Version 8/08rev

ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board's website at: **EQB Website - http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm**. The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit or its agents to determine whether an Environmental Impact Statement should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. The complete question as well as the answer must be included if the EAW is prepared electronically.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project Title:** Redpath Project

2. Proposer: Bois de Sioux Watershed District
Contact person: Jon Roeschlein
Title: District Administrator
Address: 704 South Hwy 75
City, state, ZIP: Wheaton, MN 56296-1304
Phone: 320-563-4185
Fax: 320-563-4987
E-mail: bdswd@frontiernet.net

3. RGU: Dept. of Natural Resources
Contact person: Jamie Schrenzel
Title: EAW Project Manager
Address: 500 Lafayette Road
City, state, ZIP: St. Paul, MN 55117
Phone: (651) 259-5115
Fax: (651) 296-1811
E-mail: jamie.schrenzel@state.mn.us

4. Reason for EAW preparation: (check one)
___EIS scoping _X_ Mandatory EAW ___Citizen petition ___ RGU discretion ___Proposer volunteered

If EAW or EIS is mandatory give EQB rule category subpart number _24_ and subpart name: Water Appropriation and Impoundments

5. Project location: Grant and Traverse Counties **Townships:** Gorton and Redpath

Sections 15, 16, 21, 22, 23, 24, 25, 26, 27, 28 Township 128N Range 45W
Sections 19, 20, 30 Township 128N Range 44W

GPS Coordinates:
N45d 52' 56.13" W 96d 17' 45.39"

Tax Parcel Numbers:
10-0069000; 10-0068000; 10-0067000; 10-0062000; 10-0061000; 10-0094000; 10-0093000; 10-0097000; 10-0099001; 10-0099000; 10-0104000; 10-0103000; 10-0101000; 10-0096000; 10-0095000; 10-0100000; 10-0107000; 10-0106000; 10-0117000; 10-0110000; 05-0066-0002009;

05-0069-0002009; 05-0071-5002009; 05-0073-0002009; 05-0070-0002009; 05-0067-0002009; 05-0068-0002009; 05-0072-0002009; 05-0111-0002009; 05-0075-0002009; 10-0059000; 10-0109000 10-0108000; 10-0113002; 10-0114000; 10-0113001; 10-0121000; 10-0120000; 10-0118001

Attach each of the following to the EAW:

- County map showing the general location of the project;
  See Figure 1.
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable);
  See Figure 2.
- Site plan showing all significant project and natural features.
  See Figure 3.

Attached Figures

- Figure 1 – Project Location Map
- Figure 2 – USGS Quad Map
- Figure 3 – Project Features
- Figure 4 – Southwest Corner of Impoundment
- Figure 5 – By-pass Corridor Details
- Figure 6 – Inlet and By-pass Corridor Structure
- Figure 7 – Soils

In-text Figures

- Figure A – Typical Cross Section – Upstream Improved Floodway
- Figure B – Typical Section – Redpath Project By-pass Corridor
- Figure C – By-pass Channel Inlet Culvert Baffles
- Figure D – Construction Phases

6. Description

a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

The Redpath Project is a multipurpose flood water storage impoundment along the Mustinka River/Judicial Ditch 14 in Grant and Traverse Counties. The project includes three storage pools for flood control and a by-pass corridor. Water quality and wildlife habitat Natural Resource Enhancements are also incorporated in the project design.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Overview

The Redpath Project is an off channel, multi-purpose surface water impoundment. The primary focus of the Redpath Project is flood control, which will be accomplished by storing water from the Upper Mustinka Watershed. Secondary benefits include: fish spawning habitat, migratory bird habitat, prairie restoration, riparian corridor habitat enhancement, water quality improvement, and stream flow augmentation.

As depicted in Figure 3 and Figure 5, Judicial Ditch (JD) 14, the Mustinka River, will be routed around a three pool impoundment via a by-pass corridor. A portion of JD 14/Mustinka River flows will enter the impoundment for the purpose of flood control and natural resource enhancement. As stream flow increases

and the river level rises, the impoundment water level will also rise and provide flood storage as described below.

The impoundment will be divided into 3 pools. Pool 1, located in the south half of Section 24, will be a permanent pool. The water level in Pool 1 will fluctuate along with the water level in the river. As the water level rises in Pool 1, it will overflow a weir structure to Pool 2, located in the south half of Section 23. As water levels rise in Pool 2 it will overflow another weir structure to Pool 3, located in Sections 21 and 22. As water levels rise and submerge the weir structures the entire impoundment will continue to rise to the spillway level of the outlet structure at the northwest corner of Pool 3. Water will then automatically outlet to JD14. The pool complex will provide about 24,000 acre-feet of storage during a 100 year spring flood, of which about 18,500 is gate controlled.

Other features of the project include an excavated floodway along JD14 as it approaches the impoundment, and the relocation of Traverse County Ditch 35 (TCD 35) to increase flood storage capacity and maintain road alignment. The bypass channel is also designed to function as a feature for Natural Resource Enhancement (NRE).

The concepts built into the project were formulated by a Project Team consisting of representatives of local, state, and federal agencies and organizations, along with landowners from the project area. The Project Team met several times over the past five years. They discussed the flood control and natural resource priorities for the area, considered several alternatives, and developed the components of the preferred project.

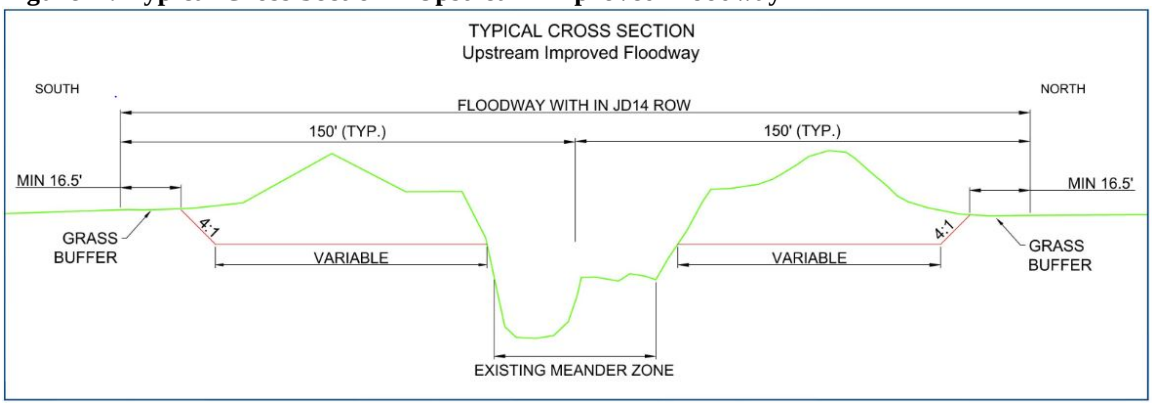
Project Features

JD14 and Inlet

Water will enter the impoundment via a diked inlet channel, which is the current JD 14 channel, beginning at the east side of Section 19, Gorton Township. Three culverts, two 16'x10' box culverts and one 16'x11' box culvert, will allow water in JD14 to enter the inlet channel. The box culverts were sized for the project and will replace a structurally deficient bridge. To form the inlet channel, the existing spoil along the south side of JD14 through Section 19 will be reshaped to form the south dike of the inlet. A new dike will be constructed approximately 300 feet north of JD14. A floodway will be excavated between JD14 and the north dike to increase the capacity of the inlet channel to the impoundment. North of the inlet location, another culvert and inlet gates will be installed for the by-pass corridor, which is described in detail below.

To improve conveyance in JD14 up to the inlet of the impoundment, the improved floodway will be constructed from west of a railroad right-of-way to the north dike (See Figure 2 and Figure A). The improvement will be achieved by excavation of the existing spoil banks and some of the under lying material along both sides of the JD14 channel. The work is anticipated to be completed within the original construction right-of-way of JD14. The existing meandering channel that has developed in JD14 will not be realigned in this reach, cleaned out, or altered by the project. It is expected that it will continue a natural meandering process within the floodway corridor. Removal of the spoil should help in minimizing the severe bank failures in this reach of JD14 and may help in reducing snow and ice blockage during the spring runoff, keeping the flows within the channel rather than causing destructive overland flooding. The excavated material is expected to be lean clay material that will be hauled and utilized in the construction of the impoundment dikes. Excavation of the floodway will also provide about 24 acres of new frequently flooded riparian habitat.

Figure A: Typical Cross Section – Upstream Improved Floodway



JD14 is also improved in the "Inlet Channel" area by shaping of the existing spoil pile along the south side to form the south dike. This floodway will be excavated to an elevation slightly higher than the original design grade of JD14. The floodway improvement along JD14 continues into Pool 1 and is gradually reduced as it proceeds thru Pool 1.

Impoundment

The impoundment will be divided into 3 pools. Pool 1, located in the south half of Section 24, will be a permanent pool with the with a runout elevation of 1013.5 feet located at the culvert invert of the bypass channel. The water level in Pool 1 is designed to flow either to Pool 2 during high flows or drain back into the by-pass channel during lower flows and will therefore fluctuate along with the water level in the river. As the water level rises in Pool 1, it will overflow a weir structure to Pool 2, located in the south half of Section 23. As water levels rise in Pool 2 it will overflow another weir structure to Pool 3, located in Sections 21 and 22. As water levels rise and submerge the weir structures the entire impoundment will continue to rise to the spillway level at the northwest corner of Pool 3. Water will then automatically outlet to JD14. The pool complex will provide about 24,000 acre-feet of storage during a 100-year spring flood of which about 18,760 is gate controlled. Pools 1, 2 and 3 have the following elevations and gate controlled storage capacities during a 100 year spring flood:

Table 1: Pool Elevations and Gated Storage Capacity

Gate Control	Pool 1	Pool 2	Pool 3	Total
Elevation	1,013.5 ft	1,017.7 ft	1,017.7 ft	
Storage	165 AF	2,775 AF	15,820 AF	18,760 AF

In addition, the impoundment provides 5,240 acre feet of un-gated flood storage, which combined with the above described gate controlled storage, totals 24,000 acre feet of storage during a 100 year spring flood.

The impoundment exterior dikes have a centerline elevation of 1023.0. The maximum height of the dike is 32 feet where it crosses JD14 and has a maximum height of 19 feet in non-channel areas. The top width of the dikes will be 28 feet, graded to a road surface. The new dike/road on the north side will be aggregate surfaced for traffic. Aggregate surfacing will also be applied to the east and south dikes. There are 4 unique exterior dike section designs planned based on the height and location of the dike to protect the dike integrity from wave action. A visual inspection of the foundation soils to determine if there are layers of permeable soil that would allow seepage under the dike will be accomplished with an inspection trench located under the pool side shoulder. The inspection trench will be backfilled with compacted clay soil along with the core area. The upper 4 feet of the core will be constructed of select lean clays compacted to build a good road base. The remainder of the dike, outside the core area, will be constructed of common fill and compacted to a lower density standard.

The exterior side slopes of the dike will be 4:1. The interior side slopes of the dikes around Pools 2 and 3 will have a vegetated wave protection berm to minimize the damaging effects of wave action at high pool levels. The interior side slopes will be 4:1 above the berm and 5:1 below. The dikes along the south, east, and west sides of Pool 1 will have a 4:1 side slope on the upper portion of the dike and flatten to 10:1 on the lower portion for wave protection in Pool 1. To minimize the potential for slope instability, borrow areas within the impoundment will be set back from the dike such that the toe of borrow area will be no closer to the dike than a minimum of a 10:1 slope projected from the shoulder of the dike. Dike slopes will be dressed with topsoil and seeded. A tile toe drain will be installed to intercept any seepage.

