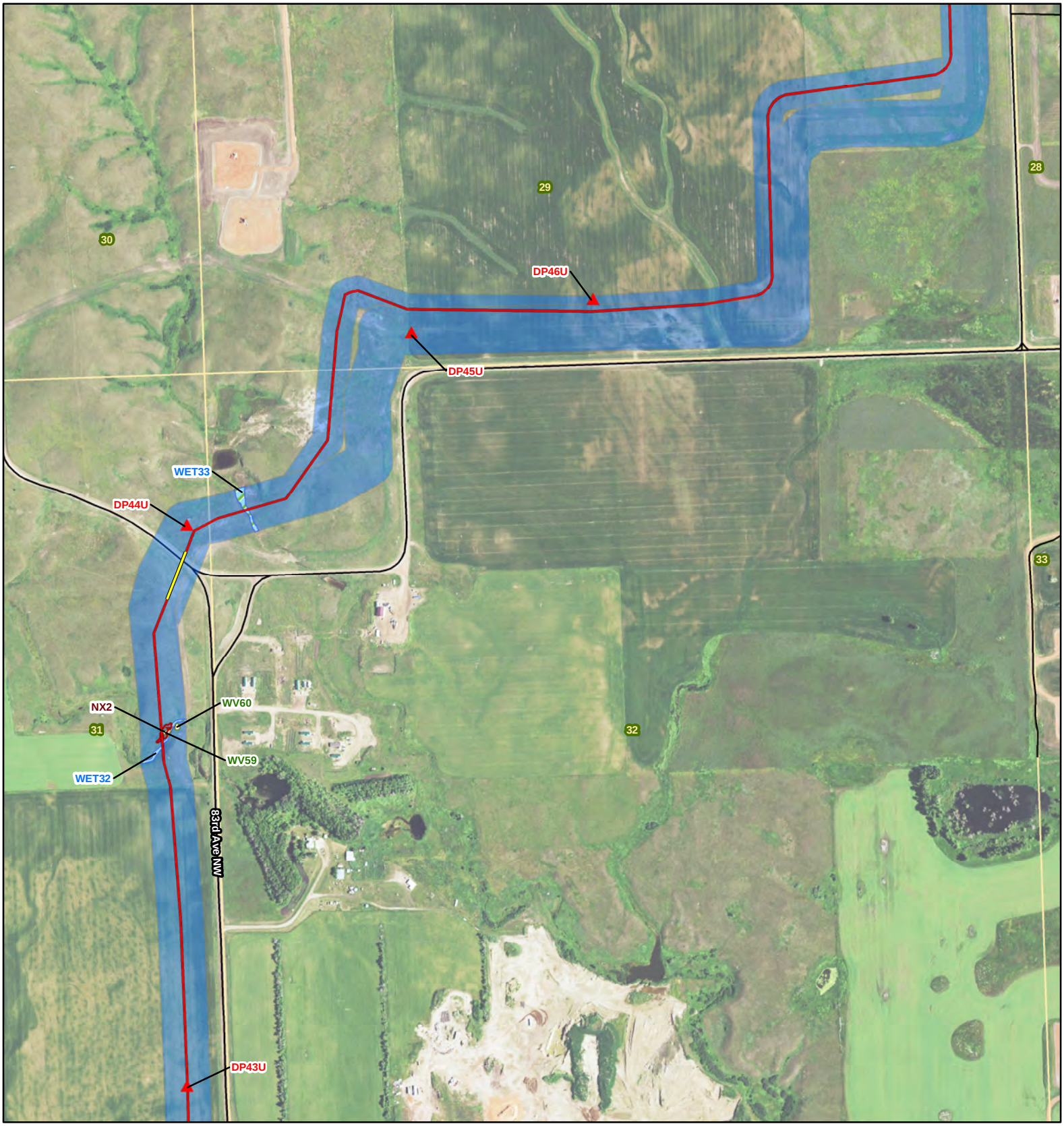

Sacagawea Pipeline

- Bore Location
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- Wetland Data Point
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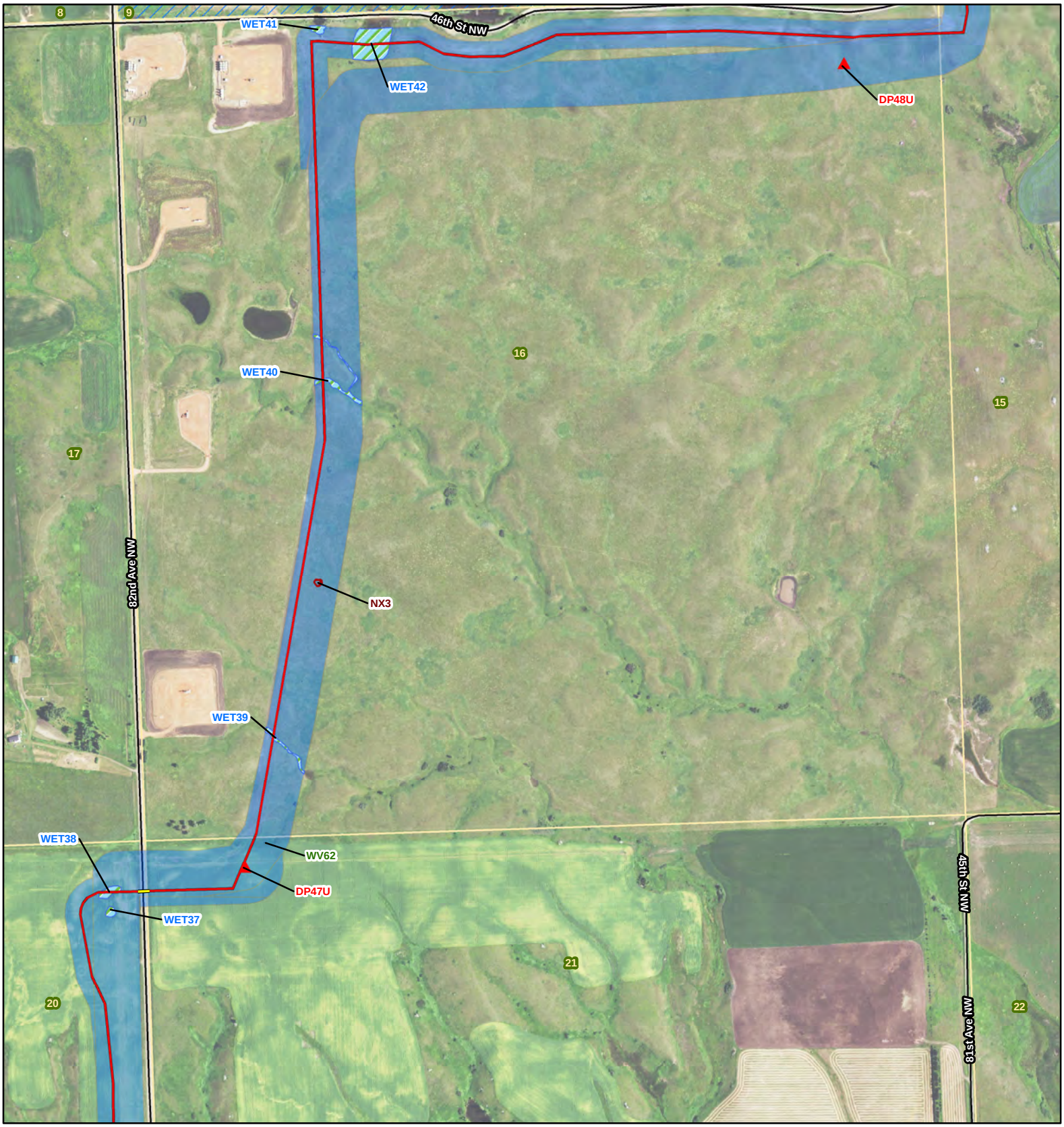

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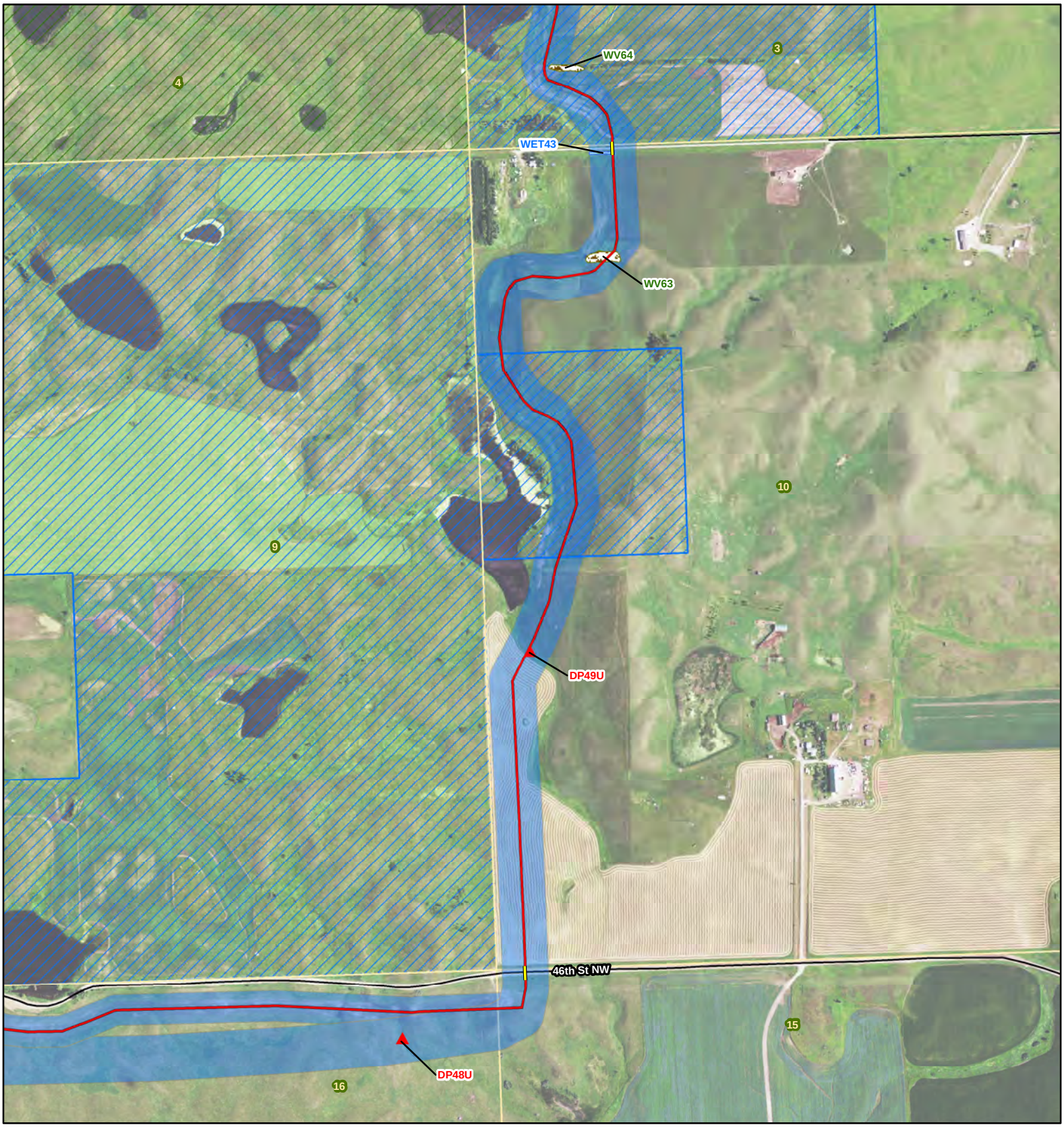

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Mountrail County, North Dakota

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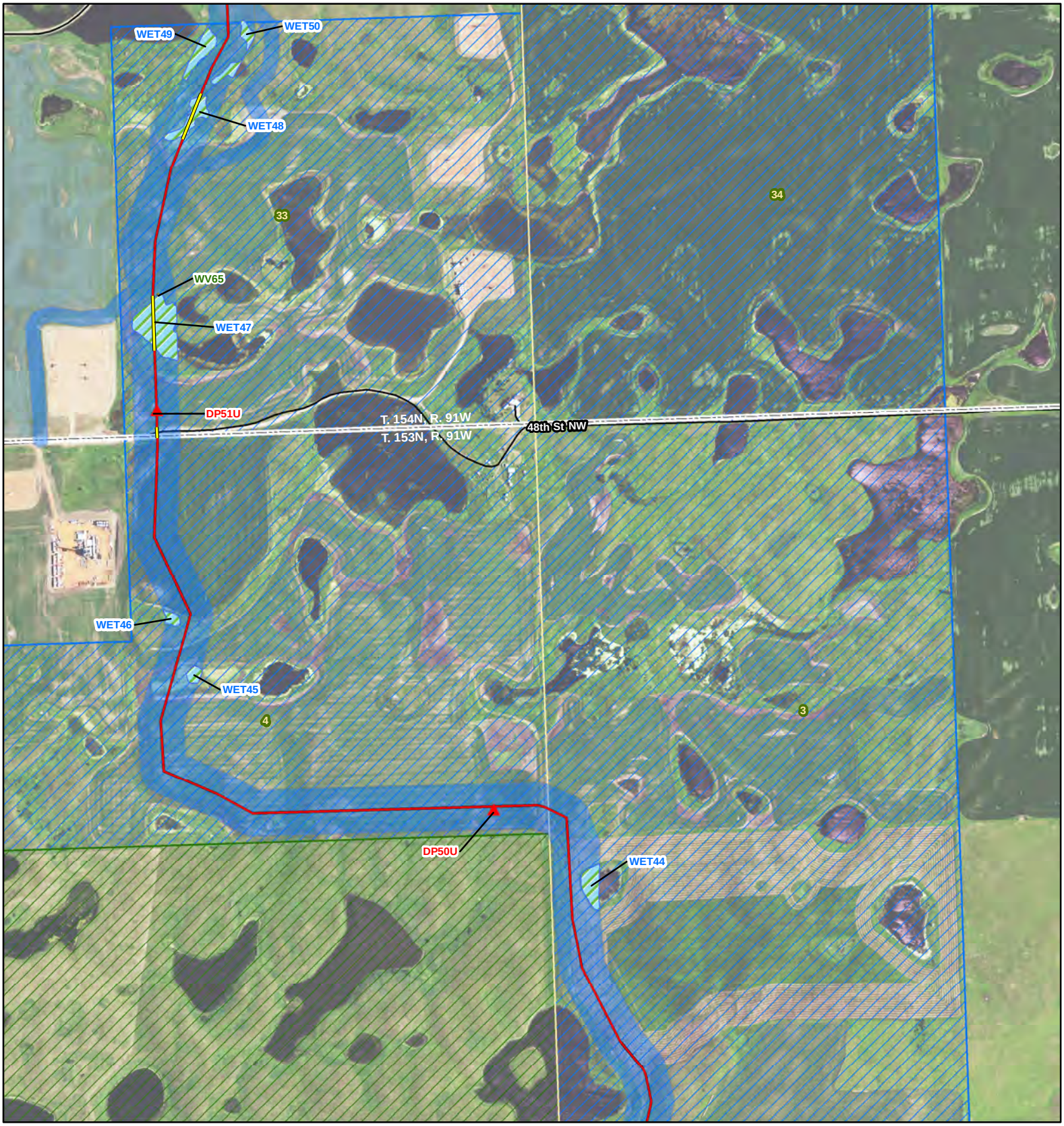

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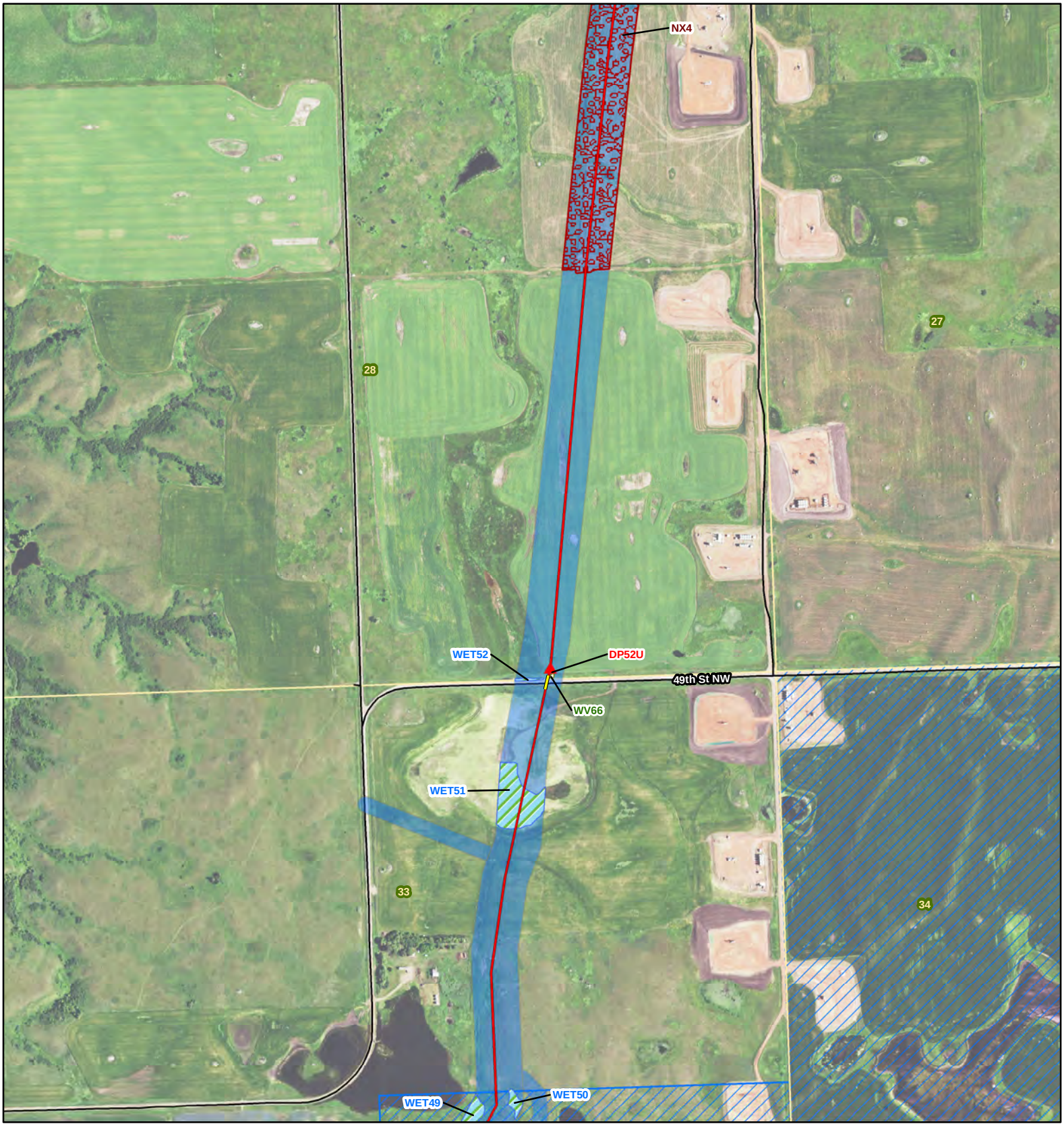

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Belden SW (1981)
Township/Range: T. 154N, R. 91W

