

ST. CROIX RIVER CROSSING PROJECT SUPPLEMENTAL DRAFT EIS
CHAPTER 10
WATER RESOURCES

10.0 INTRODUCTION

This chapter describes the water resources of the project area and potential impacts on those resources that could result from the Build Alternatives B-1, C, D and E, and the No-Build Alternative, including the Wisconsin sub-alternatives for Alternative C. Where relevant, measures that could mitigate possible impacts are also discussed. Topics addressed include: 1) water quantity, 2) surface water quality, 3) floodplains, 4) wetlands, and 5) groundwater. Impacts on natural resources, such as the fish, aquatic-based wildlife, and the habitat provided by the water resources are discussed in Chapter 9. Construction impacts on natural resources are further discussed in Chapter 12. Potential impacts on the Wild and Scenic River are discussed throughout this Supplemental Draft EIS and are summarized in the Lower St. Croix National Scenic Riverway Draft Section 4(f) Evaluation (see Appendix E).

The proposed scope of Build Alternatives include the project areas studied in the 1990 Draft EIS and the 1995 Final EIS Preferred Alternative, but also include areas outside of the previous project limits (see Figures 10-1a and 10-1b). Much of the information in those previous documents applies to the analysis of the Build Alternatives and the No-Build Alternative. In addition to these past project documents, source material for this chapter includes preliminary design for the four Build Alternatives, studies prepared for project stakeholders, and reports and studies prepared by local, state, or federal agencies.

Applicable regulatory requirements were reviewed and two sets of proposed design goals, one for the Minnesota portion of the project and one for Wisconsin, were compiled based on the requirements. The goals were refined based on information provided by the following agencies:

- Brown's Creek Watershed District
- Middle St. Croix Watershed Management Organization
- MPCA
- Mn/DOT
- Wis/DOT
- City of Stillwater
- City of Oak Park Heights
- National Park Service

The proposed design criteria were reviewed by key agencies and comments were solicited from the Stakeholder Study Group (see Chapter 15 for list of study group participants). Based on the comments received, the design criteria were updated and then applied to the design of each Build Alternative. See Table 10-1 for the proposed design criteria.

**TABLE 10-1
PROPOSED DESIGN CRITERIA**

	MINNESOTA	WISCONSIN
General Design Guidelines	Minimum treatment goal - Mn/DOT right-of-way. Overall treatment goal - Mn/DOT right-of-way, frontage roads, and all existing contributing upstream drainage areas where feasible.	
WATER QUALITY		
Infiltration / Volume Control	Infiltration where feasible within project limits.	Post-construction volume = 60 percent pre-construction volume w/ no more than 2 percent of project area being used for infiltration. 10 percent of the post-development 2-year 24-hour storm w/ type II distribution. (Highways are exempt).
Ponding	NURP Ponding (2.5" rainfall event over entire contributing drainage area). Apply rate control to meet NPDES/SDS requirements.	No specific requirements. See TSS Removal.
Phosphorus Loading	Maximize removal of phosphorus utilizing area within project limits.	No specific requirements. See TSS Removal.
TSS Removal		Minimum 80 percent removal.
WATER QUANTITY		
Rate Control	Maximize rate control within available right-of-way and water quality ponds. Additional rate control will be applied where downstream conveyance capacity is limited and where necessary to ensure water quality BMPs provide efficient pollutant removal.	Maintain or reduce the peak runoff discharge as compared to predevelopment conditions for the 2-year 24-hour design storm.
Buffer Zones	Meet NPDES/SDS buffer zone requirements along the St. Croix River.	

Figure 10-1a – Existing Drainage Area – Minnesota (11x17 – b/w)

BACK

Figure 10-1b – Existing Drainage Area – Wisconsin (11x17 – b/w)

BACK

In this chapter, each Build Alternative's affected environment, environmental consequences, and mitigation measures are described for each water resource topic. Except where noted otherwise, the No-Build Alternative is not anticipated to have adverse impacts on water resources.

10.1 WATER QUANTITY (DRAINAGE)

The regulatory requirements for water quantity (rate control) of stormwater runoff are shown in the design criteria matrix (Table 10-1). In Minnesota, rate control requirements are applied by the agencies for a variety of reasons. Most agencies try to limit the discharge rates to existing conditions or lower if needed to improve flooding conditions on a downstream system. In Wisconsin, the rate control requirement dictates that the design maintain or reduce the peak discharge as compared to the pre-development conditions for the 2-year/24-hour design storm.

10.1.1 Affected Environment

As shown on Figure 10-1a, in Minnesota, the project area lies within the Middle St. Croix River Watershed Management Organization (MSCWMO) and the Brown's Creek Watershed District (BCWD), which conduct watershed management activities within their respective watershed-based boundaries. In Wisconsin, shown in Figure 10-1b, the project area lies within the St. Croix River watershed, where watershed management activities are conducted by the St. Croix County Land Conservation Department.

In Minnesota, the highways and roads consist primarily of rural roadway sections, which incorporate ditches and culverts to convey stormwater. Several ponds exist in the proposed buttonhook area (upper bluff) that provide flood control, consisting of Washington Pond, Oasis Pond, the Perro Creek system and several dry basins. In Wisconsin, the existing highways and roads also consist of rural roadway sections, although most areas do not have defined drainage conveyance systems. There is an existing concrete swale along State Trunk Highway (STH) 64, which conveys water down the bluff to the St. Croix River. There are no existing flood control basins or water quality devices in the Wisconsin project area.

The project area was divided into ten smaller drainage areas (see Figures 10-1a and 10-1b) defined by the receiving waters or distinct discharge points. The shaded areas within Figures 10-2a and 10-2b show the overall proposed impacted area for all the alternatives. Drainage areas receive runoff directly from the highways and from the surrounding areas that discharge into the highway drainage system. The ten areas are discussed individually in the following sections.

Minnesota Drainage Areas

Marketplace Pond Drainage Area

This drainage area includes the highway and the commercial area west of Norell Avenue, both north and south of Trunk Highway (TH) 36. The drainage area is approximately 256 acres (as shown in Figure 1a) and drains to Kohl's Pond, Walmart Pond, and Menard's Pond, which in turn outlets water to Marketplace Pond and eventually discharges to the Long Lake system. In its current configuration, this system is capable of meeting the BCWD rate control rules for the

area left to be developed south of TH 36 (approx 90 acres including the Kohl's site). This area is now under a cooperative agreement between the City of Stillwater, the City of Oak Park Heights and BCWD that allows the diversion structure in the City of Stillwater to accommodate for the volume control rules.

Washington-Norell Drainage Area

This drainage area includes approximately 105 acres of commercially developed areas north of Trunk Highway 36 and east of Washington Avenue. Runoff flows to Washington Pond, which discharges water through a swale and storm sewer system to Marketplace Pond. According to the Market Place Surface Water Management Study¹, the existing Washington Pond is “very shallow and currently provides marginal water quality protection to the downstream surface water system. The pond is also under-sized in relation to its watershed to provide significant rate control.”

Oakgreen-Greeley Drainage Area

The drainage area includes the area surrounding the Oakgreen Avenue/Greeley Street intersection. The area includes 92 acres of commercial, highway, residential, and undeveloped land. Stormwater runoff from the intersection area eventually discharges into Oasis Pond, a stormwater facility created primarily for flood control. This pond overflows through a ditch and wetland prior to flowing into Lily Lake. The drainage system includes a (typically dry) detention area in the southwest quadrant of the intersection. A building adjacent to this detention area has occasionally flooded, which has been studied on several occasions to identify the problem and solutions². The proposed project would include reconstructed and new outlet structures from Oasis Pond, which would minimize or eliminate tailwater flooding impacts in the affected area.

Osgood Drainage Area

The drainage area includes the area surrounding the Osgood Avenue intersection. The drainage area includes approximately 33 acres of commercial and highway area which currently drains to swales and storm sewer to the Perro Creek Drainage Area.

Perro Creek Drainage Area

The Perro Creek highway drainage system extends from east of Greeley Street to a storm sewer crossing at Paris Street near the TH 36/TH 95 intersection (Figure 10-1A). The land use in this 207 acre drainage area is primarily commercial, and includes a large shopping mall area south of TH 36 between Oldfield Avenue North and Osgood Avenue North. Runoff from the south enters a storm sewer that parallels the south frontage road from Oldfield Avenue North to Paris Street. Runoff from the highway drainage area flows through grass ditches prior to entering this storm sewer, and eventually flows to Perro Creek.

¹ “Market Place Surface Water Management Study,” published by Bonestroo, Rosene, Anderlik and Associates, Inc. for the City of Stillwater, March 31, 1999.

² “Drainage Study: Baytown Township, Oasis Pond Watershed,” Wood, Grover and Associates, Inc., March 5, 1979; and “Preliminary Report on Oakgreen Area Drainage, Oak Park Heights, MN” Bonestroo, Rosene, Anderlik and Associates, Inc., May 9, 1983.

Perro Creek is a small urban stream that originates from a pond (Prison Pond) south of TH 36, west of County Road 21, and north of County Road 14 (see Figure 10-1a). It runs southeast through the City of Bayport before outletting into the St. Croix River. Two culverts route runoff from the area north of TH 36. These are a 24-inch culvert near Oxboro Avenue, and a 4-foot box culvert near Paris Street. Perro Creek has had a history of flooding problems, although recent projects have been implemented to solve these problems, as documented in the 1994 Study³.

St. Croix Central Drainage Area

The St. Croix Central drainage area extends from Osgood Avenue east along TH 36, including much of the connection with TH 95 (Figure 10-1a). The approximately 109-acre drainage area includes a variety of land uses, including residential land and a small amount of highway/railroad/commercial use. The outlet to the St. Croix River consists of a number of culverts connected by an open channel. A new storm sewer that runs parallel to these culverts was recently constructed. The outlet to the St. Croix River is east of TH 95 at approximately 58th Street North.

St. Croix North Drainage Area

The St. Croix North drainage area extends from approximately 63rd Street to the north terminus of Alternative E at the existing Stillwater Lift Bridge (Figure 10-1a). The approximately 222-acre drainage area includes the residential properties on the bluff west of Lookout Trail, portions of downtown Stillwater, and a small amount of highway and railroad development. The drainage system currently uses a number of shallow ditches, swales, and culverts to convey stormwater to a storm sewer at the northern terminus of Lookout Trail, which discharges into the St. Croix River. A second outlet crosses TH 95 and TH 36 at about 63rd Street North prior to outletting to the St. Croix River, which serves a portion of the bluff east of Lookout Trail, a portion of the residential area south of 62nd Street North and east of Beach Road, and the adjacent TH 36 ditch.

St. Croix South Drainage Area

The St. Croix South drainage area extends south from the Dahl Tech buildings to approximately 56th Street North. This 109-acre drainage area discharges to the St. Croix River through a series of wetlands and ditches connected by culverts.

Wisconsin Drainage Areas

St. Croix East Drainage Area

The St. Croix East drainage area includes the wooded bluff, ravines and all areas west of STH 35 (Figure 10-1b). The approximately 365-acre area generally discharges into the St. Croix River via natural ravines with the exception of the developed areas draining via a concrete channel down the ravine containing the existing STH 64 corridor.

³ “Perro Creek Minor Watershed Study for the Middle St. Croix River Watershed Management Organization,” Short Elliot Hendrickson, Inc., April 1994.