Drain tile will be installed in the outside slope of all dikes. The drain tile will be installed about 3 feet deep (below the existing ground surface) and at least 6 feet in from the toe of the outside dike slopes. The purpose of the drain tile is to alleviate seepage forces from the face of the outside slope. The tile will be gravity feed. Outlet locations will be protected from erosion. Outlets for the drain tile will be spaced approximately one-half mile up to one mile apart.

Interior Dikes will have a top elevation 3 feet below the exterior dikes, a 28 foot top width graded to a road surface, and a vegetated wave protection berms constructed on the side slopes within Pools 2 and 3. The dikes will ramp down to the existing bridges that cross JD14 with normal road design curves. To provide a continuous dike elevation around the bridge a dike will be constructed on the east side of the bridges, tying into the dike/road on either side of the bridge. The spillway weirs will be constructed with this dike. The interior dike/roadways will be open to traffic most of the time, however during times of high water they will need to be closed as the existing bridges will be under water.

The DNR Dam Safety Unit conducted a preliminary review of the Redpath Project impoundment and estimates that it will be classified as a Class 2 Significant Hazard dam. This is a moderate classification out of three levels, including Low, Significant, and High Hazard. A Dam Safety Permit will be required for the Redpath Project and will require further assessment of project plans.

Traverse County Ditch 35

Traverse County Ditch 35 (TCD 35) runs along the south side of the proposed project area adjacent to the existing east-west road. Construction of the south dike of the impoundment will require relocation of TCD35 south of its current location because the dike will be centered on the section line to maintain the current alignment of the existing road. TCD35 is also currently in a state of disrepair and not functioning as it was designed. It will be reconstructed to conform to the current watershed maintenance plan. During construction of the relocated ditch, a temporary sediment pond will be located in the borrow area in the southwest corner of Pool 3 (See Figure 4).

The design of TCD 35 will include the legally required minimum 16.5 foot grass buffer, though the buffer will be wider than this minimum in locations where the property line is further away from the ditch. Also, there is a 20 foot bench between the dike toe and the ditch top which will also be stabilized with vegetative cover.

The purpose of relocating TCD35 is both to allow construction of the south exterior dike on the section line, thereby maintaining the current location of the road, as well as increasing impoundment storage. Shifting the south impoundment dike north to allow TCD35 to remain in its current location would reduce flood storage by approximately 400 acre feet. The current alignment of the dike and channels provides a bottom area of Pools 1 and 2 by about 14 acres greater than leaving TCD35 on its current alignment, thus providing up to 14 additional acres of potential interior wetlands.

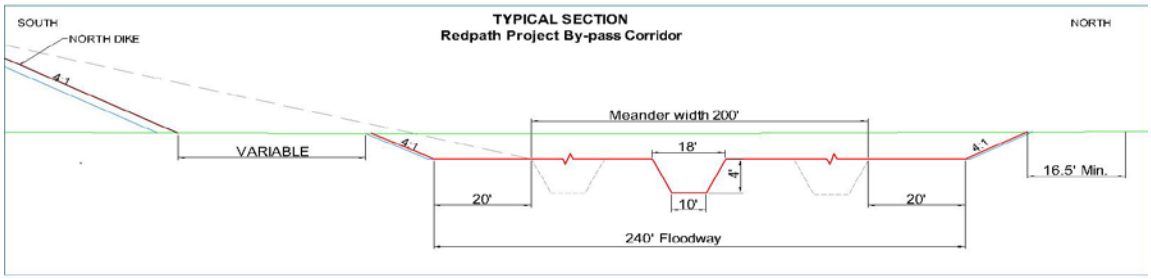
The existing TCD 35 channel will be within the footprint of the dike construction. Also, other ditches along roads within the impoundment will be moved, redesigned, or altered to function with the impoundment. Around the exterior of the impoundment the road ditches will also be moved or altered to work with the changes to the roads/dikes.

By-pass Corridor

Along the north side of the impoundment, a by-pass corridor will be created. See Figures 5 and 6. The inlet to the by-pass corridor will be a 16'x4' box culvert. The by-pass corridor will include an excavated floodway with a meandering channel within the floodway. The meander channel will have a bottom width of 10 feet, be 4 feet deep and have 1:1 side slopes. The design grade will approximate the JD14 design grade at the upper end. The lower end will approximate the current bottom grade of JD14 at the west end. The excavated floodway will have a bottom width of 240 feet. Stream crossings at each section line along the by-pass corridor downstream of the inlet will have 16'x6' box culverts. The by-pass corridor will carry the portion of flow from JD14 that does not flow into the impoundment. JD 14 flows will automatically be split with a portion being directed into the impoundment and a portion being directed to the by-pass channel. During periods of low flow, all of the water will bypass the impoundment. As flows increase, a greater proportion will enter the impoundment and flows to the bypass channel will typically be limited by culvert sizing to about 500cfs. An additional gated inlet is provided to bypass additional flows during construction, maintenance, or emergency situations.

The meander channel is designed with a sinuosity ratio of 1.5 to 1. The meander belt width is 200 feet (10 x BFW) and the floodway bottom width is 240 feet. The bottom width is 10 feet with 1:1 side slopes and set the Bank Full Width (BFW) at 18 feet throughout for calculating the other design parameters. The radius of curvature was measured to a line 2/3 of the way from the inner to outer bank and used a minimum radius of 42 feet (2.3 x BFW) and a maximum radius of 63 feet (3.5 X BFW). The ditch bottom is to tilt approximately 1' inside to outside in the curves with the centerline at the design grade. Thus pools will occur in the bends and riffles will occur in the straight sections. See Figure B below for a typical section of the by-pass corridor.

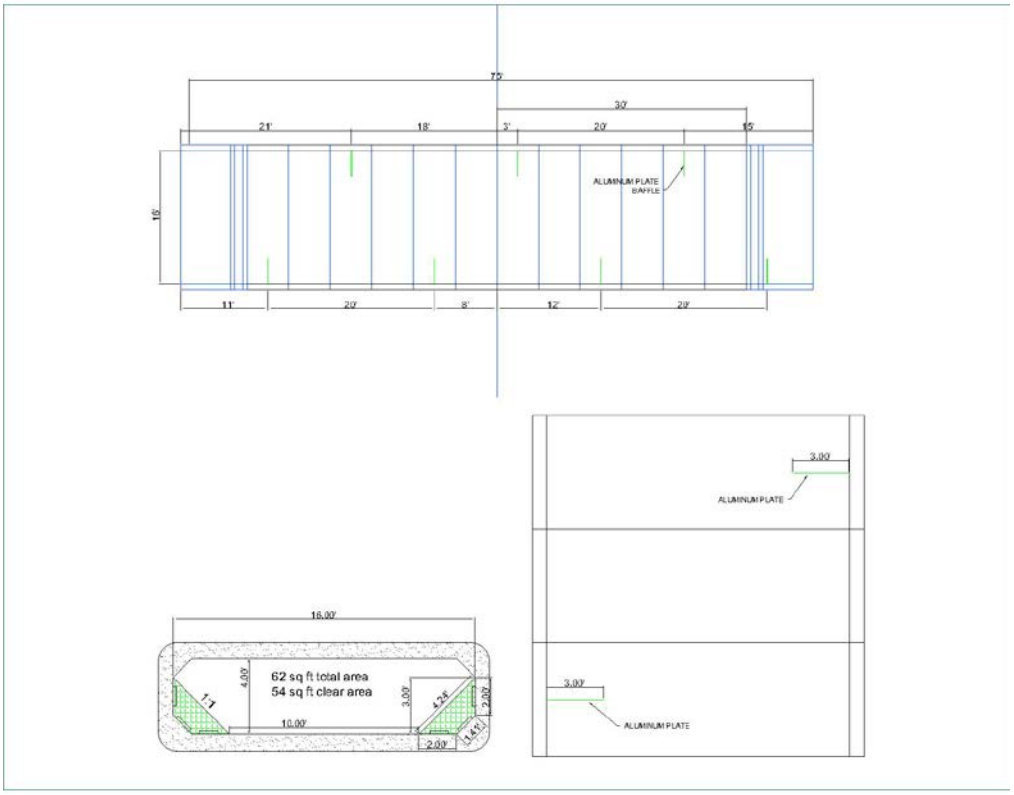
Figure B: Typical Section – Redpath Project By-pass Corridor



The 16x4 RC box culvert, to the corridor, will have an invert elevation of 1013.5, the floodway elevation at the east end is designed to be about 1017.5, and the weir out of pool 1 elevation is 1017.7. The culverts at the inlet channel to the impoundment will be 2-16x10 (invert elev. 1012.5) and 1-16x11 (invert elev. 1011.5) RC box culverts. Existing JD14 bottom elevation is about 1011 near the inlet with the original JD14 design elevation of about 1014.6. Stream crossings at each section line along the by-pass corridor downstream of the inlet will have 16'x6' box culverts.

The inlet culvert design includes several staggered baffles to reduce the end area of the culvert to 54 square feet and leaves a 10 foot bottom as shown in Figure C below. Baffles are staggered and spaced in a manner that allows fish passage through the culvert. The channel bed will be protected by a riffle series near the inlet culvert. Additional erosion protection will include rock riffles near the outlet of the by-pass corridor and near the Trunk Highway 9 Bridge. To provide increased channel stability in the meander channel and floodway near the inlet culvert, vegetation including dogwood or willow will be established at the east end of the by-pass corridor.

Figure C: By-pass Channel Inlet Culvert Baffles



Wetland diversity will be created within the by-pass channel. Material will be excavated and removed to create depression areas. These depression areas will be field located based on material needs for construction and the type of material to be excavated. The construction equipment creating the by-pass corridor and dikes will be used to create these depressions. The locations will be sited such that they will be isolated to hold water longer to provide a more diverse habitat. They will also be located so that they do not impact the meander channel. Depths of the depressions will also vary due to types of material and the adjacent need for borrow. This varying depth will also increase the diversity of the habitat.

Removal or Remodeling of Existing Structures

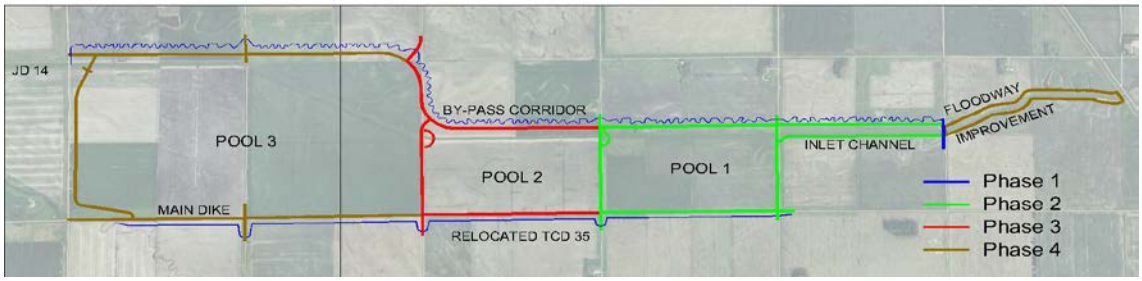
The project will improve the existing roads along the south side and east side of the impoundment. The road along of south side of Sections 21, 22, 23, and 24 is currently a road with little or no gravel. The project will surface all of the constructed roads with gravel. The roads that pass thru the impoundment will be raised to 3 feet below the exterior dikes to allow passage thru the impoundment. During high water times, these roads will be closed as the existing bridge elevations will not be changed and will be submerged. The north dike will be graded to form a road, and this will provide a new traffic route around the impoundment during times of flooding. Township Road 104 along the east side of section 21 thru the impoundment will be abandoned and closed to thru traffic. However, it will be maintained enough to provide access for agricultural operations. The project will also remove culverts in and around the project site, which will be replaced with structures designed to current standards to provide drainage in and around the project.