Mountrail County, North Dakota

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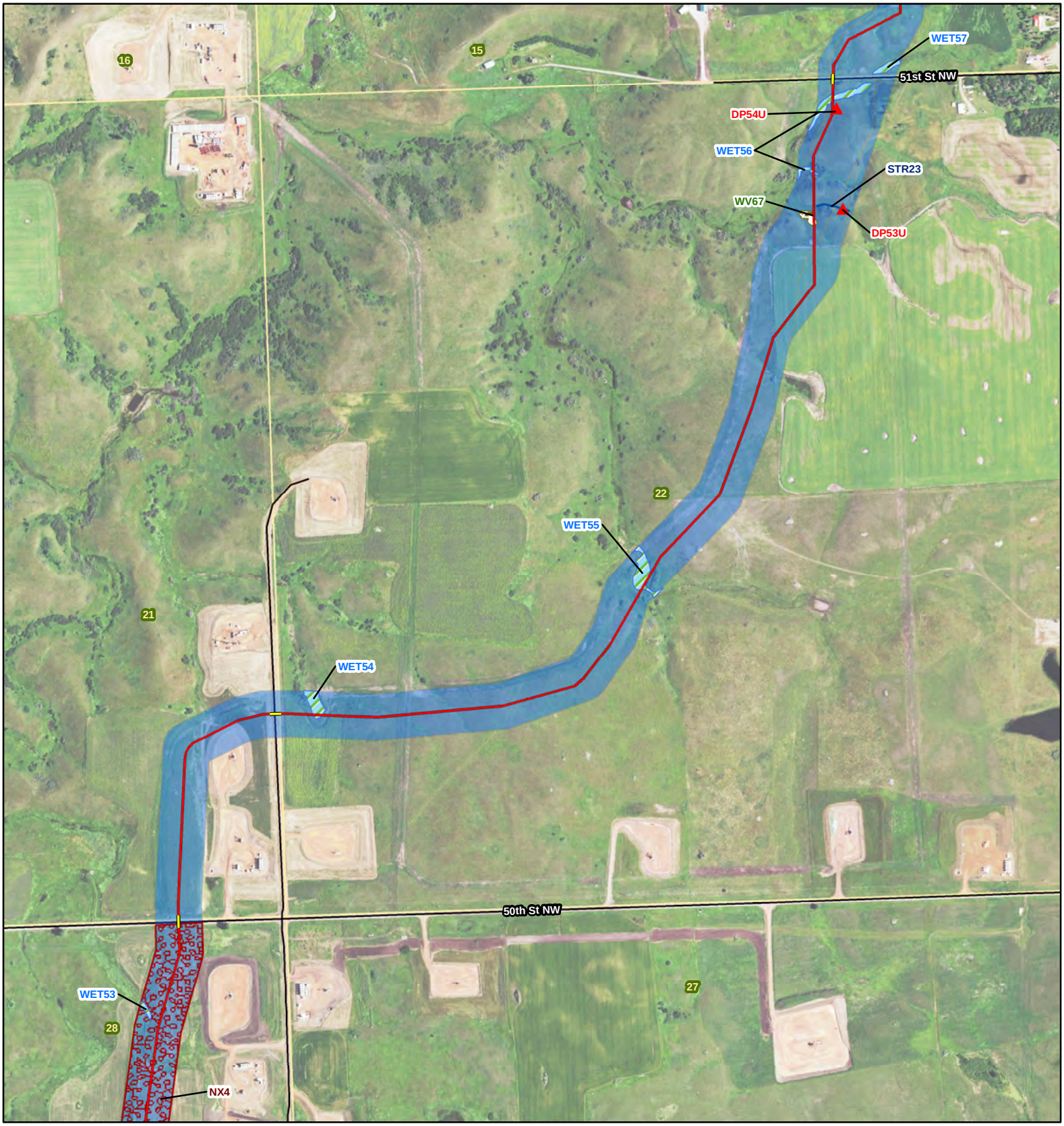

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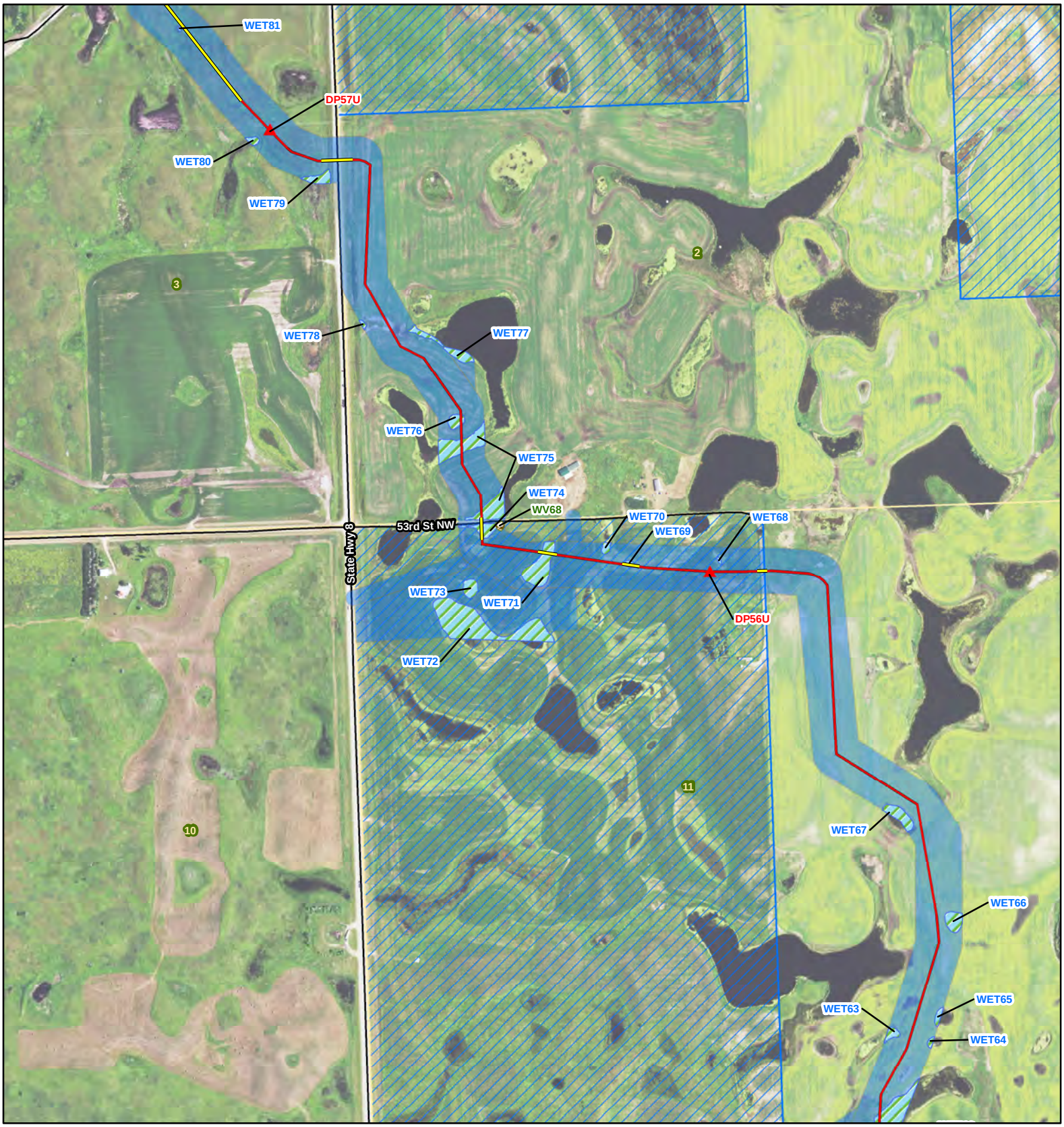

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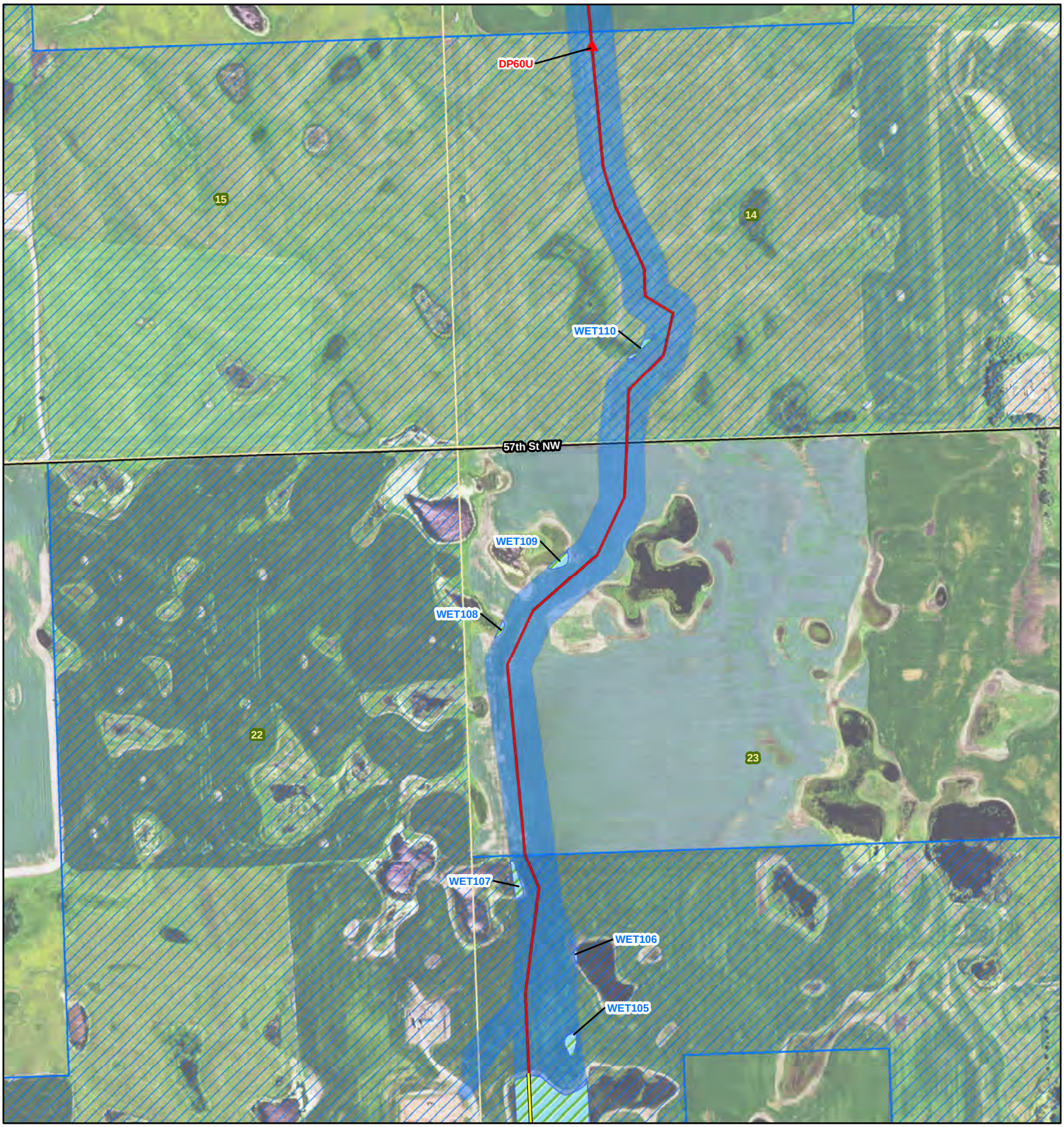

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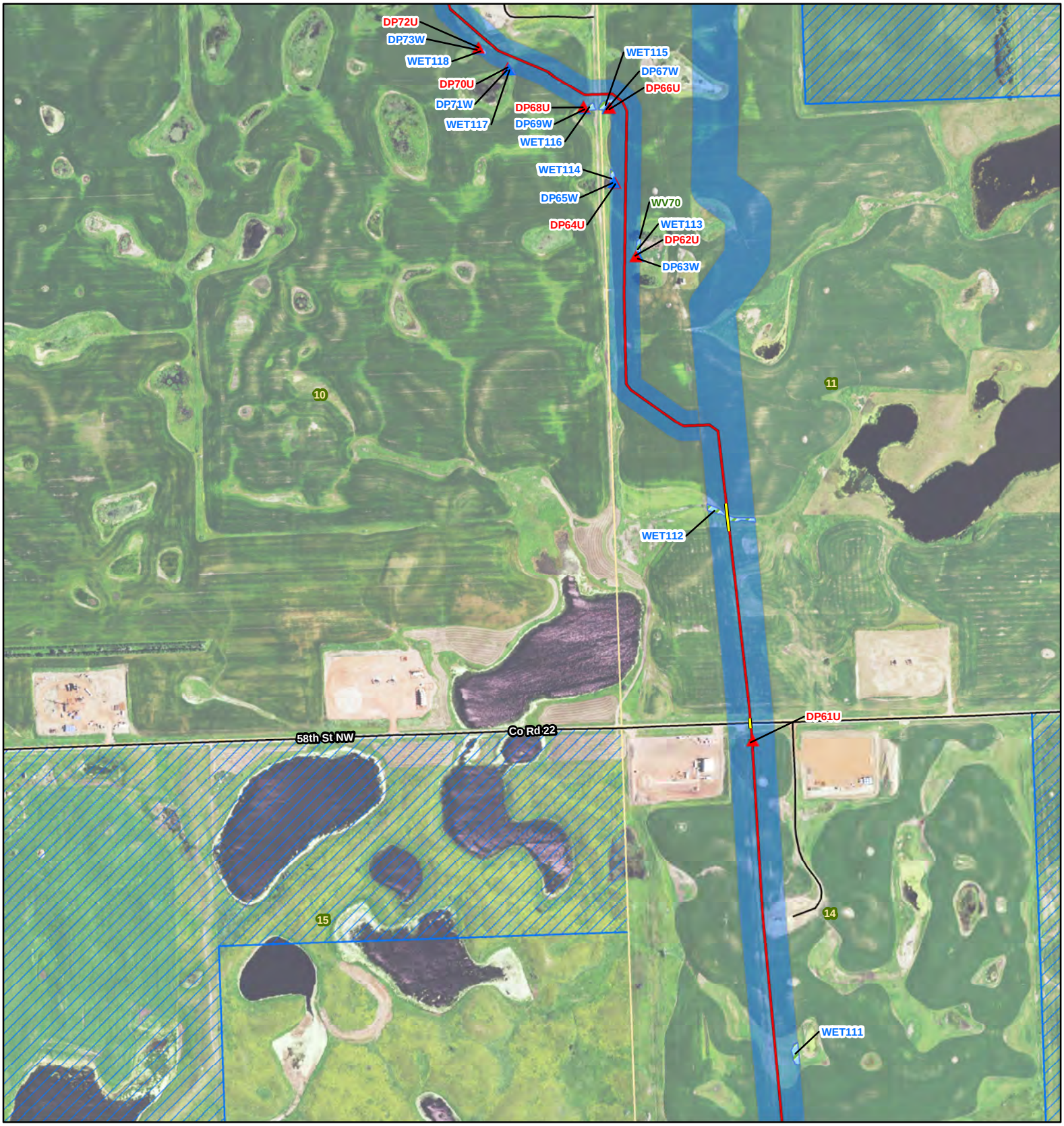

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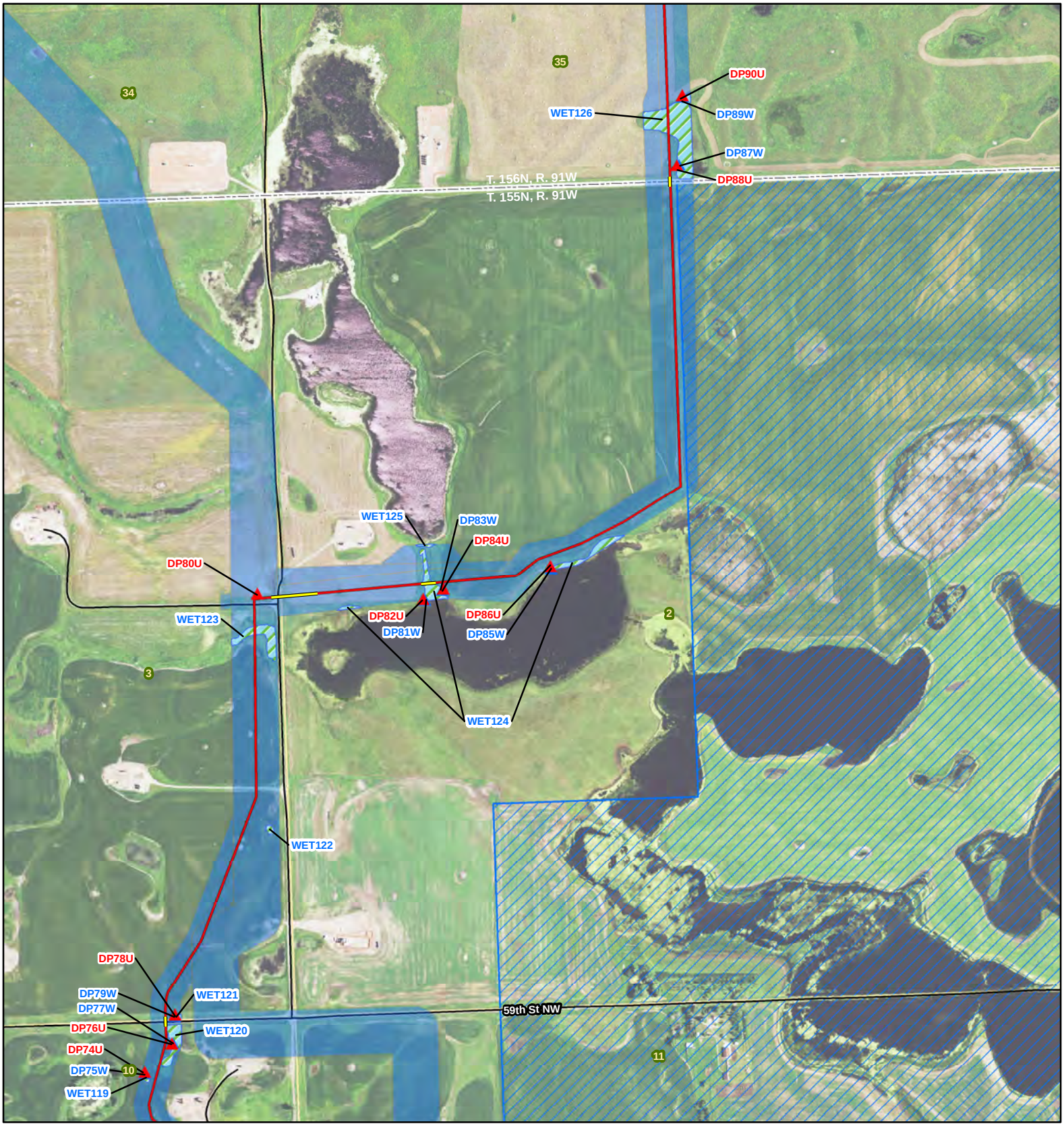