Wisconsin Uplands Drainage Area

The Wisconsin Uplands drainage area extends eastward from the boundary of the St. Croix East drainage area to just beyond the terminus of the Build Alternatives. The approximately 1450-acre area consists of a number of smaller drainage areas that discharges into a number of landlocked depressions. In the western portion, runoff from the agricultural upland areas is directed toward landlocked depressions located along STH 35 and east of STH 35. Runoff from new residential development is routed through private treatment ponds before flowing to the landlocked depressions. Stormwater evaporates or seeps into the underlying soils within these depressions.

In the eastern portion of the Wisconsin Uplands, the drainage area extends from the drainage divide east of the County Road E/STH 64 interchange to the eastern terminus of the project. The topography in the proposed corridor consists of a relatively level, undeveloped farmland, meadow, and wooded area. Runoff collects in a number of depressions, where it evaporates or seeps into underlying soils.

10.1.2 Environmental Consequences to Water Quantity (Drainage)

The No-Build Alternative would not increase the amount of impervious roadway surface in the project area and would not alter the existing water quantity (drainage) conditions (described in Section 10.1.1).

The Build Alternatives would increase the percent of impervious area of each of the drainage areas. The increase in impervious area for each Alternative is listed in Table 10-2. Based on the increase in impervious area, the volume of runoff is expected to increase. However, the incorporation of wet detention basins, dry detention basins, redesign of conveyance systems, and diversion of some flow through existing outflow areas, as shown in Figures 10-2a and 10-2b, should mitigate this effect on specific water bodies that are susceptible to flooding. The impact of the Build Alternatives on each drainage area is explained separately in the sections that follow. In the upper bluff areas, the alternatives all have the same environmental consequences and impact area; therefore, they are discussed as a single Build Alternative. The upper bluff areas include Marketplace Pond, Washington-Norell, Oakgreen-Greely, and Pero Creek drainage areas.

Minnesota Drainage Areas

Marketplace Pond Drainage Area

The reconstruction of the TH 36 mainline and south frontage road would result in increased impervious area draining to Menard's Pond and Marketplace Pond. The increased flow from this area would be offset by diversion of approximately 86 acres of commercial area north of Washington Pond to the proposed Mn/DOT system to the east, resulting in a reduction of overall flow to the Marketplace Pond system.

Figure 10-2a – Proposed Treatment Ponds – Minnesota (11x17 – b/w)

BACK

Figure 10-2b – Proposed Stormwater Treatment – Wisconsin (11x17 – b/w)

BACK

**TABLE 10-2
IMPERVIOUS AREA WITHIN PROJECT LIMITS**

Drainage Area	Existing Impervious Area (acres)	Proposed Impervious Area (acres)	Percent Increase or Decrease from Existing
Minnesota West ⁽¹⁾	65	76	17 percent
MINNESOTA EAST ⁽²⁾⁽³⁾			
Alternative B-1	38	60	58 percent
Alternative C	39	59	51 percent
Alternative D	47	63	34 percent
Alternative E	50	60	20 percent
WISCONSIN ⁽³⁾			
Alternative B-1	14	57	307 percent
Alternative C - Option 1	13	53	308 percent
Alternative C - Option 2	11	40	264 percent
Alternative D	21	61	190 percent
Alternative E	21	65	210 percent

⁽¹⁾ Includes area west of existing Osgood Avenue centerline.

⁽²⁾ Includes area east of existing Osgood Avenue centerline.

⁽³⁾ Those areas from the proposed bridge and approaches draining into Minnesota are included in the Minnesota East areas and those draining into Wisconsin are included in the Wisconsin areas.

Washington-Norell Drainage Area

The at-grade crossings of TH 36 with Washington/Norell Avenues would be removed and replaced with an overpass and buttonhook interchange. The north buttonhook would impact the existing Washington Pond. The proposed buttonhook geometrics do allow area for the construction of several new wet and dry detention basins, which will be utilized to provide some rate control to TH 36 mainline, frontage roads, and offsite commercial areas.

Due to proposed reconstruction, the existing high point on the TH 36 mainline would move approximately 230 feet east, increasing the drainage area. Due to the increase in impervious area, lowering of the TH 36 mainline profile to account for the overpass, and lack of active storage volume in the proposed ponding system, the existing gravity outflow from Washington Pond to Marketplace Pond east is not feasible. Per discussions with the City of Stillwater, Mn/DOT, and Brown's Creek Watershed District, the existing outlet from the Washington Pond area would be reconstructed to outlet the water east into the proposed Mn/DOT conveyance system which outlets into Oasis Pond. Further discussions with this proposed diversion would occur during the BCWD permitting process.

Oakgreen-Greeley Drainage Area

The at-grade crossing of TH 36 at Oakgreen/Greeley Avenues would be replaced with an overpass. The frontage road realignment would impact a small portion of the existing Oasis Pond, but the pond area and volume remain adequate for water quality treatment. The Middle

St. Croix Watershed Management Organization and the City of Stillwater have indicated in the previous EIS documents that the Lily Lake conveyance system could not accommodate the additional runoff volume that would result from highway improvements. Therefore, based on previous requests by the Middle St. Croix Water Management Organization and the City of Stillwater, some Lily Lake drainage area would be diverted east into a Mn/DOT trunkline system. The existing dry basin as well as a proposed dry basin and swale system located on the south side of TH 36 will help provide additional rate control within the Oasis Pond system. The proposed reconstruction will help provide flooding relief for the existing dry detention basin located in the southwest quadrant of the intersection, as well as for Lily Lake.

Osgood Avenue Drainage Area

The at-grade crossings of TH 36 with Osgood Avenue (County Road 24) would be removed and replaced with an overpass and buttonhook interchange. The buttonhook geometrics allow for construction of several new wet and dry ponds, which will be utilized to provide rate control for the proposed main line improvements, frontage roads, and some adjacent commercial offsite areas.

Perro Creek Drainage Area

The Build Alternatives' drainage systems would include a storm sewer for diversion of highway drainage area discharge to the treatment system in the St. Croix Central sub-drainage area. Additional diversion of adjacent residential and commercial area discharge may be possible due to the available conveyance and treatment capacity of the treatment system in the St. Croix Central sub-drainage area. Flooding in the Perro Creek watershed has been identified and is the subject of a study for the City of Bayport⁴. There is potential to divert area north of the TH 36 corridor into the St. Croix Central drainage system, if agreed to by the various parties. The current plan involves maintaining the two culverts across TH 36 that currently serve the residential and commercial area to the north as well as the trunkline that parallels TH 36 and serves the south frontage road and approximately 71 acres of commercial development.

St. Croix Central Drainage Area

This drainage area includes TH 36, TH 95, the ramps for the proposed TH 36/TH 95 interchange, a commercial area adjacent to the railroad, and the residential area south of the proposed South Frontage Road. For Alternatives B-1 and C, the St. Croix Central drainage area would receive the drainage from the proposed bridge as well. As previously stated, this system would receive discharge from the upper bluff area, which would be accounted for in the conveyance and treatment system design. The final outlet from the system would be to the proposed constructed wetland adjacent to Riverside Pond. Rate control would be applied to the wet detention basins to meet requirements outlined in the design criteria

⁴ "State of Minnesota Storm Sewer – Reconstruction Project – Phase 3," Short Elliot Hendrickson, Inc. for the City of Bayport, MN, February 2004.

St. Croix North Drainage Area

The steep bluffs on the west side, coupled with the proximity of the highway to the river on the east side, limit the land available for the creation of a detention basin for the majority of this drainage area. Several small wet detention basins were included in the Build Alternatives to treat the TH 36 mainline, as shown in Figure 10-2a. This area would receive drainage from the proposed bridge in Alternatives D and E. The bluff area which currently crosses the corridor at the intersection of Lookout Trail, would be diverted into Park Pond for low flow treatment in Alternatives C and D. The bluff area will continue to discharge directly into the river in all other Alternatives.

St. Croix South Drainage Area

The Build Alternative would add impervious area, which would drain south towards the Picket Road intersection through ditches. Ponds would be provided at the 56th Street intersection as a result of the proposed intersection modifications for treatment of TH 95. Drainage from the proposed ponds would continue to be routed through a series of ditches and wetlands before entering the St. Croix River.

Wisconsin Drainage Areas

St. Croix East Drainage Area

The Build Alternative's river crossings would increase the amount of impervious area to the watershed (See Table 10-2 for quantities). The drainage areas would be routed through proposed wet detention basins before outletting to the St. Croix River.

Wisconsin Uplands Drainage Area

The Build Alternative's alignments would affect the landlocked depressions to different degrees. Fill from roadway embankments would cause some flood storage to be lost. Runoff would be sent through grass ditches to detention basins before outletting to existing landlocked depressions. Some of the upland ponds do not have positive outfalls and would be sized to contain the 100-year storm event. These ponds would rely on infiltration and evaporation to draw the water level down. The ponds that do have positive outfalls would subject the receiving areas to concentrated flows which have previously been uncharacteristic. Alternatives B-1 and C maintain the existing drainage patterns to a greater degree than Alternatives D and E. This is due to the need for the runoff from the intersection of STH 64 and STH 35 to discharge to the St. Croix River rather than the upland area in alternatives D and E.

10.1.3 Mitigation of Impacts on Water Quantity

For all stormwater runoff exiting the proposed system, rate control will be applied where feasible to reduce flooding in downstream systems, reduce proposed conveyance system sizes, and to meet regulatory requirements. Additional rate control will be applied where necessary to ensure water quality BMPs provide efficient pollutant removal. Dry detention basins would also be designed to provide infiltration where feasible. Figure 10-2a shows the location of the proposed

wet detention basins in Minnesota and Figure 10-2b shows the basin locations in Wisconsin. In general, wet detention basins and storm sewers will be designed to provide 50-year flood protection at highway low points for storm sewers, and protection of the roadway for the 100-year event for the wet detention basins.

It is anticipated that the Build Alternatives would result in an overall increase in runoff volume, given the additional impervious area and urban drainage systems. The strategy for handling increased runoff involves a combination of infiltration within infield areas, diversion of runoff from receiving waters or downstream systems where flooding occurs to locations where conveyance systems can handle the additional flow, and attenuation within existing and proposed detention basins. Most of the practices discussed are combined with water quality practices, which are discussed further in the water quality section.

In Minnesota, a proposed mitigation measure includes the diversion of runoff from systems that would be under-capacity to newly constructed systems. Diversion of the commercial area in the Marketplace Pond system and the diversion of Oasis Pond from the Lily Lake system are examples of this approach. The second location a diversion is possible is the area north of the TH 36 corridor draining to Perro Creek. A diversion from the Perro Creek watershed to the St. Croix Central drainage area would likely help to reduce the historic downstream flooding problems experienced in the Bayport area. Determination of diverted acreage required to eliminate flooding issues would be based on further analysis, the *1994 Bayport Study*, and discussions with the City of Bayport, and MSCWMO during final design.

In Wisconsin, the strategy is to incorporate a rural drainage system consisting of grass ditches and culverts to route the runoff to ponds located near the low points of the proposed roadways. Both the ditches and the pond would provide active storage to reduce runoff rates. The water would then be discharged from the pond to perpetuate the existing drainage patterns. Currently there is not an in-place or proposed public conveyance system to receive the upland ponds' discharges.

Drainage patterns to existing ravines and drainage swales down the bluff will not be altered in the Build Alternatives. In addition, concentrated flow runoff from the Build Alternatives would be conveyed down the existing drainage corridor along STH 64 in Alternatives D and E. To avoid erosion of existing ravines, emergency outflow from Alternatives B-1 and C ponding adjacent to the bluff would be conveyed via storm sewer down the bluff to stilling basins prior to discharge to the St. Croix River. The conveyance issues would be reviewed further during final design with input from St. Croix County Land Conservation Department, WisDNR, and Wis/DOT.