Construction

The Redpath Project will be constructed with typical equipment used in highway and heavy construction. Equipment includes, but is not limited to, scrapers, trucks, backhoes, front end loaders, tractors and pull type equipment, compactors and sheet pile drivers.

Phased development is proposed for the Redpath Project (See Figure D). Phased development is a strategy to build as funding becomes available, to allow for vegetation establishment, and to minimize disruption of agricultural production.

Figure D: Construction Phases



The following is a summary of how the project is proposed to develop:

- Phase 1 includes construction of the by-pass corridor, TCD35 relocation, and the temporary sedimentation pond. The temporary sedimentation pond will provide an outlet for storm water during the construction of TCD35 and impoundment dikes. Relocation of TCD35 will facilitate the construction of the south dike and provide more adequate drainage of agricultural lands currently benefitted by the existing, out of repair, ditch system. During Phase 1, Natural Resource Enhancement (NRE) benefits will be primarily wetland and grassland habitat creation.

    - Phase 1A will construct the temporary sedimentation pond along the west side of the impoundment. Concurrently, the west dike construction will be started using the soil material excavated from the temporary sedimentation pond. Phase 1A will also construct the by-pass corridor along the north side of the impoundment. Concurrently, the north dike construction will be started using the soil material excavated from the corridor. The channel will not be connected at the upstream end to JD14 at this time. It will only handle the small amount of local drainage while vegetation is being established.

    - Phase 1B will construct TCD35 along the south side of the impoundment. Concurrently, the south dike construction will be started using the soil material excavated from TCD35.

- Phase 2 will construct the inlet channel and Pool 1. NRE benefits will be primarily water quality and habitat. It will include detention time for sedimentation, establishment of vegetation, and wetlands.

    - Phase 2a will install the connection to the by-pass corridor and place a diversion block in JD14 to facilitate completion of the excavations within Pool 1. The dikes along the Inlet Channel and Pool 1 will be completed with the excavated materials. Excess excavation material will be hauled to other dike sections and incorporated into that work. The Pool 1 drawdown structures will also be installed.

    - Phase 2b will install Sheetpile Weir 1/2 and remove the diversion at the inlet structure, bringing Pool 1 online. JD 14/Mustinka River flows will enter the by-pass corridor and high flows will enter the impoundment.

- Phase 3 will construct the features to complete Pool 2. This will expand the management of wetland habitat, water quality, and stream flow maintenance.

    - Phase 3a will complete the dikes for Pool 2. Borrow material from adjacent channels will be utilized as practical. It will also include the Pool 2 drawdown structure and Pool 2/3 transfer structure.

        - Phase 3b will install Sheetpile Weir 2/3 bring Pool 2 online. Overflows from Pool 1 will be stored, high flows will utilize the weir and continue down JD14. Until Pool 3 is completed, Pool 2 will be managed for flood storage, it then can be managed for NRE.

- Phase 4 will construct features to complete Pool 3. This will bring the entire project online and allow complete operation and management of the impoundment. The outlet structure can be built during any one of the phases. However, complete operation of it will not be realized until Phase 4 is completed.

    - Phase 4a will complete the dikes for Pool 3. Borrow material from adjacent channels will be utilized and excavated material from the upstream floodway will be hauled and incorporated into the dike construction.

The phases show the progression of construction, and the thresholds of completion, to have a project that has function at each point in time. During the progression of the phases, parts of future phases will be started when practical to use construction materials efficiently. For example, the excavation of channels in Phase 1 will produce fill materials for dikes. This fill will be located so that it is in place for completion of Phase 4. Phasing will also help with erosion control. Channel excavations will be vegetated prior to diverting new flows to them where practical. For example, the by-pass corridor will be excavated and vegetation will be allowed to establish before JD14 flows are diverted into corridor. Then, base flows in JD14 would be diverted into the by-pass corridor while work in Pool 1 (Phase 2) proceeds. JD14 will remain the main channel for flood flows during construction.

Timing of the phases will depend on how quickly vegetation establishes, and will depend on the timing of project funding. One phase of construction per year is anticipated, requiring about four years to complete the project. Depending on success of vegetation establishment and weather, construction may take less time, but is likely to take more than the four years.

As funding is proposed in phases, it is important to consider the function of the project at each stage in the unlikely scenario of a break in funding. The phasing will contribute to the function of the project in relation to the amount invested. Phase 1 includes some of the exterior channel work. If these were completed and no additional funding was provided, they would function and provide benefits. TCD35 would provide improved drainage for agriculture production and the by-pass corridor would still function to carry water and provide habitat benefits. Phase 2 would add some flood control storage the addition of a permanent pool area and wetland within Pool 1. Phase 3 would add additional storage within Pool 2. Then Phase 4 would complete the project. If construction were to be stopped at the end of any phase, an operation plan based on the completed work would need to be developed to guide management and function of the project.

Restoration

Restoration will be completed with tractors with pull type equipment and seeders. Topsoil will be placed at a depth of 1 foot to provide a seed bed for the establishment of vegetation. Soil borings indicate that topsoil thicknesses in the site area typically ranges from 1 to 1.5 feet deep. The borrow area acreages from which topsoil will be taken exceed the areas on which topsoil will be placed. Therefore, sufficient topsoil quantities, from borrow areas, should provide for the foot of topsoil called for in fill areas and an excess for various construction uses.

Native Vegetation Establishment and Enhancement Guidelines, developed by the Board of Water and Soil Resources (BWSR) will be used for seeding the site.

The following are examples of seed mixes that may be used for this project:

- On the tops and outside edges of the dikes where it will be dry - BWSR upland prairie mix 35-221.

- On the inside slope of the dikes where there may be more moisture - BWSR mesic prairie mix 35-241.
- At the lower portions of the dikes or channels where soils will be persistently wet - wet prairie mix 34-262.
- Plant materials included in the above BWSR seed mixes will be sourced as locally as possible. This practice helps ensure that the appropriate genetic variation for the local landscape, soils, and climate. Using locally sourced seed mixes is also important for this project because native prairie has been surveyed along the railroad corridor just east of the project area. Using genetically local seed sources may reduce the possibility of impacting nearby native prairie.

BWSR recommendations include separate mixes for any areas that will be flooded continually, or for long periods. In addition, BWSR provides a substitution list (at the website above) that adds some flexibility and helps when one or two species may not be available.

Operation Methods

Flood control operation will be almost automatic. Flood control storage is provided by three individual pools having a combined capacity of about 24,000 acre-feet. In spring, as snow melt begins, the gate at the outlet of pool 3 will be closed. The pools will be filled sequentially. Pool 1 will fill first. When it reaches the weir, it will automatically overflow into pool 2. When pool 2 reaches the weir, it will automatically overflow into pool 3. As the flood progresses, all three pools will continue to fill until the top of the outlet structure is reached and water starts flowing into JD14. As the pool level continues to rise, an increased volume is discharged until the outflow matches the inflow.

Following the spring flood, when downstream conditions allow, excess water will be drained from Pool 3, to allow it to return to agricultural use, and from Pool 2, retaining the desired amount for the moist soils unit. Flood capacity will thus be restored while extending the period of flow in JD14. Pool 1 will drain back through the inlet structure to the by-pass corridor.

Summer flood operation would be similar except that the gate at the outlet from Pool 3 will remain open until JD14 downstream reaches flood stage or Lake Traverse exceeds its design flood level.

The project will also be operated for Natural Resource Enhancement (NRE). Water levels in Pool 1 will naturally fluctuate along with the water level in the river. Water can be directed into Pool 2 from Pool 1 to establish and maintain desired moist soil conditions, pool levels, or other natural resource benefits. Following harvest of crops in Pool 3, available water can be drained from Pool 2 to Pool 3. This would provide flooded crop residues for waterfowl feeding in Pool 3 while exposing mud flats for shorebird feeding in Pool 2. Water levels in Pool 3 can be maintained by the weir gates in the outlet structure. During late fall or winter, the water in Pools 2 and 3 will be drained in preparation for the spring flood. However, if drought conditions prevail and there is little potential for spring runoff, water may be retained in Pool 2 for use by waterfowl during the following seasons.

System Maintenance

Portions of the project may require removal of sediment accumulation. This may include the temporary sedimentation pond during construction, and routine maintenance of ditches and culverts associated with the project. Sediment accumulation may also occur in the inlet channel and need to be removed. The project design provides a bench along the outside toe of the north dike, which may be used as a location for sediment disposal. Impoundment pools may develop vegetation or erosion concerns. These issues will need to be evaluated as they develop and a best management strategy developed for each unique situation.

Cattails will establish in some pool areas as well as other wetlands created by the project. Natural water fluctuations in Pool 1 are anticipated to help maintain wetland plant diversity and some open water. The natural resource enhancement (NRE) goals for the project include water quality improvement, low flow augmentation, wetland wildlife habitat, fish spawning habitat, and native vegetation restoration. Fish

spawning habitat is targeted to Northern Pike spawning, which is needed in the Lake Traverse and Mustinka River fisheries. Northern Pike spawn along shore behind cattail fringe. Therefore some cattail establishment is not expected to impact the NRE goals specific to this project.

Noxious weeds will also be controlled as necessary, and in accordance with applicable regulations. Maintenance equipment will vary depending on the type of maintenance necessary. Equipment might include tractors and pull type equipment, seeders, mowers and earth moving equipment.

c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Flooding is a significant problem in the Red River Basin at local and regional scales. The project will be a component of a regional approach to flood control in the Red River Basin, while also providing local flood control benefits. The Redpath Project also incorporates features that enhance a variety of natural resources and provide fish and wildlife habitat benefits.

Beneficiaries of the project will be the downstream population of the Bois de Sioux and Red River valleys and local residents. Local farmers will benefit from the project because it will reduce local flooding of farmland caused by overland flooding and by the overflow of the Mustinka River. Other local residents will benefit because roads will be elevated and flooding will do less damage to County Highways and other roads. The population of the Red River Valley will benefit because it will be part of the Red River Basin Commission's Flood Reduction Strategy, providing about 17% of the Bois de Sioux Watershed's flow reduction allocation. Hunters and anglers will benefit from the enhanced fish and wildlife habitat.

d. Are future stages of this development including development on any other property planned or likely to happen? __Yes _X_No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? __Yes _X_No
If yes, briefly describe the past development, timeline and any past environmental review.

7. Project magnitude data

Total project acreage 2536
Number of residential units: unattached NA ; attached NA ; Maximum units per building: NA
Commercial, industrial or institutional building area (gross floor space): NA total square feet

Indicate areas of specific uses (in square feet):
Office
Retail
Warehouse
Other commercial (specify)
Building height (If over 2 stories, compare to heights of nearby buildings)
Manufacturing
Other industrial
Institutional
Light industrial
Agricultural 2,249 Ac prior to project

The project does not include any buildings. The project site is about 2,536 acres, of which 2,249 acres are Agricultural and 287 acres are roads, road right of way, or existing waterways.