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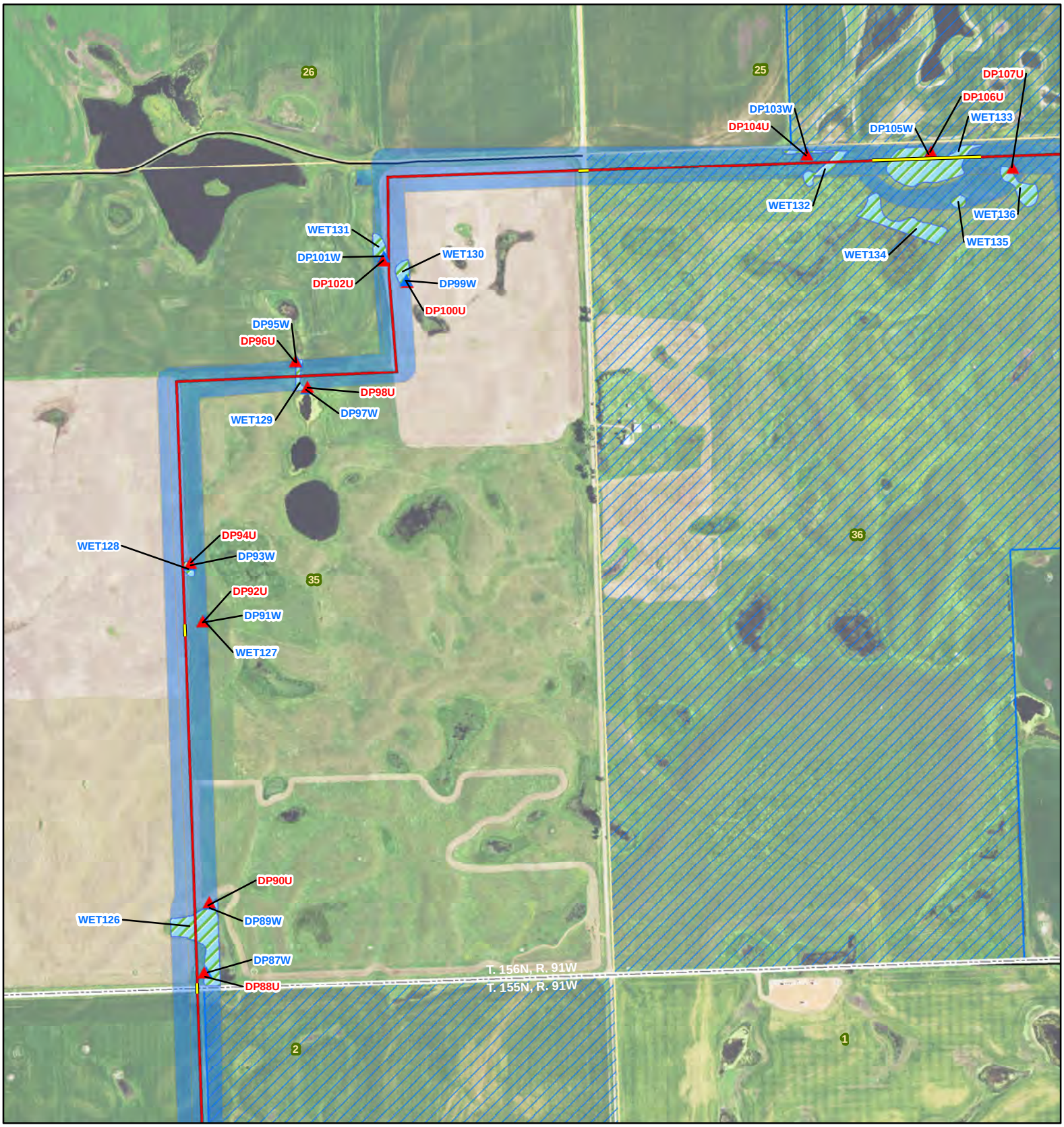

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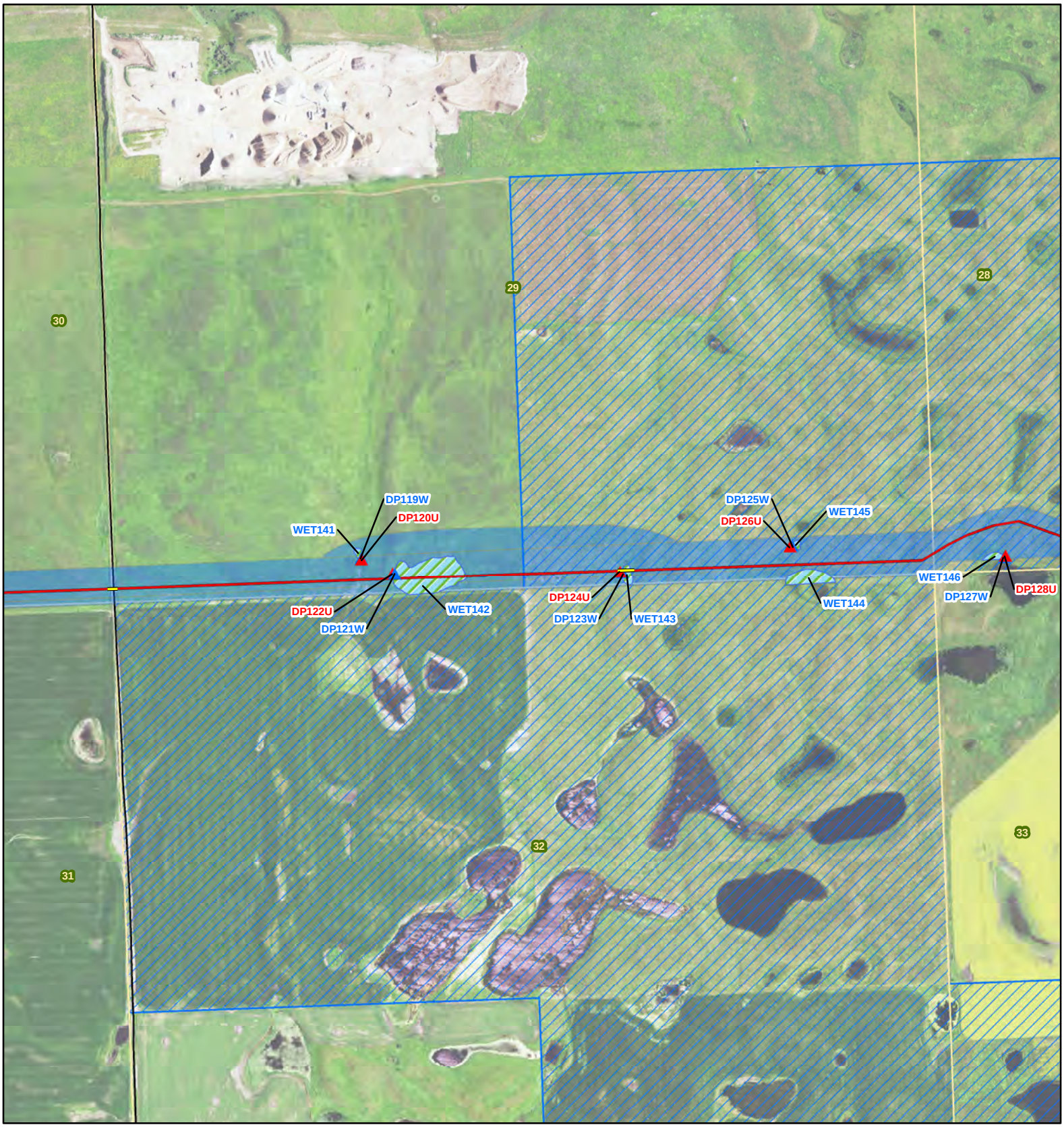

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- Proposed Pipeline System
- Ephemeral Stream
- Upland Swale
- Bore Path
- Existing Road
- Previously Inventoried Area
- Wetland
- Stream
- Waterbody
- Woody Vegetation
- Noxious Weed
- Wetland Easement
- Grassland Easement
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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0 0.25 0.5

Miles
0 0.25 0.5

Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Stanley SE (1981),
Palermo (1981)
Township/Range: T. 156N, R. 90W

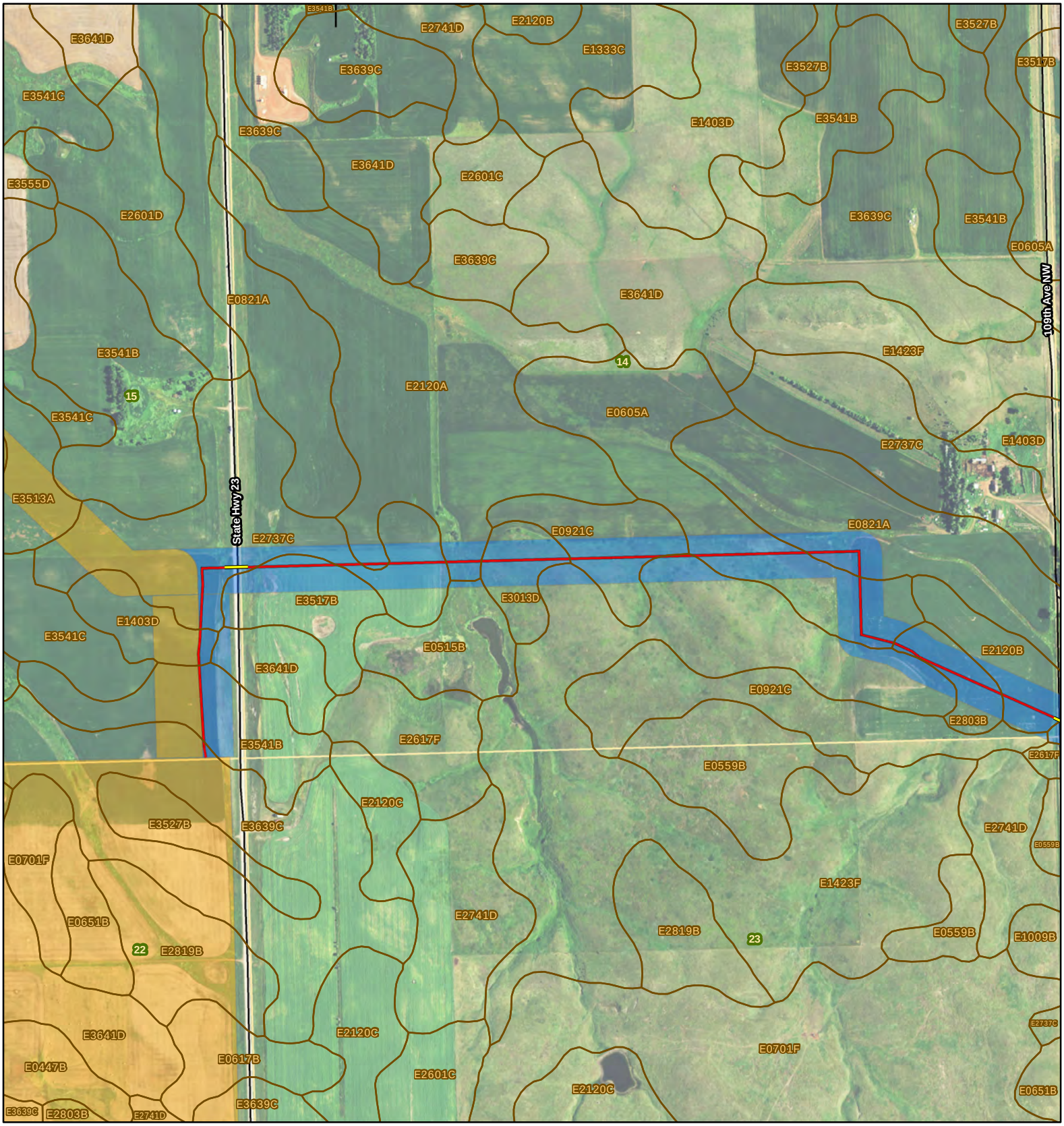
Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

APPENDIX B

Survey Area Soils Series Map



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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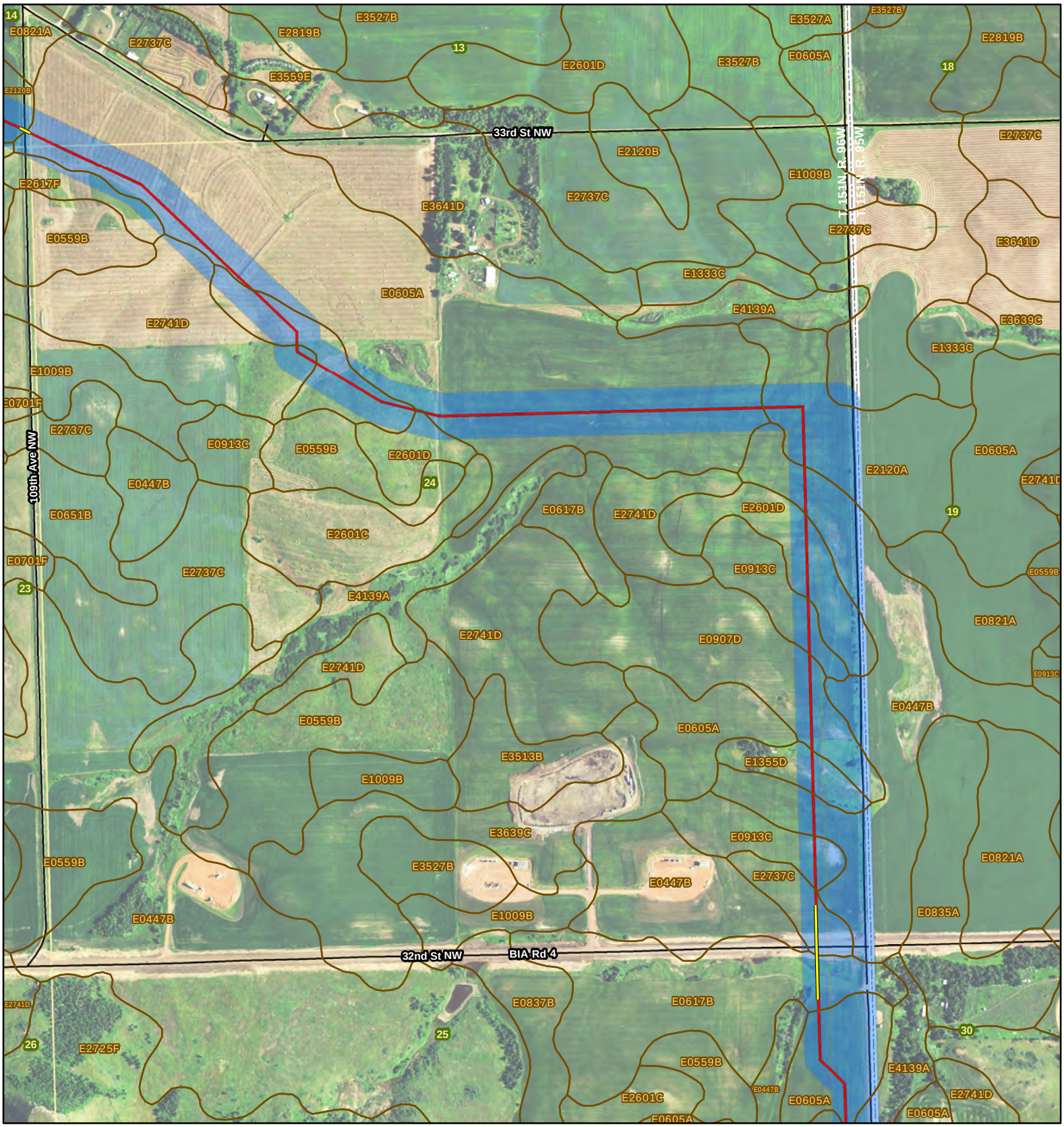
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Keene (1995)

Township/Range: T. 151N, R. 96W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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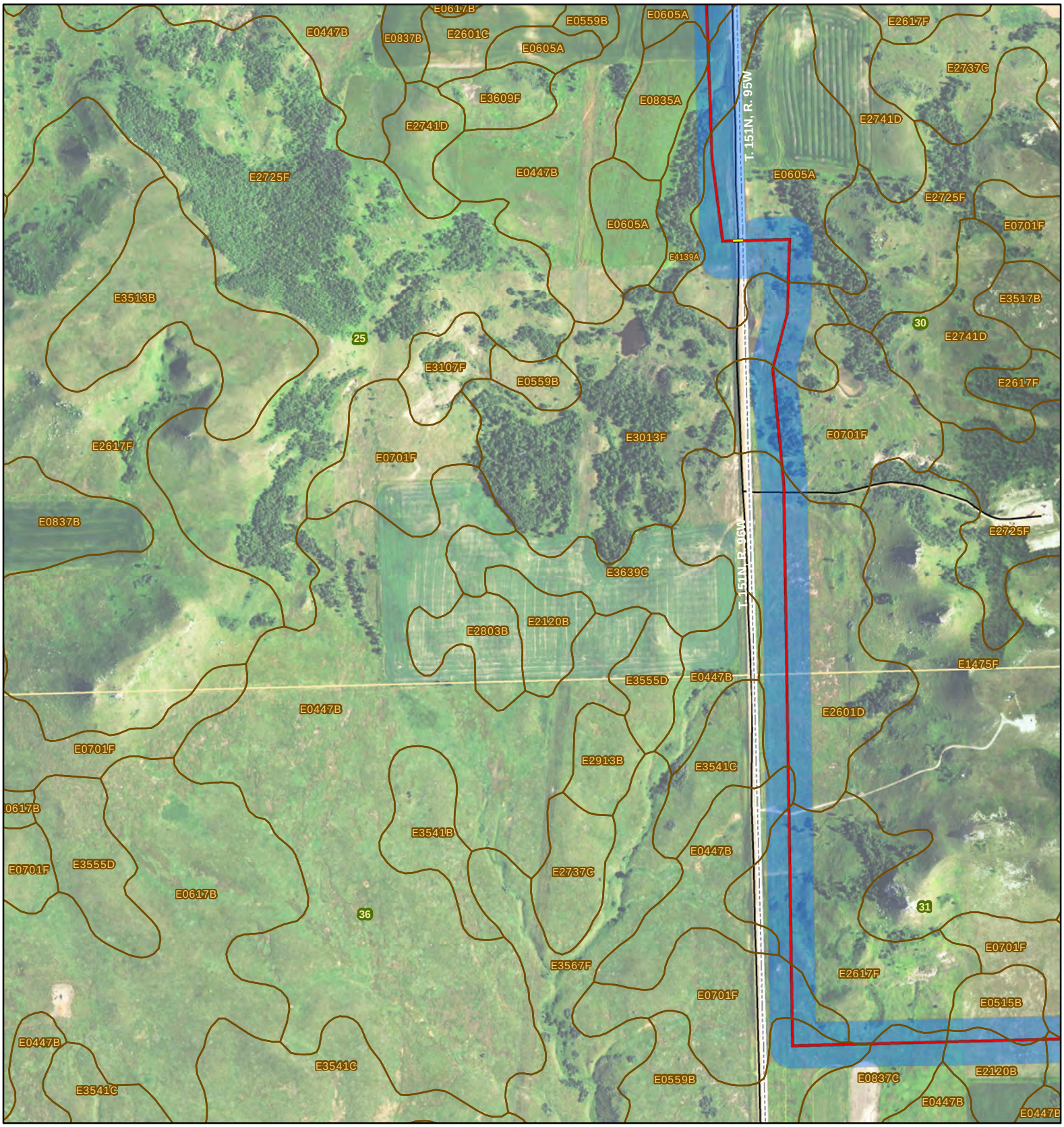
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Johnsons Corner (1995),
Keene (1995)
Township/Range: T. 151N, R. 96W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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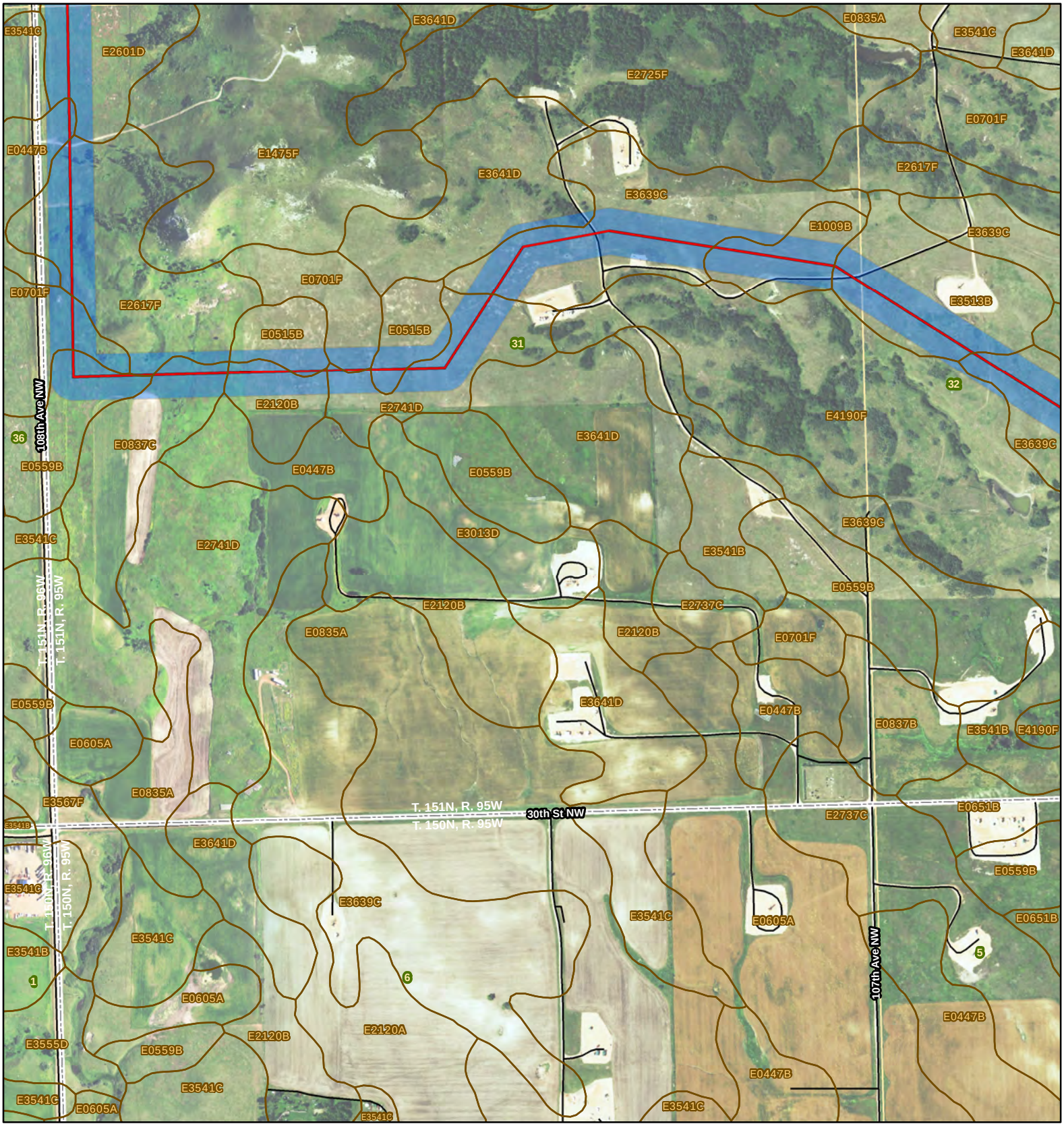
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Johnsons Corner (1995)