10.2 WATER QUALITY

This section presents background information regarding the waterborne pollutants of most concern with respect to highway stormwater runoff and the regulation of these pollutants. Also discussed are the affected water bodies and systems in the proposed project area, and the impacts on these systems resulting from all of the Alternatives.

10.2.1 Background Information

Highway stormwater runoff typically contains a number of pollutants. The majority of these pollutants can be removed from stormwater runoff by applying some type of passive treatment that involves a settling process. The most common waterborne pollutants associated with highway runoff are heavy metals, nutrients, organic matter, pesticides, chlorides, and particulates.

- **Heavy metals – paint, atmospheric deposition, tire and brake wear, rust.** The primary heavy metal pollutants attributed to highway stormwater runoff are aluminum, cadmium, chromium, iron, lead, magnesium, nickel, and zinc. The total concentration of these metals in water includes a portion in particulate form, due to being affixed to soil particles, and a portion in soluble form. The percentage of soluble metals is up to 50 percent for copper and zinc, and around ten percent for lead. Passive water quality methods (wet detention basins, filtration, etc) will remove the majority of the pollutants in particulate form.
- **Nutrients – fertilizers, leaf litter, organic matter.** The nutrients of primary concern with respect to water quality are phosphorus and nitrogen. Mean pollutant concentrations from urban and rural highway runoff contain nitrogen and phosphorous as byproducts of combustion and from atmospheric deposition, in precipitation or as dust.
- **Chlorides – winter de-icing.** De-icing agents placed on the roadway surface during the winter driving season create seasonal fluctuations of chloride levels in receiving waters. A five-year study of nine metropolitan lakes receiving highway stormwater runoff was conducted by Mn/DOT in the mid-1980s. Weekly sampling indicated seasonal fluctuations in the chloride levels, as would be expected. The study concluded that there were no changes in the annual mean chloride levels found in any of the nine lakes over the five-year period. Annual mass loading of chlorides may increase as the result of increasing the paved surface draining to each basin, but while the increase may have a minor impact on average yearly concentration, it would not be expected to change the annual fluctuations. Mn/DOT is currently involved with additional studies with regards to de-icing practices.
- **Particulates – sediment from erosion, winter sanding.** Particulates in stormwater can result from a variety of sources. Many methods for removing particulates from stormwater (grit chambers, screens, detention ponds) have been developed and are common in stormwater systems. Removal effectiveness of stormwater BMPs ranges from 50 percent to 80 percent, depending on the flow rate, BMP design, and particulate size.

10.2.2 Water Quality Protection

To standardize the protection afforded the water quality of the many water resources of the state, Minnesota Rules Chapter 7050, written by the Water Quality Division of the MPCA, were put into effect on April 18, 1994 and updated in October 2002. On August 1, 2003, the MPCA issued Phase II rules under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) program. The revised rules required more stringent water quality

requirements for discharges within 2,000 feet to a “Special Waters”, treating one inch of runoff from new impervious surfaces rather than 0.5 inches. The St. Croix River is the only water body in the project area included in the list of ‘Special Waters.’

In Wisconsin, Chapter NR102 of the Wisconsin Administrative Code sets forth water quality standards for surface water and classifies the St. Croix River in the project area as an “Outstanding Resource Water.” Chapter NR102 states that “No waters of the state shall be lowered in quality unless it has been affirmatively demonstrated to the department that such a change is justified as a result of necessary economic and social development, provided that no new or increased effluent interferes with or becomes injurious to any assigned uses made of or presently possible in such waters.” The Build Alternatives would all meet the regulatory guidelines in the following documents: Wis/DOT Chapter Trans 401, effective December 1, 2002; the Wis/DOT Facilities Development Manual, effective October 25, 2001; and the Wisconsin DNR Chapter NR 151, effective September 2002.

Short-term and long-term water quality impacts are typically evaluated on the basis of concentrations and mass loading of pollutants, respectively. Lakes and wetlands tend to be affected by long-term high mass loading of pollutants, since the long residual time provided by most lakes allows settling and biological absorption processes to occur. Short-term, high-concentration pollutant loadings can affect both river and lake/wetland systems. Therefore, the existing conditions and impacts on lakes are discussed separately from the potential impacts on the river systems in the following sections.

10.2.3 Affected Environment – Water Quality

In Minnesota, the existing rural highway section conveys stormwater runoff via overland flow and grass ditches that provide some reduction in pollutant loading through removal of suspended solids. Existing grass ditches within the upland drainage areas (west of the river bluff) are typically quite flat, which may provide relatively efficient removal of sediments. Existing ditches in the St. Croix River valley (from the top of the bluff and downward to the river) are not as efficient in removing sediments due to higher stormwater velocities created by steep slopes. In Wisconsin, the upper bluff areas are typically very flat and swales should provide efficient removal of sediments. West of STH 35, steep bluffs in the St. Croix River valley prevent the use of swales, due to the steep slopes.

The following section provides details pertaining to each receiving water specific to water quality. Brown’s Creek, Long Lake and Lake McKusick are not discussed, since they are secondary water receivers from the corridor and do not receive any direct stormwater runoff from the corridor.

Lakes

Lily Lake

Lily Lake currently receives runoff from TH 36 (Figure 10-1a). The water quality data available for Lily Lake is limited to secchi disk readings measured over the past few years. The readings vary from 2.3 to 9.5 feet for Lily Lake. The readings indicate low to intermediate clarity, which is typical of metropolitan area lakes with physical features similar to that of Lily Lake.

With existing conditions, highway runoff passes through a variety of ponding areas and wetlands prior to entering Lily Lake. The ponding areas and wetlands through which the runoff passes remove some suspended solids and some pollutants associated with the solids, and also allow some assimilation of nutrients by pond and wetland plants.

Rivers and Streams

Perro Creek

Perro Creek is a small urban stream that originates from a pond (Prison Pond) south of TH 36, west of County Road 21, and north of County Road 14 (see Figure 10-1a). It runs southeast through the City of Bayport before outletting into the St. Croix River.

St. Croix River

The St. Croix River is the most prominent drainage feature in the project area. The St. Croix River is designated a federal Wild and Scenic River. The MPCA includes the St. Croix in their list of “Outstanding Resource Value Waters.” This classification affords the river more stringent discharge standards within the MPCA Chapter 7050 regulations and NPDES/SDS Phase II regulations than other waters of the State of Minnesota. The WisDNR classifies the St. Croix River in this area as an “Outstanding Resource Water” under Chapter NR102, Wisconsin Administrative Code. Wisconsin Administrative Code Chapter NR 207, “Water Quality Anti-degradation,” states that the quality of discharges to outstanding resource waters must meet or exceed the quality of the receiving water.

Tables 10-3 and 10-4 list the existing water quality data available for the river. The background levels of heavy metals at the sampling locations are substantially below the MPCA standards at all sampling locations. The diverse aquatic community found in the St. Croix River reflects the low levels of pollutants identified in the sampling programs.

Natural conditions, as well as human-built facilities (Mississippi River Lock and Dam #3) cause the lower portion of the Lower St. Croix National Scenic Riverway to have lake-like characteristics. These lake-like characteristics have prompted concern over nutrient levels and their impacts on this river. As discussed in the 1999 St. Croix River Basin Information Document prepared by the MPCA, tributary nutrient loads of phosphorus and nitrogen currently have the greatest impact of any pollutants on the water quality of the St. Croix River. The St. Croix River Basin Water Resources Management Plan Phase II, dated June 19, 1998, prepared by the St. Croix Interagency Basin Team (consisting of MnDNR, MPCA, NPS, WisDNR, the Metropolitan Council, the Minnesota Department of Agriculture, the U.S. EPA, U.S. Geological Survey, the University of Minnesota, and Wisconsin tribes) addresses point and non-point sources of these nutrients. The plan states that the non-point sources of nutrients develop from urban and rural land use conditions that increase nutrient concentrations in both surface runoff and in groundwater that ultimately discharges to streams. This team also considered stormwater as one of the last uncontrolled sources of pollution for the St. Croix watershed.

**TABLE 10-3
MINNESOTA RECEIVING WATERS AND IMPAIRED STATUS**

Receiving Water	USGS Assessment Unit ID	DNR Lake Number	Clean Water Act Section 303(d) TMDL Impaired Status ¹		Clean Water Act Section 305(b) Uses Supported Status ²		Other Status Information
			MPCA Impaired Water Category	Pollutant or Stressor	Use Status ³	Impairment Indicator ³	
Lake McKusick	N/A	82-0020	Not listed as an impaired water	N/A	Not Listed	N/A	
Lily Lake	N/A	82-0023	5A - Impaired by multiple pollutants and no TMDL Study plans are approved by EPA	Mercury (FCA) ⁵ and excess nutrients	Swimming - FS	Eutrophic ⁶	
Long Lake	N/A	82-0021	5C - Impaired by one pollutant and no TMDL study plan is approved by EPA	Mercury (FCA) ⁵	Swimming - NS	Hypertrophic ⁶	
Browns Creek	07030005-519 ⁴	N/A	5A - Impaired by multiple pollutants and no TMDL Study plans are approved by EPA	Impaired Biota For Fish and Invertebrates	Aquatic Life - NS Swimming - NA	Biology - NS	Special water per NPDES/SDS Appendix A
Perro Creek	N/A	N/A	Not listed as an impaired water	N/A	Not Listed	N/A	
St. Croix River	07030005-504	N/A	5C - Impaired by one pollutant and no TMDL study plan is approved by EPA	Mercury (FCA) ⁵	Aquatic Life - FS Swimming - FS	Total Phosphorus - T	Special water per NPDES/SDS Appendix A

Notes:

1. From Draft MPCA 2004 CWA 303(d) List of Impaired Waters.
2. Based on 2002 MN 305(b) Report to Congress of the United States. Lake Assessments based on data collected through 2000.
3. FS - Fully Supported, NS - Not Supported, NA - Not Assessed, T - Fully Supported but Threatened. Aquatic life use not assessed for Lakes.
4. Previously listed using Assessment Unit ID 07030005-512.
5. FCA means Fish Consumption Advisory.
6. Trophic State: Oligotrophic (low algae), Mesotrophic, Eutrophic, Hypertrophic (high algae).

**TABLE 10-4
EXISTING ST. CROIX RIVER WATER QUALITY DATA ⁽¹⁾ AND MINNESOTA RULES
CHAPTER 7050 MPCA WATER QUALITY STANDARDS**

Item	MPCA Sampling – Hudson ⁽²⁾		MCES Sampling ⁽³⁾		MPCA Sampling- Stillwater ⁽⁴⁾		MPCA Standards Class 2 Bd Waters	
	Average	Sample Dates	Average	Sample Dates	Average	Sample Dates	Chronic Standard ⁽⁵⁾	Maximum Standard ⁽⁵⁾
Total Phosphorus, µg/l	103	1967-2003	57.2	1953-2003	81	1953-2003	-	-
Copper, µg/l	2	1979-1991			2	1980-1995	9.6	17
Lead, µg/l	<10 1	1968-1977 1977-1991			1	1980-1995	3.1	78.5
Zinc, µg/l	29 9	1968-1977 1978-1991			9	1980-1991	103	114
Chloride, mg/l	5	1967-1999			3	1953-1965	230	860
Total Hardness, of CaCO ₃ , mg/l	96	1967-1991	97	1985-1992	82	1980-1991	-	-

⁽¹⁾ The Wisconsin Administrative Code NR 207, “Water Quality Anti-degradation,” sets the water quality standard for Outstanding Resource Waters at the background levels.