8. Permits and approvals required. List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate*

environmental review has been completed. See Minnesota Rules, Chapter 4410.3100

Table 2: Permits and Approvals

Unit of Government	Type of Application	Status
MN Dept. of Natural Resources	Joint Dam Safety/Public Waters Work Permit	Application Pending
U.S. Army Corps of Engineers	Section 404	Application Pending
U.S. Army Corps of Engineers	Section 408	Application Pending
MN Pollution Control Agency	NPDES Construction Stormwater Permit	To Be Applied For
Redpath and Gordon Townships	TWP Road Alteration	To Be Applied For
Traverse County	Zoning and Conditional Use Permit	To Be Applied For
Grant and Traverse Counties	Road Alteration	To Be Applied For
Grant and Traverse Counties	Wetland Cons. Act Approval	Wetland Delineation Submitted
Bois de Sioux Watershed District	Project Approval and Funding	Preliminary Hearing Held
MN Dept. of Natural Resources	Flood Damage Reduction Grant	Partial Funding Approved
Red River Watershed Mgmt. Board	Flood Control Grant	Step 2 Approval

9. **Land use.** Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

The impoundment site is generally located in agricultural cropland and surrounded by agricultural cropland. Primary production is corn, wheat, sugar beets and soybeans. In the late 1800's, the State of Minnesota constructed a channel from north of Norcross to Twelve Mile Creek called the Mustinka State Ditch. In the 1950's the U.S. Army Corps of Engineers constructed JD14, which straightened and enlarged the Mustinka State Ditch. The Mustinka State Ditch is located along the northern portion of the impoundment. Remnants of the old Mustinka channel, which are now in crop production, are still visible in some locations. The project area is prone to frequent flooding from overflow from the Mustinka River/JD 14 and Five Mile Creek causing widespread damage to roads and agricultural lands.

The impoundment will be divided into 3 pools with various uses. Pool 1, located in the south half of Section 24, will be a permanent pool. Water level in Pool 1 will fluctuate along with the water level in the river. When Pool 1 is full it will overflow a weir structure to Pool 2, located in the south half of Section 23. When water levels rise in Pool 2 it will flow over the spillway into Pool 3, located in Sections 21 and 22. As water levels rise and submerge the weir structures the entire impoundment will continue to rise to the elevation of the top of the outflow structure, then water will begin to overflow the spillway at the northwest corner of Pool 3 to JD14. The pool complex will provide about 24,000 acre-feet of storage during a 100-year spring flood of which approximately 18,500 is gate controlled.

The project will reduce farm land acreage. But the productivity of remaining farmland around the project area is expected to improve by reducing the impacts overland flooding. Therefore, the effect is expected to be a net increase in both agricultural efficiency and net production.

An inquiry of the project area using PCA online application "What's in My Neighborhood" does not indicate any potentially contaminated sites within or near the project site. There is no knowledge of any soil

contamination or abandoned storage tanks within the project site. There are no known hazardous liquid or gas pipelines on or near the project site.

10. Cover types. Estimate the acreage of the site with each of the following cover types before and after development:

Table 3: Cover Type Acreage

Cover Types	Before	After
Types 1-8 Wetlands	64	696
(Ditches/Channels)	(37)	(66)
Wooded/Forest	1	0
Brush/Grassland	218	600
Cropland	2222	1200
(currently in CRP)	(190)	(0)
Lawn/Landscaping	0	0
Impervious Surfaces (roads)	31	40
Stormwater Pond	0	0
Other (describe)	0	0
Total	2536	2536

If **Before** and **After** totals are not equal, explain why:

The number of acres of cropland in the table above is 27 acres less than listed in Item 7 as there are 27 acres of delineated farmed wetland included in the wetland tally above. Also, the number of acres of existing Type 1-8 wetlands is 93 acres less than the total described in Item 12. The Minnesota Mapping Conventions were applied to the area and an additional 93 acres of wetlands were included in the wetland total for Item 12. This acreage was included in the cropland total above. Due to the existence of farmed wetlands, acreage is described in EAW questions according to the focus of the question, cropland or wetlands. However, the table above focuses on delineated wetlands in the "before" category.

The reduction in "Cropland" acreage includes the conversion of the JD14 floodway as the floodway will be seeded to permanent grass cover.

The existing "Brush/Grassland" cover type includes road slopes and the spoil area of JD14. The "after" area includes buffers and areas that may develop into wetlands.

The 1200 acres remaining as Cropland includes the anticipated remaining farmable areas within Pool 2 and 3. Pool 2 may be managed as a moist soils management area.

Ditches/Channels includes road ditches, County Ditches, and JD14. The increase is from the addition of the meander channel.

Pool 1 is expected to develop into an approximately 270 acre wetland including a permanent pool of about 45 acres. The by-pass corridor contains a floodway that is expected to develop into about 170 acres of wetlands. Ditches and channels are expected to account for 66 acres of wetlands. The remaining 190 acres of "after" Type 1-8 wetlands includes existing wetlands that will not be filled by construction and other areas anticipated to develop into wetlands such as borrow areas.

11. Fish, wildlife and ecologically sensitive resources

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Fisheries Resources

Resources which would be affected by the project include JD14/Mustinka River and Lake Traverse. Fisheries resources are currently affected in the Redpath Project area due to historic ditching of the Mustinka River/JD 14. The Mustinka River is also impaired for turbidity in the vicinity of the project (see Item 17). The Redpath Project Team identified the need for spawning habitat for northern pike in the Mustinka River due to previous loss of northern pike spawning habitat upstream of Lake Traverse.

The Project will recreate 5.5 miles of meandered river channel with pools and riffles as typically found in naturally occurring streams, along the north side of the impoundment. There will be about 1.5 times the linear length of stream in the excavated floodway channel than currently present. The floodway and meander channel will create a grassland/wetland complex within the floodway corridor. The meander channel will also include wide culverts at road crossings to provide better fish passage up the by-pass corridor. A need identified for the Lake Traverse and Mustinka River fishery is Northern Pike spawning habitat. Pool 1 will be managed to provide the flooded grassy habitat area for eggs to hatch and fry to feed. The fry can return to the river and Lake Traverse.

Erosion and sedimentation due to construction of the project may impact habitat temporarily. Construction will not start within fisheries waterways until after the Northern Pike spawning is over. Also see Items 16 and 17 regarding erosion and sedimentation and associated mitigation measures.

Wildlife Resources

The project area is located in the Ecological Province 251 Prairie Parkland, Section 251A Red River Valley and Subsection is 251Aa Red River Prairie. The existing project site is almost entirely agricultural land with portions of this land enrolled in the Conservation Reserve Program (CRP). Project construction will convert some of the agricultural land and the CRP land to various habitat types and project features. A portion will be converted to shallow water habitat in the primary flood pool (Pool 1) with some seasonally flooded wetland and a moist soil management area in Pool 2. Pool 3 is anticipated to remain in crop production. The dikes constructed to create the impoundment and interior pools will be seeded to permanent cover. Perimeter ditches will include a minimum one rod grassed buffer strip, which will provide additional habitat for wildlife.

The project will also create a riparian habitat corridor by the creation of the 5.5 mile long by 240 foot wide meander channel and wide grassed floodway (by-pass corridor). The meander channel area is approximately 20 acres and the grassed floodway is approximately 160 acres.

A competitive vegetative cover, including native species, will be established in the project area (see Item 6b for project seed mixes). The primary purpose of the vegetative cover will be minimizing site erosion. However, seed mixes are expected to also provide wildlife habitat. Board of Water and Soil Resources (BWSR) seed mixes will be used, including options for portions of the project requiring quick establishment for erosion control. For the project area overall, control of invasive species, other than noxious weeds, is not an anticipated project activity, but will be addressed if needed. A project goal is to establish native prairie vegetation within the by-pass corridor. These natives are generally competitive once established. Mechanical control methods including prescribed burns, and mowing will be used during the establishment phase. Chemical applications will be used if necessary. The invasive species of most concern is Reed Canary Grass as seen in many wetlands within the project site. Control Methods recommended by the Minnesota DNR will be used. This area is critical to have vegetation establish so the seed mixes used will contain cover crops and contain native prairie seeds (see Item 6b). These plants also need to be selected for their tolerance to inundation due to the location and likelihood of flooding once it is connected to JD14. These restoration techniques are expected to provide wildlife habitat.

During construction, there will be temporary disturbance to wildlife from construction noise and activity. Removal of CRP habitat, wetlands, relocation or maintenance to ditches, and construction of the floodway along the Mustinka River/JD 14 will also disturb wildlife using these habitat areas. The temporary and phased nature of disturbance is notable. Phased construction impacts would also be accompanied by phased

restoration activities, which would provide some mitigation for habitat disruption. During operation, habitat areas within the project area would be inundated with water during flooding, affecting species using those areas. However, it is notable that habitat outside of the impoundment and floodway areas would experience less inundation due to the flood control benefits of the project.

Also, sediment accumulation may become an issue over time and require maintenance work for removal. Sediment removal might be necessary from the TCD35 sediment pond as well as the inlet channel and possibly pool 1. Sediment materials might contain small amounts of contaminants and nutrients. To avoid impacting wildlife attracted to habitat in the project area, removed sediment will be thinly spread either on the outer sides of dikes or other appropriate areas to allow contaminants to break down and nutrients to be used by plants.

> b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? _X_Yes __No
> If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA-570) and/or Division of Ecological Resources contact number (ERDB _____) from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources. Indicate if any additional survey work has been conducted within the site and describe the results.

A search of DNR Rare Features Data showed a sighting and presumed nesting of upland sandpipers (*Bartramia longicauda*) in Sec 19, Gorton Twp. This species is not state-listed but it is a Species in Greatest Conservation Need as identified in Minnesota's State Wildlife Action Plan (MN State Wildlife Action Plan - http://www.dnr.state.mn.us/cwcs/index.html). Habitat for this species includes prairies and other grasslands. They are found throughout much of the central and northern US. This project will create a large complex of varying habitat types including large grassland tracts. As the Upland Sandpiper is a ground nesting species, there is a risk that if a nest were to be located in grassland tracts within the Pools or floodways, the nest could be inundated. However, the project will likely reduce inundation of areas outside of the impoundment/floodways due the impoundment of flood waters. Construction of the project would also impact grassland habitat located CRP farmlands, roadside ditches, and in spoil piles along the Mustinka River/JD 14. As described above, the temporary and phased nature of disturbance is notable. Phased construction impacts would also be accompanied by phased restoration activities.

The Minnesota Biological Survey has not identified any Sites of Biodiversity Significance or Native Plant Communities within Redpath Township. However, northwest of the community of Norcross, JD14 crosses the railroad and TH9 (Sections 20 and 21). The railroad right of way north of the ditch has been identified as native prairie. No construction is proposed on the railroad right of way, and the native prairie will not be disturbed. Seed mixes planned for use at the Redpath Project site will be sourced as locally as possible to address possible genetic impacts to nearby native prairie.

The following maintenance methods will be included in project planning to provide for nesting habitat in roadside ditches.

1. Delay roadside mowing until after August 1st.
2. Roadsides mowed after September 1st should be clipped high (10 to 12 inches).
3. Use spot treatment to manage site for noxious weed control
4. Avoid indiscriminate roadside burning.

Also, construction will be scheduled to comply with the Migratory Bird Treaty Act. Colonies of nesting Cliff Swallows have been observed under at least two of the bridges affected by the project. Work at these bridge sites will be restricted to between September 1st and May 1st which is outside of the swallow nesting season.

12. Physical impacts on water resources. Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch? _X_Yes __No
If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: Mustinka/JD14 - 26012a; Five Mile Creek – 26021a; Twelve Mile Creek 75038a

Describe alternatives considered and proposed mitigation measures to minimize impacts.

Data obtained from the DNR Data Deli for the Public Waters Inventory show Public Waters in the vicinity of the project site including Twelve Mile Creek, Five Mile Creek, and JD14 (Mustinka River). The project will involve the diversion of flood water from JD14. JD 14 flows will by-pass the impoundment, and flow down the new by-pass corridor. By-pass corridor flows will re-enter the existing JD14 channel at the west end of the impoundment and continue to flow west. As flows in JD14/Mustinka River increase, a portion of the water will enter the impoundment and be stored until it is released or utilized for resource management. JD14 will be the outlet for all impoundment releases. TCD35 will also be relocated approximately 160 feet south of its current location to maintain road alignment and increase impoundment storage capacity. TCD35 will be reconnected at the west end of the project area with its current channel. There are no significant changes in flows to Five Mile Creek, Twelve Mile Creek or JD 14/Mustinka River expected from the relocation of TCD35 (see Figure 4). However, when relocated, TCD35 will be designed to its original capacity, which may have a minor impact to the local hydrology.