Township/Range: T. 151N, R. 95W &
T. 151N, R. 96W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
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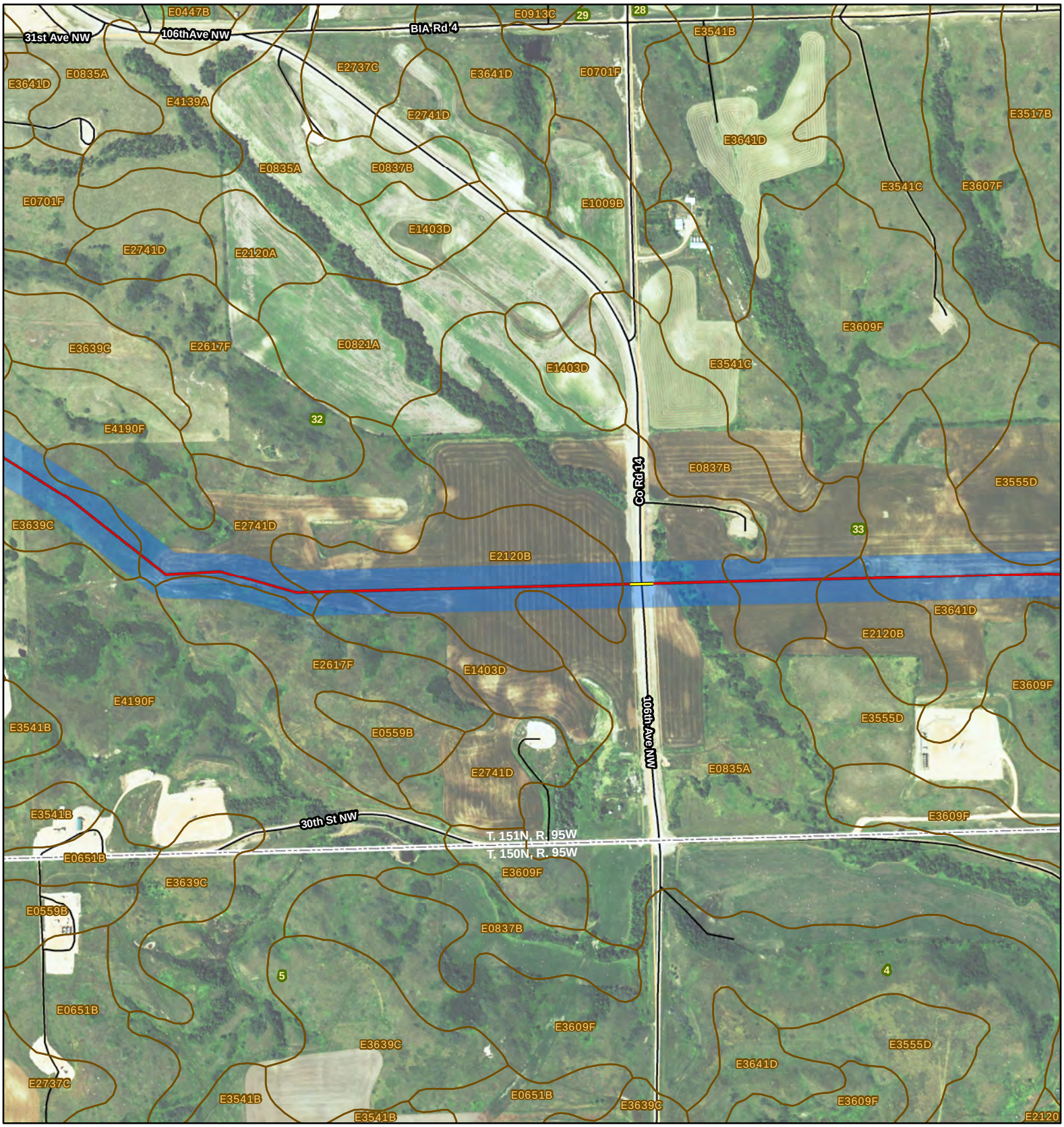
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996),
Johnsons Corner (1995)
Township/Range: T. 151N, R. 95W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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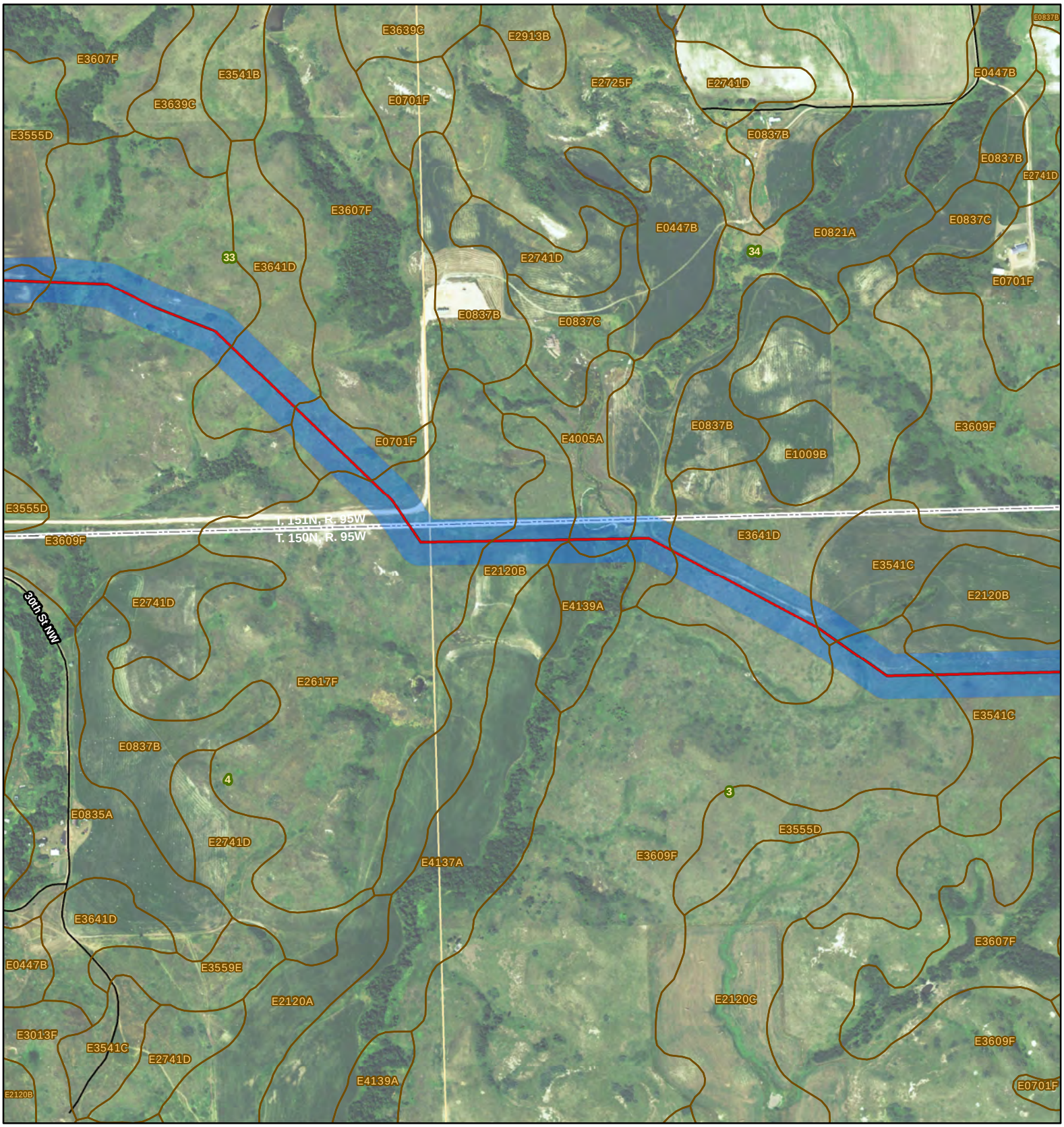
Township/Range: T. 151N, R. 95W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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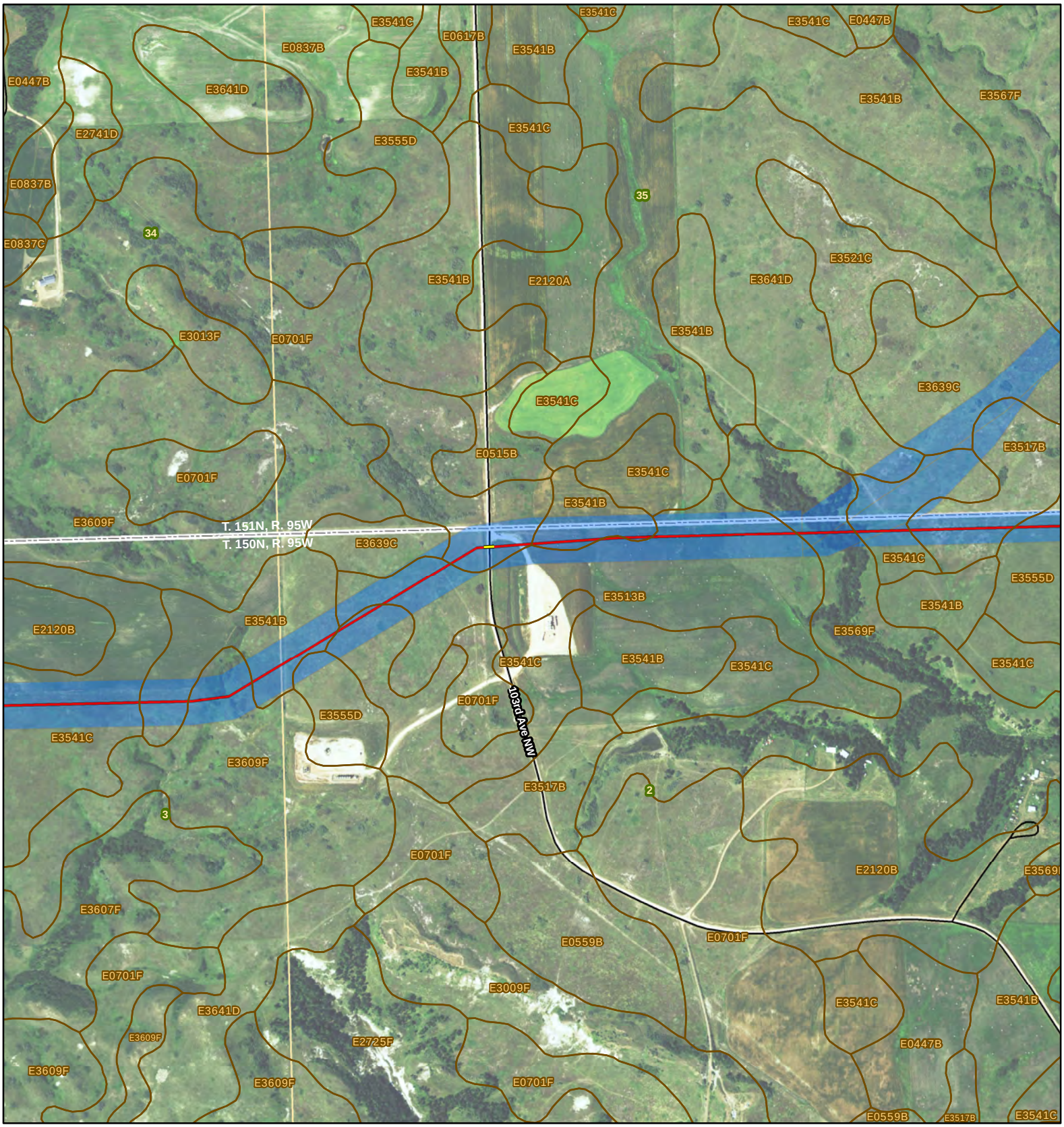
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996)

Township/Range: T. 150N, R. 95W &
T. 151N, R. 95W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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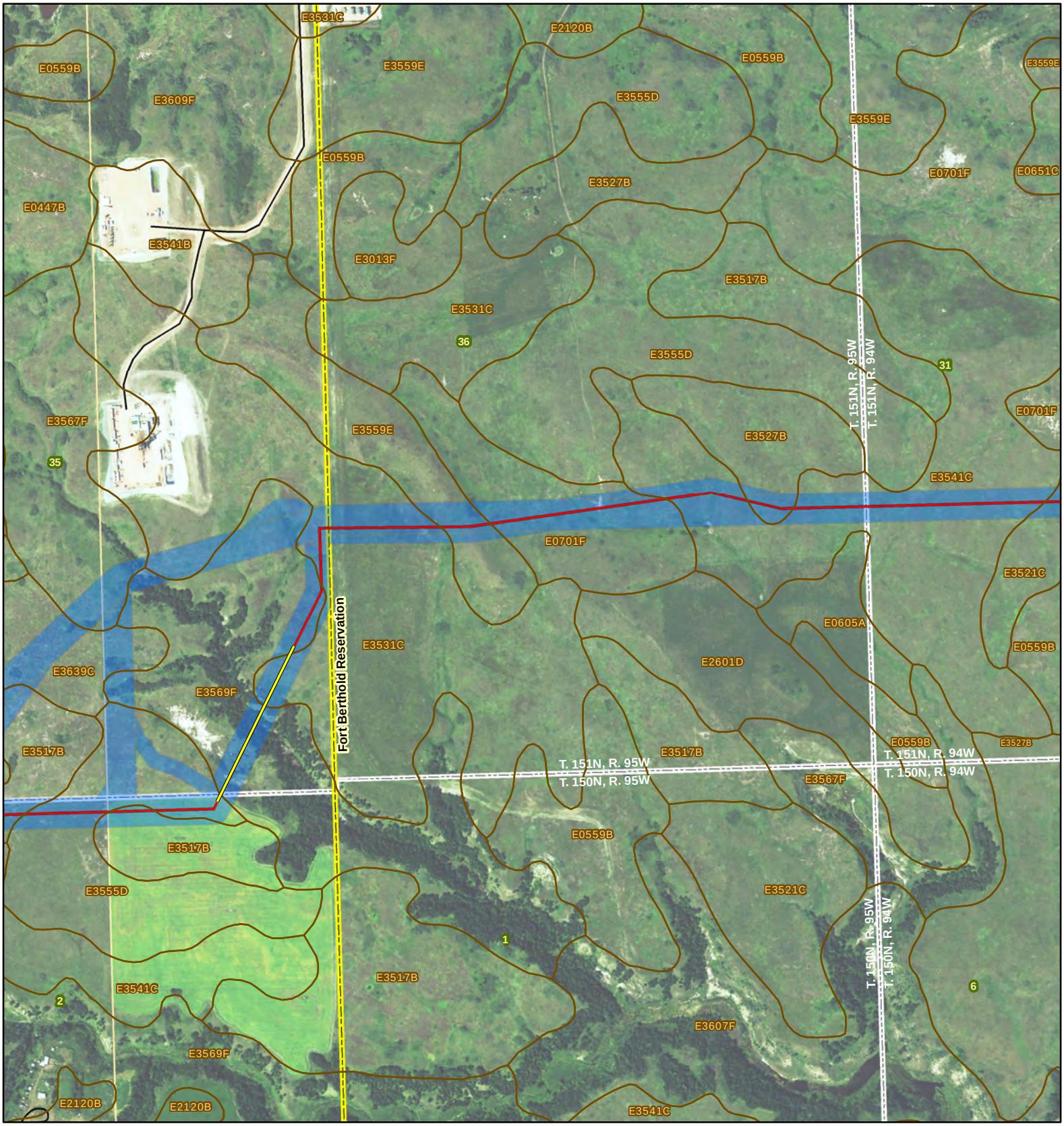
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Blue Buttes SE (1996)