⁽²⁾ Sampling location – C & N.W. Railroad Bridge at Hudson. MPCA sampling on file in the STORET Database. Sample Designation EDA_S000-126. Value is an approximate median concentration of surface sampling measured from 1967 to 1998.

⁽³⁾ Sampling performed by Metropolitan Council Environmental Services (MCES) near the Stillwater Treatment Plant. Sample Designation EDA_MWCC047.

⁽⁴⁾ Sampling location – Stillwater Bridge. MPCA sampling on file in the STORET Database. Sample Designation EDA_S000-019.

⁽⁵⁾ The quality of Class 2Bd surface waters shall be such as to permit the propagation and maintenance of a healthy community of cold- or warm-water sport or commercial fish and associated aquatic life, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface waters is also protected as a source of drinking water. “Chronic” means the highest water concentration of a toxicant to which organisms can be exposed indefinitely without causing chronic toxicity. “Maximum” means the highest concentration of a toxicant in water to which aquatic organisms can be exposed for a brief time with zero to slight mortality. “Toxic metals” concentrations vary with the hardness of the water (Minn. Rules Pt. 7050.0222, Subp. 2).

10.2.4 Environmental Consequences

The No-Build Alternative would not modify the existing water treatment methods and drainage patterns described in Section 10.2.3.

In Minnesota, the Build Alternatives would change the existing rural section of TH 36 and TH 95 in Stillwater and Oak Park Heights to an urban section with curb and gutter and storm sewer to convey stormwater for handling and treating runoff. As discussed in the water quantity section, the proposed system also includes water quality treatment facilities, consisting of wet detention basins, infiltration (dry) basins, and grass swales, which are an integral part of the drainage plan for the Build Alternatives. These facilities are intended to maintain and improve water quality in the project area.

The majority of the Wisconsin portion of the Build Alternatives would be constructed as a rural drainage system in an area where no roadway currently exists. Urban roadway sections will only be used in Alternatives D and E west of the STH 35 overpass. The rural highway section would maintain the existing drainage patterns and improve treatment through the use of grass ditches, culverts, and detention basins.

Lakes

Lily Lake

The Build Alternatives would reroute low flow drainage from approximately 88 acres of residential and highway, and land that could be commercially developed in the Lily Lake drainage area to the treatment devices in the St. Croix Central drainage area and ultimately to the St. Croix River. This area to be rerouted includes the eastbound and westbound lanes of TH 36, the TH 36 medians, the area south of TH 36 along Oakgreen Avenue and the south frontage road, and the commercial area immediately north of TH 36 (See Figure 10-2a). This diversion would cause a decrease in the total mass loading of nutrients/pollutants entering Lily Lake and should result in an improvement of water quality.

Creeks and Rivers

Perro Creek

The Build Alternatives would provide the opportunity to divert up to 156 acres of drainage area from the Perro Creek watershed to the treatment system in the St. Croix Central Drainage area before outletting to the St. Croix River. The potential diversion area is shown in Figure 10-2a and includes commercial and residential areas as well as the Washington County Government Center. See section 10.1 for further discussion of potential diversions.

St. Croix River

The St. Croix Central drainage area would convey upper bluff stormwater as well as highway and offsite runoff from the Central drainage area through a treatment system, including wet detention basins, swales, and constructed wetlands. This area currently discharges directly into the river via wetlands, ditches, and culverts.

Nutrients are a concern for the water quality of the river according to the NPS 1997 Water Resource Management Plan. The proposed wet detention basins are expected to remove up to 90 percent of the total suspended solids. The partial removal of phosphorus from stormwater that could be attained with properly designed detention basins implemented with the Build Alternatives is not likely to result in noticeable water quality improvements in the St. Croix River, but it will reduce further degradation of the St. Croix River's water quality. These basins would provide water quality treatment for approximately 100 acres of drainage area which currently discharges directly into the river, including the additional drainage area that would result from the bridge in Alternatives B-1 and C. The St. Croix South drainage area wet ponds would also act as first flush treatment for approximately 45 acres of residential and industrial area south of the TH 36/TH 95 Interchange.

10.2.5 Mitigation of Impacts on Water Quality

The existing drainage systems for TH 36 and TH 95 in Minnesota discharge water into the St. Croix River via the adjoining wetland complexes and Perro Creek. As stated previously in this chapter, the existing highway drainage systems (grass ditches) in both Wisconsin and Minnesota provide some level of pollutant removal prior to discharging into the receiving waters. The systems discharge into the river at various points, typically through culverts and ditches. For each Alternative, the proposed drainage systems would incorporate wet detention basins as the primary treatment method of stormwater runoff into the river.

In Minnesota, a series of wet detention basins in the TH 36/TH 95 interchange would provide water quality treatment for portions of the upper bluff area and for the entire St. Croix Central drainage area. In all Alternatives, stormwater runoff from the bridge would be routed through at least one wet detention basin prior to discharging into the river. In general, the proposed ponds would provide treatment for all Mn/DOT impervious surfaces, Mn/DOT infield areas, and the frontage roads. The ponds would provide, at a minimum, low flow (first flush) treatment to all offsite areas draining into the proposed Mn/DOT system. All upper bluff ponds would be routed east to Oasis Pond, and then to the St. Croix Central Drainage area for further treatment in the proposed Mn/DOT treatment system.

In Alternatives B-1 and C in Wisconsin, runoff from STH 35 just east of the bridge would be routed through a wet detention basin and then a stilling basin prior to discharging to the river. The detention basin's size would be designed to treat the runoff from the proposed roadway right-of-way. In Alternatives D and E in Wisconsin, runoff from just east of the bridges to the STH 35 overpass would be treated in ponds D1 and E1. The runoff from the area from the STH 35 overpass up to and including the STH 64 interchange would be treated in ponds before outletting through storm sewer and discharging into the existing concrete channel upstream of ponds D1 and E1.

The rural highway section in Wisconsin will incorporate grass ditches and detention basins as the primary source of water quality treatment. Properly designed ditches combined with detention devices (ditch blocks, etc.) and detention ponds can provide substantial removal of pollutants through settling and infiltration.

In Minnesota, the permanent pools of the wet detention basins are designed to include the volume of runoff from the 2.5-inch rainfall event. In Wisconsin, the wet detention basin

deadpool is designed to treat the 2-year 24-hour design storm (2.8-inch rainfall). The deadpool required to meet treatment goals for each proposed sub-drainage area is listed in Table 10-5. During final design, other measures may be incorporated to provide additional treatment. The pool volume also includes the sediment deposition anticipated to result from the drainage area, based on the concept of a 25-year design life. Wet detention basins provide for sediment removal, also provide for containment of accidental spills, and generally provide better control and easier removal of spills than do grass ditches.

Basin design parameters include a permanent pool depth ranging from 4 feet to 10 feet, a shallow shelf around the perimeter of the basins to promote vegetation, and maximum three (horizontal) to one (vertical) side slopes for stability.

Dry Detention basins would be designed in all highway gore areas, per Mn/DOT guidelines, to a maximum depth of two feet. All dry detention basins would be designed for infiltration of water within 72 hours, to encourage plant growth. Active storage within the dry detention basins would be used in conjunction with the wet ponds to reduce stormwater flow rates where necessary.

Each water quality treatment measure described in the preceding paragraphs are an integral part of the Alternatives' drainage systems, both as a replacement and an enhancement of the existing systems. Wet and dry detention basins can be designed for both water quality treatment and reduction of peak discharge rates. Wet detention basins are the primary form of water quality treatment, incorporated where right-of-way exists which cannot be developed, or in locations where stormwater quality treatment is required. Dry detention basins are incorporated where wet ponds are not feasible. Grass swales are also incorporated where possible.

One measure of water quality treatment is phosphorus removal efficiency of the proposed stormwater management systems relative to the existing systems. The Urban Catchment model (P8)⁵ was used to predict removal of stormwater runoff pollutants, specifically phosphorus, for the stormwater ponds and swales in the existing and proposed conditions. P8 is a model that performs a continuous mass balance on pollutant components for a continuous hourly rainfall and daily temperature series. The model allows the exploration of different types of BMPs and the resulting impact on overall pollutant removal efficiencies with this choice. The existing conditions and two Build Alternatives (Alternative B-1 and Alternative E) were modeled. The Build Alternatives B-1 and E were chosen because they are representative of all four Build Alternatives. With respect to BMP stormwater management design, Alternative D is very similar to Alternative E and Alternative C is very similar to Alternative B-1. Consequently, only Alternatives B-1 and E were modeled with P8. The geographic scope of the P8 models included both Minnesota and Wisconsin and take into account all surface water exiting the corridor, including water draining to Long Lake, Lily Lake, Perro Creek, and the St. Croix River.

In Wisconsin, all ponds sized for 100-year storm event containment were not included in the model, since the amount of phosphorus exiting the ponds via surface flow is assumed negligible.

⁵ P8-Urban Catchment Model, William Walker, Jr., 2000.

**TABLE 10-5
PROPOSED DRAINAGE AREA DATA AND TREATMENT METHODOLOGY**

Alternative	Drainage Area	Area (acres)	Deadpool Required (acre-ft) ⁽¹⁾	Deadpool Available (acre-ft)	Receiving BMP or Water Body	Notes
BUTTONHOOKS	Washington - Norell	111.7	13.2	6.3	Oasis Pond	Pond fully treats Mn/DOT pavement and infield areas and provides low flow treatment to Offsite areas. Additional treatment provided in infiltration basins, Oasis Pond, and BMPs located in the TH 36/TH 95 Interchange.
	Oakgreen-Greeley	80.2	10.0	21.0	Low flow to interchange ponds/swales; destination varies depending on St. Croix river crossing alternative. High flow to Lily Lake.	Low flow from Oasis Pond will be conveyed down the hill to the interchange treatment system. High flows will be conveyed through the existing system north into Lily Lake.
	Osgood	22.6	3.3	3.6	Interchange Ponds / Swales - destination varies depending on St. Croix river crossing alternative.	
ALTERNATIVE B-1	St. Croix South	85.4	6.5	4.7	Existing Swales - St. Croix River	Ponds fully treat Mn/DOT pavement and infield areas and provides low flow treatment to Offsite A, B, C, D, and E areas.
	St. Croix Central	104.4	10.9	25.8	Reconstructed Wetland - St. Croix River	Pond fully treats Mn/DOT pavement and infield areas. Additional treatment to offsite area requirements provided in Access Road Swale and in Riverside Pond
	St. Croix East	26.9	2.4	2.4	Stilling Basin - St. Croix River	
	Uplands	133.1	11.7	11.7	Upland Landlocked Depressions	
ALTERNATIVE C	St. Croix South	86.9	6.4	4.7	Existing Swales - St. Croix River	Pond fully treats Mn/DOT pavement and infield areas and provides low flow treatment to Offsite A, B, C, D, and E areas.
	St. Croix Central	98.9	10.0	20.8	Reconstructed Wetland - St. Croix River	Ponds fully treat Mn/DOT pavement and infield areas and provide treatment to Offsite A, B, C, and D areas. Additional treatment capacity for all upstream contributing areas not fully treated in previous devices.
	St. Croix North	6.9	0.8	0.9	St. Croix River	Outlet to St. Croix River through new storm sewer system.

Notes:

⁽¹⁾ Deadpool volume calculations are based on NURP criteria and the SCS runoff method. Deadpool requirement shown is based on an assumption that water quality treatment for the area is only provided by ponded deadpool. Proposed water quality treatment for most areas is accomplished utilizing "treatment train" methodology.