During construction of the by-pass corridor, flows in JD14 will remain within the current channel. No flows will be altered or diverted other than the drainage areas that flow into the by-pass corridor. That drainage will be allowed to flow thru the channel and associated storm water controls to the outlet into JD14 at the west end of the project site.

The flows in the by-pass corridor will be limited to about 500 cfs during a 100 year flood event by the corridor inlet box culvert. An additional gated inlet is provided to bypass additional flows during construction, maintenance, or emergency situations.

Every river/stream reach has erosion, sediment transport and deposition occurring. This reach is in the middle zone (sediment transfer) so the corridor will be constructed with a meander channel within the excavated floodway. The meander channel is designed to convey about 100 cfs within the channel. It will have pool/riffle areas in the bends as the cross section of the bottom will tip to the outside toe of bends and the inside toe will tip up. The curvature of the bends is anticipated to change over time as does a dynamically stable channel. The grade of the meander channel is set to approximate the design elevation at each end of the meander channel, but due to creating a meander length of approximately 1.5 times the horizontal distance the design grade will be flatter than the original JD14 design gradient. The current channel is experiencing degradation; the channel bottom is approximately four feet lower than the original design grade within the project area. The inlet culverts will be set to approximately the bottom of the current channel and the culvert diverting water into the by-pass corridor will be set about one foot below the original design elevation of JD14 at that road crossing. During large flood events, water will also be flowing overland because it will overtop the road grade at the inlet channel, as it currently does during large flood events. The design of the inlet channel and by-pass corridor will not increase the flood levels upstream of the project.

The outlet for the project is JD14. Modeling shows that design flood outflows were contained within the downstream channel. The capacity of the existing JD14 downstream channel exceeds the design flows of the by-pass corridor.

A 10-year, 10 day spring runoff event (snowmelt including rainfall during the melt period) would fill Pools 1 and 2, Pool 3 to the elevation of 1017.25 feet, which is lower than the overflow. The un-gated flow volume would bypass the impoundment in the by-pass corridor, if the Pool 3 gate is closed. However, typically during the summer, the gate would be open and no water would be stored in Pool 3 as conditions permit.

Project impacts to public waters and wetlands were reduced during development of this Environmental Assessment Worksheet (EAW). The project design has been revised at the southwest corner of Section 21, Redpath Township, to avoid impacts to Five Mile Creek, Twelve Mile Creek and JD 14 (Mustinka River). The Project Team met and reviewed design changes that eliminated any loss of public water in Five Mile Creek, eliminates about 2 acres of wetland impacts, and eliminates some anticipated hydrologic changes to Twelve Mile Creek, Five Mile Creek, and JD14/Mustinka River. The revised design moved the impoundment out of the southwest corner area, and moved the west dike slightly farther west, so that the impoundment volume did not change. The final design for the project's southwest corner is shown in Figure 4. The Project Team, including Soil and Water Conservation Districts and the United States Army Corps of Engineers has also been involved during the various development stages of the proposed project.

Wetlands

The wetland delineation found a total of 64.3 acres of wetland within the project area. Minnesota Mapping Conventions wetlands add an additional 96 acres for a total of about 160 acres. Of those wetlands, there are about 92 acres in road and field ditches, 50 acres in basins and old meander channels, and the remaining 17 acres within JD14. The project footprint is anticipated to permanently impact about 32 acres of wetlands. A review of the wetland delineation data sheets and the Minnesota Routine Assessment Method (MNRAM) for the project indicates that many of the sample points were within wetlands that contained drowned-out crops, or bare ground in agricultural fields. Other wetlands are monoculture stands of reed canary grass. Many of the wetlands are within agricultural fields or temporarily out of production CRP fields. The wetlands in agricultural production lack wetland vegetation. Approximately 19 acres of wetlands are within road ditches that will be realigned by the project. There will be an impact to existing ditch bottom wetlands due to the realignment of TCD 35 that is similar to the impact of ditch maintenance.

Pool 1 is expected to develop into an approximately 270 acre wetland including a permanent pool of about 45 acres. The by-pass corridor contains a floodway that is expected to develop into about 170 acres of wetlands. Ditches and channels are expected to account for 66 acres of wetlands. An additional 190 acres includes existing wetlands that will not be filled by construction and other areas anticipated to develop into wetlands, such as borrow areas. Pool 2 may be managed as a moist soils management area or cropland. If it is managed as a moist soils unit, considerable wetland acreage may be added.

Due to the ratio of proposed wetland creation to wetland impacts, and the expected increase in wetland vegetation quality and diversity, the Bios de Sioux Watershed District is proposing that wetland impacts are self-mitigating. The Bois de Sioux Watershed District is working with the United States Army Corps of Engineers and local government unit administering the Minnesota Wetland Conservation Act to consider practical alternatives to further avoid or minimize wetland impacts and to develop a mitigation plan for the remaining impacted wetlands.

13. **Water use.** Will the project involve installation or abandonment of any waters, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? __Yes _x_No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

During surveys of the property no wells were found and no wells are shown on the Minnesota Department of Health County Well Index within the project area.

14. **Water-related land use management district.** Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? _X_ Yes __No
If yes, identify the district and discuss project compatibility with district land use restrictions.

The project is located within 300 feet of JD14 and Five Mile Creek. In Traverse County JD14 and Five Mile Creek are Tributary shoreland zoning districts. In Grant County JD 14 is an Agricultural Shoreland Zoning District. For movement of material in the shoreland impact zone a conditional use permit is required in Traverse County. Grant County defers to the Department of Natural Resources Work in Public Waters Permit.

Also, the project will be located within 300 feet of JD14 in an area prone to flooding, but not within a delineated 100-year flood plain, but rather an undesignated area. The creation of JD14 resulted in spoil placed along the channel encroaching on the floodway. This project will remove parts of the spoil and create a floodway along a portion of JD14.

15. Water surface use. Will the project change the number or type of watercraft on any water body?
_X_Yes __No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

The project may provide an opportunity for hunters to utilize watercraft within the impoundment.

16. Erosion and sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: 714 acres; 4,200,000 cubic yards required for fill. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

The fill area is 259 acres and the Cut area is 455 acres.

Primary sources of potential erosion and sedimentation for the Redpath Project include construction disturbance and channel erosion during operation. For example, when flow is introduced to constructed portions of the project, erosion and sedimentation into the by-pass channel and/or Mustinka River/JD 14 is possible if erosion control measures such as vegetation establishment were not fully successful.

On-site erosion and sedimentation during construction will be controlled by phasing, detention ponds, silt fence, erosion control blanket, and grade checks (e.g., rocks). Side slopes of dikes on the pool side will be broken with a wave protection berm. Fill for dike construction will be taken from floodway excavation, water management channels, and borrow areas. Around the perimeter of the project permanent grass buffer strips will be established. All disturbed areas will be seeded and maintained in a permanent cover if not surfaced with riprap or gravel. Also, a temporary sediment pond will be located along the western portion of the impoundment during relocation of TCD35.

During phase one, construction of the by-pass channel would occur in the absence of flow to minimize erosion and downstream sedimentation. Then, after vegetation is established, flow would be introduced to the by-pass channel. When flow is introduced to the by-pass channel there is the potential suspension of sediment in the river. However, it is notable that currently, the instable nature of JD14/Mustinka River is causing erosion and sedimentation that is expected to be improved by the addition of a meandering design.

The project requires a Minnesota Pollution Control Agency construction stormwater permit for each construction phase. The permit and associated stormwater pollution prevention plans (SWPPP) will identify all required best management practices (BMPs). Also see Item 17a below for more information regarding erosion and sedimentation control.

17. Water quality: surface water runoff
a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

The project will cause a reduction in peak runoff water downstream during controlled flood events by way of storage. The design of the project will reduce peak flows for the design 100-year spring runoff event

from about 3300 cfs down to just over 2000 cfs. Reduction of downstream flooding will generally improve water quality during high runoff events by reducing downstream channel and overland erosion. The constructed floodway will contain the majority of flood flows within the grassed floodway reducing the amount of overland flows across agricultural fields. In addition, detention of runoff from agricultural areas during flood events when the impoundment is operated will remove suspended sediment, contaminants, and nutrients from the water, the amount depending on the duration of storage.

During non-flood times, the meandered stream channel formed by the restored river corridor will slow flow and reduce turbidity. The grass buffer areas of the floodway will also reduce sediment and erosion resulting in improved water quality.

Very long detention times during the growing season can cause increased biological activity within the impoundment pool. While some plants and microorganism growth can serve to provide a nutrient uptake function, increased bioactivity can also result in adverse water quality effects of depleted dissolved oxygen levels and increased BOD (biochemical oxygen demand) levels in the discharge water. Outflows from the impoundment will be aerated, if necessary, to reduce the impacts downstream.

Off-site runoff will be diverted through grassed waterways surrounding the impoundment. On-site runoff will be controlled by detention ponds. During construction, BMP's will be used to minimize erosion and control sediment. Construction plans will include a stormwater pollution prevention plan (SWPPP). Also, temporary sediment pond will be included in the western portion of the impoundment during relocation of TCD35.

Twelve Mile Creek and part of JD14 are on the MPCA's impaired streams list for turbidity. The SWPPP will address the requirements of the NPDES permit with the use of BMPs, phasing of construction, and timing of installation of features. During construction, management of stormwater will be addressed by construction of new channels without diverting the water to them until they are stabilized. It will also be controlled by construction of temporary detention ponds to provide settlement time of sediment prior to release to waters of the state.

The MPCA has completed a TMDL for the Mustinka River. Two reaches of the Mustinka River are impaired due to high turbidity. The impairments are located along a 4.7 mile segment running from the Grant/Traverse County line to Five Mile Creek, and a reach starting at an unnamed creek running to Lake Traverse (8.3 miles). The first reach is the same location as the Redpath project.

The Redpath project is the primary project proposed in the Mustinka River Turbidity TMDL Implementation Plan (dated Nov. 23, 2010). The implementation plan states that "the Redpath project is a multipurpose BDSWD project that incorporates stream restoration and flood control with water quality and wildlife habitat benefits." The Redpath project is a central part of the TMDL implementation plan.

The Redpath project is expected to improve water quality in the Mustinka River/JD 14 and play a part in removing the reach downstream of the Grant/Traverse County line from the impaired waters list. The project should have a positive water quality effect downstream as well. The TMDL implementation plan requires monitoring after completion of the Redpath project for flow and water quality to assess the long term effectiveness of the project.

> b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

The project will impound up to 24,000 acre-feet of the spring flood. Following the spring flood, when downstream conditions allow, excess water that is not retained for natural resource enhancement purposes will be released from Pools 2 and 3 at rates which will not contribute to downstream flooding. This water will outlet into the existing JD14 channel approximately 1.2 miles upstream of confluence of Twelve Mile Creek. Water will slowly drain from Pool 1 to restore flood capacity while providing stream flow maintenance to the new meandered channel. The design will allow up to 500 cfs in JD14 to be diverted

into the meander channel. As stated above, Twelve Mile Creek and portions of JD14 are impaired for turbidity. The major downstream water body is Lake Traverse and the project will improve runoff from the area of the project to the lake by reducing sediment and nutrient amounts being transported to Lake Traverse.