Township/Range: T. 151N, R. 95W &
T. 150N, R. 95W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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- Section Boundary
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Base Map: 2014 Aerial Imagery
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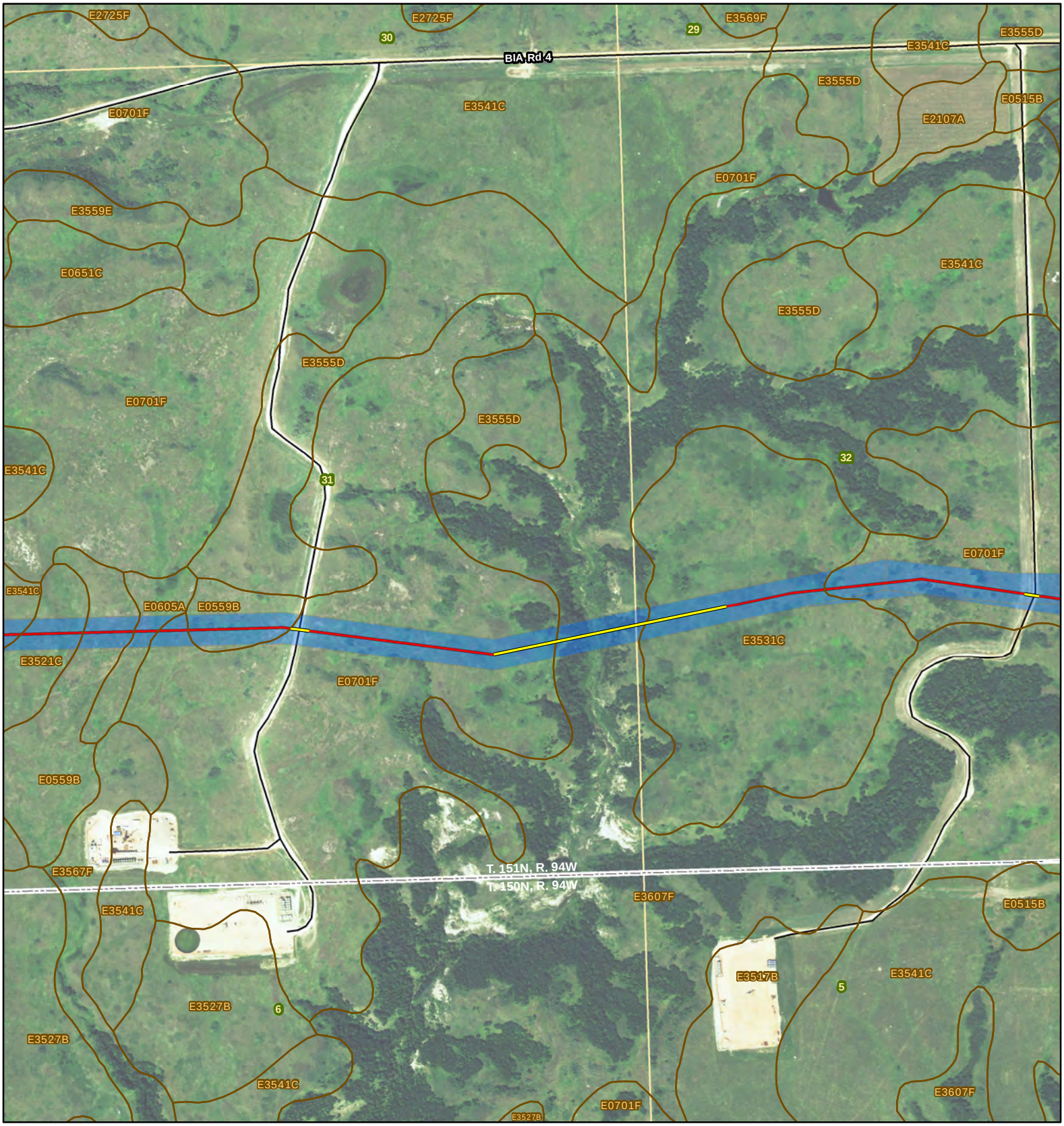
Quadrangle: Blue Buttes SE (1996)

Township/Range: T. 151N, R. 94W &
T. 151N, R. 95W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
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Base Map: 2014 Aerial Imagery
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Quadrangle: Sanish SW (1969),
Blue Buttes SE (1996)
Township/Range: T. 151N, R. 94W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
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Quadrangle: Sanish SW (1969)

Township/Range: T. 151N, R. 94W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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Quadrangle: Sanish SW (1969)

Township/Range: T. 151N, R. 94W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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Base Map: 2014 Aerial Imagery
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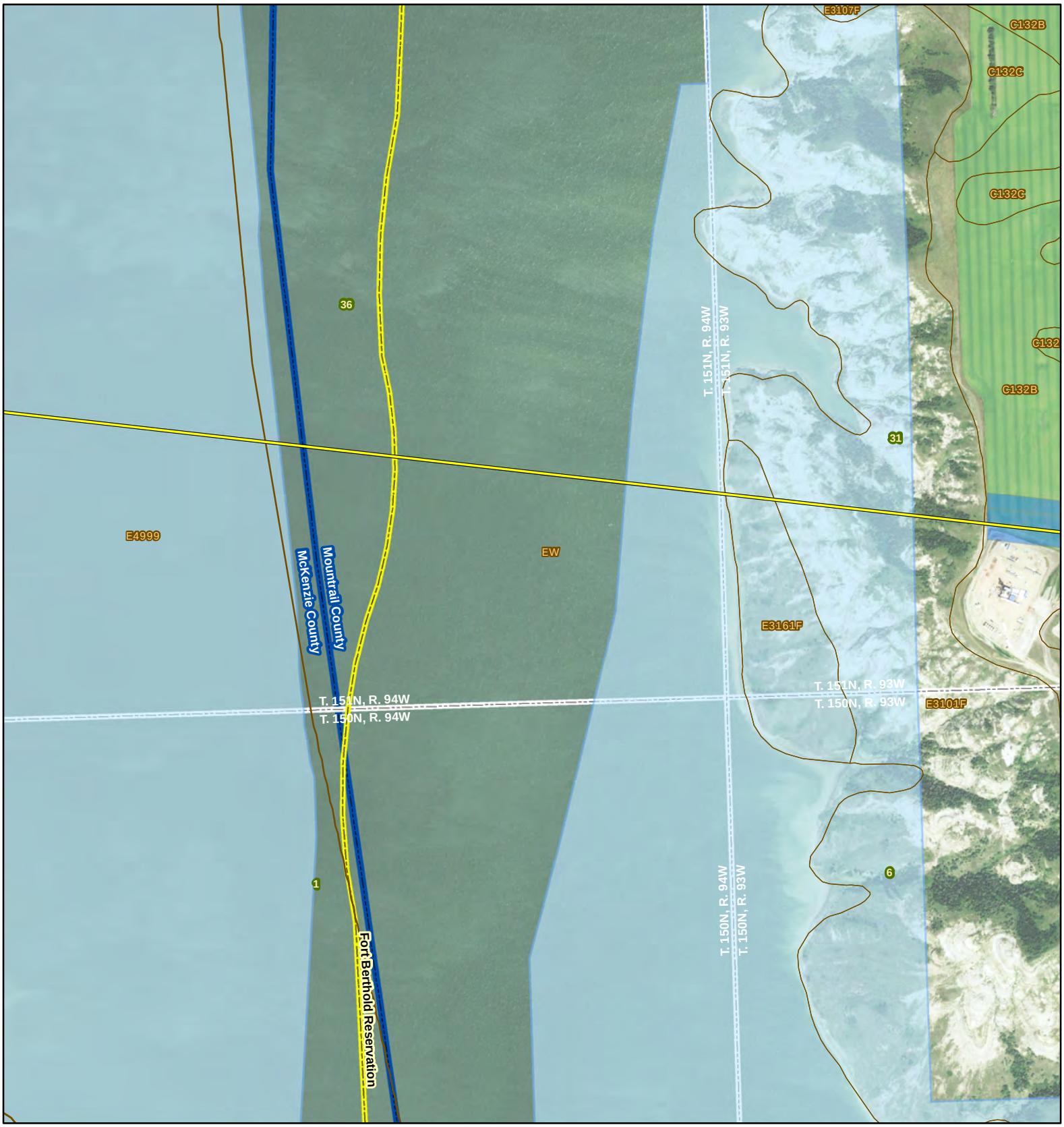
Quadrangle: Sanish SW (1969)

Township/Range: T. 151N, R. 94W

McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
- Reservation Boundary
- U.S. Army Corps of Engineers
- Section Boundary
- Township/Range Boundary
- County Boundary

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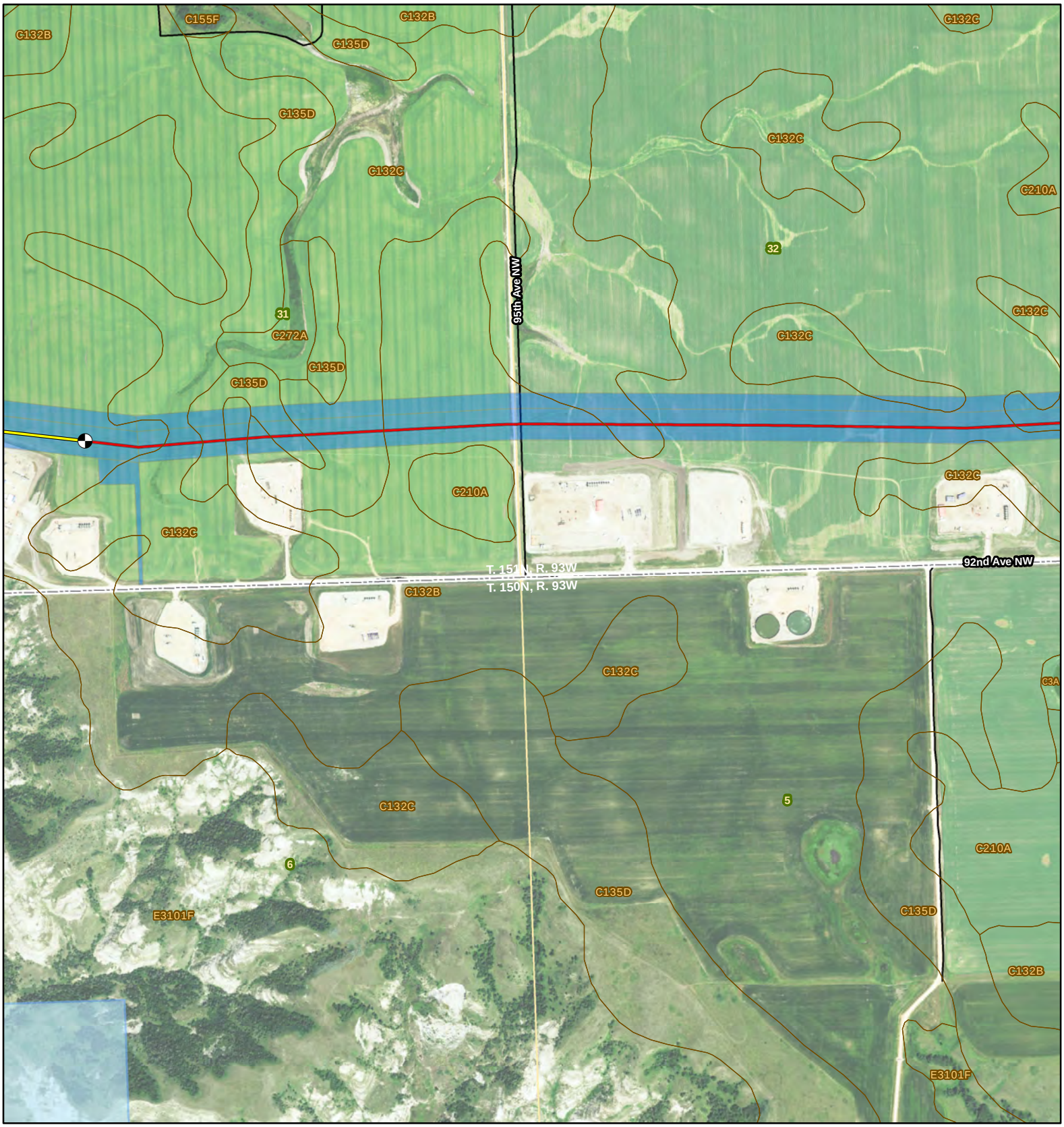
Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Sanish SW (1969)

Township/Range: T. 151N, R. 93W &
T. 151N, R. 94W
Mountrail and McKenzie Counties, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
- Previously Inventoried Area
- Soil Unit Boundary
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Sanish SW (1969)
Township/Range: T. 151N, R. 93W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
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- Previously Inventoried Area
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Quadrangle: Sanish SE (1969)

Township/Range: T. 151N, R. 93W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
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- Existing Road
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Quadrangle: Sanish SE (1969)

Township/Range: T. 151N, R. 93W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
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Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
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Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
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Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
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- Existing Road
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Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Sanish (1969)

Township/Range: T. 152N, R. 93W &
T. 151N, R. 93W
Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
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Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
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- Bore Path
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Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: New Town (1981),
Sanish (1969)
Township/Range: T. 152N, R. 92W &
T. 152N, R. 93W
Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
- Proposed Pipeline System
- Bore Path
- Existing Road
- Survey Area
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Quadrangle: New Town (1981)

Township/Range: T. 152N, R. 92W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

Sacagawea Pipeline

- Bore Location
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- Bore Path
- Existing Road
- Survey Area
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- Soil Unit Boundary
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Kilometers
0 0.25 0.5

Miles
0 0.25 0.5

Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: New Town (1981)

Township/Range: T. 152N, R. 92W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

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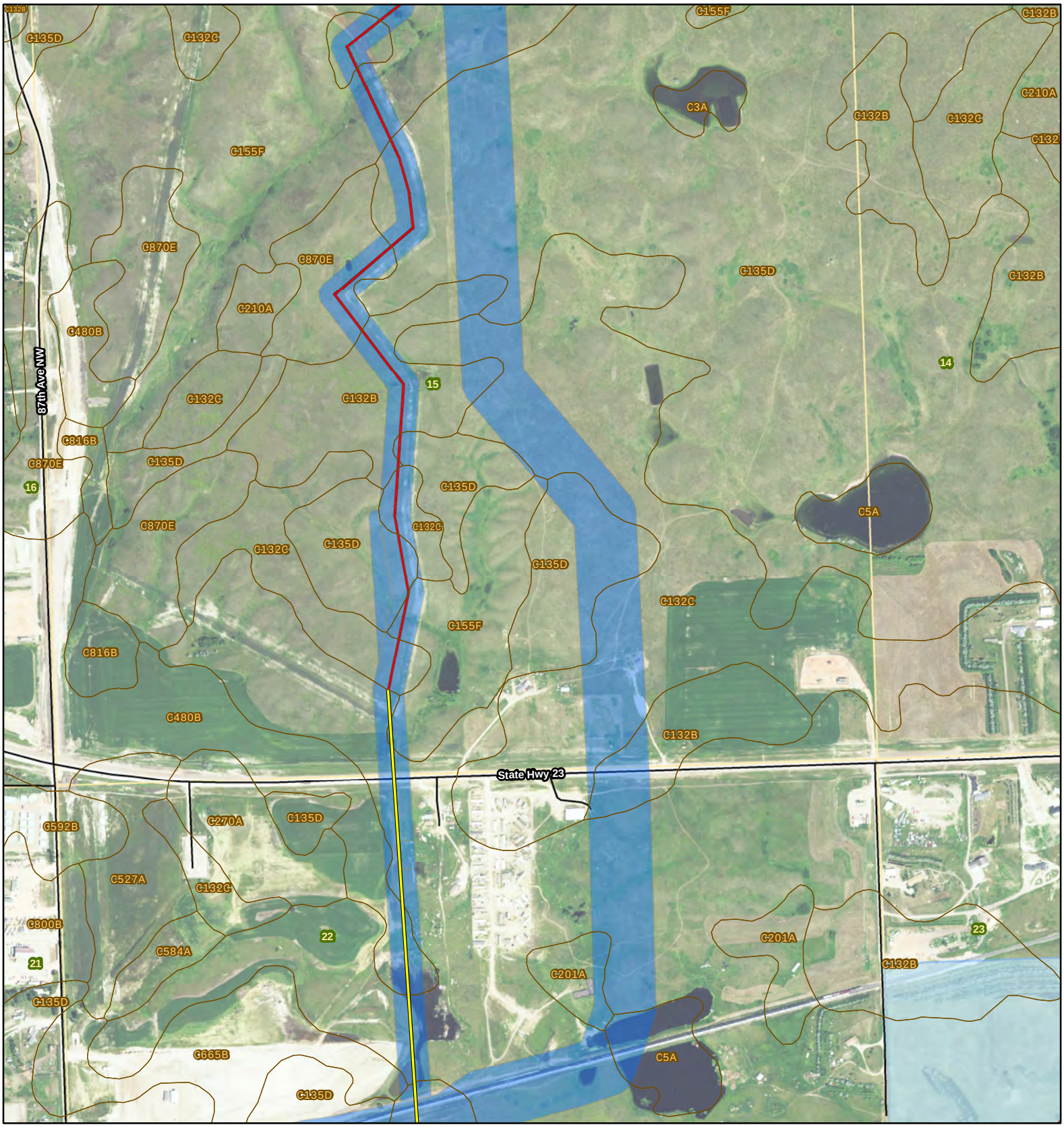

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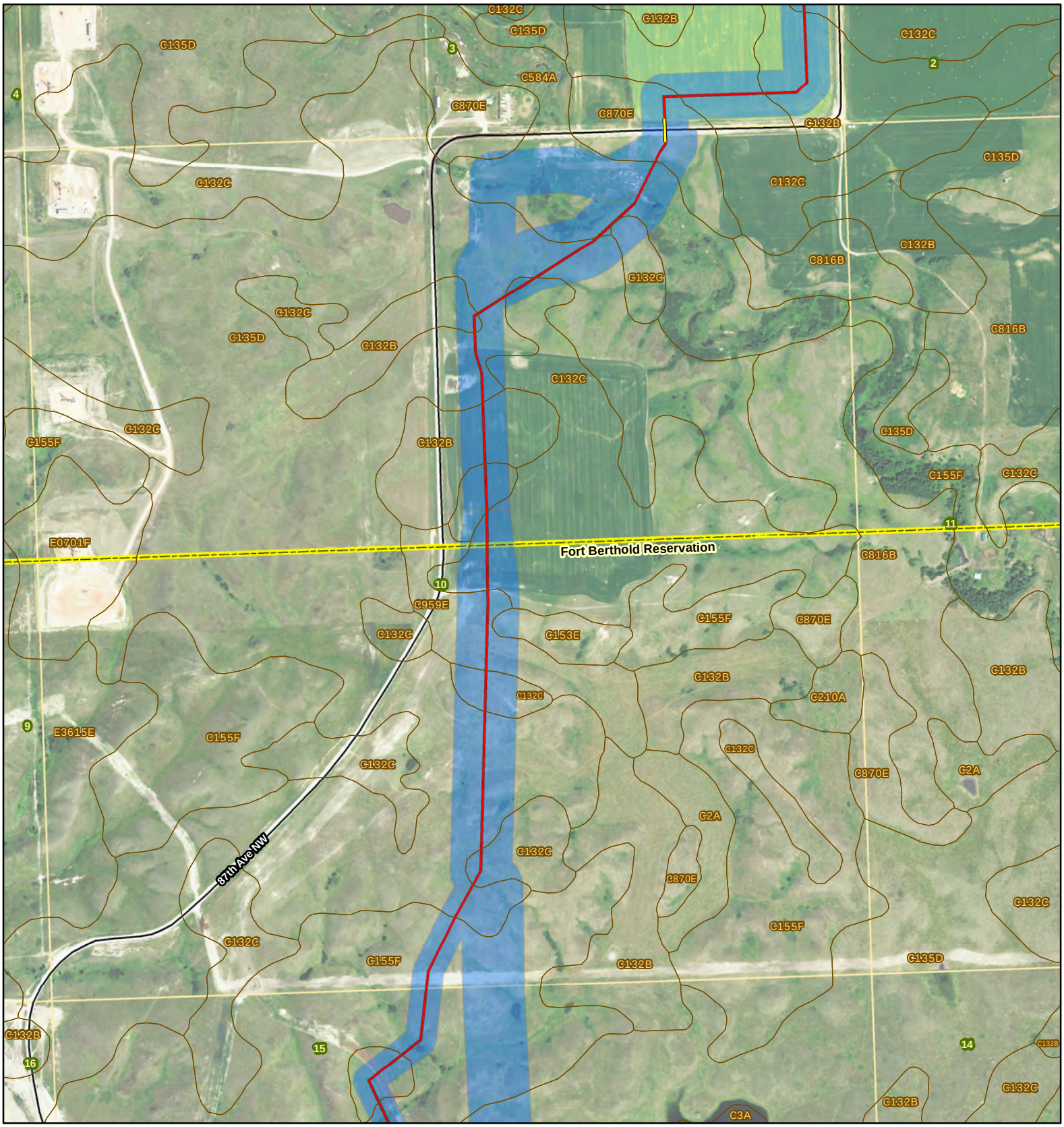