TABLE 10-5 (continued)
PROPOSED DRAINAGE AREA DATA AND TREATMENT METHODOLOGY

Alternative	Drainage Area	Area (acres)	Deadpool Required (acre-ft) ⁽¹⁾	Deadpool Available (acre-ft)	Receiving BMP or Water Body	Notes
ALTC OPTION 1	St. Croix East	21.6	1.9	1.9	Stilling Basin - St. Croix River	
	Uplands	128.6	11.3	11.3	Upland Landlocked Depressions	
ALTC OPTION 2	St. Croix East	60.4	5.3	5.3	Stilling Basin - St. Croix River	
	Uplands	59.6	5.3	5.3	Upland Landlocked Depressions	
ALTERNATIVE D	St. Croix South	83.6	6.2	4.7	Existing Swales - St. Croix River	Pond fully treats Mn/DOT pavement and infield areas and provides low flow treatment to Offsite A, B, C, D, and E areas.
	St. Croix Central	91.9	7.9	19.0	Reconstructed Wetland - St. Croix River	Ponds fully treat Mn/DOT pavement and infield areas and provide treatment to Offsite A, B, C, D, E, F and G areas. Ponds provide additional treatment capacity for all upstream contributing areas.
	St. Croix North	22.3	3.6	4.2	St. Croix River	The ponds' deadpool sizes are limited by the proposed roadway and St. Croix River.
	St. Croix East	81.9	7.2	7.0	Stilling Basin - St. Croix River	60.7 ac-ft (5.34 ac) of Upland drainage area routed through storm sewer to the St. Croix East drainage area.
	Uplands	52.1	4.6	4.6	Upland Landlocked Depressions	
ALTERNATIVE E	St. Croix South	83.6	6.2	4.7	Existing Swales - St. Croix River	Pond fully treats Mn/DOT pavement and infield areas and provides low flow treatment to Offsite A, B, C, D, and E areas.
	St. Croix Central	91.9	7.9	19.0	Reconstructed Wetland - St. Croix River	Ponds fully treat Mn/DOT pavement and infield areas and provide treatment to Offsite A, B, C, D, E, F and G areas. Ponds provide additional treatment capacity for all upstream contributing areas.
	St. Croix North	16.2	2.4	4.1	St. Croix River	The ponds' deadpool sizes are limited by the proposed roadway and St. Croix River.
	St. Croix East	85.4	7.5	7.0	Stilling Basin - St. Croix River	60.7 ac-ft (5.34 ac) of Upland drainage area routed through storm sewer to the St. Croix East drainage area.
	Uplands	52.1	4.6	4.6	Upland Landlocked Depressions	

Notes:
⁽¹⁾ Deadpool volume calculations are based on NURP criteria and the SCS runoff method. Deadpool requirement shown is based on an assumption that water quality treatment for the area is only provided by ponded deadpool. Proposed water quality treatment for most areas is accomplished utilizing "treatment train" methodology.

As shown in Table 10-2, the Build Alternatives increase impervious area in the project corridor. Consequently, the P8 model indicates that the quantity of pollutants associated with stormwater runoff also increases. The proposed BMPs mitigate for these conditions and provide additional treatment of offsite areas. The data from the models indicates that Alternative B-1, and by association Alternative C, would result in approximately a 2 percent decrease in phosphorus loading from the proposed corridor. Alternatives D and E would result in approximately a 3 percent increase in phosphorus loading from the corridor above existing conditions. The difference in the Build Alternatives can be attributed to a slightly higher loading rate associated with Build Alternatives D and E, more mitigation opportunities in Build Alternatives B-1 and C, and an increase in impervious area draining towards the St. Croix River in Alternatives D and E on the Wisconsin side.

10.3 FLOODPLAINS

10.3.1 Affected Environment

Figure 10-3a shows the boundaries of the existing St. Croix River 100-year floodplain, elevation 692.6 feet (1998 datum), based on data provided by the U.S. Army Corps of Engineers. The floodplain was drawn using topographic data of the project area, and corroborated with the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) for the area near Stillwater, Minnesota, and downstream of the project area. As shown on this figure, the existing floodplain is broad and wide on the Minnesota side where terrain is relatively flat, and narrower on the Wisconsin side where existing terrain is steeper. The flood profile of this stretch of the St. Croix River is governed by hydraulic structures on the Mississippi River.

10.3.2 Environmental Consequences to Floodplains

In accordance with Executive Order 11988, Minnesota Statute 103F.101 – 103F.155, and Wisconsin Statute 87.30, an analysis of floodplain impacts that would result from the No-Build and Build Alternatives was completed. Under these statutes, the No-Build and Build Alternatives will be determined to have no adverse floodplain impacts if:

- no significant potential for interruption of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route will occur,
- no significant impact on natural and beneficial floodplain values will occur,
- no significant increased risk of flooding will result, and
- the project will support and/or result in incompatible floodplain development

The No-Build Alternative would not result in further encroachment on the floodplain. The No-Build Alternative would not change the existing conditions, and is discussed further in Section 10.3.2.2.

A floodplain assessment, consisting of an analysis of the flooding risks, longitudinal/transverse impacts, and activities that would occur in the floodplain as a result of the Build Alternatives between the 100-year flood elevation and normal water elevation was performed to identify the area of any permanent impacts between these elevations. Encroachments on the floodplain are

identified in Table 10-6 for each alternative. The Build Alternatives also include measures to minimize floodplain impacts and measures to restore and preserve the natural and beneficial floodplain values. These are described in Section 10.3.3.

10.3.2.1 Alternative Impact Description

Impacts to the floodplain of the St. Croix River have been evaluated and summarized in Table 10-6 and Figures 10-3b through 10-3d. Impacts resulted from the following sources.

- For all Build Alternatives, bridge piers in the 100-year floodplain would require fill in the floodplain. Piers are not expected to influence the river hydraulics, because the river at flood stage flows at a very low velocity due to the lake characteristics.
- All Alternatives would result in longitudinal disturbances for the construction of access to the Xcel Energy King Power Plant and the Stillwater Municipal Barge Facility Property.
- Alternatives D and E in Minnesota would result in a lengthwise (longitudinal) area of disturbance in the floodplain for retaining walls and fill east of and adjacent to TH 95/TH 36. Proximity to the bluff, constructability issues, the TH 36/TH 95 interchange design, and the need to avoid the existing railroad location made the avoidance of longitudinal encroachment for Alternatives D and E infeasible.
- Alternatives D and E would also result in a transverse area of disturbance on the existing bridge causeway in Wisconsin in order to allow the addition of a trail for Alternatives D and E as well as reconstruction of the road for Alternative E. For Alternative E the proposed disturbance would widen the causeway to meet roadway standards, but would not alter the existing causeway length.
- One wet detention pond for Alternatives B-1 and C, and three wet detention ponds for Alternatives D and E would be located partially or completely in the 100-year floodplain. Impacts to the floodplain have been included as pond construction would likely require a berm between the pond and the river.

TABLE 10-6
ST. CROIX RIVER CROSSING PROJECT
FLOODPLAIN IMPACTS⁽¹⁾

	Alternative B-1	Alternative C	Alternative D	Alternative E
Floodplain Encroachment (Below Elev. 692.6 Ft.)				
MINNESOTA				
Longitudinal (feet)	900	1,600	4,100	4,800
Transverse (feet)	0	0	0	0
WISCONSIN				
	(Options 1 & 2)			
Longitudinal (feet)	0	200	700	600
Transverse (feet)	0	0	300	800

⁽¹⁾ Includes floodplain impacts from all items listed in Section 10.3.2.1, except impacts from the construction of bridge piers.

Figure 10-3a – Existing St. Croix River Floodplain (11x17 – b/w)

BACK

Figure 10-3b – Proposed Floodplain Impacts – Alternative B-1 (8.5x11 – b/w)

Figure 10-3c – Proposed Floodplain Impacts – Alternative C (8.5x11 – b/w)

Figure 10-3d – Proposed Floodplain Impacts – Alternatives D and E (11x17 – b/w)

BACK

The following sections discuss the project responses to each of the four areas.

10.3.2.2 Potential for Interruption of a Transportation Facility

No potential for interruption of a transportation facility would result from Alternatives B-1, C, and D because all roadway grade elevations for these alternatives would be above the 100-year floodplain elevation of 692.6 feet. However, the No-Build Alternative and Alternative E utilize the existing bridge which is below the 100-year flood elevation, and is subject to periodic closures. Based on Mn/DOT and U.S. Army Corps of Engineer data, the existing Lift Bridge closes for approximately the 5-year river flood level. Based on historical analysis of flood events, there have been approximately 11 closure events over the last 30 years, with an average closure duration of 13 days per occurrence. In Alternative E, in the event of closure of the west bound lanes on the existing bridge, one lane of traffic in each direction could be maintained on the proposed bridge, after placement of temporary traffic control devices.

10.3.2.3 Impacts on Natural and Beneficial Floodplain Values

No substantial impacts on natural and beneficial floodplain values would result from the Build Alternatives. Temporary and permanent erosion control measures would be used where appropriate and would be designed to meet Mn/DOT, Wis/DOT, WisDNR, and MPCA guidelines. (A temporary disruption of the navigational and recreational use of the river may occur during bridge construction, as described in Chapter 12.) Activities within the Lower St. Croix Riverway are subject to regulation under Wisconsin Statute 30.27, "Lower St. Croix River Preservation," Minnesota Statute 103.25, "Lower St. Croix National Scenic Riverway," and the amendments to the "Wild and Scenic Rivers Act" (Public Law 92-560). Appendix E includes the Draft Section 4(f) Evaluation of the Lower St. Croix National Scenic Riverway.

Both beneficial and adverse impacts on the following areas are discussed in Chapter 9 and Chapter 12 of this document. The topics discussed include fisheries, plants, public access (boat and-or canoe), channel changes, boat passage, threatened and/or endangered species, and various temporary and permanent erosion control measures.

10.3.2.4 Flooding Risks

No increase in flooding, change in the river profile, or increase in the 100-year and 500-year floodplain elevations is expected as a result of the Build Alternatives. The project encroachment into the floodplain would be limited to the items described in Section 10.3.2.1. Based on discussions with the U.S. Army Corps of Engineers, the flood stage through this part of the St. Croix River is flat and flood stages in this reach are controlled by hydraulic structures on the Mississippi River. Given the lake nature of this stretch of the river, velocities at the bridge crossing average less than one foot per second at flood stage. Mn/DOT completed a bridge hydraulics study in 1999 which concluded that new bridge construction would result in a maximum stage increase of 0.01 feet. Consequently, it is anticipated that the project would not increase flood stage in the area and the proposed floodplain encroachments would not affect the flood profile.

10.3.2.5 Incompatible Floodplain Development

No incompatible floodplain development (i.e., any development that is not consistent with a community's floodplain development plan) would result from the Build Alternatives. The cities of Stillwater and Oak Park Heights in Washington County and St. Croix County in Wisconsin have zoning ordinances regulating floodplain development. Development within the Lower St. Croix National Scenic Riverway is subject to regulation under Wisconsin Statute 30.27, "Lower St. Croix River Preservation," Minnesota Statute 103.25, "Lower St. Croix National Scenic Riverway," and under the amendments to the "Wild and Scenic Rivers Act" (Public Law 92-560). Appendix E includes the Draft Section 4(f) Evaluation of the Lower St. Croix National Scenic Riverway.