18. Water quality: wastewaters

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

Not applicable

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Not applicable

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Not applicable

19. Geologic hazards and soil conditions

a. Approximate depth (in feet) to ground water: 5 ft. minimum, 10 ft. average;
to bedrock: 170 ft. minimum, 200 ft. average.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

None of these hazards exist on the project site or in the immediate area.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

Review of the soil survey shows that soils found on the impoundment site include: Hamerly clay loam, Doran clay loam, Wheatville silt loam, Lindaas clay loam, Vallers clay loam, Hamerly_Lindaas clay loam, and Doran-Lindaas silty clay loam (see Figure 7). These soils generally have a slow to moderately slow permeability except for the Wheatville silt loam, which has a moderately rapid permeability in the upper part of the horizon.

Preliminary soil borings were advanced at the project site. The results of the boring show that the topsoil is underlain with both lean and fat clays. Near the old Five Mile Creek channel there was a layer of silty sand which is presumably in an old meander of the creek.

No chemicals or other wastes, other than those connected to construction, will be associated with this project and are therefore not a hazard for groundwater contamination during project operation. Construction equipment fueling and repair will be addressed as part of the General Stormwater Permit to minimize potential effects from spills.

20. Solid wastes, hazardous wastes, storage tanks

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

During construction any solid waste generated will be disposed of properly by the contractor, they will also be required to properly dispose of any waste generated by maintenance of vehicles. After construction no additional waste is expected to be produced. The SWPPP will address requirements for solid wastes, hazardous wastes, and storage tanks.

Types of solid waste anticipated include sediment, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes that must be disposed of properly and must comply with MPCA disposal requirements. Hazardous wastes could include fertilizers which must be stored in covered locations, chemicals which must be stored in locked containers, oil and fuels which must be stored properly including secondary containment to prevent spills.

Removal of existing culvert pipes will generally be treated as a salvage operation. They will be stockpiled and reused where feasible. At the end of construction all remaining pipes will be recycled as appropriate.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

The SWPPP will address the requirements of the NPDES permit with regard to construction materials, such as oils and fuels and proper handling and storage to prevent contamination. Typical BMPs that will be used include not allowing storage of hazardous materials or refueling near surface waters. After completion of the project, no other toxic or hazardous material will be associated with this project.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

Petroleum products used by the contractor will be handled as described above.

21. Traffic. Parking spaces added: N/A

Existing spaces (if project involves expansion): N/A Estimated total average daily traffic generated: Minimal (10 - 20 vehicles) during construction or maintenance.

Estimated maximum peak hour traffic generated and time of occurrence: Beginning and end of average work day hours, negligible traffic.

Indicate source of trip generation rates used in the estimates: Estimation.

If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance *(available at: MNDOT Traffic Impact Study Guidance - http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf)* or a similar local guidance, provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

Not applicable.

22. Vehicle-related air emissions. Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation

measures on air quality impacts.

Typical equipment used in Highway and Heavy construction will be used. Construction equipment includes, but is not limited to scrapers, trucks, backhoes, front end loaders, tractors and pull type equipment, compactors and sheet pile drivers. Restoration and maintenance equipment will include tractors with pull type equipment, seeders, mowers, and earth moving equipment. Emissions from these vehicles will be relatively minor and temporary in nature.

23. **Stationary source air emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

Not applicable.

24. **Odors, noise and dust.** Will the project generate odors, noise or dust during construction or during operation? _X_Yes __No
If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

There will be temporary noise associated with the construction of the impoundment dikes and structures. This noise will be generated by earth-moving machinery. Equipment noises will be similar to that of agricultural equipment which is predominant in the project area. Construction will generally be done in moist soils reducing the amount of fugitive dust, however haul of borrow material could cause dust problems but will be minimized by requiring the contractor to treat haul roads.

There are two occupied residences within one half mile of the construction area on the north side. There is one residence about three fourth of a mile west of the impoundment. There are four residences about one mile south of the impoundment.

Work hours during construction are generally restricted to week days during daylight hours. Work on Saturdays may be permitted and work on Sundays is not generally allowed except in unusual circumstances. It is anticipated that the project will be completed in phases (see item 6b above) over a period of 4 years.

25. **Nearby resources.** Are any of the following resources on or in proximity to the site?
Archaeological, historical or architectural resources? __Yes _X_No
Prime or unique farmlands or land within an agricultural preserve? _X_Yes __No
Designated parks, recreation areas or trails? __Yes _X_No
Scenic views and vistas? __Yes _X_No
Other unique resources? __Yes _X_No
If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

A request for review of the Minnesota State Historic Preservation Office (SHPO) archaeological, cultural, and historical data base was submitted to the SHPO. No archaeological sites were identified in the review of the Minnesota Archaeological Inventory and Historic Structures. There was a historic property identified, a school, within the search area. The location is outside of the project and it will not be disturbed. Also, a Phase I Cultural Resources Survey was completed for the entire project site. The report finding is No Properties Affected.

The site and surrounding land is classified primarily as “prime farmland” or “prime farmland if drained.” The surrounding farmland will either not be affected or improved by reductions in flooding and improved drainage outlets around the impoundment. Some of the farmland within the project area will be converted to wildlife or fisheries resource uses by the creation of the pools, vegetated impoundment dikes, and by-pass channel features. Following the spring flood, when downstream conditions allow, excess water will be drained from Pool 3, to allow it to return to agricultural use. See Item 10 listing acreage of cover type changes.

26. **Visual impacts.** Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? __Yes _X_No
If yes, explain.

27. **Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? _X_Yes __No.
If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

The project is consistent with the Red River Flood Damage Reduction Work Group Mitigation Agreement broad goals for flood damage reduction. The project is also consistent with the watershed management plan of the Bois de Sioux Watershed District and with Grant and Traverse County Comprehensive Local Water Plans. Listed as a priority concern in the Traverse County Water Plan is flood damage, objective A includes reducing damage from the 10 year 24 hour runoff event and objective B includes managing high volume runoff. This project is compatible with both objectives. Another priority concern is contaminated runoff, objective A4 calls for the installation of grass buffer strips on waterways. This project will install buffer strips along 6.5 miles of the Mustinka River (JD 14) and about 6 miles of other exterior channels.

28. **Impact on infrastructure and public services.** Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? _X_Yes __No.
If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

The project will raise and improve some of the existing roads within the project that will form the impoundment dikes. These altered roads/dikes will be designed to meet current standards. The north dike will also become a new road serving the traveling public. Township Road 104, along the east side of section 21 thru the impoundment Pool 3, will be abandoned and closed to thru traffic. However, it will be maintained enough to provide access for agricultural operations. It is notable that a bridge in this portion of Township Road 104 is currently closed with no replacement proposed.

29. **Cumulative potential effects.** Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.
Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)
Describe the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects *(or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form).*

Past and present environmental effects in the area of the project represent the existing condition. The EAW compares environmental effects of the proposed project to the existing condition, thus addressing the cumulative impacts of the project with past and present projects.

In order to compare the project with future projects for which a basis of expectation has been laid, the DNR has determined that erosion, sedimentation, and hydrologic impacts are the likely potential cumulative impacts. Therefore, the appropriate geographic area for cumulative impacts assessment is the Bois de Sioux Watershed. The DNR discussed the possibility of potential future projects with county officials in each county for the area within the Bois de Sioux Watershed District and also discussed possible impacts with the Watershed District. Projects in each county are described below, followed by possible impacts that are applicable to various counties.

Grant County is currently working on replacing culverts along the Mustinka River upstream of the project site. The culverts are being replaced with sizes to facilitate flood damage reduction. Some of these may be replaced during construction of the Redpath Project, however they are upstream of Pine Ridge Park Dam, where sediment will be removed before reaching the Redpath site. About one mile upstream of the Redpath Project at CSAH1, the culverts may be replaced by Grant County during construction of the Redpath Project. It is anticipated that stormwater procedures will be followed to minimize erosion and sediment upstream of the Redpath site. Phases of construction during the Redpath Project provide additional sediment and erosion protection as described above. Over the next two years, Grant County also anticipates replacing bridges and that ditch cleanouts will occur. If work occurred within a public water, a DNR work in public waters permit would be required for a bridge replacement. Ditch cleanouts are described more below.

Culvert replacement with smaller culverts for the purpose of storing water temporarily during a flood upstream of a culvert/road would have a hydrologic impact intended to reduce damaging flooding. This approach would, however, affect the transport of sediment in the stream/ditch system by withholding some sediment and possibly causing erosion downstream. Naturally meandered rivers transport a sediment load in a more balanced manner. The counties are working with the DNR for permitting these projects. It is notable that there was a focus during development of the Redpath Project on culvert sizing to ensure sediment transport through the by-pass channel to create a more stable meandered system. Therefore this type of impact is not one the Redpath Project would be anticipated to increase in the watershed.

In Traverse County, a large fertilizer plant is being constructed. Construction is expected to be complete in approximately six months from the time of this EAW. Also, an erosion control project is in early planning stages for Traverse County Ditch 52. The timing of the fertilizer plant construction is not expected to coincide with construction of the Redpath Project. Though hydrologic alteration and erosion and sedimentation effects may be part of the Travers County Ditch 52 project, the project is in such early planning stages, a basis of expectation has not been laid.

Otter Tail County identified proposed size for size culvert replacements and road resurfacing, which would not be expected to have significant hydrologic or erosion impacts.

Big Stone County identified no upcoming projects within the Watershed other than ditch cleanouts.

Wilken County discussed an upcoming bridge replacement project in Campbell, MN. The construction date is unknown and a DNR Work in Public Waters permit would be required.

Stevens County did not foresee any upcoming applicable projects.

Generally, across the Watershed District, practices related to the predominantly agricultural land use of the area will be ongoing. These include installation of tiling, ditch cleanouts, erosion and sedimentation resulting from farming, and agricultural impacts to wetlands and shorelands. Projects for on-farm agricultural drainage require permits from the Bois de Sioux Watershed District, limiting the extent of surface and subsurface drainage improvements. Counties are also planning to excavate sediment basins to reduce sedimentation. These ongoing practices will likely result in alterations to hydrology and sedimentation load. The Redpath Project includes Natural Resource Enhancements in addition to flood control features intended to address some of the natural resource impacts of historic and ongoing changes

the landscape for the purpose agricultural productivity and to protect homes and other structures from flooding.

The Watershed District is also aware of projects that are being pursued, but are not yet at the preliminary design level. Those include stabilization of an erosion problem near Lake Traverse known as Traverse County Ditch #52, the Brandrup 9 Impoundment for flood damage reduction, the Western 32 Impoundment for flood damage reduction. These projects are in such early planning stages, a basis of expectation has not been laid. Other potential projects that are anticipated in concept are included in the 20% Flow Reduction Strategy of the Watershed District.

The 20% Flow Reduction Strategy is part of a basin wide flow reduction strategy in the Red River Basin. The Red River Basin Commission has developed a strategy to reduce peak flows in the Red River mainstem by 20%. In cooperation with the Commission, the Bois de Sioux Watershed District developed an implementation strategy to achieve its allocated flow reduction goal. To meet this goal, the Bois de Sioux Watershed is proposing to reduce flooding by approximately 20% within the Watershed District. A total of 26 storage locations were identified including one, the North Ottawa Project, which has already been constructed and provides about 16% of the allocated storage goal. The Redpath Project will provide an additional 17%. The remaining 67% of the flood reduction goal would be provided by the identified 24 additional storage sites. Those sites are considered to be representative of what will eventually be built, but will likely evolve in both location and design as planning proceeds. Other than flood control, the individual and cumulative environmental impacts of these future projects cannot be determined at this time. Due to the early stage of project planning a basis of expectation has not been laid. However, the Bois de Sioux Watershed District plans to implement the terms and philosophies of the Red River Mediation Agreement, which seeks to include "Natural Resource Enhancements" in flood control projects wherever practical and feasible.

30. Other potential environmental impacts. If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

There are no other negative environmental impacts anticipated.