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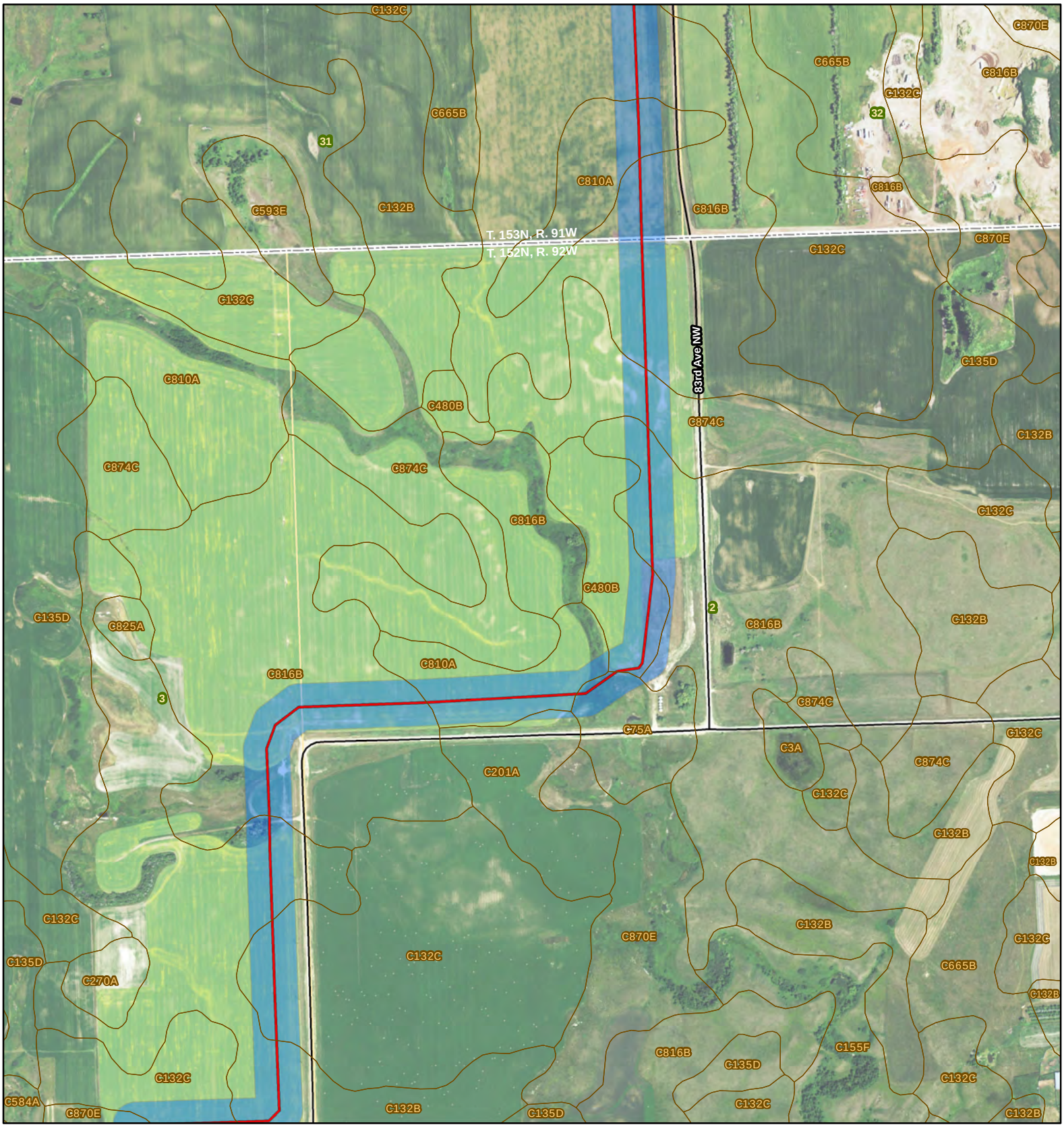

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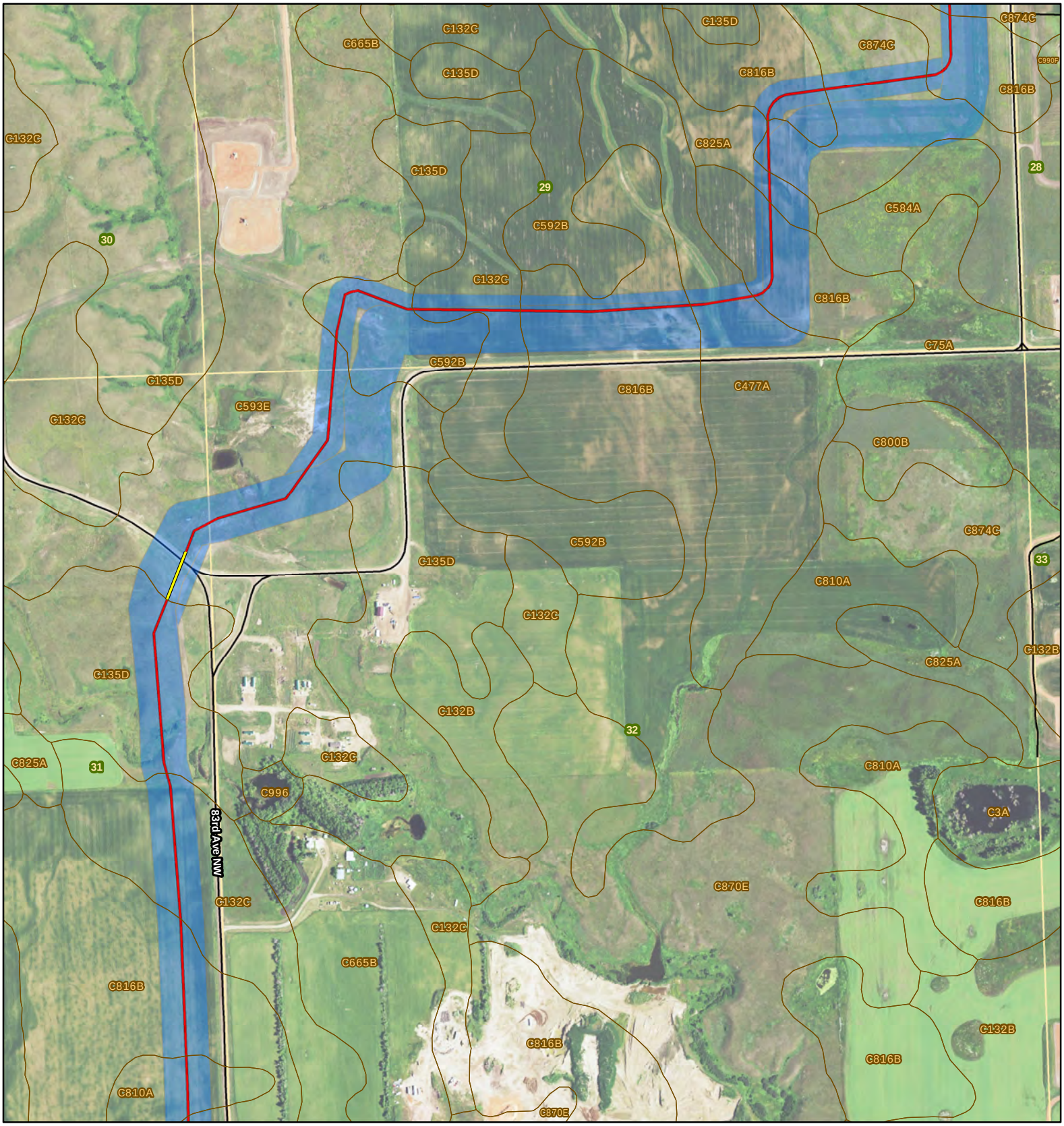

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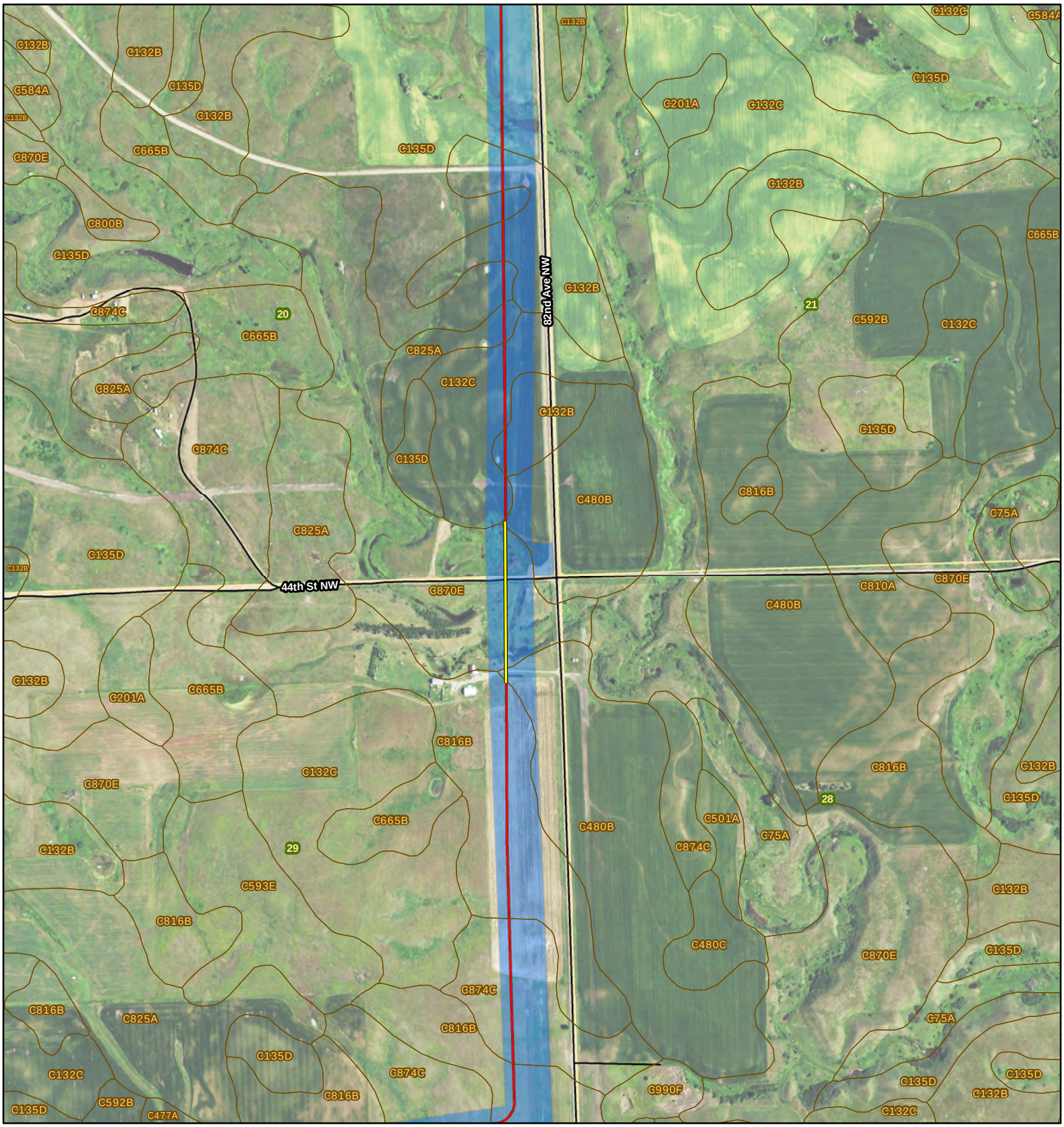

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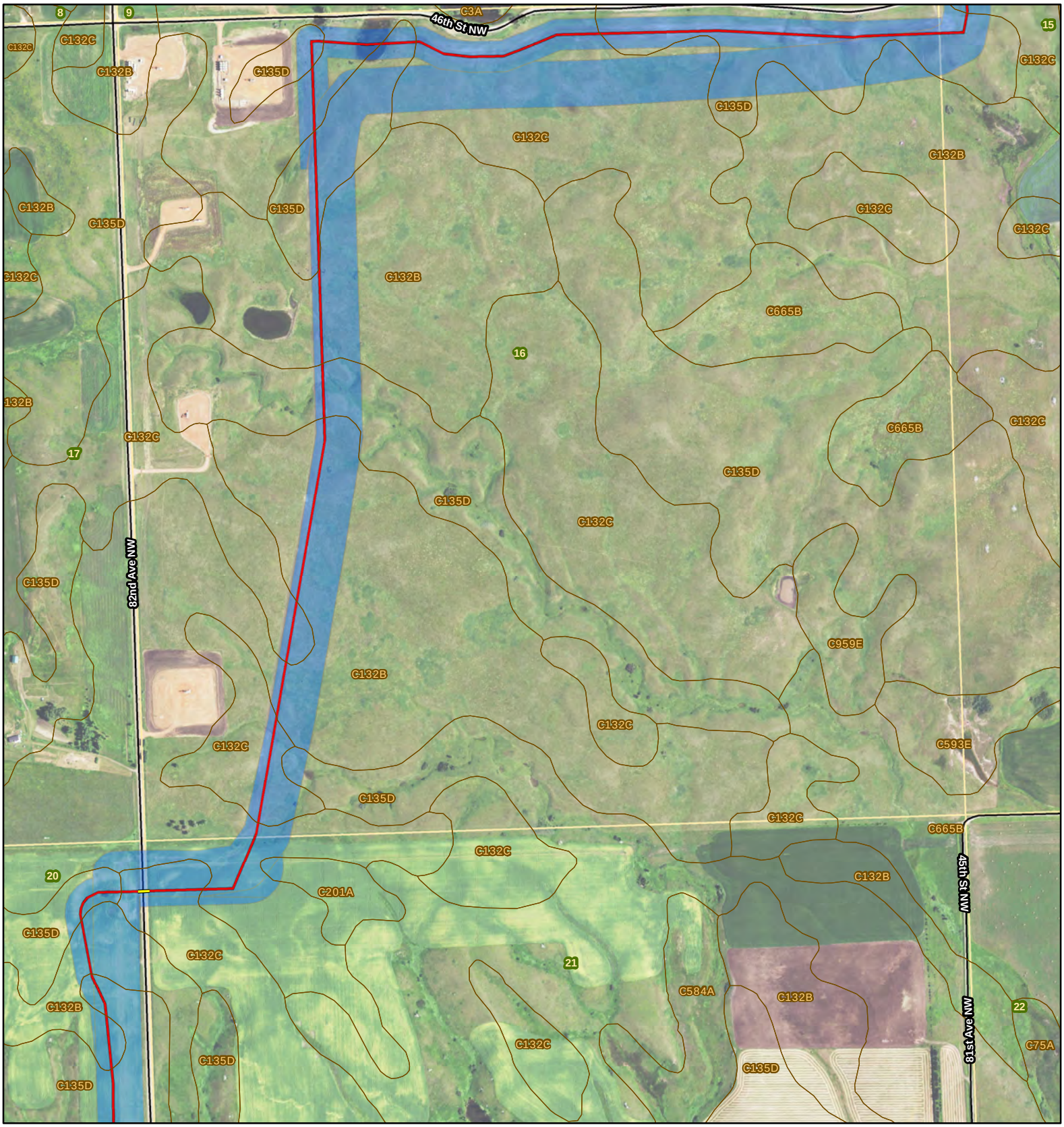

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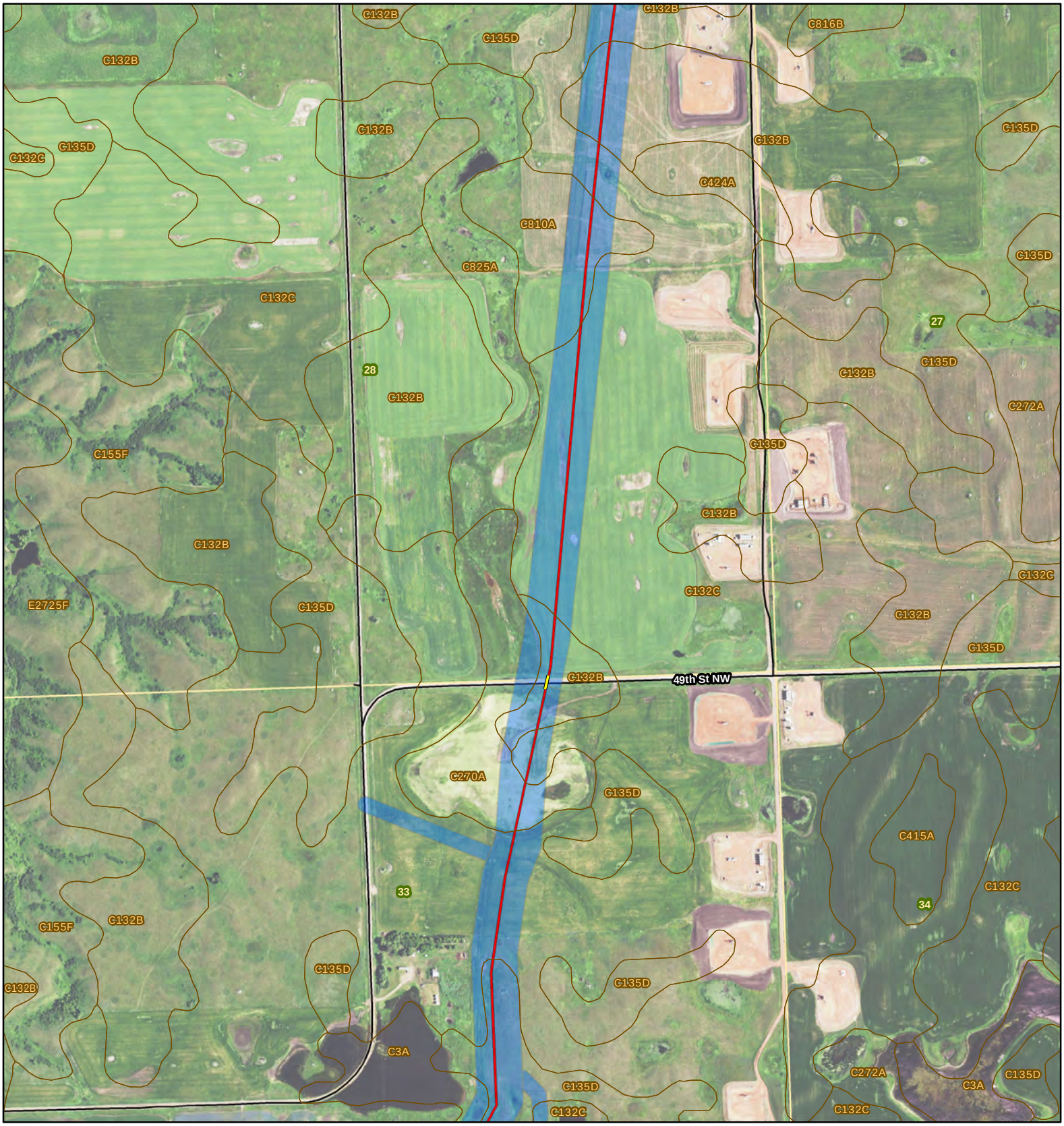

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Mountrail County, North Dakota