10.3.3 Mitigation of Impacts on Floodplain

All of the Build Alternatives have been designed to limit floodplain impacts wherever feasible. Retaining walls have been included for Alternatives D and E, to minimize the effect of the longitudinal impact due to realigning TH 95/TH 36. All other impacts due directly to roadway construction are relatively small and have been minimized as much as possible. The preliminary designs for the wet detention ponds included minimization of floodplain encroachment by locating the ponds above the 100-year floodplain where possible. In addition, waterway crossings (including the proposed bridge for all options and any other localized water crossings or localized flood area crossings that may be identified during final design) would comply with both Minnesota and Wisconsin regulations, and would minimize the headwater and tailwater impacts of the structures.

The Build Alternatives would not substantially increase flooding risks, impact floodplain's natural and beneficial values, or support incompatible floodplain development. All alternatives except Alternative E would eliminate any potential for disruption of a transportation facility, and Alternative E would reduce this potential from the existing condition. All Alternatives include measures to minimize floodplain impacts and preserve the natural and beneficial floodplain values. Therefore, no substantial impacts on the floodplain would result from any of the Build Alternatives.

10.4 GROUNDWATER

Any type of development, including roadway construction, can affect groundwater in a number of ways. The groundwater elevation can be temporarily or permanently altered due to temporary or permanent dewatering efforts. An increase in impervious (paved) surfaces can reduce movement of precipitation to the groundwater tables. Filling of wetlands and ponds can also reduce the migration of surface water to the underlying layers. Groundwater quality can also be affected by contaminated surface water migrating through the surficial layers to groundwater aquifers, or migrating directly to the aquifers via bedrock outcropping.

10.4.1 Affected Environment

Groundwater and Groundwater Elevations

The deep groundwater aquifers present in the project area are the Prairie Du Chien and Jordan aquifers. They are used as water sources for residences, industries, and local municipalities in the project area. Depths of these aquifers vary greatly throughout the corridor. The water table drops from the upland areas into the river valley. Data from the Minnesota Geological Survey indicates that depths of the water table range from approximately 175 feet in the upland areas to approximately 20 feet at TH 95. In Wisconsin, the depth of the water table ranges from 105 feet along the existing STH 35 alignment, to 35 feet at the proposed intersections, to 10 feet (or less) at the eastern extents of the Build Alternatives. The depth of bedrock ranges from 145 feet along the existing STH 35 alignment, to 55 feet at the proposed intersections, to 190 feet at the eastern extents of the proposed projects.

Shallow groundwater is also present in the project area. This groundwater also flows toward the river valley, discharging into the river at various points.

Wells

A variety of residential, municipal, and industrial wells exists in the project area. In Minnesota, well depths range from 70 feet to 650 feet, with the majority of wells drawing from the Jordan aquifer at 200 to 300 feet deep. In Wisconsin, the residential wells all draw water from at least 100 feet of depth, with the majority of wells having depths of greater than 150 feet to 250 feet below ground level.

Well logs obtained from the Wisconsin Geological Survey indicate that some of the residential wells in the project area draw water from below a confining layer of clay, shale or limestone. This confining layer can provide additional protection to deep aquifers by limiting movement of contaminated water from above into the deeper well-supply aquifers.

Groundwater Recharge

The amount of groundwater recharge that occurs is dependent on numerous factors, including the rate of precipitation, surface cover, surface slopes, soil types, and other physical features. Soils in the corridor range from well-drained silty or sandy loam over sand outwash in the river valley, to primarily silty loam in upland areas. Soil permeability is moderate to slow in the upper layers, with more rapid groundwater movement occurring as the soils transition to the sand outwash.

10.4.2 Environmental Consequences to Groundwater

Groundwater

The No-Build Alternative would not result in impacts on groundwater in the project area.

As requested by the Stakeholder study group, an in depth analysis of groundwater issues was conducted. The study report titled "Analysis of Highway Stormwater Runoff Impacts to Potable Groundwater Aquifers," dated April 13, 2004, contained the following conclusions. Based on

the literature review and analysis of existing conditions, “it is not expected that the existing wells in the project area will experience heavy metal contamination from highway stormwater drainage. It is possible that there will be some occasional and temporary increases in salt content, but it is expected that these concentrations would be infrequent (spring season) and within acceptable State water quality health standards.”

In Minnesota, highway runoff is not expected to affect the quality or quantity of water supplied to the wells in the corridor. The Build Alternative roadways would have an urban section design, including curbs, gutters, and a stormwater runoff system to control and treat stormwater (where necessary) before directing it to receiving waters. In Wisconsin, the grass ditches that would convey stormwater would disperse runoff throughout the Wisconsin project area, allowing the infiltration of groundwater to occur over the project area. This would disperse runoff and any pollutants it carries as the runoff seeps into the shallow groundwater. The residential wells in the project area in Wisconsin are at least 100 feet deep, and some draw water from below a confining layer (shale, clay, or limestone); therefore, the movement of any pollutants into these deeper well-supply aquifers is not anticipated.

Groundwater Elevation

Based on a review of preliminary design drawings, soil borings and existing water table information, it does not appear that roadway construction operations would intersect the water table, so dewatering is not expected to be required for road construction. Dewatering may be required for bridge pier construction, depending on the construction technique selected.

Groundwater Recharge

As discussed in Section 10.1 Water Quantity, the Build Alternatives would increase the impervious surface in the project area. In Minnesota, the urban section would transport some of the stormwater, that had previously seeped into the ground through the grass ditches directly to receiving waters. In addition, portions of existing wetland complexes would be filled, decreasing the groundwater seepage area (see Section 10.5 Wetlands). While these changes would decrease the groundwater recharge in the immediate area of the highway and road activities, the changes are not expected to change the amount of recharge occurring in the entire project area. In Wisconsin, the impervious surface would remain a relatively low percentage of the project area contributing to the various wells in the corridor. In Minnesota and Wisconsin, the encroachment into wetland areas is also not expected to have a substantial impact on groundwater recharge, since most of the soils underlying the wetlands have a low permeability rate.

Groundwater Quality

The Build Alternatives would use grass ditches, dry detention ponds, and wet detention basins to manage stormwater, allowing for control of both runoff and associated pollutants. If state agencies deem it necessary, wet detention basins could be designed to minimize movement of stormwater to the underlying water table, thereby offering greater protection of the aquifers from any pollutants introduced into the groundwater. In general, grass ditches, and both dry and wet detention ponds would allow infiltration to occur throughout the project area, allowing the various pollutants associated with highway runoff to seep into the surficial aquifer over a broad area, and allowing many contaminants to be absorbed and diluted as the water flows through the

soil. This would reduce the concentrations of contaminants reaching the groundwater. The treatment methodology provides for redundancy in the system and a level of groundwater protection from accidental spills.

Based on the previous information, the Build Alternatives are not expected to negatively affect the groundwater resources in the project area.

10.4.3 Mitigation of Impacts on Groundwater

Wells

Any existing wells encountered during construction or located on properties acquired for this project would be sealed in accordance with the appropriate state statutes. In addition, highway stormwater runoff would be directed away from shallow well fields when physically possible.

Groundwater Elevation

Based on the data available, the Build Alternatives are not expected to permanently affect groundwater elevations in the study area. Temporary dewatering may be required for pier construction. Dewatering and discharge would be performed in accordance with Minnesota and Wisconsin regulatory requirements.

10.5 WETLANDS

10.5.1 Introduction

Wetlands are unique ecosystems resulting from the interaction of hydrology, vegetation, and soil on the landscape. Wetlands are generally recognized as lowlands covered with shallow and sometimes temporary or intermittent waters. Wetlands include, but are not limited to, seeps, swamps, marshes, bogs, sloughs, potholes, wet meadows, and river overflows, as well as shallow lakes, and ponds with emergent vegetation. Areas saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation adapted for life in saturated soil conditions are included in this definition. Wetland functions include groundwater recharge and discharge, flood storage, sediment trapping, nutrient retention and removal, habitat for a wide variety of vegetation and wildlife species. Wetlands provide aesthetic value to communities and landscapes.

10.5.1.1 Jurisdiction

Protection of wetlands is mandated by both state and federal law. At the federal level, Executive Order 11990, "Protection of Wetlands" (1977) established a national policy requiring that adverse impacts on wetlands be avoided and minimized to the extent practicable. The U.S. Department of Transportation Administrative Order 5660.1A addresses the impacts of transportation projects on wetlands. The U.S. Army Corps of Engineers regulates the placement of fill materials in wetlands through Section 404 of the Clean Water Act, which requires a permit. Permit reviews are coordinated with the U.S. FWS, the U.S. EPA, and state agencies. Jurisdiction of wetlands under the Section 404 program depends on a wetland's connection to a navigable water body. Isolated wetlands are not regulated under this program.

At the state level in Minnesota, Governor's Executive Order 91-3 established the "No net loss policy with regard to wetlands." The Minnesota Wetlands Conservation Act of 1991 (Minnesota Statute 103G.222-2373 amended 1996; Minnesota Rules Chapter 8420), established wetland protection in Minnesota to be administered by the Board of Water and Soil Resources, and requires "Local Governmental Units" to oversee the wetland and permitting process and to enforce mitigation requirements. The MnDNR Division of Waters requires a permit for any activity constructed below the ordinary high water mark that alters the course, the current or the cross section of state-protected waters.

Wisconsin wetland policy is set forth in Wisconsin administrative rule NR 103. These rules are a set of water quality standards that guide the water quality certification process (NR 299). The standards call for a "sequencing" process similar to that of Section 404. The "Isolated Wetlands Law" (Wisconsin Act 6) was passed in May 2001 to provide protection to isolated wetlands that, due to a court ruling, no longer fell under federal jurisdiction. The isolated wetlands law provides jurisdiction to the state for wetlands where the federal government does not have jurisdiction. Local agencies in Wisconsin also regulate activities in shorelands-wetland zones in accordance with Section NR 115 and 117 of the Wisconsin Administrative Code and other state statutes.

Coordination with regulatory agencies for wetland characterization, sequencing and mitigation strategies for potential impacts to wetlands occurred through the past studies and has been brought up to date through a Technical Evaluation Panel meeting held in March, 2004. A follow-up meeting was held to view selected wetlands in the project corridor on June 21, 2004. Additional agency coordination, functions analysis and refinement of mitigation analysis will occur as an alternative is selected and design information is refined.

10.5.1.2 Methodology

In Minnesota, wetland basins are found in the project corridor in three general areas; south of the intersection of TH 36 and Oakgreen Avenue/Greeley Avenue, and near TH 95 south of TH 36, and along the St. Croix River edge. Wetlands are found along the project corridor in one area in Wisconsin: along STH 64 near the eastern project terminus. To analyze potential wetland impacts, wetlands in the project area were first inventoried, delineated and classified and the functions and values of each wetland basin were assessed. The area of impacts on wetlands that would result from each alternative were estimated, using anticipated construction limits. Finally, methods to avoid, minimize, or mitigate unavoidable wetland impacts were evaluated, and a mitigation strategy was developed.

Identified wetlands include 23 wetland basins in Minnesota (Figure 10-4) and three wetland basins in Wisconsin (Figure 10-5). Identification and assessment of wetlands in the project area has been ongoing for the past 10 years. The wetland basins in the project area were initially delineated in 1993-1994, for the 1995 Final EIS. The initial delineation used the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands. In August 1999, the wetland basins were re-delineated using the 1987 Corps of Engineers Wetland Delineation Manual, in compliance with state and federal agency guidance. Wetlands are classified according to Wetlands of the United States (U.S. FWS Circular 39; Shaw and Fredine, 1971), and Wetlands and Deepwater Habitats of the United States (U.S. FWS/OBS Publication 79/31; Cowardin et al., 1979). Wetland boundaries delineated in 1999 were re-examined and confirmed in 2003.