31. Summary of issues. *Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.*
List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

The regulatory requirements related to affected wetlands are a remaining issue that needs to be addressed. The delineation report identifying existing wetlands in the project area has been submitted. Final designs will consider alternatives that would reduce the effected wetland acreage. The wetland impacts will be mitigated as required. The project is expected to result in an overall increase in wetland functions and values.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept SIGNED Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature Janine Schmeizl Date 9/8/14

Title EAW Project Manager

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines,* contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or EQB Website - http://www.eqb.state.mn.us

Figure 1: Project Location Map

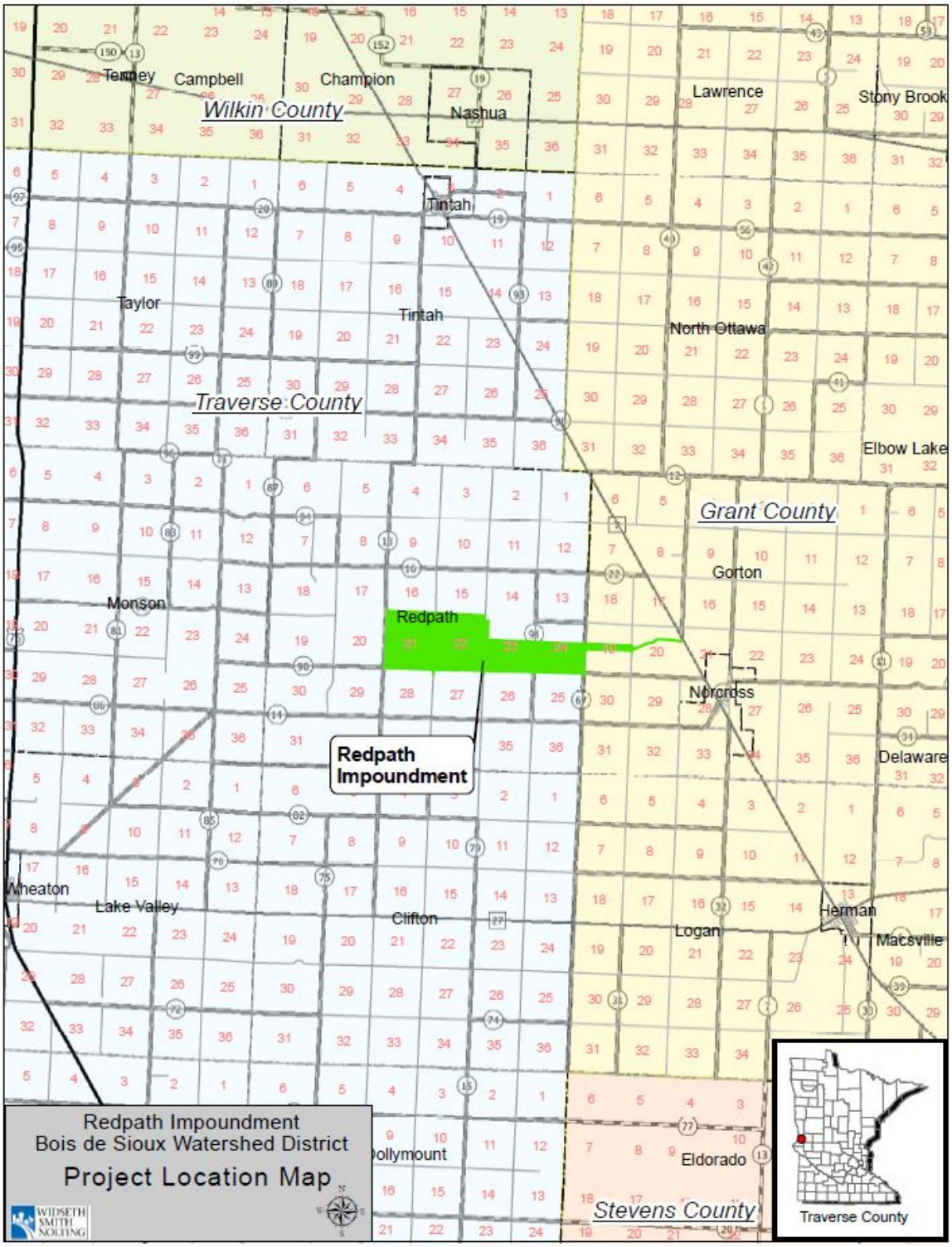


Figure 2: USGS Quad Map

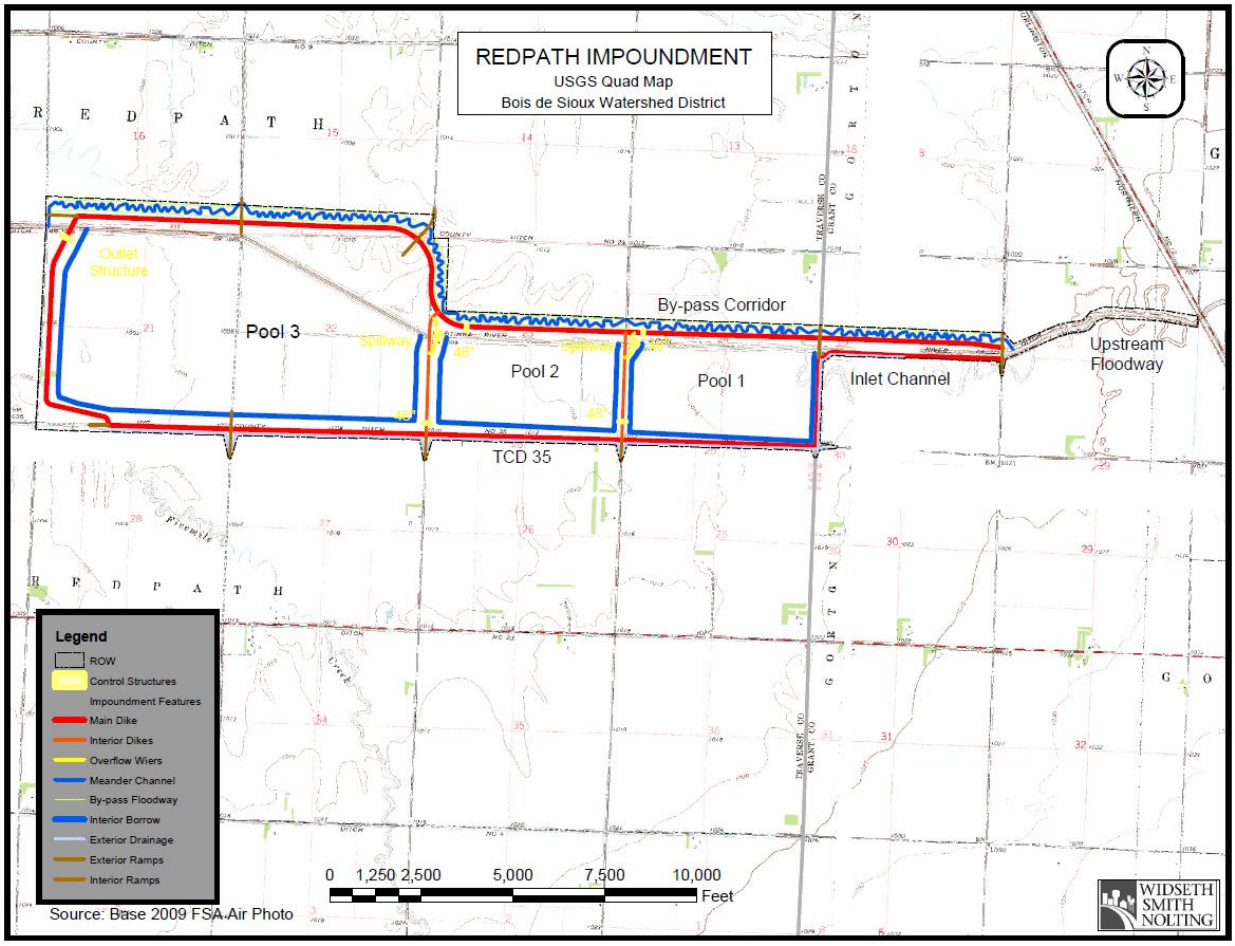


Figure 3: Project Features

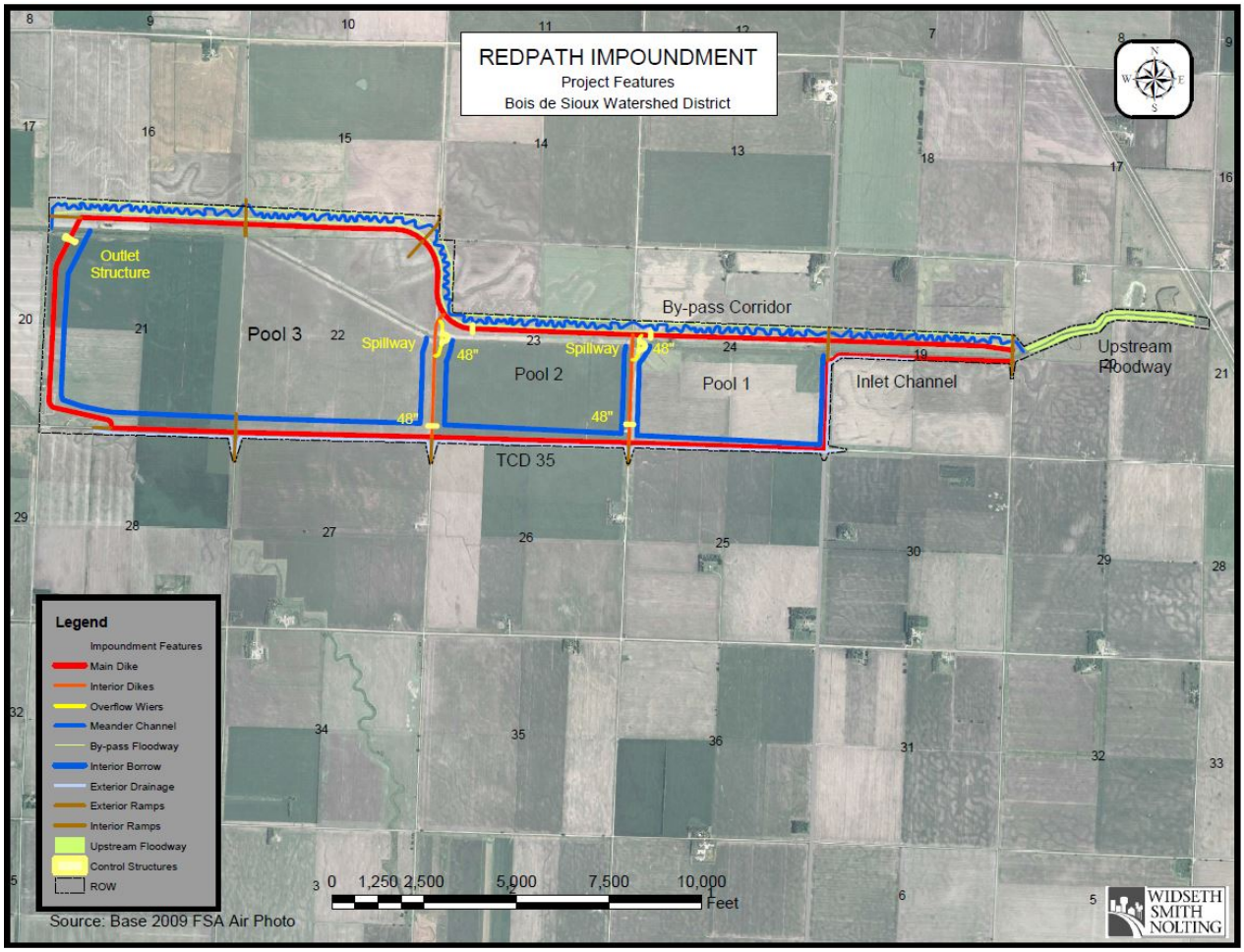


Figure 4: Southwest Corner of Impoundment

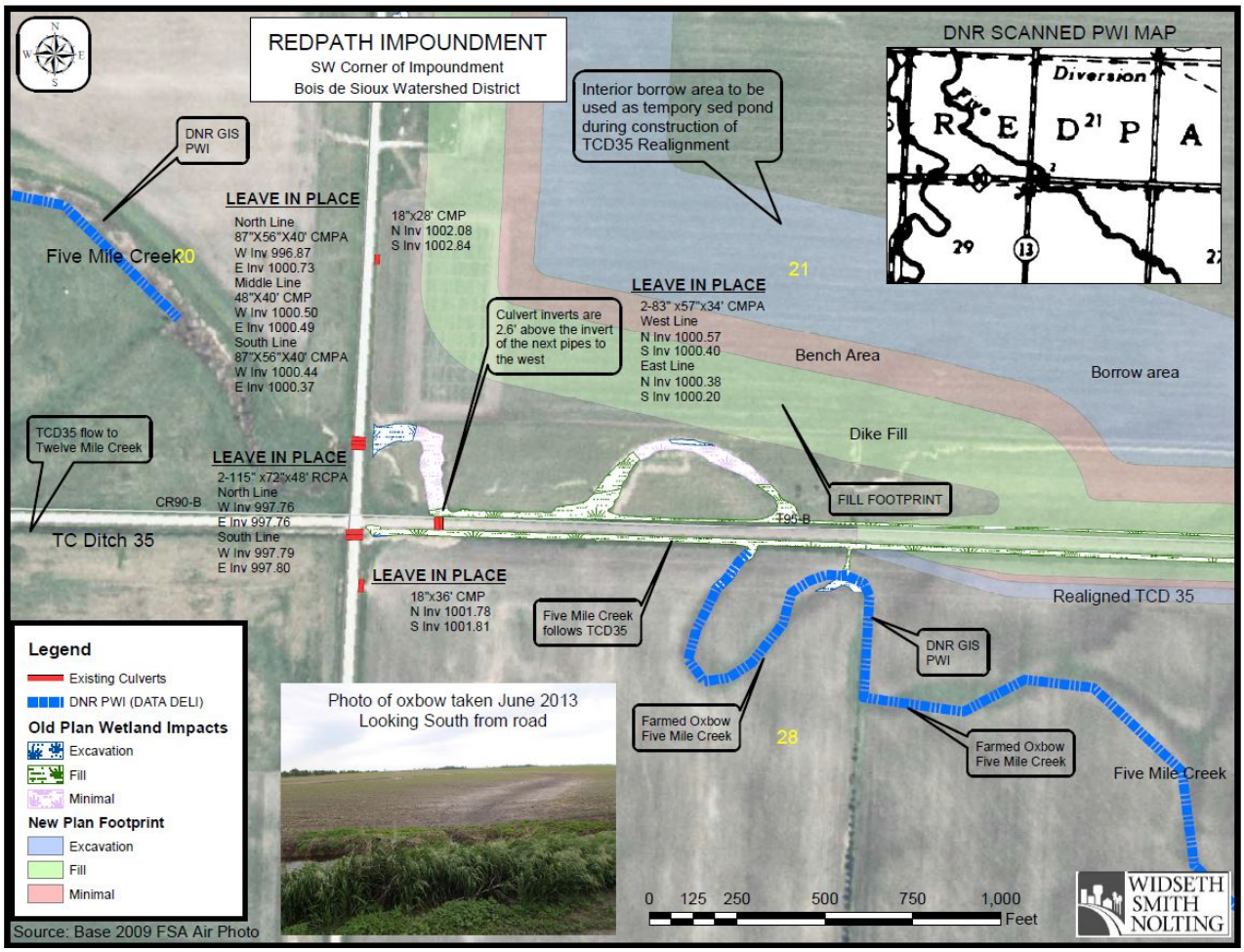


Figure 5: By-pass Corridor Details

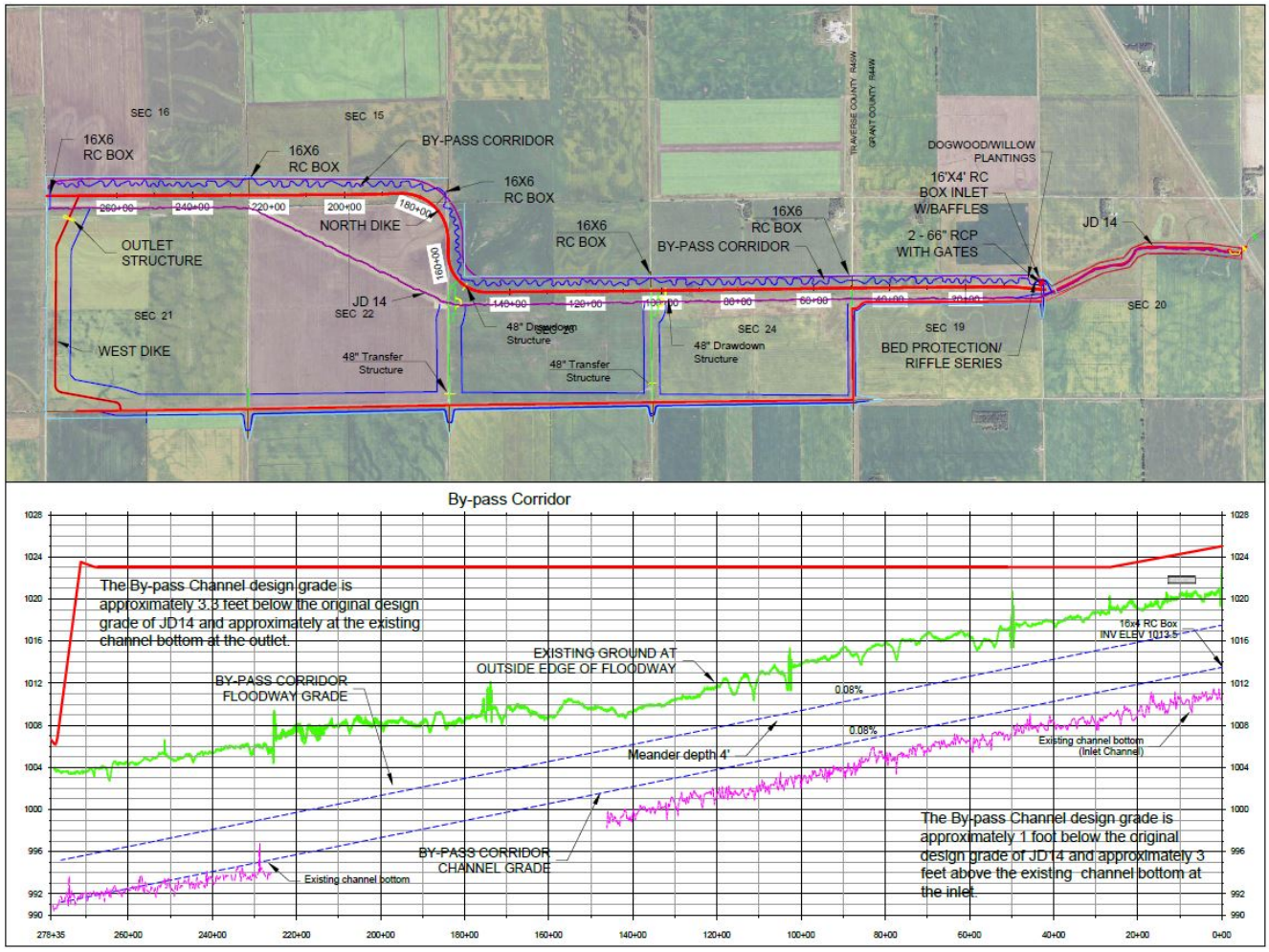


Figure 6: Inlet and By-pass Corridor Structure

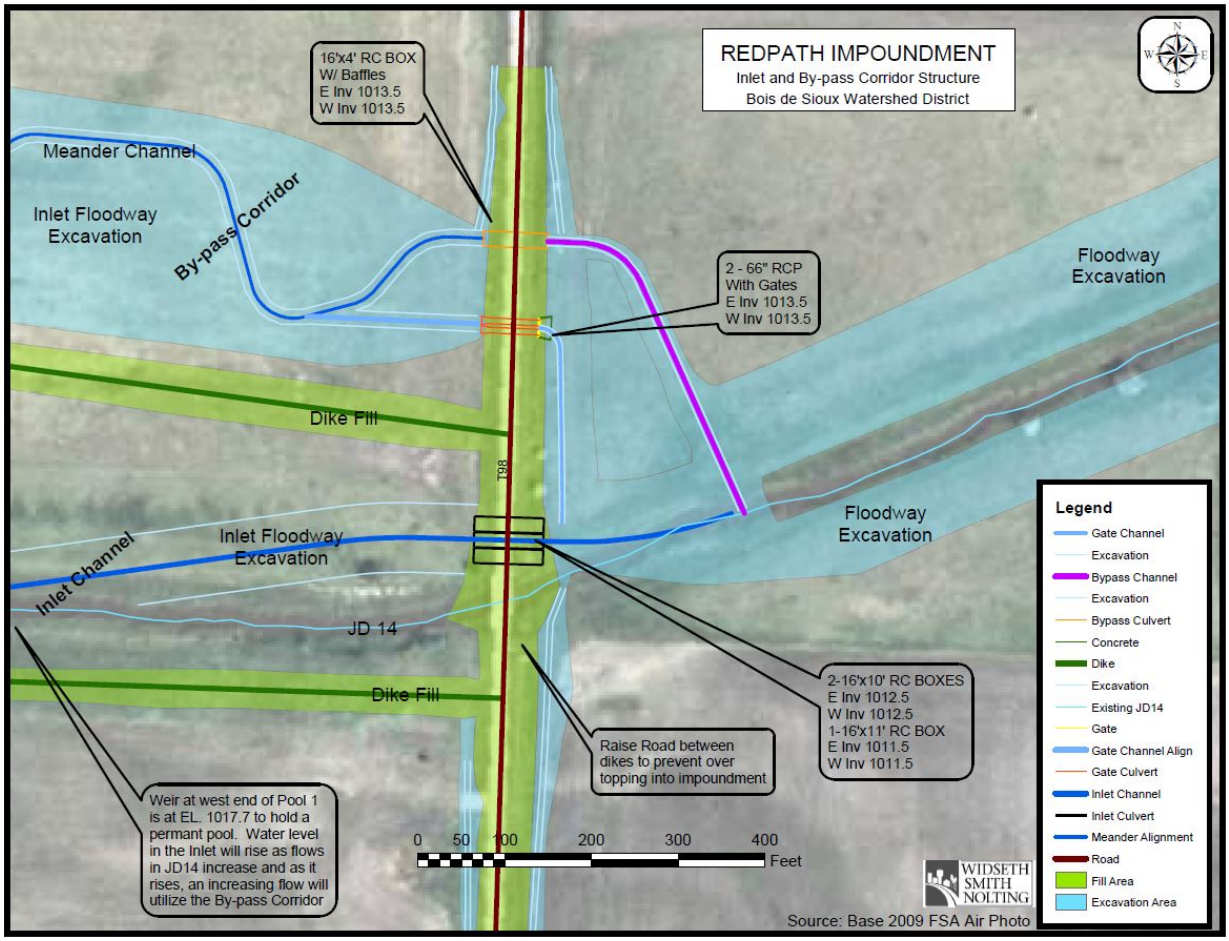


Figure 7: Soils