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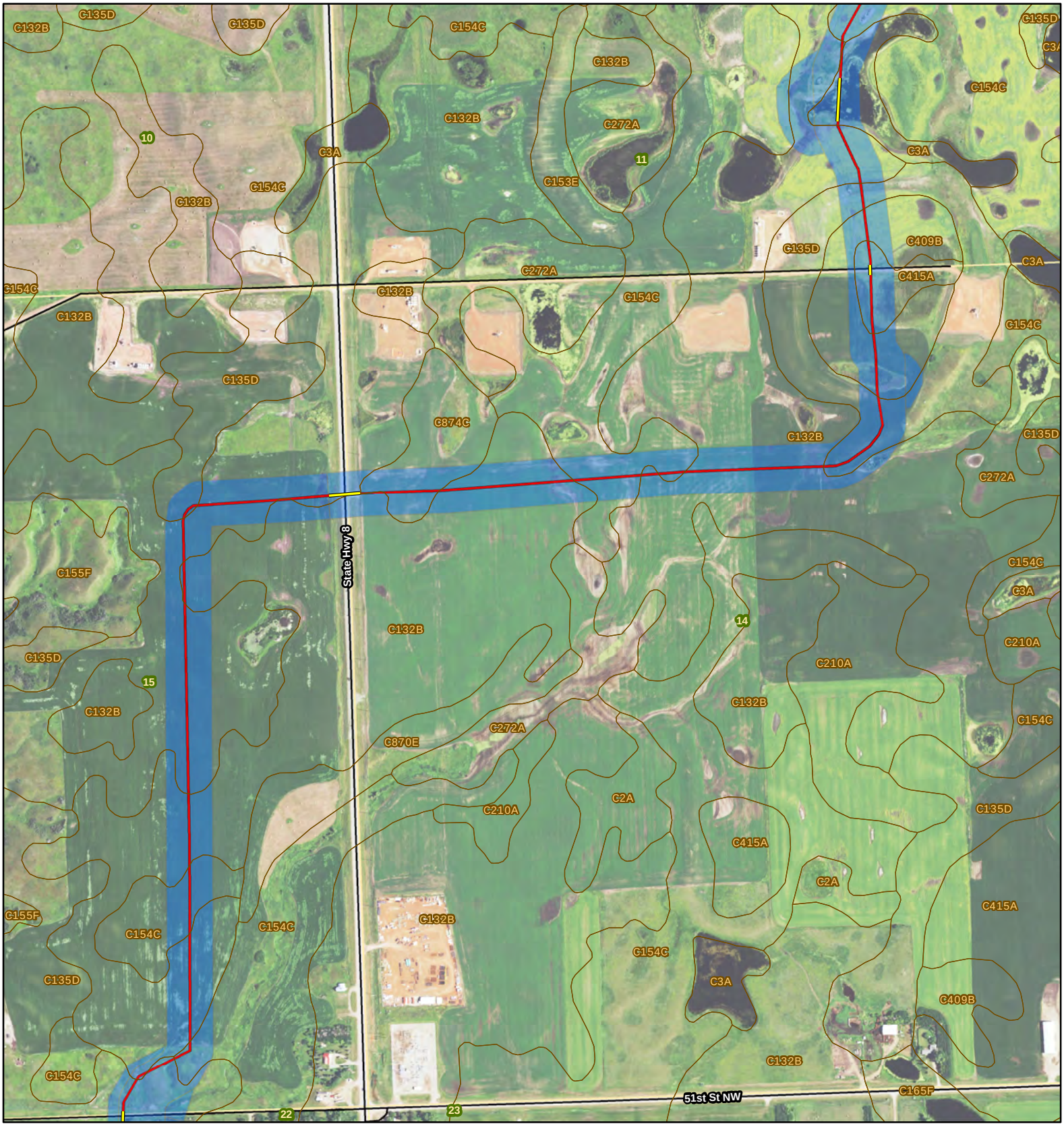

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Mountrail County, North Dakota

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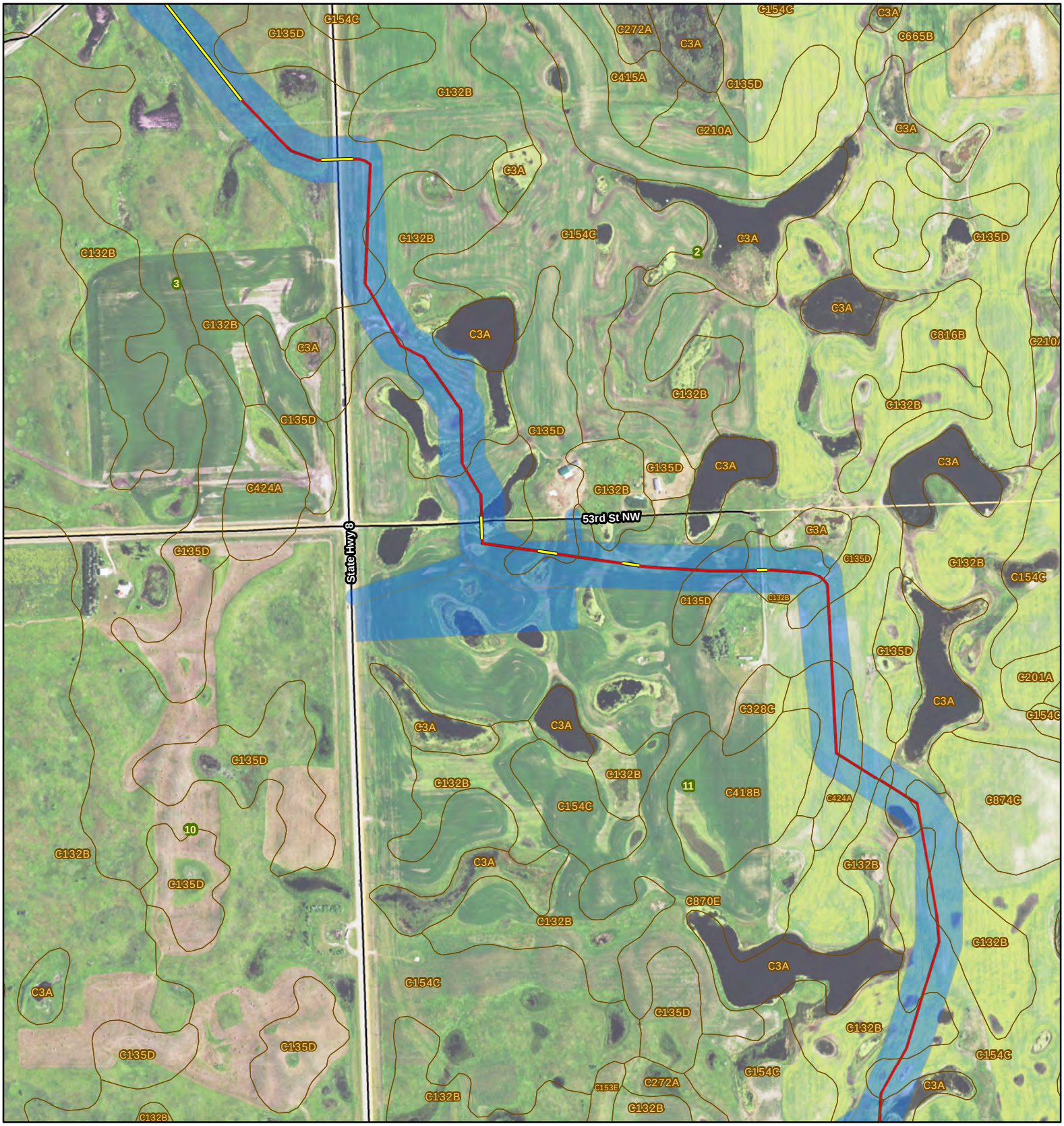

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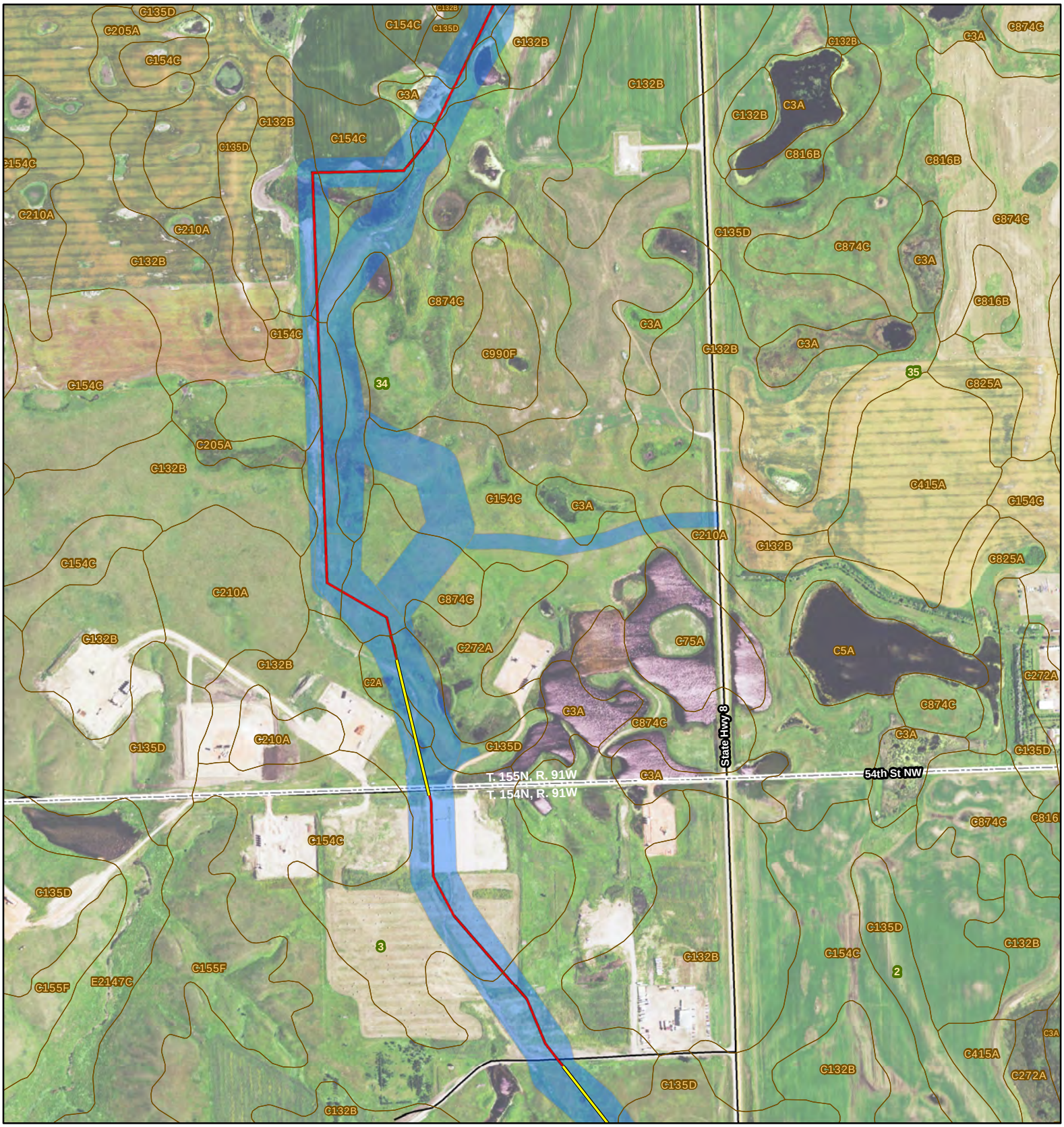

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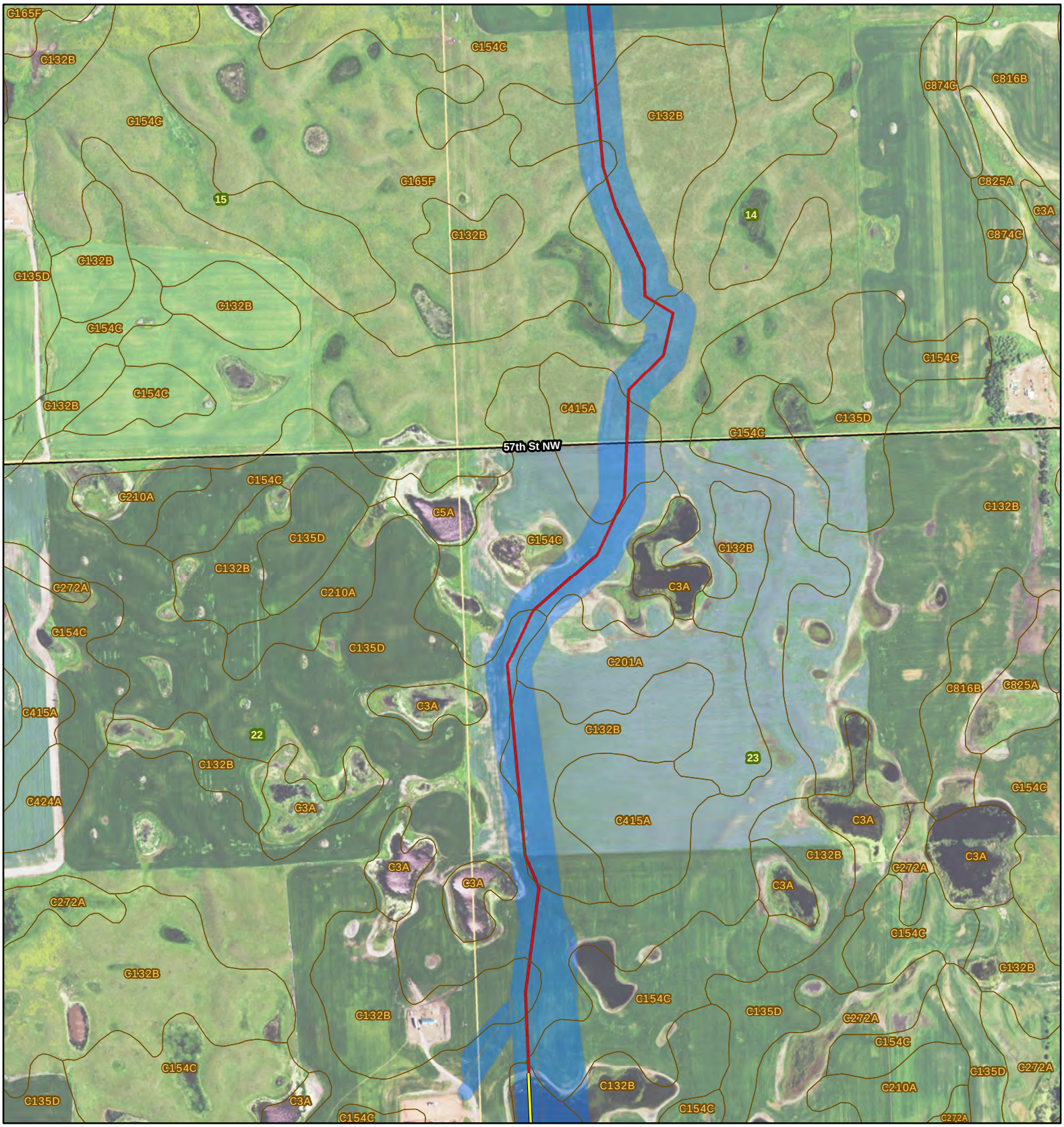

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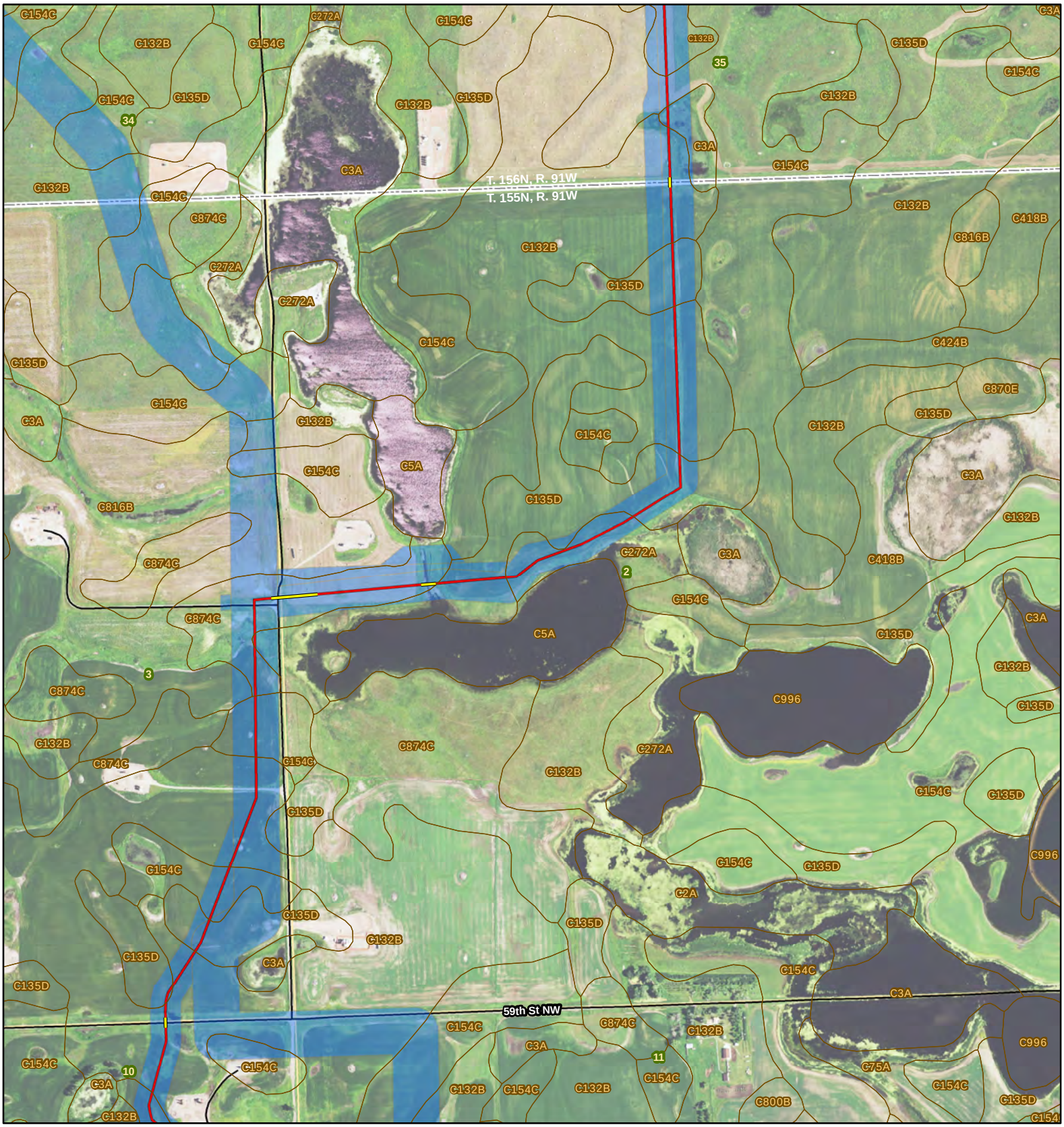