Figure 10-4 – Wetland and Mitigation Site – Minnesota (11x17 – b/w)

BACK

Figure 10-5 – Wetland and Mitigation Site – Wisconsin (11x17 – b/w)

BACK

Other sources of information used in this wetland impact analysis included the National Wetlands Inventory mapping of the U.S. Fish and Wildlife Service; the MnDNR Protected Waters mapping, the Natural Resource Conservation Service (NRCS) soils and wetland mapping, county soil service wetland mapping, aerial photographs and topographic maps.

10.5.2 Affected Environment

10.5.2.1 Affected Basins

The No-Build Alternative would not affect any wetland basins. Of the 26 wetland basins within the project area, 16 would be affected by the four Build Alternatives. Of these 15 wetlands, 13 are in Minnesota and two are in Wisconsin. Characteristics of the wetland basins that would be affected (size, soil, type, vegetation, location) are described in the following section.

To further describe and characterize the wetlands that would be affected, the functions they perform are described. The wetlands in the project area are diverse and include many of the types identified in the Circular 39 system of wetland classification. Wetlands of similar type can have highly varying functions, and can therefore also greatly differ in their respective “value” in terms of these functions. The value of each wetland (for the functions evaluated) is described in the following pages using relative terms, e.g., low, moderate, or high. These terms were assigned based upon 1999 field review of the existing wetland basins, using a descriptive evaluation similar to the Minnesota Interagency Routine Assessment Methodology (MnRAM Version 2.0). However, some of the functions evaluated varied from those used in MnRAM. Each basin was evaluated for: vegetation diversity; wildlife habitat and food; flood/stormwater storage; sediment and nutrient retention; aesthetics/recreation; groundwater recharge/discharge; and location with respect to residential/commercial development. Based upon this evaluation, the general functions of wetlands in the project area are also discussed in the following section.

Minnesota Wetland Description

Wetlands A and B are located near the TH 36 intersection with Washington Avenue and Norell Avenue. These wetlands currently function as stormwater ponds and have constructed inlets and outlets. Wetland A is an open water pond that appears to have been constructed in an upland area. As such, this pond does not likely fall under either state or federal jurisdiction. Wetland B lies in the same general area as a wetland shown on the Washington County Soil Survey. The size and orientation of this basin appears to have been altered by surrounding development.

Wetland C-1 is a 3.7-acre open water pond located northwest of the intersection of TH 36 at Greeley Avenue. Very little vegetation is present in the basin and it is surrounded generally by steep rocky slopes leading up to developed areas and roadways. Storm sewer inlets and outlets are present.

Basins A through C-1 are stormwater fed wetlands surrounded by developed land. These basins have low wildlife habitat functions and moderate to high water quality improvement and water storage functions.

Wetland Basins C through N occur in the area near the TH 36 intersection with Oakgreen Avenue and Greeley Avenue (Figure 10-4). They occur in a series of poorly drained depressions. Soils in the depressions are silt over loamy upland glacial till.

Basin C is a 0.09 acre stormwater-fed wetland surrounded by cottonwood trees and sandbar willows. Basins D and E are small (0.07 and 0.03 acre) grassy/wooded depressions dominated by prairie cord grass and green ash. These wetlands are surrounded by roadways and residential or business land uses.

Basins D through H are generally isolated basins that possess moderate wildlife habitat and flood water retention values. These basins have high aesthetic and groundwater recharge value, but little sediment and nutrient removal capability.

Basins F, G, H, I, J, K and N are all forested wetlands ranging from 0.03 to 0.15 acre in size. These wetlands are dominated by silver maple, green ash, and box elder trees and are located in a mostly wooded, approximately 30-acre parcel of land southeast of the TH 36/Oakgreen Avenue intersection.

Basins L and M lie along a trail corridor that has been planted in a native prairie plant community. Basin L is a shallow marsh, dominated by smartweeds, reed canary grass, and bittersweet nightshade. Basin M is a very shallow, seasonally-wet basin dominated by cordgrass and surrounded by black raspberry and wild black currant. Both basins have high aesthetic and water recharge value, and moderate-to-low habitat value, sediment and nutrient removal value, and water storage value.

Basins I, J and K are Type 7 (wooded) basins, which have high aesthetic and groundwater recharge values, but only moderate and low flood water retention and sediment/nutrient removal value, respectively. Basin I has high wildlife habitat values, while Basins J and K are only moderately valuable for habitat.

Basin N-1 is a depression that was graded in 1999 by NSP/Xcel with fill supplied from a Mn/DOT mitigation project. There is no evidence that a wetland existed here prior to 1999, however, wetland vegetation (primarily reed canary grass with a small area of cattails and sedges) has become established in the basin. The basin was examined by the technical evaluation panel, during a June 2004 field review where the U.S. Army Corps of Engineers suggested that the basin may meet wetland criteria. A wetland determination and delineation has not been finalized for this basin but it appears that the basin may not be a wetland or only a small portion of the basin would be considered a wetland. Any wetlands in this basin would be considered isolated and therefore, not under Corps jurisdiction. In addition, any wetlands in the basin would meet the Minnesota Wetland Conservation Act exemption for Incidental wetlands.

The Corps has indicated that basins west of Beach Road (Basins A through N-1) are isolated and are not under the Corps Section 404 jurisdiction.

As shown on Figure 10-4, Basins O-1, O-2, O-3, P-1, P-2 and Q are located along TH 95, south of TH 36. The area around Basin O-1 has been disturbed by the construction of a sanitary sewer, a maintenance road, drain tiles, and extensive grading, essentially dividing Basin O-1 into three

separate sub-basins (O-1A, O-1B and O-1C). Basins O-1, O-2, and O-3 are adjacent to TH 95, south of 59th Street below the bluffs. Basins O-1 and O-2 are part of a larger wetland complex consisting of wooded marsh and fresh meadow areas. These basins lie between a residential/commercial area on the west and TH 95 on the east. Basin O-3 has similar physical characteristics and lies between TH 95 on the west and the Union Pacific Rail Line to the east.

Vegetation in these wetlands consists of box elder, cottonwood, common buckthorn, green ash, northern white cedar, weeping willow, and black willow in wooded areas; sandbar willow, red osier dogwood, and speckled alder in shrub areas; and cattail, jewelweed, reed canary grass, and various other non-dominant herbaceous species in the meadow areas. Purple loosestrife (an invasive species) was also noted in these wetlands.

Basins O-1, O-2 and O-3 are related and extremely variable basins. They exhibit high wildlife habitat and aesthetic values, and moderate floodwater retention and ground water recharge capabilities. Basins O-2 and O-3 have high sediment removal value, while Basin O-1 has moderate value for this parameter.

Two additional basins, a wet meadow and wooded marsh designated as P-1 and P-2 (approximately 0.63 and 1.14 acres respectively), are located east of TH 95, south of the wastewater treatment plant, and are separated by the Union Pacific rail line. Dominant vegetation in Basin P-1 consists of cottonwood trees, sandbar willow and red osier dogwood shrubs, cattail and jewelweed. Dominant species in Basin P-2 include cottonwood and aspen trees, red osier dogwood and willow shrubs, jewelweed, cattail, and prairie cordgrass. These two wetlands were likely disturbed during railway or highway construction, and may have at one time been a single basin.

Basins P-1 and P-2 have markedly varied values and functions. With the exception of a high value for sediment and nutrient removal, Basin P-1 has moderate value for all parameters. Conversely, Basin P-2, currently a beaver pond, has high wildlife and aesthetic values, while only moderate value for floodwater retention, sediment and nutrient removal, and ground water recharge.

Basin Q occupies approximately 22 acres adjacent to the St. Croix River southeast of the wastewater treatment plant and north of the Xcel Energy King Power Plant. A detailed study of this wetland was performed by Mn/DOT and is documented in a report entitled *What is a Wetland? the NSP Site*, December 7, 1995. The wooded portion of this wetland along the river is relatively undisturbed and is considered to be a diverse, high quality floodplain wetland. The non-wooded area of the wetland has been extensively disturbed by past land uses. The soil profile in this area is highly disturbed and consists of miscellaneous earthy fill and debris material placed over a poorly-drained, hard pan layer of mineral or organic soil. Large quantities of slag (a byproduct of coal burning) were landfilled here from the adjacent King Power Plant. After an offsite disposal location was found, Xcel (formerly NSP) removed much of this slag, and placed a layer of peat-like organic soil over the area. In 1993, test borings were made throughout the basin, revealing a highly-disturbed soil profile at this location with varying amounts of urban fill, slag, and peat at or near the surface. The basin is a seasonally-flooded,

wet meadow vegetated primarily with reed canary grass. The impacts on wetland Q would occur on its western boundary and result from the construction of a wet detention basin along the west edge of the wetland.

The portion of Basin Q that would be impacted possesses moderate wildlife habitat, floodwater storage, and aesthetic values, while having low values for ground water recharge and sediment removal.

Wisconsin Wetland Description

In Wisconsin, three small basins (R, S, and T) of one acre or less are located in the area between 20th and 23rd Streets (see Figure 10-5). These isolated basins are generally surrounded by undeveloped, residential, agricultural, or wooded land. Basin R is a deep marsh vegetated with bullrush and reed canary grass. Basin S is a shallow marsh dominated by cattail. Basin T is a wet meadow dominated by reed canary grass and smartweed. The Corps has indicated that these basins are isolated and are not under the Corps Section 404 jurisdiction.

These basins are characterized by high values for wildlife habitat and ground water recharge, and moderate sediment and nutrient removal capabilities. The three basins show moderate, high, and low aesthetic value, respectively. While Basin R has a high capability to retain floodwater, Basins S and T have only moderate value for such storage.

10.5.3 Environmental Consequences to Wetlands

10.5.3.1 Wetland Basin Impacts

The No-Build Alternative would result in no impacts on any of the identified wetland basins.

Wetland basin impacts that could result from the Build Alternatives (including direct impacts such as fill, and indirect impacts such as excavation or drainage) are summarized in Table 10-7 and are described in the section that follows:

Minnesota Wetlands

Basins A through N-1: Road configurations for all Build Alternatives are similar and potential wetland impacts are the same for each alternative. Under all Build Alternatives, reconstruction of TH 36 and associated frontage roads would avoid impacts on basins A, C, G, H, J, K, L, M, and N.

Impacts to Wetland B include reconfiguring the pond location and reconstruction of the basin as a stormwater pond. While this reconstruction preserves the main functions of the basin (water quality and flood control), under state regulations it would be considered an adverse impact for which mitigation would be required. The Corps has indicated that this basin is not regulated under the Section 404 program.

**TABLE 10-7
POTENTIAL WETLAND IMPACT SUMMARY**

Basin	Type (Cowardin) ⁽¹⁾	Type (Circ. 39) ⁽¹⁾	Total Wetland Area Acres	Proposed Impact Area (Approximate)				Impact Type / Comments
				B-1	C1 / C2	D	E	
A	PEMC	3	0.9	0.00	0.00	0.00	0.00	
B	PEMC	3	1.2	1.2	1.2	1.2	1.2	Replaced with a reconfigured pond
C	PEMD	1	0.1	0.00	0.00	0.00	0.00	
C-1	PUB	5	3.7	0.00	0.00	0.00	0.00	Possible Excavation
D	PFOIC	1	0.07	0.07	0.07	0.07	0.07	
E	PFOIC	1	0.03	0.03	0.03	0.03	0.03	
F	PFOIC	1	0.03	0.01	0.01	0.01	0.01	
G	PFOIE	7	0.15	0.00	0.00	0.00	0.00	
H	PFOIC	1	0.05	0.00	0.00	0.00	0.00	
I	PEMF	3	0.03	0.01	0.01	0.01	0.01	
J	PFOIC	1	0.07	0.00	0.00	0.00	0.00	
K	PFOIC	1	0.1	0.00	0.00	0.00	0.00	
L	PEMC	3	0.2	0.00	0.00	0.00	0.00	
M	PEMF	3	0.03	0.00	0.00	0.00	0.00	
N-1	PFOIC	1	0.1	0.00	0.00	0.00	0.00	
O-1A	PSSIB	6	0.56	0.2	0.3	0.4	0.4	
O-1B	PEMC	3	5.99	2.5	2.6	3.10	3.10	
O-1C	PEMC	3	0.1	0.1	0.1	0.1	0.1	
O-2	PFOI34F	7	2.7	0.6	0.8	1.1	1.1	
O-3	PSSIB	6	2.9	0.5	0.4	0.1	0.1	
P-1	PEMC	2	0.6	0.00	0.2	0.3	0.3	
P-2	PFOIEB	7	1.1	0.1	0.1	0.01	0.01	
Q	PEMA/PSSIA	1	23	0.9	1.0	1.1	1.1	Roadway and stormwater pond
Minnesota Subtotal:				6.22	6.82	7.53	7.53	
R	PEMC	3	1.48	0.05	0.05 / 0.2	0.05	0.05	
S	PEMC	3	0.32	0.1	0.1 / 0.6	0.1	0.1	
T	PEMC	3	0.80	0.0	0.0 / 0.0	0.0	0.0	
Wisconsin Subtotal:				0.15	0.15 / 0.8	0.15	0.15	
Total Wetland Impacts – MN and WI				6.37	6.97/7.62	7.68	7.68	

⁽¹⁾ Wetland types presented reflect the deepest-water habitat or type, in accordance with WCA regulations.

The stormwater treatment function of Basin C-1 may be improved by excavation of some of its bottom sediments. The effect of excavation on the Basin's other functions will be studied to determine whether excavation in this basin would be considered an adverse impact. This potential impact is the subject of on-going coordination with various agencies.

Based on preliminary construction limits, 100 percent of Basins D and E would be filled for the new frontage road alignment. Small portions of Basins F and I would be filled by the proposed alignment of the frontage road.

All of the Build Alternatives would impact Basin N-1. Any wetlands located in Basin N-1 are isolated and were incidentally created as a result of grading in 1999. Therefore, these impacts are not regulated under Section 404 nor are they subject to mitigation under the WCA. Impacts to Basin N-1 are not included on Table 10-7.

Basins O-1A, O-1B, O-1C, O-2, and O-3: These basins lie partially within the preliminary construction limits for the TH 95 alignment. The TH 95 roadway would be widened from two lanes to four lanes and would be raised to match the elevation of the intersection of the TH 36 ramps. Due to the presence of wetlands along both sides of TH 95 and the similar proposed roadway configurations for the Build Alternatives, potential impacts are similar for all Build Alternatives. Reconstruction of the roadway to accommodate the additional lanes and raised profile would require fill to be placed in these basins.

The alignment of the roadway near Basins O-1A and O-1B was shifted to the east as far as possible while maintaining access to properties east of TH 95 and avoiding impacts on Basin P-1 and power line towers located east of TH 95.

The existing alignment of TH 95 would be maintained near Basins O-2 and O-3, but because wetlands are present on both sides of the alignment, wetland impacts could not be avoided.

Basins P-1 and P-2: These basins would be partially affected by fill necessary for construction of the TH 95 interchange and access roads to commercial property along TH 95. All of the Build Alternatives have some impact to these basins but Alternative B-1 has the least impact in this area and does not impact Basin P-1.

Basin Q: This basin would be partially affected from the construction of a wet detention basin along the west edge of the wetland and construction of a road to provide access to the Xcel property located south of Basin Q. The area of proposed impact to Basin Q is similar for all Build Alternatives and ranges from approximately 0.9 to 1 acre.

Wisconsin Wetlands

Basins R and S: Because these wetlands are located on both sides of the existing alignment of STH 64, the roadway cannot be widened without affecting some wetlands. A portion of Basins R and S would be affected by the project regardless of the alignment implemented in Wisconsin. All of the Build Alternatives would result in the same area of impact to Wisconsin wetlands (0.16 acre) except the "Option 2" alignment of Alternative C which impacts approximately one half acre of additional wetland area.

Basin T: This basin would not be affected by any of the Alternatives.

Wetland Impact Summary

After employing the identified avoidance and minimization measures for the various alternatives (based on preliminary designs), it is expected that a total of 13 wetland basins in Minnesota and two wetlands in Wisconsin would be affected. Approximately six to eight acres of impact would result from the various Build Alternatives.

Comparing amongst alternatives, each Build Alternative would impact a similar area of wetland. Furthermore, impacts from the various Build Alternatives generally affect the same areas of the same basins. All alternatives avoid impacts to the high quality area of Wetland Q.

10.5.4 Mitigation of Impacts on Wetlands

Federal and state wetland regulations require the use of a sequenced approach when projects have potential impacts on wetlands. Sequencing requires avoiding impacts on wetlands first, and if impacts are not avoidable, they must be minimized to the greatest extent practicable. Finally, after all options for avoidance and minimization of impacts have been considered and implemented, mitigation that will replace lost wetland functions and values is required for those impacts that are not avoidable. Mitigation of wetland impacts is most commonly accomplished by restoring previously-altered wetlands or creating new wetlands (“new” wetland credits). In Minnesota, wetland mitigation “public value credit” can also be given for construction of stormwater treatment ponds and/or preservation of upland buffer areas.

10.5.4.1 Avoidance of Wetland Impacts

Specific road location designs used or considered for the various alternatives to avoid the wetlands in the project area were described in Chapter 3. Despite consideration of several design alternatives, construction of any of the Build Alternatives would affect approximately six to eight acres of wetland area. Complete avoidance of wetland impacts was not possible due to several factors, including the presence of wetlands on both sides of existing roads, roadway safety design standards, avoidance of other resources or physical barriers, and the need to provide roadway access points and realignments.

10.5.4.2 Minimization of Wetland Impacts

Minimization of wetland impacts was considered during the design of the various alternatives. The alignment of the roads, bridge and other activities were designed to avoid wetland impacts. Several measures were considered to minimize wetland impacts where avoidance could not be achieved. These design measures include designing road profiles as low as possible and designing inslopes beyond the required clear zone as steeply as practicable.

Measures would be taken to control impacts to the functions of the wetlands. Erosion prevention and sediment control systems would be provided in accordance with state and federal requirements. These measures include silt fences and traps, hay bales, and temporary ponding areas. Permanent ponding areas would be constructed as early in the project as practicable. Excess fill material would not be deposited in wetlands or other environmentally-sensitive areas.

Temporary disturbance of wetland areas during construction would be avoided where possible; however, some disturbance of wetlands may occur. A temporary construction staging area would be established to access the river during bridge construction. The location of a staging area has not yet been established for the various alternatives. Any wetland areas disturbed by construction activity would be reestablished as soon as practicable following grading or excavating activities. No construction debris would be permanently placed in wetlands. Any temporary construction impacts would be rectified through the use of vegetation replacement and landscaping. Based on the preliminary design available at the time of this report, all of the Build Alternatives would result in similar areas of temporary impact.

The existing hydrologic characteristics of basins experiencing partial impacts as a result of the project would be maintained through minimization techniques such as ensuring that drainage patterns between and through wetlands are maintained, and preventing wide fluctuations in existing water levels.

10.5.4.3 Mitigation Measures

A wetland compensation plan for replacement of the affected wetland areas would be developed for the project and would reassess the exact areas of wetland impacts (and mitigation) based on final design plans and the current and applicable wetland mitigation guidelines and regulations in effect at that time. The intent of the proposed wetland compensation plan would be to replace lost wetland functions and values in the project area.

For this Supplemental Draft EIS, potential mitigation locations and scenarios have been identified and developed to demonstrate the consideration and coordination being given to these necessary actions. The following mitigation plans and scenario have been developed during past project studies and based on the coordination and assistance of the U.S. Army Corps of Engineers, U.S. FWS and FHWA, and in Minnesota, the MnDNR, Washington County Soil and Water Conservation District, Brown's Creek Watershed District, the Middle St. Croix Watershed Management Organization and in Wisconsin, the WisDNR and Wis/DOT.

For Wisconsin wetland impacts, Wis/DOT has been coordinating the required wetland mitigation with the WisDNR in accordance with the Wis/DOT/WisDNR cooperative agreement. Wetland impacts and mitigation are also being coordinated with the Corps. In cases where the Corps requires wetland mitigation as a condition of their permit, WisDNR normally acts as the Corp's coordination agent, while the Corps is contacted for concurrence at key stages. Mitigation for wetland losses in Wisconsin related to the proposed action would follow this coordination procedure for permitting. If Wisconsin losses are compensated through a Wisconsin bank site, the Wis/DOT Wetland Mitigation Banking Technical Guideline will be followed for compensation ratios.

In Minnesota, current Wetland Conservation Act (WCA) regulations require mitigation of non-agricultural wetland impacts at a replacement ratio of 2:1 for filling non-public waters and wetlands, by creating new wetlands or creating other types of replacement land. Created or new wetlands should be used for the first 1:1 ratio, and Public Value Credit (PVC) areas may be used for the required replacement acreage in excess of the initial 1:1 ratio. Under the WCA,

acceptable PVC areas include permanent upland buffer and water quality treatment ponds. The 2:1 replacement ratio would require 12 to 16 acres of mitigation (half of which must be new wetlands) preferably within the St. Croix River Watershed, to mitigate impacts in Minnesota.

A completed mitigation site (see Figure 10-4), located approximately 0.25 mile south of TH 36 and east of Oakgreen Avenue, was constructed in 2000 as a separate project. The mitigation site was constructed for the sole purpose of mitigating the anticipated impacts from an alternative previously considered for this project (the previous project proposal was similar to Alternative C and was referred to as the “Consensus Alternative” in previous project studies and documents). The mitigation site is located adjacent to the MnDNR Wildlife Management Area and has created approximately seven acres of new wetland. This mitigation site has been monitored by Mn/DOT and approved as a successful for use by appropriate regulatory agencies and will account for the bulk of the project impacts. If required, additional new wetland areas could be developed in or near the project site. In addition, Mn/DOT has an established wetland mitigation banking site that could be used to mitigate project impacts if necessary. This site is located in William O’Brien State Park, approximately 10 miles north of the project site.

PVC credits would result from the stormwater detention basins proposed for the various alternatives. Approximately ten to 15 acres of PVC would result from the wet detention basins thus supplying the remainder of the required mitigation in the form of public value credits. The Corps generally does not give credit for water quality treatment areas that are required under NPDES/SDS however, the Corps mitigation requirements are likely to be less than WCA because many of the impacts would be to isolated, non-Corps jurisdictional wetlands.

Mitigation for wetland impacts in Wisconsin would be coordinated with the WisDNR. The impacts would probably be mitigated using a combination of on-site and bank-site mitigation, depending on the final alignment and practicality. Wisconsin mitigation would be coordinated in accordance with a Wis/DOT and WisDNR cooperative agreement.