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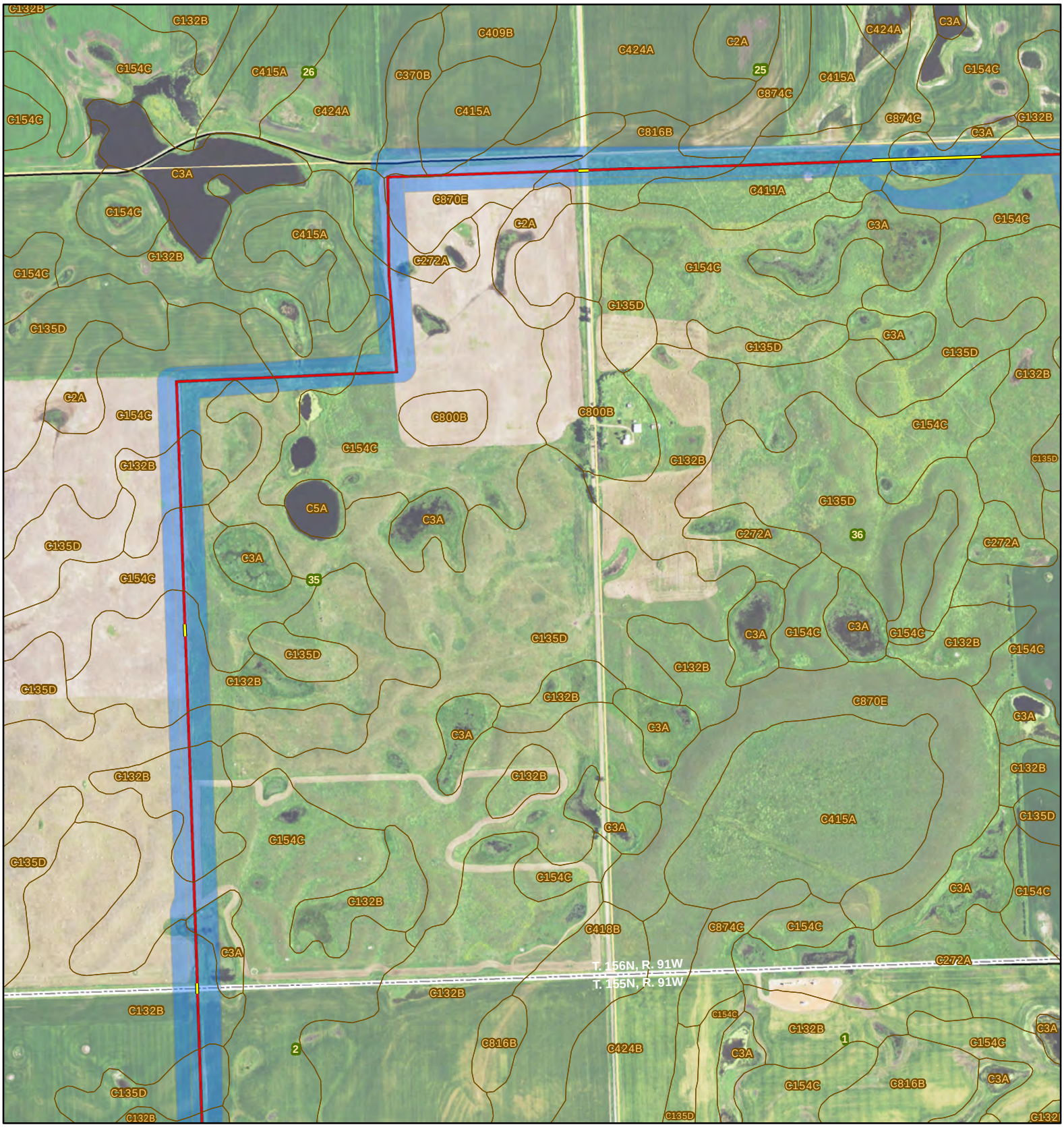

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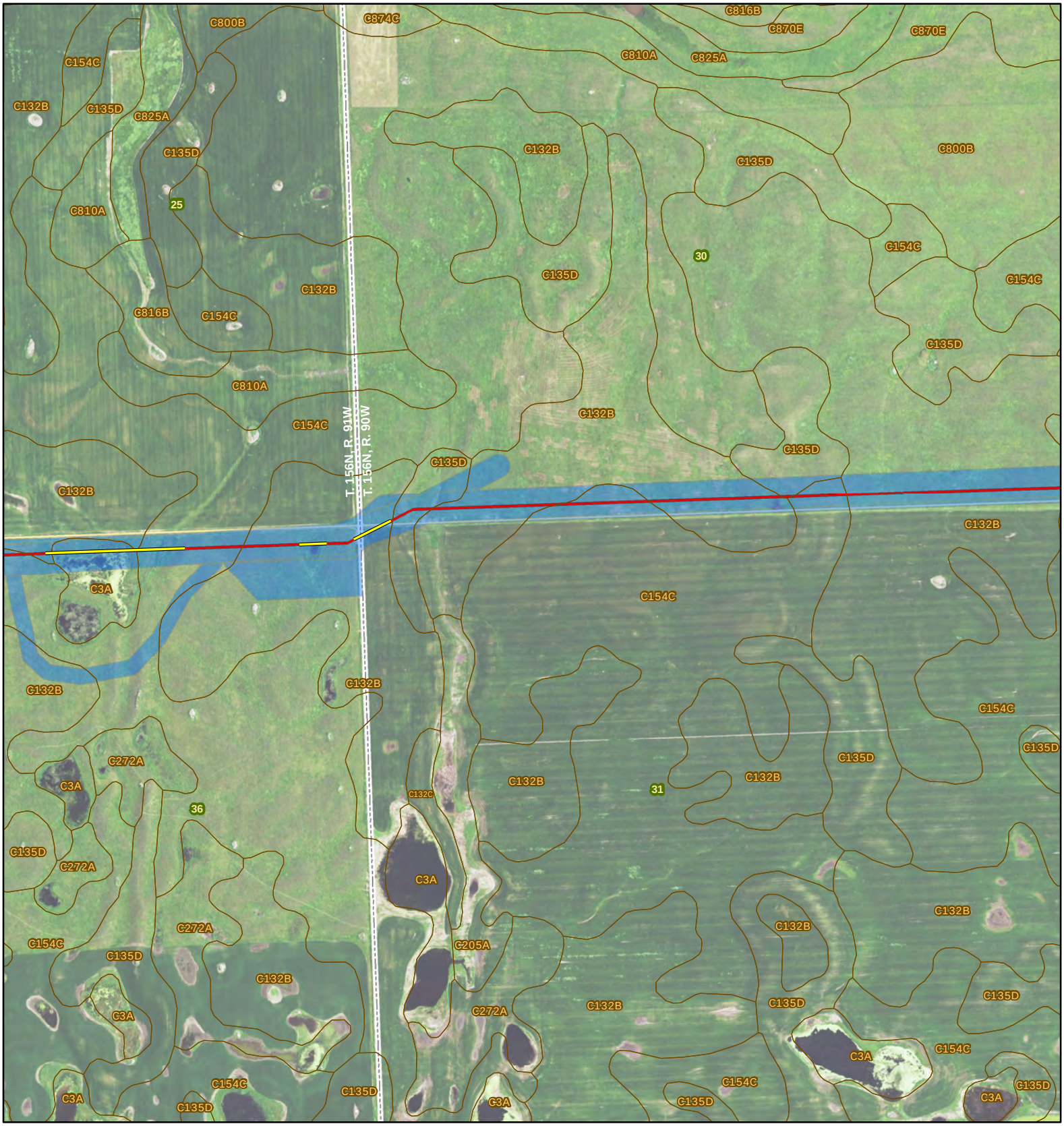

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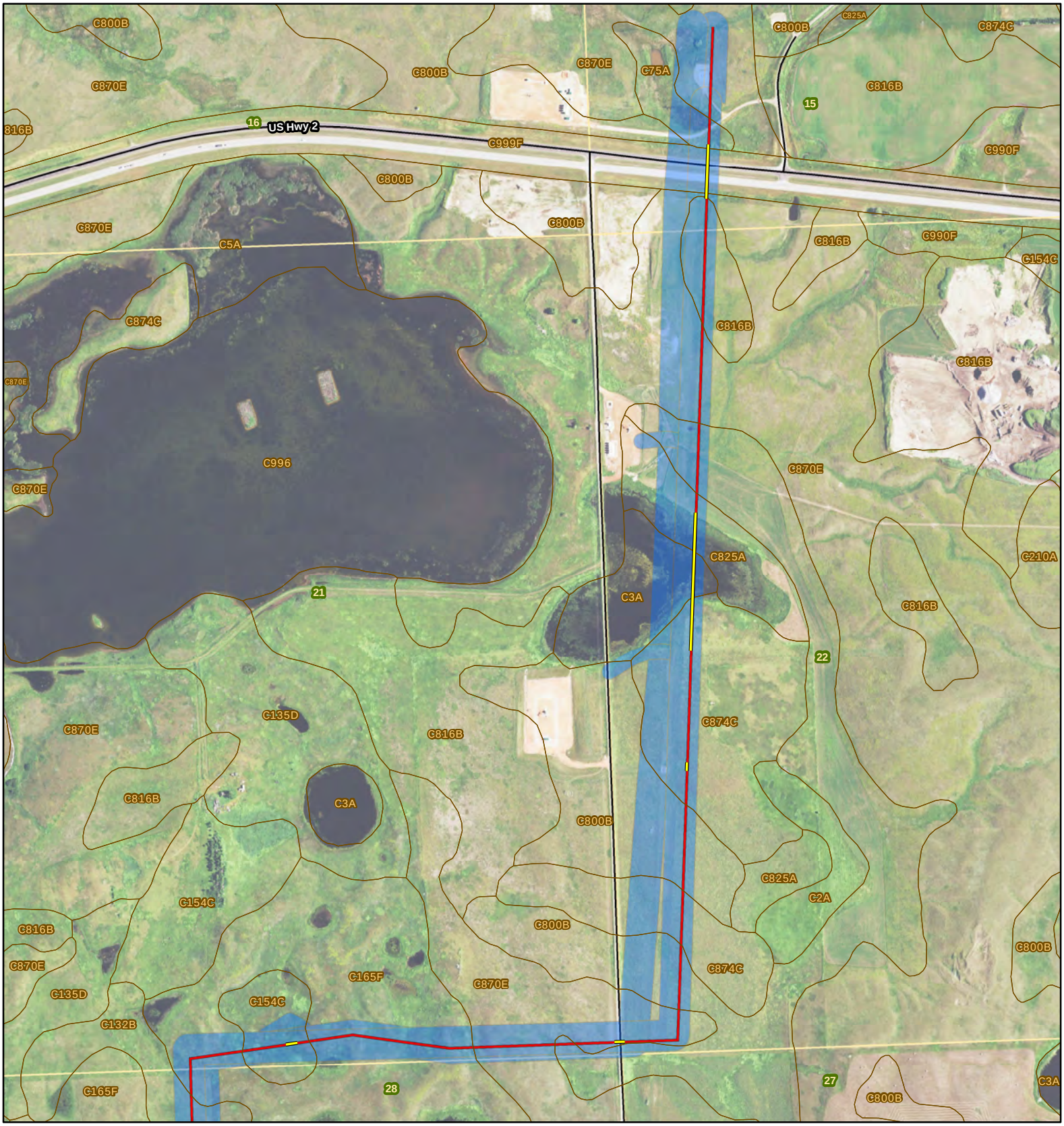

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- Township/Range Boundary
- County Boundary

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Kilometers
0 0.25 0.5

Miles
0 0.25 0.5

Base Map: 2014 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Stanley SE (1981),
Palermo (1981)
Township/Range: T. 156N, R. 90W

Mountrail County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

APPENDIX C
Photographs of Project Area

Figure C.1. View of general topography near northern end of pipeline, facing south (photo taken August 27, 2014).

Figure C.2. Semi-permanent wetland, facing east (photo taken August 5, 2014).

Figure C.3. Semi-permanent wetland, facing southwest (photo taken September 3, 2013).

Figure C.4. View of general topography of pipeline corridor on the Van Hook peninsula, facing north (photo taken August 8, 2014).

Figure C.5. Permanent wetland, facing west (photo taken October 14, 2014).

Figure C.6.View of general topography of pipeline corridor on western side of Lake Sakakawea, facing west (photo taken November 14, 2013).

Figure C.7. Woody vegetation consisting of green ash (*Fraxinus Pennsylvanica)*, facing south (photo taken November 15, 2013).

Figure C.8. Ephemeral drainage within native prairie, facing west (photo taken October 14, 2014).

Figure C.9. Permanent wetland impounded by railroad east of Newtown, facing northwest (photo taken October 14, 2014).

Figure C.10. Semi-permanent wetland northeast of Newtown (photo taken January 29, 2015).

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Appendix E

Cultural Resources Survey Report Abstracts

Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space

Prepared for

Paradigm Midstream, LLC

Prepared by

SWCA Environmental Consultants

May 2015

MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:

2. SHPO Reference #:

3. Author(s): Carolyn Riordan

4. Title: Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space

5. Report Date: May 21, 2015

6. Number of Pages: 66

7. Type – I, T, E, O: I

8. Acres: 180.58

9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s): Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2008; available at http://history.nd.gov/hp/hpforms.html) for Study Unit assignments.
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

COUNTY	TWP	RNG	SEC	SU
Mountrail	155N	91W	3, 22, 23, 27, 34	GA
	154N	91W	2, 11, 14, 15, 22, 33	GA
	153N	91W	16, 20, 31	GA
	152N	92W	15, 22	GA
	151N	93W	31, 32	GA
McKenzie	151N	95W	35	GA
	150N	95W	2	GA
	151N	96W	24, 25	GA

Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Sacagawea Pipeline, McKenzie and Mountrail Counties, North Dakota, to Allow for Temporary Work Space

Submitted to:

State Historical Society of North Dakota

Prepared for:

Paradigm Midstream, LLC
5949 Sherry Lane
Dallas, Texas 75225

Prepared by:

Carolyn Riordan

Principal Investigator:

William Harding

SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

SWCA Cultural Resource Report Number 15-228

May 21, 2015

ABSTRACT

SWCA Environmental Consultants (SWCA) conducted a Class III cultural resource inventory in support of changes to the proposed Sacagawea gathering pipeline project on behalf of Paradigm Midstream, LLC (Paradigm). The original Class I and Class III inventory was conducted in 2013, 2014, and 2015, and is detailed in McCarty and Riordan (2015). Subsequent to SWCA's original cultural resource inventory, Paradigm proposed adjustments to the project to facilitate access to the proposed pipeline right-of-way, to provide work spaces to be used for the staging of equipment and materials, and to provide adequate avoidance of cultural resources. As proposed, the changes to the project would be located on privately owned and state trust lands in Mountrail and McKenzie Counties, North Dakota. The entire proposed project, detailed in the original inventory report (McCarty and Riordan 2015) is under the jurisdiction of several agencies; however, the current cultural resource inventory is under the jurisdiction of the North Dakota Public Service Commission. Therefore, the cultural resource inventory supports Paradigm in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application, and will assist Paradigm with guidance and recommendations regarding the management of any cultural resources present within the project area. The report is being submitted to the State Historical Society of North Dakota.

The original Class I and III cultural resource inventory is detailed in McCarty and Riordan (2015); an updated Class I file search was conducted on March 19, 2015, and the current Class III inventory was conducted on March 10, 11, 21, 30, April 10 and 16, and May 16, 2015. The survey area includes irregularly shaped survey parcels extending from the previous inventory area, and includes 180.58 acres.

The Class I file search did not identify any additional cultural resources within the project area. During the Class III inventory, no cultural resources were newly observed, and no previously recorded cultural resources were revisited. McCarty and Riordan (2015) made recommendations for 20 sites associated with the proposed project. Subsequent to the initial reporting, Paradigm updated the proposed alignment resulting in increased distance from five of the previously recorded resources (32MN1130, 32MN1131, 32MN1206, 32MN1207, and 32MN1320). The proposed alignment has been shifted outside of the 50-foot avoidance boundaries for four of the five previously recorded sites (32MN1131, 32MN1206, 32MN1207, and 32MN1320), thereby negating the need for fencing and monitoring. The proposed alignment has been shifted approximately 25 feet farther to the west of 32MN1130; however, fencing and monitoring is still recommended. The alignment has not moved closer to any site. The proposed project changes do not require alterations to any of the remaining cultural resource management recommendations detailed in the original inventory report for the remaining 15 previously recorded cultural resources (McCarty and Riordan 2015); therefore, SWCA suggests no change to these recommendations. It is recommended that a determination of *No Significant Sites Affected* be granted for the project to proceed as planned.

Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space

Prepared for

Paradigm Midstream, LLC

Prepared by

SWCA Environmental Consultants

May 2015

MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:

2. SHPO Reference #:

3. Author(s): Aidan McCarty and Carolyn Riordan

4. Title: Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space

5. Report Date: May 21, 2015

6. Number of Pages: 34

7. Type – I, T, E, O: I

8. Acres: 77.3

9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s): Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2008; available at http://history.nd.gov/hp/hpforms.html) for Study Unit assignments.
Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

COUNTY	TWP	RNG	SEC	SU
Mountrail	155N	91W	2	GA
	156N	91W	35, 36	GA
	156N	90W	15, 21, 22, 28, 29, 30	GA

Addendum to the Class I and Class III Cultural Resource Inventory of the Paradigm Palermo Gathering Pipeline, Mountrail County, North Dakota, to Allow for Temporary Work Space

Submitted to:

State Historical Society of North Dakota

Prepared for:

Paradigm Midstream, LLC
5949 Sherry Lane
Dallas, Texas 75225

Prepared by:

Aidan McCarty and Carolyn Riordan

Principal Investigator:

William Harding

SWCA Environmental Consultants
116 North 4th Street, Suite 200
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SWCA Cultural Resource Report Number 15-195

May 21, 2015

ABSTRACT

SWCA Environmental Consultants (SWCA) conducted a Class III cultural resource inventory in support of changes to the proposed Palermo gathering pipeline project on behalf of Paradigm Midstream, LLC (Paradigm). The original Class I and Class III inventory was conducted in 2014 and is detailed in Cox and Yost (2014). Subsequent to SWCA's original cultural resource inventory, Paradigm proposed adjustments to the project to facilitate access to the proposed pipeline right-of-way, to provide workspaces to be used for the staging of equipment and materials, and to provide adequate avoidance of cultural resources. As proposed, the changes to the project would be located on privately owned lands in Mountrail County, North Dakota. The cultural resource inventory supports Paradigm in meeting the cultural resource requirements within the North Dakota Public Service Commission's Certificate of Corridor Compatibility and Route Permit application, and will assist Paradigm with guidance and recommendations regarding the management of any cultural resources present within the project area. The report will be submitted to the State Historical Society of North Dakota.

The original Class I and III cultural resource inventory is detailed in Cox and Yost (2014); an updated Class I file search was conducted on March 19, 2015, and the current Class III inventory was conducted on January 29, March 10, 19, and 30, and April 10 and 12, 2015. The inventory area is located in Section 2, Township (T) 155 North (N), Range (R) 91 West (W); Sections 35 and 36, T156N, R91W; and Sections 15, 21, 22, 28, 29, and 30, T156N, R90W. The survey area includes 14 irregularly shaped survey parcels extending from the previous inventory area, totaling 77.3 acres.

The Class I file search did not identify any additional cultural resources within the project area. During the Class III inventory SWCA newly recorded one cultural resource (32MN1297), a cairn site, which was left unevaluated regarding its eligibility for the National Register of Historic Places. Avoidance of at least 50 feet is recommended, and as proposed, the gathering pipeline right-of-way is approximately 63 feet from the site boundary, adequately avoiding the resource. During the original inventory, three cultural resources (32MN1149, 32MN1317, and 32MN1318) were left unevaluated regarding their eligibility for the National Register of Historic Places, and avoidance of the sites by at least 50 feet was recommended (Cox and Yost 2014). Should avoidance of 50 feet not be possible, temporary fencing and archaeological monitoring was recommended (Cox and Yost 2014). SWCA suggests no change to these recommendations. However, as currently proposed, Paradigm would bore the gathering pipeline adjacent to 32MN1149 to avoid the resource. Fencing and monitoring is still recommended for this resource to ensure no disturbance. If the above stipulations are met, it is recommended that a determination of *No Significant Sites Affected* be granted for the project to proceed as planned.

Appendix F

10-Year Plan

Refer to the Updated 10-Year Plan Filed with the PSC on May 14, 2015.

Appendix G

Landowner Waivers

Additional Landowner Waivers Pending

Appendix H

NEPA (BIA/USACE)

Refer to Consolidated Application filed with the North Dakota Public Service Commission on March 16, 2015

Appendix I

United States Army Corps of Engineers NWP #12 PCN Section 10 Permit

Refer to Consolidated Application filed with the North Dakota Public Service Commission on March 16, 2015

Appendix J

North Dakota State Water Commission Sovereign Lands Permit

Refer to Consolidated Application filed with the North Dakota Public Service Commission on March 16, 2015

Appendix K

Construction, Mitigation, and Reclamation Plan

Refer to Consolidated Application filed with the North Dakota Public Service Commission on March 16, 2015